



COMMONWEALTH DEPARTMENT OF  
**TRANSPORT AND REGIONAL  
DEVELOPMENT**

# Planning, Land Use and Social Impacts

Proposal for a Second Sydney Airport  
at Badgerys Creek or Holsworthy Military Area

# 2

**Technical Paper**

**PPK**  
Environment & Infrastructure

Infrastructure Library



C6101728432

387.736099441  
PPK

Prepared for:



COMMONWEALTH DEPARTMENT OF  
**TRANSPORT AND REGIONAL  
DEVELOPMENT**

GPO Box 594  
Canberra ACT 2601

# Planning, Land Use and Social Impacts

Proposal for a Second Sydney Airport  
at Badgerys Creek or Holsworthy Military Area

**Technical Paper**

Prepared by:

**PPK**  
Environment & Infrastructure

ACN 078 004 798

A NATA Certified Quality Company

PPK House

PO Box 248

Concord West NSW 2138

December 1997

Report No: 58H233B PR1123

ISBN No: 0642280266

## **Explanatory Statement**

This technical paper is not part of the Draft Environmental Impact Statement (EIS) referred to in paragraph 6 of the Administrative Procedures made under the Environment Protection (Impact of Proposals) Act 1974.

The Commonwealth Government is proposing to construct and operate a second major airport for Sydney at Badgerys Creek. This technical paper contains information relating to the Badgerys Creek airport options which was used to assist the preparation of the Draft EIS.

The technical paper also assesses the impacts of developing a major airport at the Holsworthy Military Area. On 3 September 1997, the Government eliminated the Holsworthy Military Area as a potential site for Sydney's second major airport. As a consequence, information in this technical paper relating to the Holsworthy Military Area is presented for information purposes only.

## **Limitations Statement**

This technical paper has been prepared in accordance with the scope of work set out in the contract between Rust PPK Pty Ltd and the Commonwealth Department of Transport and Regional Development (DoTRD) and completed by PPK Environment and Infrastructure Pty Ltd (PPK). In preparing this technical paper, PPK has relied upon data, surveys, analyses, designs, plans and other information provided by DoTRD and other individuals and organisations, most of which are referenced in this technical paper. Except as otherwise stated in this technical paper, PPK has not verified the accuracy or completeness of such data, surveys, analyses, designs, plans and other information.

This technical paper has been prepared for the exclusive use of DoTRD. PPK will not be liable to any party other than DoTRD and assumes no responsibility for any loss or damage suffered by any other party arising from matters dealt with in this technical paper, including, without limitation, matters arising from any negligent act or omission of PPK or for any loss or damage suffered by any other party in reliance upon the matters dealt with and opinions and conclusions expressed in this technical paper.

## **Acknowledgments**

Data used to develop the figures contained in this document have been obtained and reproduced by permission of the Australian Bureau of Statistics, NSW Department of Land and Water Conservation, NSW National Parks and Wildlife Service (issued 14 January 1997), NSW Department of Urban Affairs and Planning and Sydney Water. The document is predominantly based on 1996 and 1997 data.

To ensure clarity on some of the figures, names of some suburbs have been deleted from inner western, eastern, south-eastern and north-eastern areas of Sydney. On other figures, only 'Primary' and 'Secondary' centres identified by the Department of Urban Affairs and Planning's Metropolitan Strategy, in addition to Camden, Fairfield and Sutherland, have been shown.

## Copyright

© Commonwealth of Australia 1997

This work is copyright. Apart from any use as permitted under the Copyright Act 1968, no part may be reproduced by any process without written permission from the Australian Government Publishing Service. Requests and inquiries concerning reproduction and rights should be directed to the Manager, Commonwealth Information Service, GPO Box 84, Canberra, ACT 2601.



# CONTENTS

	Page Number
PART A: INTRODUCTION	
CHAPTER 1 OVERVIEW OF THE PROPOSAL	1 - 1
1.1 INTRODUCTION	1 - 1
1.2 A BRIEF HISTORY	1 - 1
1.3 THE PROPOSAL	1 - 3
1.4 AIR TRAFFIC FORECASTS	1 - 5
1.5 OPERATION OF THE AIRPORT OPTIONS	1 - 6
CHAPTER 2 CONSULTATION	2 - 1
2.1 COMMUNITY CONSULTATION	2 - 1
2.2 OTHER CONSULTATION	2 - 1
CHAPTER 3 METHODOLOGY	3 - 1
3.1 AIMS	3 - 1
3.1.1 PLANNING AND LAND USE	3 - 1
3.1.2 SOCIAL IMPACTS	3 - 1
3.2 SCOPE OF WORK AND METHODOLOGY	3 - 2
3.2.1 RESIDENTIAL	3 - 3
3.2.2 EMPLOYMENT LAND	3 - 7
3.2.3 SOCIAL IMPACTS	3 - 8
3.3 INFORMATION SOURCES	3 - 9
3.3.1 OVERVIEW	3 - 9
3.3.2 REVIEW OF PREVIOUS WORK	3 - 10
3.4 ASSESSMENT SCENARIOS	3 - 11
3.5 INTERACTION WITH OTHER STUDIES	3 - 12

## PART B: EXISTING ENVIRONMENT

CHAPTER 4	EXISTING PLANNING	4 - 1
4.1	HISTORICAL PLANNING CONTEXT	4 - 1
4.1.1	METROPOLITAN PLANNING	4 - 1
4.1.2	REGIONAL PLANNING	4 - 2
4.1.3	CHARACTERISTICS OF SYDNEY'S GROWTH	4 - 3
4.2	EXISTING PLANNING	4 - 5
4.2.1	METROPOLITAN PLANNING	4 - 5
4.2.2	SECTION 117 DIRECTIONS	4 - 8
4.2.3	STATE ENVIRONMENTAL PLANNING POLICIES	4 - 11
4.2.4	SYDNEY REGIONAL ENVIRONMENTAL PLANS	4 - 12
4.2.5	REGIONAL COOPERATION	4 - 14
4.2.6	LOCAL PLANNING	4 - 16
4.3	IMPLEMENTATION	4 - 19
4.3.1	WHOLE OF GOVERNMENT APPROACH	4 - 19
4.3.2	URBAN DEVELOPMENT PROGRAM	4 - 20
4.3.3	LOCAL GOVERNMENT RESIDENTIAL PLANNING INITIATIVES	4 - 21
CHAPTER 5	EXISTING LAND USES	5 - 1
5.1	OVERVIEW	5 - 1
5.2	REGIONAL LAND USES	5 - 1
5.2.1	RESIDENTIAL	5 - 1
5.2.2	COMMERCIAL AND INDUSTRIAL	5 - 2
5.2.3	RURAL	5 - 3
5.2.4	OPEN SPACE AND RECREATION	5 - 4
5.2.5	ENVIRONMENT PROTECTION	5 - 6
5.2.6	SPECIAL USES	5 - 6
5.3	NOISE SENSITIVE LAND USES	5 - 8
5.4	LAND USES ON AIRPORT SITES	5 - 9
5.4.1	BADGERYS CREEK	5 - 9
5.4.2	HOLSWORTHY MILITARY AREA	5 - 10
5.5	LAND OWNERSHIP	5 - 12
5.5.1	BADGERYS CREEK	5 - 12
5.5.2	HOLSWORTHY	5 - 13
5.6	SUMMARY OF LAND USES	5 - 13

CHAPTER 6	EMPLOYMENT	6 - 1
6.1	EXISTING EMPLOYMENT	6 - 1
6.2	EXISTING EMPLOYMENT LAND	6 - 2
6.3	EMPLOYMENT LANDS DEVELOPMENT PROGRAM	6 - 5
6.4	EXISTING SUPPLY AND DEMAND FOR EMPLOYMENT LAND	6 - 6
6.4.1	SUPPLY	6 - 6
6.4.2	DEMAND	6 - 7
6.5	FACTORS AFFECTING DEMAND FOR EMPLOYMENT LAND	6 - 8
CHAPTER 7	EXISTING SERVICES AND INFRASTRUCTURE	7 - 1
7.1	BADGERYS CREEK	7 - 1
7.1.1	TRANSPORT	7 - 1
7.1.2	WATER	7 - 2
7.1.3	WASTEWATER	7 - 2
7.1.4	ELECTRICITY	7 - 2
7.1.5	TELECOMMUNICATIONS	7 - 2
7.1.6	NATURAL GAS	7 - 3
7.2	HOLSWORTHY	7 - 3
7.2.1	TRANSPORT	7 - 3
7.2.2	WATER	7 - 4
7.2.3	WASTEWATER	7 - 4
7.2.4	ELECTRICITY	7 - 4
7.2.5	TELECOMMUNICATIONS	7 - 5
7.2.6	NATURAL GAS	7 - 5
CHAPTER 8	EXISTING SOCIAL CHARACTERISTICS	8 - 1
8.1	AREA OF IMPACT	8 - 1
8.2	REGIONAL SOCIAL CHARACTERISTICS	8 - 1
8.2.1	POPULATION AND AGE STRUCTURE	8 - 2
8.2.2	LABOUR FORCE STATUS	8 - 4
8.2.3	ETHNICITY	8 - 6
8.2.4	EDUCATION	8 - 7
8.2.5	HOUSEHOLD COMPOSITION AND STATUS	8 - 8
8.2.6	JOURNEY TO WORK	8 - 9
8.2.7	REGIONAL CHARACTER	8 - 10
8.3	SUMMARY OF SOCIAL CHARACTERISTICS	8 - 11

## PART C: ASSESSMENT OF IMPACTS

CHAPTER 9	IMPACTS OF BADGERYS CREEK AIRPORT OPTIONS	9 - 1
9.1	IMPACTS ON PLANNING	9 - 1
9.1.1	METROPOLITAN PLANNING	9 - 1
9.1.2	REGIONAL PLANNING	9 - 4
9.1.3	BADGERYS CREEK AIRPORT OPTIONS FUTURE LAND USE SCENARIOS	9 - 6
9.1.4	LOCAL PLANNING	9 - 11
9.2	IMPACTS ON LAND USES AND OWNERSHIP	9 - 13
9.2.1	LAND USE	9 - 13
9.2.2	LAND OWNERSHIP AND ACQUISITION	9 - 16
9.3	IMPACTS ON EMPLOYMENT	9 - 19
9.3.1	DEFINITIONS OF AIRPORT AND NON-AIRPORT RELATED DEVELOPMENT	9 - 19
9.3.2	EMPLOYMENT FORECASTS	9 - 23
9.3.3	EMPLOYMENT LAND REQUIREMENTS FOR THE SECOND SYDNEY AIRPORT PROPOSAL	9 - 26
9.3.4	LOCATION OF EMPLOYMENT LAND	9 - 28
CHAPTER 10	IMPACTS OF HOLSWORTHY AIRPORT OPTIONS	10 - 1
10.1	IMPACTS ON PLANNING	10 - 1
10.1.1	METROPOLITAN PLANNING	10 - 1
10.1.2	REGIONAL PLANNING	10 - 2
10.1.3	HOLSWORTHY AIRPORT OPTIONS FUTURE LAND USE SCENARIOS	10 - 4
10.1.4	LOCAL PLANNING	10 - 7
10.2	IMPACTS ON LAND USES AND OWNERSHIP	10 - 8
10.2.1	LAND USE	10 - 8
10.2.2	OWNERSHIP AND ACQUISITION	10 - 10
10.3	IMPACTS ON EMPLOYMENT	10 - 11
CHAPTER 11	OFF AIRPORT SITE INFRASTRUCTURE REQUIREMENTS	11 - 1
11.1	BADGERYS CREEK OPTIONS	11 - 1
11.1.1	ROAD ACCESS	11 - 1
11.1.2	RAIL ACCESS	11 - 2

11.1.3 WATER	11 - 3
11.1.4 WASTEWATER	11 - 3
11.1.5 ELECTRICITY	11 - 4
11.1.6 TELECOMMUNICATIONS	11 - 5
11.1.7 AVIATION FUEL	11 - 5
11.1.8 NATURAL GAS	11 - 6
11.2 HOLSWORTHY OPTIONS	11 - 6
11.2.1 ROAD ACCESS	11 - 7
11.2.2 RAIL ACCESS	11 - 7
11.2.3 WATER	11 - 8
11.2.4 WASTEWATER	11 - 8
11.2.5 ELECTRICITY	11 - 9
11.2.6 TELECOMMUNICATIONS	11 - 10
11.2.7 AVIATION FUEL	11 - 10
11.2.8 NATURAL GAS	11 - 11
11.3 OVERVIEW OF ENVIRONMENTAL ISSUES AND MANAGEMENT	11 - 11
11.4 ENVIRONMENTAL ISSUES - BADGERYS CREEK OPTIONS	11 - 12
11.4.1 ROAD ACCESS	11 - 12
11.4.2 RAIL ACCESS	11 - 16
11.4.3 WATER	11 - 17
11.4.4 WASTEWATER	11 - 17
11.4.5 ELECTRICITY	11 - 17
11.4.6 TELECOMMUNICATIONS	11 - 18
11.4.7 AVIATION FUEL	11 - 18
11.4.8 NATURAL GAS	11 - 18
11.5 ENVIRONMENTAL ISSUES - HOLSWORTHY OPTIONS	11 - 18
11.5.1 ROAD AND RAIL ACCESS	11 - 19
11.5.2 WATER	11 - 20
11.5.3 WASTEWATER	11 - 21
11.5.4 ELECTRICITY	11 - 21
11.5.5 TELECOMMUNICATIONS	11 - 22
11.5.6 AVIATION FUEL	11 - 22
11.5.7 NATURAL GAS	11 - 22
11.6 SUMMARY OF POTENTIAL ENVIRONMENTAL ISSUES OF PROPOSED OFF AIRPORT SITE INFRASTRUCTURE	11 - 22
CHAPTER 12 SOCIAL IMPACTS	12 - 1
12.1 INTRODUCTION	12 - 1
12.1.1 DEFINITION OF SOCIAL IMPACT	12 - 1
12.2 POTENTIAL NATURE OF SOCIAL IMPACTS	12 - 3
12.2.1 EFFECTS ON COMMUNITIES	12 - 3
12.2.2 EFFECTS ON INDIVIDUALS	12 - 4

12.3	IMPACTS OF BADGERYS CREEK OPTIONS	12 - 4
12.3.1	CONSTRUCTION IMPACTS	12 - 4
12.3.2	OPERATIONAL IMPACTS	12 - 5
12.4	IMPACTS OF HOLSWORTHY OPTIONS	12 - 14
12.4.1	CONSTRUCTION IMPACTS	12 - 14
12.4.2	OPERATIONAL IMPACTS	12 - 15
12.5	ENVIRONMENTAL MANAGEMENT	12 - 27
12.6	SUMMARY OF POTENTIAL SOCIAL IMPACTS	12 - 29
PART D:	ENVIRONMENTAL MANAGEMENT	
CHAPTER 13	ENVIRONMENTAL MANAGEMENT	13 - 1
13.1	ENVIRONMENTAL MANAGEMENT STRATEGY	13 - 1
13.2	MONITORING	13 - 3
PART E:	OVERVIEW AND COMPARISON OF AIRPORT OPTIONS	
CHAPTER 14	OVERVIEW OF POTENTIAL PLANNING, LAND USE AND SOCIAL IMPACTS	14 - 1
14.1	PLANNING	14 - 1
14.2	RESIDENTIAL	14 - 2
14.3	EMPLOYMENT	14 - 4
14.4	SPECIAL AND NOISE SENSITIVE USES	14 - 5
14.5	OPEN SPACE AND ENVIRONMENT PROTECTION	14 - 6
REFERENCES		R - 1

## LIST OF FIGURES

		Following Page No.
Figure 1.1	Potential Airport Sites Currently Being Considered in the Draft EIS	1-3
Figure 1.2	Summary of Passenger Movement Forecasts Used for Environmental Assessment	1-3
Figure 1.3	Predominant Directions of Movement of Aircraft for Airport Operation 1	1-7
Figure 1.4	Predominant Directions of Movement of Aircraft for Airport Operation 2	1-7
Figure 3.1	Planning Assessment Region	3-2

Figure 3.2	Community Assessment Areas	3-4
Figure 3.3	Employment Land Catchment Areas	3-7
Figure 4.1	South Creek Valley Draft Regional Environmental Plan	4-3
Figure 4.2	Metropolitan Planning Strategy	4-6
Figure 4.3	Integrated Transport Strategy	4-8
Figure 4.4	Draft Strategic Road Network Strategy	4-8
Figure 4.5	Draft Planning Strategies for Sydney West Airport Sub-Region	4-16
Figure 4.6	Zoning In and Around Badgerys Creek Airport Options	4-18
Figure 4.7a	Zoning In and Around Holsworthy Airport Option A	4-19
Figure 4.7b	Zoning In and Around Holsworthy Airport Option B	4-19
Figure 4.8	Urban Development Program Release Areas	4-20
Figure 5.1	Regional Land Uses	5-1
Figure 5.2	Land Uses Within Badgerys Creek Airport Sites	5-9
Figure 5.3	Land Uses: Holsworthy Military Area	5-10
Figure 5.4	Badgerys Creek Land Ownership	5-12
Figure 6.1	Existing Employment Lands	6-7
Figure 7.1	Existing Services and Infrastructure Around Badgerys Creek Airport Sites	7-1
Figure 7.2	Existing Services and Infrastructure Around Holsworthy Military Area	7-3
Figure 9.1	Future Urban Land Use Assumptions to 2016 for Badgerys Creek Options A and B	9-8
Figure 9.2	Future Urban Land Use Assumptions to 2016 for Badgerys Creek Option C	9-10
Figure 9.3	Regional Open Space in the Vicinity of Badgerys Creek	9-15
Figure 10.1	Future Urban Land Use Assumptions to 2016 for Holsworthy Option A	10-4
Figure 10.2	Future Urban Land Use Assumptions to 2016 for Holsworthy Option B	10-6
Figure 10.3	Regional Open Space in the Vicinity of Holsworthy Military Area	10-10
Figure 11.1	Potential Road and Rail Access to Badgerys Creek Airport Sites	11-1
Figure 11.2	Required Off Airport Site Infrastructure for Badgerys Creek Options	11-3
Figure 11.3	Road and Rail Access Alternatives to Holsworthy Options	11-7
Figure 11.4	Proposed Road Improvements for Holsworthy Option A Alternative Access Scenarios (A1, A2, A3, A4)	11-7
Figure 11.5	Proposed Road Improvements for Holsworthy Option B Alternative Access Scenarios (B5 and B6)	11-7
Figure 11.6	Required Off Airport Site Infrastructure for Holsworthy Options	11-8

## APPENDICES

Appendix A	QASCO Photogrammetry Methodology
Appendix B	Regional Open Space and Recreational Facilities
Appendix C	Badgerys Creek: Properties within Proposed Airport Options B and C
Appendix D	Demographic Profile Tables

# Part A

Introduction



# CHAPTER 1 OVERVIEW OF THE PROPOSAL

## 1.1 INTRODUCTION

*This technical paper addresses the potential planning, land use and social impacts identified as part of the previously proposed development of the Second Sydney Airport at either Badgerys Creek or the Holsworthy Military Area. It also addresses the potential impacts of off airport site infrastructure requirements. It contains information used to prepare the Draft Environmental Impact Statement (EIS) which addresses the overall environmental impacts of the Badgerys Creek airport options.*

## 1.2 A BRIEF HISTORY

The question of where, when and how a second major airport may be developed for Sydney has been the subject of investigation for more than 50 years. The investigations and the associated decisions are closely related to the history of the development of Sydney's existing major airport, located at Mascot.

The site of Sydney Airport was first used for aviation in 1919. It was acquired by the Commonwealth Government in 1921, and was declared an International Aerodrome in 1935. In 1940 the first terminal building and control tower were opened.

In 1945 the airport had three relatively short runways. A major expansion began in 1947, and by 1954 the current east-west runway was opened. The north-south runway was first opened in 1954 and was extended to its current length in 1972. The present international terminal was opened in 1970.

Planning and investigations for a site for a second Sydney airport first started in 1946. A large number of possible sites both within and outside the Sydney Basin have been investigated.

The *Second Sydney Airport Site Selection Program Draft Environmental Impact Statement* (Kinhill Stearns, 1985) re-examined all possible locations for the second airport and chose 10 for preliminary evaluation. Two sites, Badgerys Creek and Wilton, were examined in detail and an EIS was prepared. In February 1986 the then Commonwealth Government announced that Badgerys Creek had been selected as the site for Sydney's second major airport.

The Badgerys Creek site, which is about 46 kilometres west of Sydney's Central Business District and is 1,700 hectares in area, was acquired by the Commonwealth between 1986 and 1991. A total of \$155 million has been spent on property acquisition and preparatory works.

Since 1986, planning for Sydney's second airport has been closely linked to the development of the third runway at Sydney Airport. In 1989 the Government announced its intention to construct a third runway. An EIS was undertaken and the decision to construct the runway was made in December 1991.

At the same time as investigations were being carried out on the third runway, detailed planning proceeded for the staged development of the second airport at Badgerys Creek. In 1991 it was announced that initial development at Badgerys Creek would be as a general aviation airport with an 1,800 metre runway.

The third runway at Sydney Airport was opened in November 1994. In March 1995, in response to public concern over the high levels of aircraft noise, the Commonwealth Senate established a committee in March 1995 to examine the problems of noise generated by aircraft using Sydney Airport and explore possible solutions. The committee's report, *Falling on Deaf Ears?*, containing several recommendations, was tabled in parliament in November 1995 (Senate Select Committee on Aircraft Noise, 1995).

During 1994 and 1995 the Government announced details of its proposed development of Badgerys Creek, and of funding commitments designed to ensure the new airport would be operational in time for the 2000 Olympics. This development included a 2,900 metre runway for use by major aircraft.

The decision to accelerate the development of the new airport triggered the environmental assessment procedures in the *Environment Protection (Impact of Proposals) Act 1974*. In January 1996 it was announced that an EIS would be prepared for the construction and operation of the new airport.

In May 1996, the present Commonwealth Government decided to broaden the environmental assessment process. It put forward a new proposal involving the consideration of 'the construction and operation of a second major international/domestic airport for Sydney at either Badgerys Creek or Holsworthy on a site large enough for future expansion of the airport if required' (Department of Transport and Regional Development, 1996). A major airport was defined as one 'capable of handling up to about 360,000 aircraft movements and 30 million passengers per year' (Department of Transport and Regional Development, 1996).

The Government also indicated that 'Badgerys Creek at this time remains the preferred site for Sydney's second major airport, subject to the favourable outcome of the EIS, while Holsworthy is an option to be considered as an alternative' (Minister for Transport and Regional Development, 1996). The two sites considered in this technical paper are shown in *Figure 1.1*.

Following the substantial completion of a Draft EIS on the Badgerys Creek and Holsworthy airport options, the Government eliminated the Holsworthy Military Area as a potential site for Sydney's second major airport. The environmental assessment showed that the Badgerys Creek site was significantly superior to the Holsworthy Military Area. As a result a Draft EIS was prepared which examines only the Badgerys Creek site. While this technical paper examines both the Badgerys Creek and Holsworthy airport options, only the parts of the assessment relating to the Badgerys Creek airport options were used to assist the preparation of the Draft EIS.

### 1.3 THE PROPOSAL

The Commonwealth Government proposes the development of a second airport for Sydney capable of handling up to 30 million domestic and international passengers a year. By comparison, Sydney Airport will handle about 20 million passengers in 1997. The *Second Sydney Airport Site Selection Program Draft Environmental Impact Statement* anticipated Sydney's second airport would accommodate about 13 million passengers each year (Kinhill Stearns, 1985).

In the Government's view, Sydney needs a second major airport to handle the growing demand for air travel and to control the level of noise experienced by Sydney residents (Coalition of Liberal and National Parties, 1996).

Government policy (Coalition of Liberal and National Parties, 1996) indicates:

- an intention that Sydney's second airport will be more than just an overflow airport and will, in time, play a major role in serving Sydney's air transport needs; and
- a goal of reducing the noise and pollution generated by Sydney Airport as much as possible and that the Government would take steps to ensure that the noise burden around Sydney Airport is shared in a safe and equitable way.

Certain assumptions are made on how the Second Sydney Airport would operate, and in the master plans which set out the broad framework for future physical development of the airport. These assumptions are based on an operational limit of 30 million passengers a year. The main features include

parallel runways, a cross wind runway and the provision of the majority of facilities between the parallel runways.

Consideration has also been given to how the airport might be expanded in the future and the subsequent environmental implications. Such an expansion could not proceed, however, unless a further detailed environmental assessment and decision making process were undertaken by the Government.

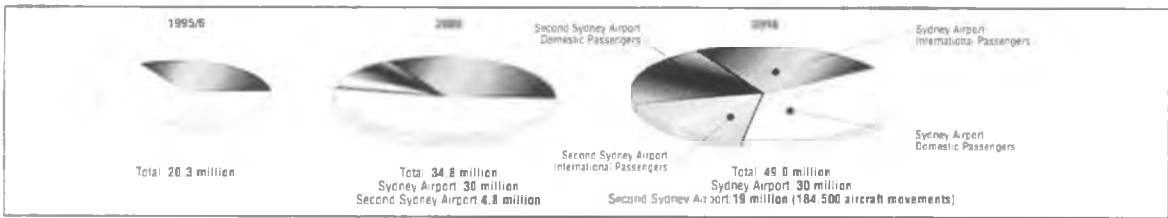
Five airport options are considered in this Technical Paper, as well as the implications of not proceeding with the proposal. Three of the airport options are located at Badgerys Creek and two are located within the Holsworthy Military Area. The environmental assessment of all five airport options assisted the Government in making its decision to eliminate the Holsworthy Military Area from further consideration. The environmental assessment of the Badgerys Creek airport options was also used to assist in the preparation of the Draft EIS which examines only those three options. Generally, the airport options are:

- Badgerys Creek Option A develops the site in a form generally consistent with the planning undertaken since 1986. The airport would be developed within land presently owned by the Commonwealth with two parallel runways constructed on an approximate north-east to south-west alignment;
- Badgerys Creek Option B would adopt an identical runway alignment to Option A, but provides an expanded land area and also a cross wind runway;
- Badgerys Creek Option C would provide two main parallel runways on an approximate north to south alignment in addition to a cross wind runway. Again the land area required would be significantly expanded from that which is presently owned by the Commonwealth;
- Holsworthy Option A would be located centrally within the Holsworthy Military Area and would have two main parallel runways on an approximate north to south alignment and a cross wind runway; and
- Holsworthy Option B would be located in the south of the Holsworthy Military Area and would have two main parallel runways on an approximate south-east to north-west alignment and a cross wind runway.

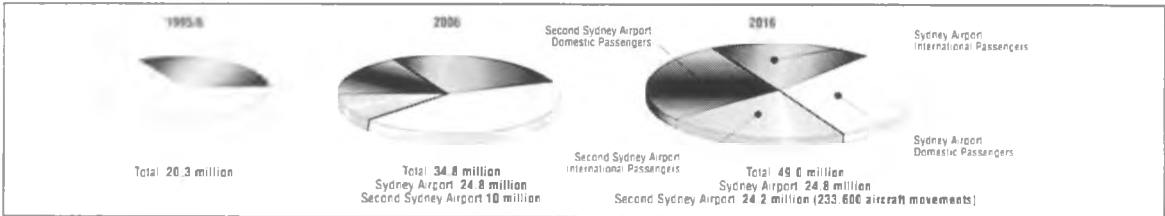
To ensure that the likely range of impacts are identified, a number of assumptions have been made about how the different airport options would be developed and operate. These relate to the number and types of aircraft



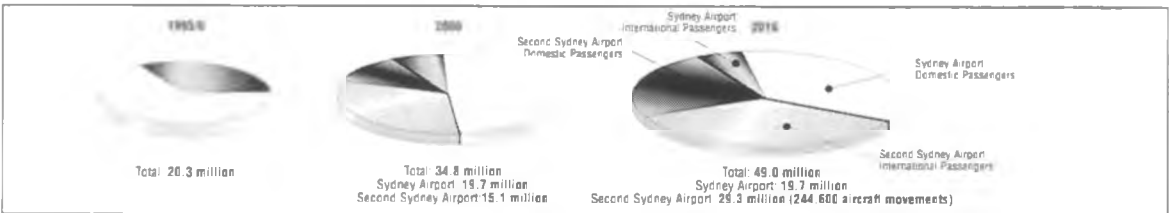
Figure 1.1  
**Potential Airport Sites Considered in the Draft EIS**



**Assumptions about Passenger Movements for Air Traffic Forecast 1**



**Assumptions about Passenger Movements for Air Traffic Forecast 2**



**Assumptions about Passenger Movements for Air Traffic Forecast 3**

Figure 1.2  
**Summary of Passenger Movement Forecasts Used for Environmental Assessment**

that may operate from the airport, the flight paths used and the direction of take offs and landings.

It is clear that the number of flights into and out of the proposed airport would depend partly on the types of aircraft using it and the associated numbers of passengers in each aircraft. The proposal put forward by the Government anticipates a major airport handling 30 million passengers and up to 360,000 aircraft movements per year.

Air traffic forecasts have been developed based on an examination of the number and type of aircraft liable to be using the airport as it approaches the proposed operating level of 30 million passengers per year. This examination has shown that if the airport accommodated about 245,000 aircraft movements each year, the number of air passengers would approach 30 million. This assumes a relatively high percentage of international flights being directed to the Second Sydney Airport. Therefore it is appropriate for this environmental assessment to examine the airport operating at a level of 245,000 aircraft movements per year, rather than the 360,000 originally anticipated by the Government. It has been assumed that this level of operation could be reached by about 2016.

## 1.4 AIR TRAFFIC FORECASTS

Cities around the world which have developed second major airports have responded to their particular needs in different ways. For example, the original airport in Dallas, United States, is now used for short range traffic that does not connect with other flights. Second airports in New York and Washington serve as hubs for particular airlines. In Taipei, Taiwan, smaller domestic aircraft use the downtown airport and larger international flights use a newer airport 40 kilometres from the city.

It is clear that each metropolitan area around the world has unique characteristics and the development of multi-airport systems respond to particular local circumstances. The precise role and consequential staging of development of the Second Sydney Airport would be the subject of future Government decisions. To assist in developing a realistic assessment of the potential impacts of the Second Sydney Airport, three sets of air traffic forecasts for the airport were developed. Each forecast assumes a major airport would be developed, however, this may be achieved at different rates of growth.

The three potential air traffic scenarios considered for the Second Sydney Airport are shown in *Figure 1.2*. They are:

- *Air Traffic Forecast 1* where the Second Sydney Airport would provide only for demand which cannot be met by Sydney Airport. This is an

overflow forecast, but would nevertheless result in a significant amount of air traffic at the Second Sydney Airport. The proportion of international and domestic air traffic is assumed to be similar at both airports;

- *Air Traffic Forecast 2* where the Second Sydney Airport would be developed to cater for 10 million passengers a year by 2006, with all further growth after this being directed to the second airport rather than Sydney Airport. The proportion of international and domestic traffic is also assumed to be similar at both airports; and
- *Air Traffic Forecast 3* which is similar to Forecast 2 but with more international flights being directed to the Second Sydney Airport. This would result in the larger and comparatively noisier aircraft being directed to the second airport. It would accommodate about 29.3 million passengers by 2016.

## 1.5 OPERATION OF THE AIRPORT OPTIONS

At any airport, aircraft operations are allocated to runways (which implies both the physical runway and the direction in which it is used) according to a combination of wind conditions and airport operating policy. The allocation is normally performed by Air Traffic Control personnel.

Standard airport operating procedures indicate that a runway may not be selected for either approach or departure if the wind has a downwind component greater than five knots, or a cross wind component greater than 25 knots. If the runway is wet, it would not normally be selected if there is any downwind component. This applies to all aircraft types, although larger aircraft would be capable of tolerating relatively higher wind speeds. Wind conditions at the airport site therefore limit the times when particular runways may be selected. However, there would be a substantial proportion of the time, under low wind conditions, when the choice of runways would be determined by airport operating policy.

For the environmental assessment, the maximum and minimum likely usage for each runway and runway direction was estimated and the noise impact of each case calculated. The actual impact would then lie between these values and would depend on the operating policy which is applicable at the time.

The three airport operation scenarios were adopted for the environmental assessment, namely:

- *Airport Operation 1* shown in *Figure 1.3*. Aircraft movements would occur on the parallel runways in one specified direction (arbitrarily

chosen to be the direction closest to north), unless this is not possible due to meteorological conditions. That is, take offs would occur to the north from the parallel runways and aircraft landing would approach from the south, travelling in a northerly direction. Second priority is given to operations in the other direction on the parallel runways, with operations on the cross wind runway occurring only when required because of meteorological conditions;

- *Airport Operation 2* shown in *Figure 1.4*. As for Operation 1, but with the preferred direction of movements on the parallel runways reversed, that is to the south; and
- *Airport Operation 3*. Deliberate implementation of a *noise sharing* policy under which seven percent of movements are directed to occur on the cross wind runway (equal numbers in each direction) with the remainder distributed equally between the two parallel runway directions.

Since a cross wind runway is not proposed at Badgerys Creek Option A, only Operations 1 and 2 were considered for that option.



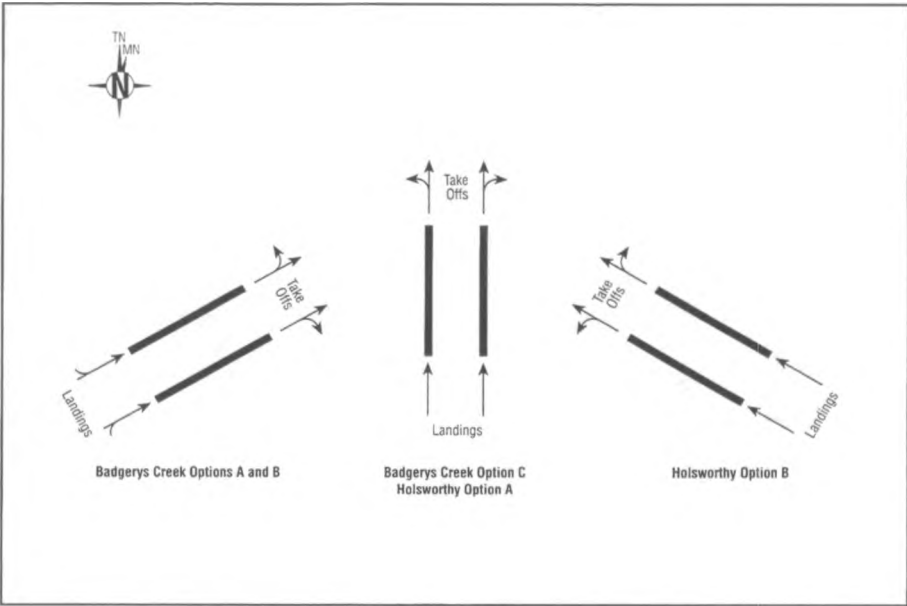


Figure 1.3  
**Predominant Directions of Movement of Aircraft for Airport Operation 1**  
 Note: Cross wind runway used only when required because of meteorological conditions

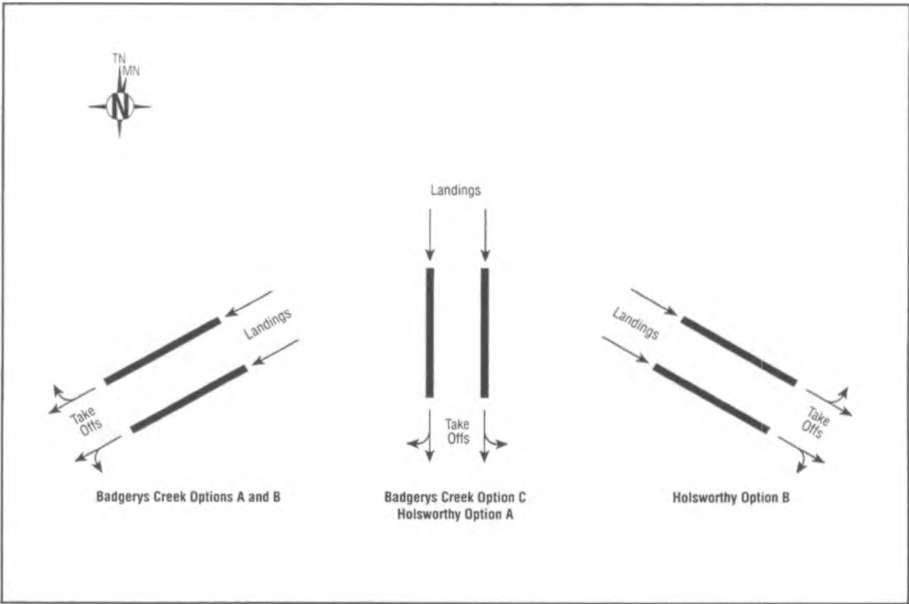


Figure 1.4  
**Predominant Directions of Movement of Aircraft for Airport Operation 2**  
 Note: Cross wind runway used only when required because of meteorological conditions

## CHAPTER 2 CONSULTATION

Preparation of this Draft EIS involved consultation with the community, other stakeholders, Commonwealth, State and local Governments and Government agencies.

### 2.1 COMMUNITY CONSULTATION

The primary role of the consultation process during the preparation of the Draft EIS was to provide accurate, up to date information on the proposals being considered and the assessment process being undertaken. From October 1996 to May 1997, ten separate information documents were released and over 400,000 copies distributed to the community. Four types of display posters were produced and 700 copies distributed. Over 140 advertisements were placed in metropolitan and local newspapers. Non English language documents were produced in 14 languages and over 20,000 copies distributed. Advertisements in seven languages were placed on ethnic radio.

Opportunities for direct contact and two way exchange of information with the community occurred through meetings, information days, displays at shopping centres, telephone conversations and by responding to written submissions. Through these activities over 20,000 members of the community directly participated in the consultation activities.

Written and telephone submissions received were incorporated into a database which grouped the issues in the same way as the chapters of the Draft EIS. The issues raised were progressively provided to the EIS study team to ensure that community input was an integral part of the assessment process.

Further details of consultation with the community and other stakeholders and its outcomes are contained in *Technical Paper No. 1 Consultation*.

### 2.2 OTHER CONSULTATION

Regular consultation was undertaken with a variety of State Government departments and local councils during the preparation of the Draft EIS. In addition, feedback on planning issues was obtained through the wider community consultation program.

Consultation with the State Government took place through direct contact with agencies and through a Commonwealth/State Liaison Committee which was

a regular forum for communication between PPK, Commonwealth Government and State Government.

State Government departments provided access to a wide range of documents and data and regularly provided clarification and feedback on land use planning issues.

All 15 local government areas identified as being potentially directly impacted by the Second Sydney Airport were contacted formally by letter to:

- obtain up to date information on local planning and relevant strategic planning studies;
- establish regular consultation with a nominated staff member; and
- keep staff and elected representatives informed of the EIS progress.

The consultation program with Councils included the following:

- presentation to various council planning fora including regular meetings of the strategic planners associated with the Western Sydney Regional Organisation of Councils and the Macarthur Regional Organisation of Councils;
- discussion with council planners in the sub-region on the details specific to their local government area;
- briefings to elected representatives at council meetings; and
- a Regional Planning Workshop with key State and local Government planning representatives to present the analysis and gain feedback on each of the regional land use scenarios associated with the airport options.

## CHAPTER 3 METHODOLOGY

### 3.1 AIMS

The aims of this Technical Paper are divided into planning and land use (incorporating the employment and residential assessments) and social impact assessment.

#### 3.1.1 PLANNING AND LAND USE

The aims of the planning and land use analysis are to:

- review the opportunities and constraints associated with the planning and land use framework of the Second Sydney Airport Assessment Region;
- establish future regional land use scenarios for each proposed airport option with particular emphasis on residential and employment lands;
- develop assumptions about future populations to assist in defining the extent of potential environmental impacts of the airport options in future years; and
- determine the strategic, regional and local planning and land use impacts of the airport options and the associated future land use scenarios.

#### 3.1.2 SOCIAL IMPACTS

The aim of the social impact assessment is to consider the existing and projected social characteristics of the populations potentially affected by the Second Sydney Airport options and assess how these communities are likely to be affected by the proposal both during construction and operation of the airport. This is undertaken by examining the potential impacts arising from:

- the potential change in composition and distribution of population within each local government area resulting from the development of an airport;
- impacts on special groups or individuals;
- changes to accessibility within and beyond the defined areas of impact;

- community severance or instability; and
- changes to amenity of impacted areas.

3.2 SCOPE OF WORK AND METHODOLOGY

The scope of work for the preparation of this Technical Paper has been developed based on definitions of regions, community assessment areas and catchments which may be impacted by the Second Sydney Airport proposal.

Fifteen local government areas which would most directly be affected by the Second Sydney Airport have been chosen as a basis for the land use and social impact assessment. They are shown on *Figure 3.1* and listed in *Table 3.1*.

TABLE 3.1 SECOND SYDNEY AIRPORT ASSESSMENT REGION

▪ Auburn	▪ Hurstville
▪ Bankstown	▪ Liverpool
▪ Blacktown	▪ Parramatta
▪ Blue Mountains	▪ Penrith
▪ Camden	▪ Sutherland
▪ Campbelltown	▪ Wollondilly
▪ Fairfield	▪ Wollongong
▪ Holroyd	

The 15 local government areas have been termed the Second Sydney Airport Assessment Region. All or combinations of these local government areas have been used for sub-regional or catchment analysis. Specific areas used in the residential, employment and social impact sections of this paper are explained in each of the respective sections.

This Technical Paper has been divided into five parts. Part A provides information on the background of the proposal and methods used in the planning, land use and social impact assessment. Part B outlines the existing environment, including the statutory and administrative framework and the current major land uses. Because of the size of the region considered, land use impacts have concentrated on the following:



Extent of Planning Assessment Region  
Urban Areas (indicated by local roads)



Figure 3.1  
**Planning Assessment Region**

Note: Includes whole of Wollondilly, Wollongong and Blue Mountains Local Government Area



0Km 10Km

- residential (including rural-residential);
- employment lands (including commercial and industrial);
- rural and agricultural lands;
- open space;
- major special uses; and
- potential noise sensitive land uses such as schools, hospitals and churches.

Part C assesses the impacts of the proposed airport options. These impacts take account of the impact of each airport option on the long term land use potential in the region.

Part D outlines environmental management measures proposed and summarises and compares the anticipated planning, land use and social impacts for each airport option.

Part E provides a summary of the potential planning, land use and social impacts.

The methodologies adopted for the major components of this Technical Paper are summarised below.

### **3.2.1 RESIDENTIAL**

#### *Overview*

For the residential planning and land use assessment, future regional land use scenarios have been developed using various data sources. Because the results of the 1996 Census are still being processed and preliminary figures are not available until September 1997, this analysis has relied on 1991 Census data; published estimates of 1996 local government area populations (Australian Bureau of Statistics, 1997); published population and State Government Urban Development Program (Department of Urban Affairs and Planning, 1994, 1995a, 1995d, 1996b, 1996c, 1996d and 1996e) information; and estimated 1996 population data derived from photogrammetry undertaken for this Draft EIS by QASCO.

For the purpose of assessing the Second Sydney Airport proposal, it has been necessary to develop population forecasts and therefore to define a number of land use scenarios for specific time horizons.

Four land use scenarios for the region were developed to reflect possible future land use patterns influenced by each of the airport options. Each scenario was assessed at 2006 and 2016. The land use scenarios are:

- regional land use scenario based on the north-east/south-west runway configuration of Badgerys Creek Option A and Badgerys Creek Option B;
- regional land use scenario based on the north-south runway configuration of Badgerys Creek Option C;
- regional land use scenario based on Holsworthy Option A; and
- regional land use scenario based on Holsworthy Option B.

On the advice of the Department of Urban Affairs and Planning, it has been assumed that published population projections for local government areas (Department of Urban Affairs and Planning, 1995a) do not reflect the development of an airport and associated urban infrastructure in this region.

### *1996 Population Estimates*

Populations in many of the areas included in the Second Sydney Airport Assessment Region have changed since the 1991 Census because of urban development and the emergence of new suburbs. Estimates of 1996 population by local government area (Australian Bureau of Statistics, 1997) have therefore been used.

The methodology for assessing and describing noise impacts of the airport options has involved the development of Community Assessment Areas as shown in *Figure 3.2*. This methodology is explained in detail in *Technical Paper No. 3*. Population estimates within each of these Community Assessment Areas for 1996 were developed using the following methods:

- the number of residential dwellings in each Community Assessment Area was estimated using dwelling counts derived from photogrammetry. The methodology used for the photogrammetry work and an example of this is provided in *Appendix A*;
- multiple dwelling rates were applied to the dwelling counts to estimate the number of multiple dwellings in each Community Assessment Area. The rate used differed between areas and was the ratio of multiple dwellings to total dwellings derived from 1991 Census data at a Collector District level and then amalgamated into Community Assessment Areas;





Urban Areas (indicated by local roads)   
 Indicates Density of Dwellings in 1996 

Figure 3.2  
**Community Assessment Areas**



- this enabled the total 1996 dwellings to be estimated for each Community Assessment Area;
- occupancy rates were applied to the 1996 estimated number of total dwellings to estimate the total 1996 population for each Community Assessment Area. The occupancy rate used differed between areas and was the percentage derived from the 1991 Census data at a Collector District level and then amalgamated into Community Assessment Areas; and
- a review was then undertaken of the population data developed. The total population of the local government areas of Camden, Campbelltown and Liverpool (which are wholly contained within the boundaries of the Community Assessment Areas) was compared with the published estimates of population for 1996 (Australian Bureau of Statistics, 1997). The population derived for each Community Assessment Area was also compared with the 1991 Census population for each area.

### *2006 and 2016 Land Use and Population Projections*

As described previously, four regional land use scenarios have been developed for the five airport options. These scenarios were predominantly developed by examining future residential growth within the State Government's urban development program lands. Assumptions about that growth based on future population projections developed by the Department of Urban Affairs and Planning were modified to take into account potential influences of the airport options. Some modifications were also made to areas outside of urban development program lands due to potential high aircraft overflight noise impacts. These areas predominantly consist of rural and rural residential development. The reductions in growth rates that were assumed over the next 20 years did not have a significant impact on overall population forecasts.

Long Technical were then engaged to test the validity of the scenarios in terms of land use capacity and long term Sydney regional population forecasts. Long Technical have previously developed tables of projected population and employment of small areas of Sydney (referred to as 'travel zones') based on population forecasts developed by the Department of Urban Affairs and Planning. Long Technical modified the projected population and employment tables to develop the four regional land use scenarios.

The gravity model used by Long Technical incorporates the following basic steps to develop residential land use forecasts:

- base land use data was assembled from the 1991 Census at Collector District level and subsequently aggregated to travel zone level, of which there are more than 700 in the Sydney region;
- population forecasts for the Sydney region, based on *Population Projections Sydney Region Local Government Areas 1991-2021 1995 Revision* (Department of Urban Affairs and Planning, 1995a) were identified;
- potential urban development areas were identified for each airport option using *Sydney Residential Land Urban Development Program - The 1995/96-1999/2000 Program* (Department of Urban Affairs and Planning, 1996c); and
- population was distributed within the Sydney region using a dwelling stock approach, based on assumptions about dwelling commencements in both urban release and established areas, vacancy rates, occupancy rates and replacement rates.

### *Community Assessment Areas*

For the noise (*Technical Paper No. 3*), air quality (*Technical Paper No. 6*), property values (*Technical Paper No. 4*) and hazards and risks (*Technical Paper No. 10*) studies the results from this forecasting exercise were then reviewed and translated into population forecasts for each Community Assessment Area. The methodology used to develop these projections was as follows:

- the growth rates between the Long Technical model 1996 population estimates and the 2006 and 2016 population projections were derived for each land use scenario. These growth rates were reviewed and where necessary amended to take account of small area anomalies, changes that were relevant to the characteristics, potential influences on growth rates of high noise impacts and published growth forecasts relevant to each Community Assessment Area;
- these growth rates were applied to the 1996 population estimates developed as described previously using photogrammetry; and
- as a result, population forecasts were estimated for each Community Assessment Area for the years 2006 and 2016 for each airport option. The differences between airport options are the assumptions that were incorporated in the model about how future urban development would

shift due to the impacts of developing the Second Sydney Airport (mostly potential noise impacts).

To validate the above methodology, total 2006 and 2016 population projections of all Community Assessment Areas were compared to the Long Technical base case which was developed to reflect projections developed by the Department of Urban Affairs and Planning. The total 1996 estimates and the 2006 and 2016 projections for the Community Assessment Areas are generally about four percent higher than similar Department of Urban Affairs and Planning figures. This is considered to be an acceptable level of accuracy given the general uncertainty inherent in the development of population projections. It is also noted that a conservative approach was adopted in undertaking the photogrammetry to ensure all potential populations that may be affected by noise were identified. For example each caravan within caravan parks located within Community Assessment Areas were regarded as being one dwelling.

### *Dwelling Forecasts*

In addition to the population forecasts, dwelling forecasts for each Community Assessment Area for the years 2006 and 2016 for each airport option were also developed. These were used as the basis for the property values impact assessment documented in *Technical Paper No. 4*. The methodology adopted for the dwelling forecasts was as follows:

- the revised population growth rates (based on the Long Technical model) were adjusted to represent a dwelling growth rate. This adjustment was made to take account of projected declines in occupancy rates; and
- this dwelling growth rate was applied to the total estimated dwellings for 1996 for each Community Assessment Area to derive dwelling forecasts for each Community Assessment Area for each airport option.

### **3.2.2 EMPLOYMENT LAND**

The employment land assessment takes into account all employment generation arising from the development of a Second Sydney Airport, including industrial, commercial and retail uses. For the purpose of projecting employment growth, employment land catchment areas have been identified for each airport site based on local government areas. These are described in *Table 3.2* and shown on *Figure 3.3*.

TABLE 3.2 EMPLOYMENT LAND CATCHMENT AREAS FOR EACH AIRPORT SITE

Airport Option	Local Government Areas Included in Catchment
Badgerys Creek	Liverpool, Camden, Penrith, Blacktown, Fairfield, Campbelltown, Wollondilly
Holsworthy	Liverpool, Wollondilly, Campbelltown, Camden, Bankstown, Sutherland

For each local government area an assessment of existing land availability and employment was made by referring to the Employment Lands Development Program (Department of Urban Affairs and Planning, 1996a; Australian Bureau of Statistics, 1991), and through discussions with relevant local government planning officers.

Projections for employment growth as a result of developing a Second Sydney Airport were made by developing a forecasting model, using base employment data from a recent study of Sydney Airport (Institute of Transport Studies, 1996). Employment multipliers from this model were applied to estimate future flow-on impacts. Direct employment estimates for the Second Sydney Airport were based on current levels of employment and future passenger projections, which were then discounted by a productivity forecast.

Estimates of land requirements were then made using average employment densities and floorspace ratios for industry types associated with airport development. Source documents are included in the reference list. Assumptions for the distribution of this land were also made by reference to metropolitan strategy policy, accessibility from each airport site and based on an assessment of existing suitable vacant land and potential employment land in the vicinity of each airport option.

3.2.3 SOCIAL IMPACTS

The social impact assessment has considered 15 local government areas termed the Second Sydney Airport Assessment region. These were chosen as they represent defined sectors of the community, for which information is consistent and impacts may be readily defined. For each of these areas the following methodology was adopted:

- identify communities involved;
- prepare community profile (existing and projected);
- identify likely impacts;



Note: Includes whole of Wollondilly Local Government Area



- evaluate and assess impacts;
- identify mitigative measures; and
- recommend measures for ongoing monitoring and review.

This methodology broadly follows theoretical models for social impact assessment from Wolfe (1983) and Formby (1988).

The profile of the existing community was established by examining demographic characteristics derived from Australian Bureau of Statistics Census data for 1991 (based on local government areas) and then updated using Council data where available. A review of these areas was then made in terms of land use relationships and spatial characteristics. Major items of community infrastructure such as recreational areas, schools and churches were identified as part of this task.

Issues of particular concern or interest were also identified from the community consultation data base, which has been compiled during the course of the preparation of the Draft EIS. General community response and issue identification in relation to social impacts were also recorded during this period.

Limitations associated with this approach are generally related to consistency of information between local government areas and availability of recent information relating to demographic characteristics.

In addition, the extent of the assessment region and the range of characteristics within it have limited the extent of detailed analysis. Therefore, the social impact assessment only considers detailed impacts for local areas surrounding each site and provides a broad indication of anticipated impacts for the remaining Second Sydney Airport Assessment Region.

### **3.3 INFORMATION SOURCES**

#### **3.3.1 OVERVIEW**

State and local Government have been the primary sources of information for this paper. This includes published and unpublished material, along with oral communications with relevant staff, other professionals and the general public.

There are a number of key public documents which provide the basis for developing the future land use scenarios and subsequent impact assessment, many of which have been published by the NSW Department of Urban Affairs

and Planning. These have been used to ensure that the process of assessment is as transparent and publicly accountable as possible.

A comprehensive list of publications is contained in the reference list. However, the key documents used to develop the land use scenarios are:

- *Sydney Residential Land Urban Development Program 1995/96 - 1999/2000* (Department of Urban Affairs and Planning, 1996c);
- *Employment and Industrial Lands Development Program* (Department of Urban Affairs and Planning, 1996a);
- *Cities for the 21st Century* (Department of Planning, 1995);
- *Population Projections: Sydney Regional Local Government Areas 1991 - 2021, 1995 Revision* (Department of Urban Affairs and Planning, 1995a); and
- various local environmental plans, community profiles and reports from councils in the Second Sydney Airport Assessment Region.

### 3.3.2 REVIEW OF PREVIOUS WORK

In addition to Government publications and references, several studies relating to the development of a Second Sydney Airport and the existing operation at Sydney Airport were examined. The main studies falling into this category are:

- *Second Sydney Airport Site Selection Programme Draft Environmental Impact Statement and Supplement* (Kinhill Stearns, 1985);
- *Sydney West Airport Sub-Region Strategic Plan Stage 1 Investigations - Final Report* (Taskforce on Planning for the Sub-Region Surrounding Sydney West Airport, 1995);
- *Sydney West Airport Sub-Region, Draft Strategic Plan* (Taskforce on Planning for the Sub-Region Surrounding Sydney West Airport, 1996a);
- *Sydney West Airport Sub-Region Employment and Economic Development Strategy* (Taskforce on Planning for the Sub-Region Surrounding Sydney West Airport, 1996b);
- *Economic Significance of Sydney (Kingsford Smith) Airport* (Institute of Transport Studies, 1993; 1996); and
- *Proposed Third Runway, Sydney (Kingsford Smith) Airport, Draft Environmental Impact Statement* (Kinhill, 1990).



A full list of references is provided at the end of this Technical Paper.

### 3.4 ASSESSMENT SCENARIOS

Assessment scenarios used in this Technical Paper are either related directly to the forecast passenger growth scenarios for the Second Sydney Airport (for employment growth and land requirements) or to population forecasts prepared by the NSW Department of Urban Affairs and Planning (for the residential land assessment).

The passenger growth scenarios correspond to those adopted in the *Noise Technical Paper No. 3* are described in *Chapter 1* as follows:

- Air Traffic Forecast 1 (Second Sydney Airport caters for demand which cannot be met by Sydney Airport);
- Air Traffic Forecast 2 (Second Sydney Airport caters for 10 million passengers per annum by 2006 with subsequent growth being directed to the Second Sydney Airport); and
- Air Traffic Forecast 3 (similar to Air Traffic Forecast 2 but with more international flights directed to the Second Sydney Airport).

Population forecasts used have been confirmed or substantiated through other sources, namely:

- estimates of current population from local councils;
- 1996/97 photogrammetry undertaken by QASCO to determine existing development and special use facilities and subsequent population estimates; and
- by reference to land use forecasts estimated for the land transportation modelling exercise developed by consultants Long Technical.

The social impact was assessed by reference to the 'worse case' scenario, that is, Air Traffic Forecast 3, whereby the number of passengers at a Second Sydney Airport is assumed to reach approximately 30 million per annum by 2016.

### 3.5 INTERACTION WITH OTHER STUDIES

This paper has relied on and provided input to a number of other technical papers being prepared as part of the preparation of the Draft EIS. These are:

- *Technical Paper No. 1 - Consultation* which discusses issues raised and community responses to the various airport options;
- *Technical Paper No. 3 - Noise* which assesses impacts on existing and future populations and land uses;
- *Technical Paper No. 4 - Property Values* where property value impacts have been based on the number of dwellings needed to accommodate the anticipated population growth;
- *Technical Paper No. 6 - Air Quality* where the air quality impacts of (and on) the anticipated population and employment growth has been modelled;
- *Technical Paper No. 10 - Hazard and Risk* where the impacts on anticipated population and employment growth has been modelled;
- *Technical Paper No. 13 - Land Transport* where the anticipated population and employment growth has been modelled as a basis for traffic generation; and
- *Technical Paper No. 15 - Economics* where the anticipated economic impacts have been closely correlated with the anticipated population and employment growth.

# Part B

**Existing Environment**

## CHAPTER 4 EXISTING PLANNING

### 4.1 HISTORICAL PLANNING CONTEXT

#### 4.1.1 METROPOLITAN PLANNING

The *Report on the Planning Scheme for the County of Cumberland* (Cumberland County Council, 1948) was Sydney's original post-war master plan. It reflected the planning philosophy of the period with an emphasis on greenbelts to contain Sydney's growth and the development of a suburban residential environment which separated housing, schools and the local community from industrial and other uses which were thought to be incompatible at the time.

Two decades later, the *Sydney Region Outline Plan* (State Planning Authority, 1968) was released. This plan proposed a network of self-contained cities to accommodate the growth of Sydney to an estimated population of 5.5 million by the year 2000. It was anticipated that the cities of Campbelltown and Camden in the south-west of Sydney would grow to populations of 340,000 and 100,000 respectively. A further 60,000 people were to be accommodated in Appin, bringing the total population in the Macarthur region to 500,00 by the year 2000.

The *Sydney Region Outline Plan* expanded the concept of the greenbelts proposed in the *Planning Scheme for the County of Cumberland* to serve the dual purpose of accommodating utilities and special uses along with open space provision. The Hoxton Park and Horsley Park corridors, located between the Badgerys Creek airport site and Liverpool and Fairfield were part of those proposals.

In 1979, the *NSW Environmental Planning and Assessment Act, 1979* was introduced to direct planning in NSW. Cultural and economic changes which prompted this new legislation included the development of low density suburbs at the fringes of the city, heightened community awareness of environmental issues, changing household occupancy patterns and a changing economic and employment environment.

A new metropolitan strategy was released in 1988 to meet the challenges posed by these changes. *Metropolitan Strategy - Sydney into its Third Century* (Department of Planning, 1988) planned for a population of 4.5 million by the year 2011. Eight new areas were identified as possible development areas to accommodate this growth. These areas were Scheyville, Maraylya, Londonderry, Macarthur South, South Somersby (Gosford West), Warnervale, Bringelly/South Creek Valley and Rouse Hill.

In 1993, the Department of Planning published a discussion paper, *Sydney's Future* (Department of Planning, 1993c). It presented a planning strategy based on a review of the 1988 metropolitan strategy. This document provided the basis for the development of the most recent metropolitan strategy released in 1995 and discussed in *Section 4.2*.

#### 4.1.2 REGIONAL PLANNING

Following its identification in the *Sydney Region Outline Plan* (State Planning Authority, 1968) as a future growth area, a plan for the Macarthur Growth Centre *The New Cities of Campbelltown, Camden, Appin: Structure Plan* (Department of Planning, 1973) was produced. The Macarthur Development Board was established in 1975 to coordinate and implement these proposals at the State and regional level.

In the 1980s and early 1990s, several studies of the south-western area of Sydney were undertaken with a view to determining the development constraints and potential of the region.

The *Macarthur Regional Environmental Study* (Department of Environment and Planning, 1986) was produced to provide a framework for managing the then rapid urban growth in the region.

The report notes the announcement earlier that year (1986) that Badgerys Creek was the selected site for the Second Sydney Airport.

'The decision to locate an airport at Badgerys Creek will have a major impact on the future development of Macarthur and the Sydney Region. Depending on when it is built and its role, it will affect the pattern and timing of urban growth, the provision of employment, infrastructure investment and transport facilities' (Department of Environment and Planning, 1986).

A further review, *South-Western Sydney, A Vision for Environmentally Sensitive Development* (Department of Planning, 1990) confirmed the development potential of urban release areas identified earlier in Campbelltown, Camden and Wollondilly local government areas. The strategy also identified potential urban land in the South Creek Valley and Macarthur South and foreshadowed the release of regional environmental studies for these areas.

In 1991, the *South Creek Valley Regional Environmental Study* (Department of Planning, 1991a), the *South Creek Valley Draft Regional Environmental Plan* (Department of Planning, 1991b) and the *Macarthur South Regional Environmental Study* (Department of Planning, 1991d) were placed on exhibition.

The *South Creek Valley Regional Environmental Study* (Department of Planning, 1991a) shown in *Figure 4.1* examined more than 16,000 hectares of land between Penrith (Orchard Hills) and Camden (Oran Park) to determine its suitability for accommodating growth in the Sydney region. It identified approximately 10,000 hectares capable of urban development but raised a number of economic and environmental issues to be further investigated before commitments to major urban development were made. The economic concerns related to demand for and timing of release of significant areas of land for employment and industrial use. Environmental concerns included the cumulative impacts on air and water quality. The *South Creek Valley Draft Regional Environmental Plan* which identified Oran Park as the first potential development area was never formally adopted.

The *Macarthur South Regional Environmental Study* (Department of Planning, 1991d) aimed to establish guidelines for the future development of Macarthur South in the context of the environmental sensitivity of the area and the need for viable and cost-effective development. The strategies for development identified in the study propose a series of distinct urban villages based around Menangle, Appin and Wilton, each with a high level of self-containment. A potential population of 140,000 to 160,000 was identified in a development period of approximately 30 years. Coal reserves, air and water quality issues and the high quality natural environment were identified as significant issues requiring further study.

In 1992, the then NSW Department of Planning carried out a review of the South-Western Sydney Strategy (Department of Planning, 1992) in response to environmental concerns over the release of land in the region. These concerns included the capacity of the Hawkesbury Nepean River to accept increased volumes of pollutants associated with further urban development, air quality, transport, provision of human services, urban design and planning. It was concluded that rezoning of a number of proposed new communities would be deferred to allow further environmental and planning studies to be undertaken.

#### **4.1.3 CHARACTERISTICS OF SYDNEY'S GROWTH**

Sydney's growth is influenced by a number of factors. The most important are the levels of overseas and internal migration to and from the region. Overseas migration to Sydney has compensated for domestic migration from the region to areas such as Queensland and Western Australia. Commonwealth Government policy dictates the level of overseas migration allowed each year. Changes in policy make it difficult to precisely predict the rate and characteristics of Sydney's growth in future years.

Over the last two decades significant urban growth has occurred in areas such as the south western and western regions of Sydney, the Blacktown and

Baulkham Hills area, the Fairfield and Liverpool area and Gosford and Wyong. Over the same period many established urban areas of Sydney have experienced declining population. Some local governments have slowed this trend in recent times by encouraging in-fill and higher density residential development.

Since the early 1980s, the State Government has been concerned over the rapidly increasing size of the Sydney metropolitan area. This phenomenon is commonly referred to as 'urban sprawl'. For example the *Sydney Region Outline Plan* (State Planning Authority, 1968) assumed by the year 2000 the population of Sydney would increase to 5.5 million. Urban development has commenced in almost all areas identified in that plan to accommodate new growth. It has been estimated that if the present densities of urban development continue the capacity of the region, if these areas are fully developed, may be as low as 4.3 million people (Roseth, 1988).

The population of the Sydney Statistical Division in 1986 was about 3.4 million. The Australian Bureau of Statistics (1997) estimated that the population had grown to about 3.8 million by 1996.

The most obvious reasons for Sydney's sprawl include the declining population of the inner areas and a significant change in the structure of the populations and Sydney's households since the late 1960s. For example in 1966 about 3.5 people (on average) were living in each Sydney home. The Department of Urban Affairs and Planning expects this to decline to 2.7 persons per home by 2016 (Department of Urban Affairs and Planning, 1995a).

Other considerations in the desire to restrict Sydney's urban sprawl is the escalating cost of servicing residential land and the environmental costs of new urban development, especially to manage air quality, water quality and ecological impacts.

Sydney is a large and complex city. It has an intrinsic role in the urban and economic structure of NSW and Australia. Over 60 percent of the people living in NSW live in Sydney (Australian Bureau of Statistics, 1997).

The latest State Government strategic planning initiatives for the future development of Sydney are discussed in *Section 4.2*. It is, however, difficult to predict what Sydney will be like in the future and the structure, size and locations of future populations. Sydney's growth is influenced by Australian and international economic trends and local, State and Commonwealth Government policies. Major investments and development initiatives such as the 2000 Olympics and potentially the Second Sydney Airport are examples of Government policy initiatives which may influence the way Sydney grows.



- |                                |                                   |
|--------------------------------|-----------------------------------|
| Boundary of South Creek Valley | Living Area: 10 dwellings/hectare |
| Proposed Sydney West Airport   | Living Area: 35 dwellings/hectare |
| Major public transport route   | Mixed: 50% living, 50% employment |
| Arterial road                  | Mixed: 33% living, 67% employment |
| Sub-arterial road              | Employment area                   |
| Regional park                  | Sub-regional (town) centre        |
|                                | District centre                   |

Figure 4.1  
**South Creek Valley Draft Regional Environmental Plan**  
 Source: NSW Department of Planning





Consequently, the planning of Sydney is a dynamic process. Urban planning strategies, by necessity, are constantly under review. The *Sydney Region Outline Plan* (State Planning Authority, 1968) predicted Sydney would have a population of 5.5 million by the year 2000. Metropolitan planning strategies released in the 1980s and early 1990s predicted Sydney's population would grow to 4.5 million by the year 2011 (Department of Planning, 1988; Department of Planning, 1993). By the mid 1990s projections had been revised down to 4.5 million people by 2021 (Department of Planning, 1995), 10 years later than anticipated in the 1988 Metropolitan Strategy.

## 4.2 EXISTING PLANNING

Planning within Sydney occurs at three levels: metropolitan, regional and local. All of these levels of planning have some impact on the Second Sydney Airport proposal and are also influenced by the various airport options.

### 4.2.1 METROPOLITAN PLANNING

The *Environmental Planning and Assessment Act 1979* is the statutory basis for planning in NSW with the Minister for Urban Affairs and Planning and the Department of Urban Affairs and Planning responsible for implementing that Act.

There are two current documents which provide broad strategic planning direction for the Greater Metropolitan Region of Sydney, Newcastle, the Central Coast and Wollongong:

- *Cities for the 21st Century* (Department of Planning, 1995); and
- *Integrated Transport Strategy for the Greater Metropolitan Region* (Department of Transport, 1995).

Together they form the current metropolitan strategy for the development of Sydney.

#### *Cities for the 21st Century*

As a strategy for the Greater Metropolitan Region, *Cities for the 21st Century* (Department of Planning, 1995) seeks to balance growth and change with the need to achieve high environmental quality, social equity and livable cities. Using a process of integrated urban management, the strategy applies three key themes to long term planning in the region:

- an emphasis on dynamic decision making processes rather than rigid blue prints;

- management by whole-of-government by linking budget processes with the coordination of urban development; and
- recognition of Newcastle and Wollongong as part of a wider urban system and subsequently identified along with Sydney as the Greater Metropolitan Region.

*Cities for the 21st Century* (Department of Planning, 1995) forecasts the population of the Sydney Region to reach 4.48 million by 2021, while the Newcastle and Wollongong regions are expected to have reached around 556,000 and 409,000 respectively.

The planning strategy as shown in *Figure 4.2* identifies three key principles for planning and managing that population growth:

- more compact cities;
- an ecologically sustainable region including the integration of land use and transport planning; and
- effective implementation of the strategy.

The principle of compact cities places much greater reliance than previous strategies on redevelopment and infill of established areas as a means of slowing the rate of urban development at the fringe. This policy has implications for the urban growth anticipated in the local government areas adjoining the sites of the airport options.

*Table 4.1* identifies a notional distribution of housing in the Sydney Region to accommodate the anticipated population growth.

TABLE 4.1 NOTIONAL DISTRIBUTION OF FUTURE SYDNEY REGION HOUSING

Geographic Area	Number and Type of New Dwellings					
	Houses		Multi-unit		All New Dwellings	
	Current Trend	Compact City	Current Trend	Compact City	Current Trend	Compact City
Inner	7,000	5,000	40,000	61,000	47,000	66,000
Middle	24,000	19,000	58,000	98,000	82,000	117,000
Outer <sup>1</sup>	281,000	222,000	110,000	115,000	391,000	337,000
Region Total	312,000	246,000	208,000	274,000	520,000	520,000

Source: Department of Planning, 1995.

Notes: 1. Includes areas identified under the Urban Development Program and areas identified as long term growth options.



Figure 4.2  
**Metropolitan Planning Strategy**  
*Source: NSW Department of Planning*

Employment Clusters	Longer Term Options
Strategic Transport Opportunities	Railway
Primary Centres	Roads
Established Areas	Major Airports
Major Housing Precincts	Major Open Space
Existing Urban Development Program	
Secondary Centres	

0 Km 10 Km 20 Km

The slower population growth predicted in *Cities for the 21st Century* (Department of Planning, 1995) combined with the anticipated increase in urban consolidation, indicates that there will be less demand for long term residential growth areas than estimated in earlier studies (Department of Planning, 1988). The three areas identified as long term options are Warnervale, South Creek Valley-Bringelly, and Rouse Hill. *Cities for the 21st Century* states that development in the South Creek Valley-Bringelly area is contingent on clarification of several other issues including a possible rail link to a potential airport at Badgerys Creek and environmental concerns.

Ecological sustainability is central to urban development proposals. *Cities for the 21st Century* promotes integrated environmental management with the objective of applying ecologically sustainable principles to the urban management of the region. It recognises that environmental protection and pollution control measures must be brought together within a single framework. Environmental costs and benefits will be considered along with social and economic issues throughout the decision making process.

In discussing the South Creek Valley-Bringelly area as a long term growth option, *Cities for the 21st Century* identifies air and water quality concerns as well documented environmental issues needing resolution before development can proceed.

In terms of employment, *Cities for the 21st Century* aims to encourage economic growth and the concentration of retail, commercial and service employment, and to reduce car dependence for journeys to work. The proposed Second Sydney Airport and its associated infrastructure is recognised as a catalyst for economic development in western Sydney.

The employment opportunities presented by the Second Sydney Airport proposal are outlined in more detail in *Chapter 6*.

### *The Integrated Transport Strategy*

The *Integrated Transport Strategy for the Greater Metropolitan Region* (Department of Transport, 1995) was prepared in conjunction with *Cities for the 21st Century* (Department of Planning, 1995) with the objective of developing a comprehensive approach to land use and transport planning. The *Integrated Transport Strategy* establishes a strategic approach for the operational transport agencies such as CityRail and the Roads and Traffic Authority. The *State Road Network Strategy* (Roads and Traffic Authority, 1994) and the CityRail component of the *State Rail Strategic Plan* (State Rail Authority, 1994) were developed to support the broader strategic plan.

The *Integrated Transport Strategy* sets out the transport response to the concept of urban containment, or the compact city, which is the key underlying

concept in both documents. Its primary objective is to promote patterns of land use which make the most efficient use of highly accessible areas, through increased residential densities and concentrated employment patterns.

The *Integrated Transport Strategy* identifies 10 priority transport corridors for transport infrastructure investment as shown in *Figure 4.3*. The corridors seek to redress imbalance in access and help promote longer term opportunities. The corridors are identified as a need, and not necessarily as a mode. Improved cross regional links, particularly aimed at serving Parramatta and central Sydney are also identified, as are key feeder links.

There are several key transport links that influence decisions on the potential development of the Second Sydney Airport including:

- Liverpool-Hornsby link;
- access to the Badgerys Creek airport site;
- the South West Link (M5); and
- inter-city corridors between Sydney and Canberra and Wollongong.

The *Integrated Transport Strategy* does not address the relatively recent proposal of potentially locating the Second Sydney Airport within the Holsworthy Military Area. The *Strategic Road Network* as shown in *Figure 4.4* highlights the road corridors identified for development or under investigation which impact on the potential development of the Second Sydney Airport, while the CityRail component of the *State Rail Strategic Plan* identifies a possible Sydney West Airport Rail Link and development work at Campbelltown and Glenfield stations.

*Technical Paper No. 13, Land Transport* addresses these issues in detail.

#### **4.2.2 SECTION 117 DIRECTIONS**

Section 117 of the Environmental Planning and Assessment Act 1979 enables the Minister for Urban Affairs and Planning to issue directions which a council must consider in the preparation of a draft local environmental plan.

#### ***G12 Environmental Protection Zones (Revoked for Wollongong Local Government Area)***

Land identified for environmental protection in Draft local environmental plans and provisions related to that land cannot be altered or removed without justification by an environmental study.

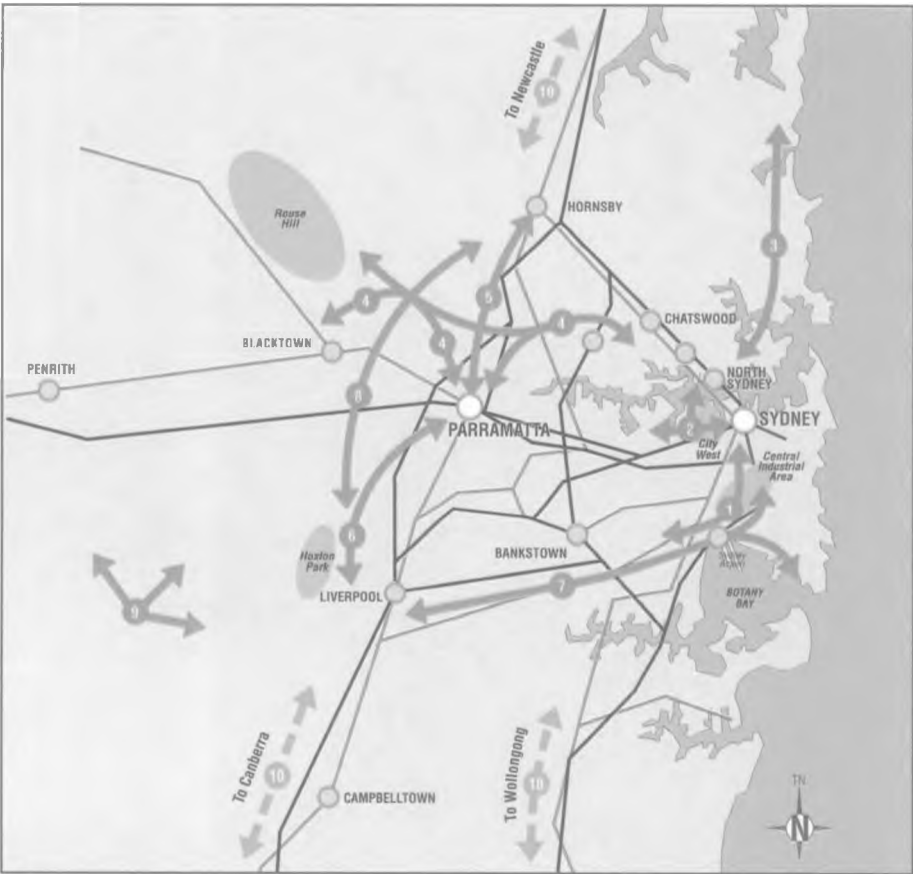


Figure 4.3  
**Integrated Transport Strategy**  
 Source: NSW Department of Transport



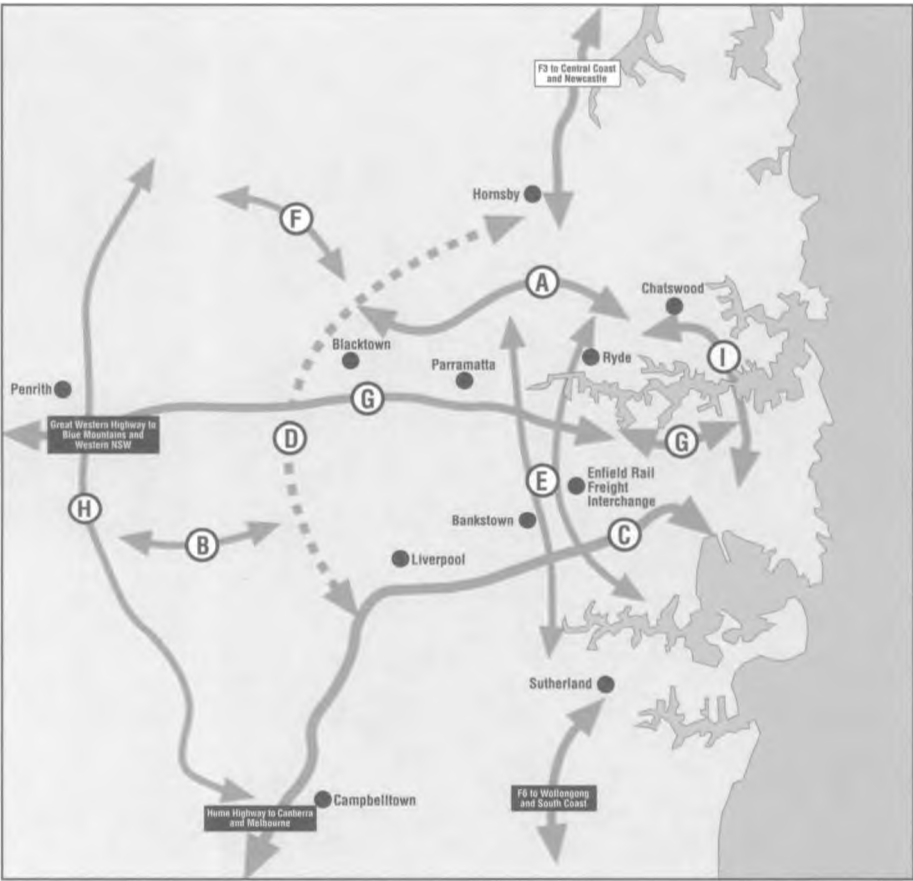


Figure 4.4

### Draft Strategic Road Network Strategy

Source: NSW Roads and Traffic Authority

Strategic corridors for development  
 National Highway metropolitan link under investigation

- North West Link (M2) A
- Badgerys Creek (Elizabeth Drive) B
- South West Link (M5) C
- National Highway metropolitan link under investigation D
- King Georges and Silverwater corridor (Routes 33 and 45) E
- North West Sector (Windsor and Old Windsor Roads) F
- City-West corridor (Western Distributor-City West Link-M4) G
- Northern Road Peripheral: Campbelltown-Penrith- Windsor/North West Sector H
- Gore Hill Link-Harbour Tunnel/Bridge-Eastern Distributor I

*C16 Airport noise (Revoked for Wollongong Local Government Area)*

Draft local environmental plans shall not rezone land for:

- residential purposes or increase densities in areas where the ANEF exceeds 25;
- schools, hospitals, churches and theatres where the ANEF exceeds 20; and
- hotels, motels, offices or public buildings where the ANEF exceeds 30.

Draft local environmental plans which rezone land for:

- residential purposes or increase residential densities in areas where the ANEF is between 20 and 25;
- hotels, motels, offices or public buildings where the ANEF is between 25 and 30; and
- for commercial or industrial purposes where the ANEF is above 30;

shall include a provision to ensure that development meets Australian Standard 2021 regarding interior noise levels.

*C20 Planning in Bush Fire Prone Areas*

In the preparation of a draft local environmental plan, the council shall consider whether land is subject to bushfire hazard. When bushfire hazard is determined for land on which urban development is to be permitted, the draft local environmental plan should where appropriate:

- provide for a perimeter road or reserve on the hazard side of the land;
- provide for the creation of a fire radiation zone managed for hazard reduction;
- specify minimum residential lot depths when adjoining perimeter road;
- minimise perimeter of land to be developed for urban purposes; and
- introduce controls which avoid placing inappropriate developments in hazardous areas.



*G21 Conservation of Environmental Heritage and Ecologically Significant Items and Areas*

Councils should ensure that where a draft local environmental plan applies to:

- land on which a building, work, relic, or place of historic significance, scientific, cultural, social, archaeological, natural or aesthetic significance for the local government area; or
- an area which is of ecological significance for the local government area;

that the plan shall contain provisions to facilitate the conservation of that building, work, relic, place or area.

*G25 Flood Liable Land*

Draft local environmental plans shall not :

- rezone flood liable land to residential, business, industrial, special use, village etc;
- permit significant increase in the development of that land;
- likely to result in a substantially increased requirement for government spending on flood mitigation measures, on infrastructure or services; or
- permit development without development consent except for the purposes of agriculture and minor development (except to do with water management or buildings in floodways).

*S19 Second Sydney Airport : Badgerys Creek [15 May 1985]*

This direction applies to Fairfield Council, Liverpool City Council, Penrith City Council and Wollondilly Shire Council.

This applies to land within the boundaries of the proposed airport site and within the 20 ANEF contour shown on the map entitled 'Badgerys Creek - ANEF - Proposed Alignment - Worse Case Assumptions'.

A draft local environmental plan may contain provisions for a development where the Director of the Department of Urban Affairs and Planning is satisfied that it would not hinder the future development of the land for a second Sydney airport or uses associated with an airport.

### *S25 Development near Licensed Aerodromes*

This applies to all of the 15 councils except the Blue Mountains, Wollongong and Wollondilly.

When preparing draft local environmental plans involving land in the vicinity of a licensed aerodrome, councils shall control the height of buildings, minimise the risk of obstacles to aircraft, for example bird strike, to ensure that the draft plan maintains aircraft flight surface clearance and minimise other obstacles to aircraft.

### **4.2.3 STATE ENVIRONMENTAL PLANNING POLICIES**

State Environmental Planning Policies and guidelines for specific issues significant for the State and must be considered by a consent authority.

#### *State Environmental Planning Policy 11 - Traffic Generating Developments*

This policy establishes the NSW Roads and Traffic Authority as the sole traffic management authority to be consulted regarding traffic generating developments.

#### *State Environmental Planning Policy 19 - Bushland in Urban Areas*

Aims to protect and preserve bushland within the urban area because of its value to the community, as part of the natural heritage and as a recreational, educational and scientific resource. It is designed to protect bushland in existing public open space zones and reservations and to ensure that preserving bushland is given a high priority when local environmental plans for urban development are being prepared.

#### *State Environmental Planning Policy 29 - Western Sydney Recreation Area*

Enables development to be carried out for recreational, sporting and cultural purposes within the Western Sydney Recreation Area, including the development of a recreation area of State significance.

#### *State Environmental Planning Policy 33 - Hazardous and Offensive Development*

Provides new definitions for hazardous industry, hazardous storage establishment, offensive industry and offensive storage establishment. The definitions enable decisions on developments to be made on the basis of merit. Applications must be advertised and supported by a Preliminary Hazard Analysis when appropriate.

*State Environmental Planning Policy 34 - Major Employment - Generating Industrial Development*

The policy aims to promote and co-ordinate orderly and economic use and development of land and the economic welfare of the State. It will facilitate certain types of major employment - generating industrial development of State significance.

*State Environmental Planning Policy 44 - Koala Habitat Protection*

The purpose of this policy is to encourage the conservation and management of areas of natural vegetation that provide habitat for koalas. This will ensure that permanent free living populations will be maintained over their present range.

The policy provides that councils cannot issue consent to affected development applications within an investigation for core koala habitat. This policy provides a state-wide approach to ensure that appropriate development can continue, while still ensuring the ongoing protection of koalas and their habitat.

*State Environmental Planning Policy 48 - Major Putrescible Landfill Sites*

The Minister for Urban Affairs and Planning is the consent authority for major putrescible landfills in NSW. It applies to all landfills in NSW which receive waste from more than one local government area, when the volume of waste to be received exceeds the thresholds specified in the policy.

*Sewerage Works Draft State Environmental Planning Policy*

This policy establishes uniform planning controls for sewerage works. These will allow public authorities to undertake sewerage works, subject to other authorities being consulted and satisfactory environmental impact assessment being carried out. Sewerage projects will be treated as an activity in accordance with Part 5 of the *Environmental Planning and Assessment Act 1979*.

#### **4.2.4 SYDNEY REGIONAL ENVIRONMENTAL PLANS**

*Sydney Regional Environmental Plan No. 18 - Public Transport Corridor*

This policy reserves a corridor from Hoxton Park to Baulkham Hills via the Parramatta city centre with the aim of improving public transport access to Parramatta from the rapidly developing north-western and south-western fringe areas.

*Sydney Regional Environmental Plan No. 20 - Hawkesbury/Nepean River*

This policy aims to provide a single overall framework to guide future planning and development in the Hawkesbury/Nepean River catchment.

*Sydney Regional Environmental Plan No. 25 - Orchard Hills*

This covers an area south-east of Penrith, bounded by Caddens Road and the Western Freeway to the north, South Creek to the east, transmission lines to the south and The Northern and Bringelly Roads to the west. It aims to protect the rural scenic landscape as a buffer and a gateway to Penrith. It also provides for a variety of residential needs in the area.

*Sydney Regional Environmental Plan No. 9 - Extractive Industry*

This identifies regionally significant extractive resources within the Sydney region and facilitates their development. It seeks to ensure that extraction is carried out in an environmentally acceptable manner. It prohibits extraction from certain environmentally sensitive areas and ensures that decisions on future urban expansion take into account the ability of important deposits to realise their full potential.

The plan includes Bringelly as one of three clay/shale resource areas of regional significance which are protected to enable the Department of Mineral Resources to assess their ceramic potential.

This applies to the following parcels of land for shale/clay extraction purposes within and adjacent to the Badgerys Creek site:

- Ferndale Resources, Adams Road, Luddenham;
- Boral Bricks, Martin Road, Badgerys Creek and Greendale Road, Bringelly;
- Khari and Ghossayn, Clifton Avenue, Kemps Creek;
- Noland Q and M, Elizabeth Drive, Kemps Creek;
- Pacific Waste Management, Elizabeth Drive, Badgerys Creek; and
- Brandown, Elizabeth Drive, Kemps Creek.

The two planning policies of most relevance are the Section 117 Directions on the Second Sydney Airport (S19) and development near licenced aerodromes (S25). The former seeks to ensure that no development occurs around the Badgerys Creek site that would hinder the development of the airport and the

latter seeks to control the heights of buildings around airports to minimise the risk of obstacles to aircraft.

Generally, the development of an airport by the Commonwealth on land owned by the Commonwealth would not be subject to State planning legislation and policies. Nevertheless, the legislation and policies are relevant matters to consider as they assist in providing an understanding of the way Sydney will develop in the future. They will also influence the variety of development that would be required to support the Second Sydney Airport such as roads, rail lines, services and commercial and industrial development.

4.2.5 REGIONAL COOPERATION

Regional planning controls and policies are the responsibility of the State Government and are often prepared in collaboration with local Government. In addition to this, there are a number of organisations with a regional coordinating role.

*Regional Organisations of Councils*

Regional Organisations of Councils are voluntary associations of local councils with the role of presenting a regional perspective to Government and industry. They play a significant role in strengthening the voice of local government in regional and metropolitan issues. Regional Organisations of Councils actively promote their region to the Commonwealth and State government with the objective of obtaining financial assistance, policy changes and additional resources. They also foster cooperation between members in addressing problems and projects of joint interest. The Regional Organisations of Councils representing the Second Sydney Airport Assessment Region are set out in Table 4.2.

TABLE 4.2 REGIONAL ORGANISATIONS OF COUNCILS - MEMBER COUNCILS IN SECOND SYDNEY AIRPORT ASSESSMENT REGION

Regional Organisation of Councils				
Inner Metropolitan	Western Sydney	Macarthur	Southern Sydney	Illawarra
Auburn	Blacktown City Council	Camden City Council	Hurstville City Council	Wollongong City Council
	Blue Mountains City Council	Campbelltown City Council	Sutherland Shire Council	
	Fairfield City Council	Wollondilly Shire Council	Bankstown City Council	
	Holroyd City Council			
	Liverpool City Council			
	Parramatta City Council			
	Penrith City Council			

### *Greater Western Sydney Economic Development Board*

The Greater Western Sydney Economic Development Board was established by the NSW Department of State and Regional Development to help the region fully realise its economic and investment opportunities. It comprises leading representatives of the commercial sector in Greater Western Sydney.

The Greater Western Sydney Economic Development Board has been given the task of championing a vision of Western Sydney as the economic powerhouse of Australia to be achieved through regional cohesion and environmental excellence. The Greater Western Sydney Economic Development Board's recent publication, *Australia Starts Here - for Investment Profile* (Greater Western Sydney Economic Development Board, 1997) states that the region has a total Gross Domestic Product of \$34 billion. That is almost a quarter of the entire Gross Domestic Product of NSW.

The Greater Western Sydney Economic Development Board projects that the regional economy will grow to \$46 billion by 2011 with the creation of an additional 350,000 jobs (Greater Western Sydney Economic Development Board, 1997). The Board lists several proposals which will act as a catalyst for this growth over the next decade, including the Second Sydney Airport and the 2000 Olympics.

'The proposed Sydney West Airport will be within 30 minutes of most Greater Western Sydney commercial centres and major industrial estates. It will provide a direct gateway to service Greater Western Sydney's \$34b economy. The benefits to business in export potential and increased freight economies will be substantial. It will also offer many opportunities for the development of commercial clusters of airport-related activities' (Greater Western Sydney Economic Development Board, 1997).

### *Sydney West Airport Sub-Region Task Force - Draft Strategic Plan*

The 1985 Commonwealth Government decision to build the Second Sydney Airport at Badgerys Creek has guided State and Local Government planning for the sub-region during the past decade. In 1995, a Taskforce comprising Commonwealth, NSW and local government representatives was established to coordinate the preparation of a strategic plan for the area known as the *Sydney West Airport Sub-Region* (Taskforce on Planning for the Sub-Region Surrounding Sydney West Airport, 1995). When Holsworthy was announced as a potential airport site in 1996 the Taskforce was disbanded. The strategic planning component of the Taskforce's work had, however, been substantially completed.

Stage 1 of that Taskforce Study identified planning options for the sub-region which maximised the benefits from the airport, its infrastructure and access corridors. Stage 2 produced the *Draft Strategic Plan* (Taskforce on Planning for the Sub-Region Surrounding Sydney West Airport, 1996a) as shown in *Figure 4.5* which was supported by a range of specialist studies including:

- *Sydney West Airport Sub-Region - Employment and Economic Development Strategy*, Taskforce on Planning for the Sub-Region Surrounding Sydney West Airport, 1996b;
- *Sydney West Airport Sub-Region Integrated Transport and Urban Design Study*, Symonds Travers Morgan and MSJ Keys Young, 1996;
- *Sydney West Airport Sub-Region - Water Cycle Management Study*, Snowy Mountains Engineering Corporation, 1995;
- *Sydney West Airport Sub-Region - Human and Physical Services*, Taskforce on Planning for the Sub-Region Surrounding Sydney West Airport; and
- *Sydney West Airport Sub-Region Sydney West Airport Rail Link - Financial and Economic Evaluation*, Travers Morgan, 1995.

The *Sydney West Airport Sub-Region Draft Strategic Plan* and specialist studies have provided much of the framework for the development of the regional land use scenarios for the Badgerys Creek Options A, B and C (as outlined in *Chapters 9 and 10*). In particular, the conclusions which state that a rail connection to Badgerys Creek airport is only financially viable if supported by urban development have been adopted. It should be noted, however, that these strategies have not been formally adopted by either the State or Commonwealth Governments.

#### 4.2.6 LOCAL PLANNING

Planning at a local level is controlled by councils primarily through statutory planning instruments. These instruments describe the nature and scale of development that may be approved by each council in their local government areas.

The development of the Second Sydney Airport by the Commonwealth on Commonwealth land would not be subject to these local planning controls. Nevertheless, they provide an indication of the type of development the Councils believe is appropriate for particular areas. It should be noted, however, that these local planning controls are constantly subject to review, especially when local councils become convinced of the merits of a particular proposal, notwithstanding inconsistencies with existing planning controls.



Sub-Region Boundary  
 Bringelly Rail Corridor  
 Rossmore Rail Corridor  
 Possible Extension of Rail Line to Main Western Line  
 Existing Rail Lines

Potential Urban Villages  
 Potential Employment Area  
 Urban Areas (indicated by local roads)

# Figure 4.5 **Draft Planning Strategies for Sydney West Airport Sub-Region**

Source: Various reports, Taskforce on Planning for the Sub-Region Surrounding Sydney West Airport, 1996

Note: Rail corridors are indicative only as precise routes have yet to be determined





In considering the impact of the Second Sydney Airport proposal at the local government level, the broad area defined as the Second Sydney Airport Assessment Region outlined in *Figure 3.1* was applied. At this level 15 local government areas were considered and the relevant local environmental plans and associated reports for each of these Councils were reviewed. In addition, the planning instruments and existing and proposed land uses for the three local government areas adjoining the Badgerys Creek site and Holsworthy Military Area were reviewed in detail.

### *Badgerys Creek*

The relevant local planning instruments for the local government areas surrounding Badgerys Creek are:

- Liverpool City Council:
  - *Liverpool Local Environmental Plan 1997;*
  - *Interim Development Order 74; and*
  - *Liverpool Planning Scheme Ordinance, 1972.*
- Penrith City Council:
  - *Draft Penrith Local Environmental Plan, 1997 (Urban Land), currently on exhibition;*
  - *Consolidating Plans for Penrith's Existing Employment Areas, 1996;*
  - *Local Environmental Plan, 1994 (Industrial Lands); and*
  - *Local Environmental Plan No. 201, 1996 (Rural Lands).*

Liverpool City Council had proposed that the Option A airport site be zoned 5(e) Special Uses - Airport under the *Liverpool Local Environmental Plan, 1997*. The Plan was gazetted on 29 August 1997, however, the proposed zoning was deferred by the Minister for Urban Affairs and Planning because of the uncertainty over the choice of the airport site.

Where determination of the zoning of land has been deferred the previous planning controls and zonings continue to apply. On this basis, for the area of the Option A airport site, the applicable planning instruments continue to be *Interim Development Order 74*, under which the majority of the site is zoned 1(a) - Non Urban and *Liverpool Planning Scheme Ordinance, 1972*, under which portions of the site are zoned 2(a1) Residential and 5(a) Special Uses - School. An airport is a prohibited use within each of these zones.

The deferral does not, however, include the additional lands required to accommodate the Option B and C airport sites to which lands the *Liverpool Local Environmental Plan, 1997* now applies as follows:

- Option B airport site (excluding area of Option A) is zoned 1(a) Rural; and
- Option C airport site (excluding area of Option A) is zoned 1(a) Rural and 5(a) Special Uses - Telecommunications.

An airport would not be consistent with the objectives of these zones. The current zoning of the site is shown on *Figure 4.6*.

### *Holsworthy*

The relevant local planning instruments for the local government areas which include or surround the Holsworthy Military Area are:

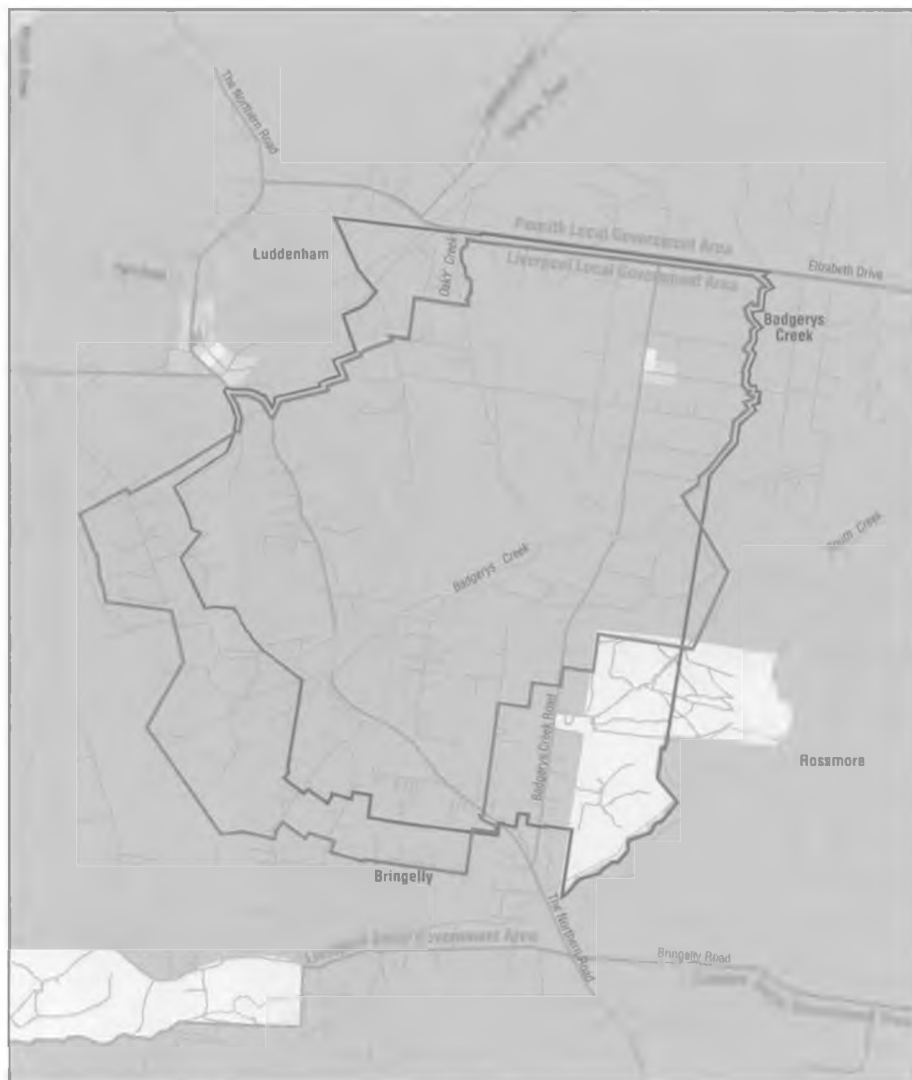
- Liverpool City Council *Liverpool Local Environmental Plan, 1997*;
- Campbelltown City Council *Interim Development Order No. 15*; and
- Sutherland Shire Council, *Local Environmental Plan 1993*.

The northern section of the Holsworthy Military Area is located within the boundaries of Liverpool City Council, the extreme eastern section of the site is located within Sutherland Shire Council and the southern section of the site is located within Campbelltown City Council.

Under *Liverpool Local Environmental Plan, 1997* the site is zoned 7(b) Environment Protection - Bushland and 6(b) Recreation - Private. The 7(b) zoning has been proposed to protect the natural qualities of the area and the small portion of land to be zoned 6(b) is the proposed site for the Olympic shooting facility for the year 2000. Since the colocation of an International Shooting Complex at Holsworthy with a Second Sydney Airport has been ruled out on aircraft safety grounds, the NSW Government is proceeding with an alternative site at Cecil Hills which, according to the Civil Aviation Safety Authority, will not have the same safety implications for aircraft operating to and from Badgerys Creek. An airport would not be consistent with the objectives of the 7(b) and 6(b) zones.

The area which is within the boundary of Sutherland Shire Council is zoned 5(a) Special uses - Military Area under the *Sutherland Local Environmental Plan 1993*. A commercial airport would not be in accordance with the objectives of this zone and the land has been reserved for military uses.

The southern section of the site is zoned 5(a) Special uses - Military Reserve and 5(c) Special Uses - Water Catchment along the southern boundary under Campbelltown City Council *Interim Development Order No. 15*. A commercial airport would not be in accordance with the objectives of these



- |                    |                      |
|--------------------|----------------------|
| Rural              | Local Government     |
| Rural Conservation | Area Boundaries      |
| Residential        | Boundary of Option A |
| Commercial         | Boundary of Option B |
| Open Space         | Boundary of Option C |
| Special Uses       |                      |



Figure 4.6  
**Zoning In and Around  
 Badgerys Creek  
 Airport Options**

Note: Zonings are as per Penrith, Liverpool and Camden local government area planning instruments



zones as the 5(a) zone is solely for military related purposes and the 5(c) zone is to maintain water quality.

The above zonings are shown in *Figures 4.7a and 4.7b*.

Generally, the development of an airport by the Commonwealth on land owned by the Commonwealth would not be subject to State planning legislation and policies. However, they do provide an understanding of intentions for the future development of Sydney and issues effecting development of an airport, including roads, rail lines, services and commercial and industrial development.

## 4.3 IMPLEMENTATION

### 4.3.1 WHOLE OF GOVERNMENT APPROACH

In recent years there has been a shift from a narrow focus on planning to a wider whole of government approach.

‘This approach recognises that the process of strategic planning is as important as the end result, and that results cannot be effectively achieved by a single agency’ (Department of Planning, 1995).

At the metropolitan level in Sydney there are a number of State Government agencies with significant responsibility for urban planning issues. These agencies include the transport agencies (NSW Department of Transport, CityRail, Rail Access Corporation and the Roads and Traffic Authority), the Environment Protection Agency, the service authorities including Sydney Water and most recently the Ministry of Urban Infrastructure Management.

Implementation of metropolitan planning policy occurs at several levels, including the:

- Urban Management Committee of Cabinet which has primary responsibility for the coordination and integration of NSW Government policy;
- Ministry of Urban Infrastructure Management which has been established to improve the coordination and integration of infrastructure planning and expenditure. The Ministry is responsible for improving linkages between:
  - urban management strategies, coordinated by the Department of Urban Affairs and Planning;

- infrastructure planning and provision, undertaken by individual Government departments; and
  - the budget process, managed by Treasury.
- Metropolitan Strategy Committee which is the officer level committee with responsibility for whole of government integrated urban management. Membership comprises State Government departments with a role in metropolitan planning along with local government, represented by the Local Government and Shires Association; and
  - annual Metropolitan Forum which provides the opportunity for State and local Government along with academics, the community and business representatives to meet and discuss current metropolitan planning issues.

#### 4.3.2 URBAN DEVELOPMENT PROGRAM

The Urban Development Program is a NSW Government program implemented by the Department of Urban Affairs and Planning which coordinates the planning and servicing of new residential land in identified release areas in Sydney. Introduced in 1981, the Program now accounts for 40 percent of new dwellings commenced in Sydney each year. The documents *Sydney Residential Land-Urban Development Program 1995/96-1999/2000 Program* and *Sydney Residential Land-Urban Development Program - 1996 Regional Consultations* (Department of Urban Affairs and Planning, 1996b and 1996c) have been used to identify current lot production and the development potential in the Second Sydney Airport Assessment Region. The release areas identified and shown in *Figure 4.8* have formed the basis for the future residential land use scenarios developed as part of this draft EIS.

*Table 4.3* identifies the five year lot production forecasts for the Urban Development Program in the Sydney Region.

The release areas within the Second Sydney Airport Assessment Region represent a significant part of this five year program with Liverpool, Fairfield, Campbelltown and Camden representing more than 43 percent of the current urban development program in the Sydney region. Liverpool, in particular, is the local government area with the largest lot production forecast over the five year program (7,650 lots).



- |                               |                                   |
|-------------------------------|-----------------------------------|
| Rural                         | Local Government Area Boundaries  |
| Residential                   | Option A                          |
| Recreation and National Parks | Airport Boundary                  |
| Water Catchment               | Holsworthy Military Area Boundary |
| Military Use                  |                                   |
| Research and Technology       |                                   |

Figure 4.7a  
**Zoning In and Around  
Holsworthy Airport  
Option A**

Note: Zonings are as per Sutherland.



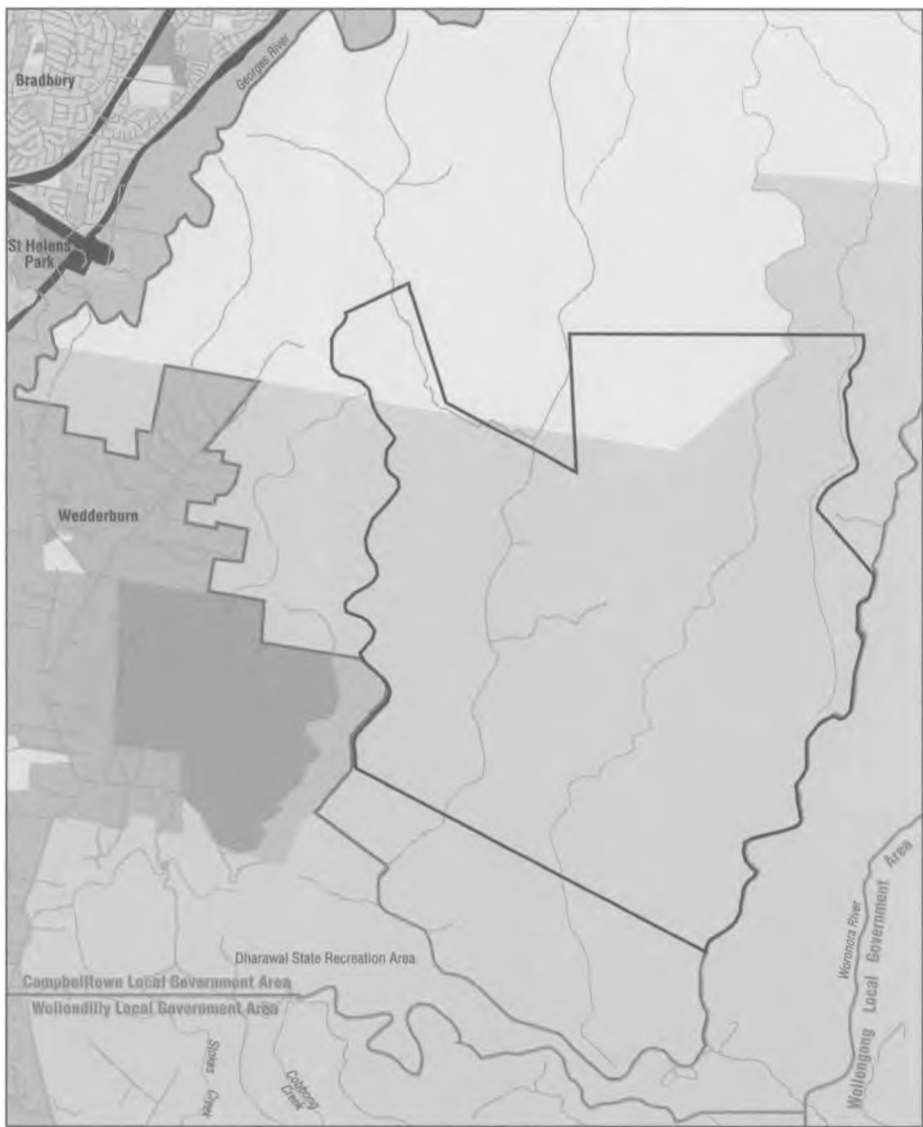


Figure 4.7b  
**Zoning In and Around  
 Holsworthy Airport  
 Option B**

Note: Zonings are as per Wollongong,  
 Wollondilly and Campbelltown local

- |                           |                                   |
|---------------------------|-----------------------------------|
| Rural                     | Water Catchment                   |
| Residential               | Military Use                      |
| Commercial                | Other Special Uses                |
| Recreation and Open Space | Roads                             |
| Environmental Protection  | Local Government Area Boundaries  |
| Scenic Protection         | Option B Airport Boundary         |
|                           | Holsworthy Military Area Boundary |



Reference	UDP Area
1.1	North Rocks
1.2	Castle Hill
1.3	Glenhaven
1.4	Heritage Park
1.6	West Pennant Hills
1.7	Kings Road
1.8	Bingara Crescent
1.9	Rouse Hill
1.10	Norwest
2.1	Marayong, Parkies, Kings Langley
2.2	South Quakers Hill
2.3	North Doonside
2.4	Prospect
2.5	Plumpton
2.6	Roos Hill
2.7/2.11	Minchinbury
2.9	South Blacktown
2.10	North Quakers Hill
2.12	Brickworks
2.13	Rouse Hill
2.14	St Marys, ADI
3.1	Narellan
3.2	Elderslie
3.3	Harrington Park
3.4	Springfarm
4.1	Macquarie Fields, Glenfield
4.2	Ingleburn East
4.3	East Minto
4.5	Ambarvale
4.6	Airbs
4.7	St Andrews
4.8	Ingleburn
4.9	Claymore
4.10	South Ingleburn
4.11	Raby
4.12	Blairmont
4.13	Minto
4.14	Leumeah
4.15	Eagle Vale
4.16	<del>Flemington</del>
4.17	St Helens Park
4.18	Mensangle Park
4.19	Glen Alpine
4.20	Mount Gilead
4.21	Blair Athol
4.22	Macquarie Links
5.1	Fairfield 1
5.2	Fairfield 2
5.3	South Bonnyrigg 1
5.4	South Bonnyrigg 2
5.5	South Abbotsbury
6.1	Bligh Park 1
6.2	Bligh Park 2
7.1	West Pennant Hills
7.3	Rogans Hill 2
8.5	Casula East
8.6	Casula West
8.9	Hinchinbrook
8.10	Pleasure Point
8.11	Wattle Grove
8.12	Aerodrome
8.13	Cabramatta Creek
8.14	Carnes Hill
8.15	Cecil Park
8.16	Edmondson Park
8.17	Prestons
9.1	Werrington
9.2	Cambridge Park
9.3	Pasfield/Jamison Town
9.4	St Clair
9.5	Cranebrook
9.6	Denheved
9.7	South West St Clair
9.8	South Kingswood
9.9	Erskine Park
9.10	South Werrington
9.11	St Marys
9.13	North Cranebrook
9.14	Glenmore Park
9.15	St Marys A.D.I.
10.1	East Menai
10.2	Woronora Heights
10.3	Manai Town Centre
10.4	West Menai
12A	Kellyville
12B	Barina Downs Road
12C	Old Windsor
12D	Mungrove Park
12E	Mile End Road



Urban Development Program Release Areas

Existing Urban Areas (indicated by local roads)

Figure 4.8

**Urban Development Program Release Areas**

Source: NSW Department of Urban Affairs and Planning





TABLE 4.3 PRELIMINARY SYDNEY REGION LOT PRODUCTION FORECASTS 1996/97-2000/2001

Local Government Area	Lot Production							5 Year Total
	Actual	Forecast				Possible		
	95/96	Jul-Dec 1996	96/97	97/98	98/99	99/2000	2000/01	
Baulkham Hills	533	520	1,010	790	820	720	720	4,060
Blacktown	1,158	530	1,180	1,080	1,140	1,120	970	5,490
Camden	383	200	450	670	750	700	700	3,270
Campbelltown	229	185	445	530	530	390	290	2,185
Fairfield	95	40	200	130	110	100	70	610
Gosford	50	80	180	360	210	170	100	1,020
Hawkesbury	0	0	0	30	0	0	0	30
Hornsby	334	80	180	110	70	70	70	500
Liverpool	2,240	700	1,700	1,950	1,320	1,290	1,390	7,650
Penrith	326	290	720	560	590	630	260	2,760
Pittwater	0	0	10	20	0	0	0	30
Sutherland	140	150	360	300	100	195	10	965
Warringah	69	65	245	110	0	0	0	355
Wyong	651	190	460	710	590	510	470	2,740
Sydney Total	6,208	3,030	7,140	7,350	6,230	5,895	5,050	31,665

Source: Department of Urban Affairs and Planning, 1996b.

#### 4.3.3 LOCAL GOVERNMENT RESIDENTIAL PLANNING INITIATIVES

Residential development, and the Urban Development Program in particular, is the catalyst for the provision of a wide range of urban infrastructure including roads and physical and social services. Ultimately, it forms the basis of the urban structure of Sydney. The residential development initiatives for each of the local government areas which are included in the Urban Development Program within the Second Sydney Airport Assessment Region are briefly outlined below.

##### *Penrith*

The Penrith Urban Development Program is forecast to produce 2,760 lots over the next five years. Many of the currently identified release areas including Glenmore Park, South Werrington and Erskine Park will be substantially developed within this timeframe.

The recently exhibited *Draft Penrith Consolidating Local Environmental Plan, 1997 (Urban Land)* identifies a comprehensive urban consolidation and infill program to complement the traditional release area program which has been the focus of residential development in this local government area to date. As the population profile matures, it is anticipated that there will be increasing demand for a variety of housing types including multi unit housing adjacent to commercial areas and public transport. The North Penrith Army lands, adjacent to Penrith Town Centre is one site identified for an innovative mix of commercial and multi unit residential.

The Australian Defence Industries site at St Marys represents significant development potential in the Penrith and Blacktown local government areas. The master plan for the site *ADI St Marys The Environmental and urban Development Master Plan* (ADI Limited and Lend Lease Development, 1996) shows that the 1,535 hectares site may be developed as a series of four urban villages within a 600 hectare open space system. The site has the potential to accommodate 30,000 people over a period of 15 years.

### *Blacktown*

The Australian Defence Industries site at St Marys and the Rouse Hill release area represent the main urban release development potential in Blacktown over the next decade. The remaining urban release areas identified in the Urban Development Program are largely infill projects with development nearing capacity over the next five years. The Scheduled Lands at Riverstone represent development capacity which will be delayed because of the fragmentation of land ownership and servicing delays.

Blacktown has an active urban consolidation policy focussed on transportation nodes and centres. Many of the older, established areas of Blacktown have unrenovated dwellings on large allotments which represent significant development potential. In particular, the Department of Housing is assessing its property in Mt Druitt and other suburbs with a view to redevelopment of the older areas to meet current dwelling demand and modern design standards.

### *Fairfield*

The Urban Development Program in Fairfield is expected to be substantially developed by 2001. The release area of Abbotsbury previously identified in the program has now been deleted and will become part of the open space corridor identified by the Department of Urban Affairs and Planning. The recently released *Fairfield Draft Housing Strategy* has identified six centres as nodes for medium density residential development: Fairfield, Cabramatta, Smithfield, Fairfield Heights, Canley Heights and Canley Vale. In 1994, Fairfield City Council altered its minimum lot size requirements for non urban

residential (zone 1(a)) from two hectares to one hectare. This increases the potential number of dwellings in the rural residential zonings west of the open space corridor.

### *Liverpool*

Liverpool Urban Development Program with a five year production forecast of 7,650 lots, represents a significant proportion of the total new lot production scheduled for west and south west Sydney over that period. To the west of Liverpool, it is anticipated that Cecil Park, Hinchinbrook and parts of Cabramatta Creek are to be developed in the short term (approximately five years) while the remainder of Cabramatta Creek, along with Carnes Hill and Prestons will be developed over a longer time frame. Land identified as Aerodrome is still in the early planning stages and the release of the urban development area of Edmondson Park is viewed by Council as dependant on Second Sydney Airport, servicing and greenbelt decisions. The completion of Wattle Grove is a short term urban release program.

The *Liverpool Rural Lands Study* (Liverpool City Council, 1994) recommended no further release of land for rural residential development beyond that already zoned.

In keeping with metropolitan planning policy, Liverpool City Council has an urban consolidation policy which includes villa homes, dual occupancy and integrated development as permissible throughout all residential zones. Higher density residential development is encouraged around the Liverpool and Warwick Farm railway stations.

### *Campbelltown*

Campbelltown will contribute 2,185 residential lots to the Urban Development Program over the next five years, largely in the form of infill development throughout the local government area. Menangle Park and Mt Gilead represent the longer term urban development potential in the area. Council has a flexible residential development policy which permits a range of residential forms (including medium density housing) to be developed with the consent of Council.

### *Camden*

Camden has identified two major urban release areas, Narellan and Harrington Park which are anticipated to contribute 3,270 lots to the Urban Development Program over the next five years. Lots in Elderslie and Springfarm are not scheduled for release in the next five years. The urban development potential of South Creek Valley has been the subject of investigation and its long term development is linked to decisions relating to

the Second Sydney Airport and the resolution of environmental issues including air and water quality in the sub-region.

### *Wollondilly*

Because of its largely rural environment, Wollondilly is not within the current Urban Development Program. The *Wollondilly Draft Residential Development Strategy* (Wollondilly Shire Council, 1996) seeks to manage urban growth to protect the agricultural viability and rural nature of much of the Shire. Residential expansion is therefore limited to selected towns which have been targeted for modest growth, including:

- Picton, Tahmoor and Thirlmere;
- Warragamba and Silverdale;
- Appin;
- Bargo; and
- Wilton.

### *Sutherland*

The Urban Development Program in Sutherland will be largely completed by 2001. West Menai is likely to be removed from the program and as a result future residential development in Sutherland will be focussed on redevelopment and renewal. The *Sutherland Shire Housing Strategy 1996-2011* retains the potential for high rise development in the centres of Miranda, Sutherland, Cronulla and Caringbah in addition to creating the opportunity for a range of medium density development in other centres throughout the Shire. It is anticipated that medium density housing including a mix of town houses, three storey walk-ups and in some cases 'shop-top' housing will be encouraged in those areas including Heathcote, Engadine and Menai.

### *Wollongong*

The potential for residential development of the northern beach suburbs of Wollongong between Helensburgh and Fairymeadow, was reviewed as part of this Draft EIS. In summary, there are three main influences on future urban development in this area. They are:

- additional new lot production is limited with potential release areas identified as the South Bulli Colliery, the Boral Brickworks at Woonona and the Excelsior Colliery site;

- Wollongong Council has an urban consolidation policy which proposes higher density residential areas at transportation nodes and centres. Redevelopment is anticipated in the Thirroul and Fairymeadow areas, especially within the older Department of Housing estates; and
- demographic changes are anticipated in many of the northern beach suburbs as existing ageing residents are replaced by younger families. The proximity to Sydney, the natural beauty of the region and the relative price advantages are expected to increase demand in the area.

## CHAPTER 5 EXISTING LAND USES AND OWNERSHIP

### 5.1 OVERVIEW

The assessment of land uses and ownership presented in this chapter, relates to the following areas:

- land use - local (on airport site) and regional; and
- land ownership - based on ownership within the proposed airport sites.

Land uses have been broadly described from land use zoning maps for each of the council areas within the Second Sydney Airport Assessment Region, visits to each site and immediately adjoining areas, aerial photographs and with reference to information provided by councils.

### 5.2 REGIONAL LAND USES

Land uses described in this section represent broad land use allocations (as specified by council zonings) in terms of their use and location in relation to each of the airport options. *Figure 3.2* shows the extent of the community assessment areas. Regional land uses are shown on *Figure 5.1*. This section does not attempt to present a detailed assessment of all land uses within or adjoining each airport site. Such an assessment is presented in *Section 5.4*.

#### 5.2.1 RESIDENTIAL

With both airport sites located on the periphery of metropolitan Sydney, residential land uses within the assessment region are characterised by a mixture of rural residential development and new release areas. The latter are concentrated to the south of Penrith and north of Badgerys Creek; to the west of Liverpool and east of Badgerys Creek; to the south of Liverpool and north of Holsworthy and to the east of Campbelltown and west of Holsworthy. Older established residential areas are also located within the assessment region, mostly within Holroyd, Auburn, Fairfield, Liverpool, Bankstown and Parramatta.

The most recent residential development in proximity to Badgerys Creek is at Erskine Park and St Clair, located approximately 12 to 13 kilometres to the north of the site, Cecil Hills which is approximately 12 kilometres to the east, Harrington Park, Raby and Narellan which are 15 to 17 kilometres to the south-east and Warragamba, located approximately 11 kilometres to the west.

Residential areas closest to the Holsworthy Military Area include rural residential properties around Long Point, Minto Heights, Kentlyn and Wedderburn. Long Point and Minto Heights are located approximately six kilometres to the west of the closest runway of Holsworthy Option A.

More established residential areas at North Engadine, Engadine and Heathcote are located approximately six kilometres east of the closest runway.

Residential and rural residential areas to the east of the Holsworthy Military Area, include Waterfall and Helensburgh which are eight to 10 kilometres from the nearest proposed runway. Wedderburn is approximately four to six kilometres south west of the nearest runway and St Helen's Park, Airds, Bradbury and Rosemeadow, are located approximately six to eight kilometres from the nearest runway of Holsworthy Option B.

The northern boundary of the Holsworthy Military Area adjoins the recent residential release areas of Wattle Grove and Holsworthy Village.

### *Rural Residential*

There are significant rural residential zonings in the vicinity of the Badgerys creek and Holsworthy airport sites. Each of the local government areas of Liverpool, Penrith, Campbelltown, Camden and Wollondilly has a variety of zones accommodating rural residential development and these are identified in *Figures 4.6, 4.7a and 4.7b*. While each of the councils exercise different planning controls for its rural and rural residential zonings, these zonings generally follow a pattern of Rural 1(a) - 40 hectare minimum lot size and Rural 1(b) - two hectare minimum.

While the majority of zonings in the vicinity of the airports are rural or non-urban zonings (usually a 1(a) zone) with a 40 hectare minimum lot size, the distribution of residential dwellings reflects a rural residential density significantly greater than that. An analysis of the photogrammetry undertaken by QASCO, estimates a density of approximately one dwelling per seven hectares within a four kilometre radius of Badgerys Creek. The rural residential zonings in the vicinity of the site (usually a 1(b) zone) generally permit subdivision of no less than two hectares and are designed to meet demand for hobby farms and rural living in a region which retains good access to the metropolitan area.

### **5.2.2 COMMERCIAL AND INDUSTRIAL**

Commercial and industrial uses within the assessment region tend to be concentrated within designated employment zones and existing commercial centres. The closest commercial centres and employment zones to the Badgerys Creek site are shown in *Table 5.1*.



Figure 5.1

### Regional Land Uses

Note: Land uses based on generalized zonings in planning instruments of each local council within the community assessment areas



0Km 10Km



TABLE 5.1 EMPLOYMENT AND COMMERCIAL AREAS CLOSEST TO BADGERYS CREEK SITE

Name of Centre/ Employment Zone	Designation	Local Government Area
Erskine Park	Employment zone	Penrith
Smeaton Grange	Employment zone	Camden
Minchinbury	Employment zone	Blacktown
Penrith	Town centre	Penrith
Liverpool	Town centre	Liverpool
Wetherill Park	Employment zone	Fairfield
Prestons	Employment zone	Liverpool
St Marys	Employment zone	Penrith

The closest employment and commercial areas to the Holsworthy Military Area are:

- Moorebank industrial area, Liverpool;
- Ingleburn industrial area, Campbelltown;
- Minto industrial area, Campbelltown;
- Campbelltown commercial area;
- Chipping Norton industrial area, Liverpool;
- Bankstown Airport industrial area, Bankstown;
- Liverpool Central Business District, Liverpool; and
- Sutherland town centre, Sutherland.

In addition to these, some smaller industrial sites are located to the east of the Holsworthy Military Area at Heathcote and Lucas Heights. Details of these areas and their locations are presented in *Chapter 6*.

5.2.3 RURAL

Both airport sites are within predominantly rural areas, and accommodate a large number of rural residential properties and market gardens. The Badgerys Creek area is a significant agricultural producer within the Sydney region,

especially for the production of vegetables and poultry. Typical rural activities within the region include:

- extensive grazing of beef cattle and agisted horses, and semi-intensive grazing of dairy cattle, training and spelling of trotting horses;
- intensive poultry production (chicken, turkey, duck and ostrich businesses); and
- intensive cropping of vegetables, fruit and nursery products. The nurseries in the area produce plants and cut flowers for local markets, the Flemington markets and retail outlets. The plants are produced in sheds or outside areas. The market gardens in the region are generally family run operations and typically contain gardens with a mixture of fruit and vegetables, most of which is sold at Flemington markets.

Rural residential uses are located to the west of the Holsworthy Military Area at Minto Heights and Kentlyn. Rural land is also located to the north-east of the Holsworthy Military Area at Voyager Point, Pleasure Point and Sandy Point, although residential development on land at Voyager Point is currently in progress. The long term potential of this area for high density residential development has also been recognised, although no formal proposals to rezone land at this location exist at present.

#### 5.2.4 OPEN SPACE AND RECREATION

The major regional areas of open space and recreation are shown on *Figure 5.1*. A list of these, the management body responsible for their maintenance and the local government area in which each is located, is shown in tables presented in *Appendix B*.

The most significant areas of public open space are:

- Blue Mountains National Park;
- Burratorang State Recreation Area;
- Dharawal State Recreation Area;
- Nattai National Park;
- Heathcote National Park;
- Royal National Park;
- Thirlmere Lakes;

- Bargo and Yerrinderie State Recreation Areas; and
- Cattai and Bents Basin State Recreational Areas.

Other notable areas of open space are the Royal Botanic Garden at Mount Annan in Camden/Campbelltown and the Warragamba Special Area Water Catchment in Wollondilly.

Also of regional importance and included within this category are the beaches north of Wollongong at Bellambi, Bulli, Thirroul, Coledale, Wombarra and Scarborough and water catchment areas at Woronora, O'Hares Creek, Divines Weir and Metropolitan, which are located in Campbelltown, Sutherland, Wollondilly, Wollongong and Wingecarribee local government areas.

Regional recreation facilities include aerodromes, waterways, sports centres, venues and race courses. These are listed on tables presented in *Appendix B*. The most significant of these are:

- the Penrith Lakes Scheme (rowing/sailing venue);
- Australia's Wonderland;
- Eastern Creek Raceway;
- Fairfield (Calmsley) City Farm; and
- Oran Park Raceway.

In addition, there are several golf courses and sports venues, including Greenlands Golf Course on Camden Valley Way, Liverpool Showground, on Kurrajong Road, the Rugby League Country Club, on Camden Valley Way, Wallacia Park Golf Club at Wallacia and the Glenmore Golf Course on Mulgoa Road.

*Table B1 of Appendix B* also shows total numbers of recreation facilities (both active and passive) within the assessment region. This shows a considerable number of council managed open space and recreational facilities, as well as some major non-council open space. Those areas located within each of the respective airport sites are discussed in *Section 5.4*.

### 5.2.5 ENVIRONMENT PROTECTION

Several areas of Environment Protection exist within the assessment region. Primarily, these are associated with the catchment areas of major rivers and lakes within the region. The most significant of these are:

- the water catchments of Woronora, Cordeaux, Metropolitan, Avon, Cataract and Nepean Dams;
- the water catchment of Lake Burragorang;
- the water catchment of Georges River;
- areas surrounding the Sydney Water Supply upper canal west of Campbelltown; and
- the water catchment of the Nepean River.

Liverpool City Council have rezoned the northern portion of the Holsworthy Military Area to Environment Protection under the *Liverpool Local Environmental Plan, 1997*.

### 5.2.6 SPECIAL USES

Special uses are defined as one off uses, not falling within the previous categories, where they might be affected by airport operations or influence the operation of the airport itself.

The main special uses within the airport assessment region are defined within the following categories:

#### *Communications*

The Royal Australian Air Force operate a remote receiving station at Bringelly which is located to the south-east of Badgerys Creek Options B and C. The Department of Defence have advised that this facility is planned to be relocated by the year 2000.

The Telstra Bringelly high frequency radio station which adjoins the northern side of the Royal Australia Air Force site, is currently in operation. Telstra advise that they intend to relocate the facility in 1997 and sell the land.

#### *Department of Defence*

An explosive storage facility for the Royal Australian Navy and the Royal Australian Air Force is located at Kingswood/Orchard Hills. The Royal

Australian Navy armament depot provides storage and maintenance facilities and co-ordinates the movement of Naval ammunition, explosives, missiles and torpedoes. The Royal Australian Air Force central ammunition depot provides centralised engineering maintenance, storage and resource facilities for major contingency reserves of explosive ordnance. A large demolition range is used for disposal of explosive ordnance and training in explosive ordnance demolition. This site is a restricted area for flying operations. It should be noted that the recently released *Defence Efficiency Review* (Department of Defence, 1997a), recommends the sale of the Orchard Hills munitions storage area by 2006.

A Defence National Storage and Distribution Centre, the School of Military Engineering, the Greenhills Military Police Complex, Headquarters of Base Administrative Support Centre (Liverpool) and the East Hill Barracks are all located in Moorebank to the north of the Holsworthy Military Area.

### *Aerodromes*

Hoxton Park aerodrome is located approximately nine kilometres to the east of Badgerys Creek. This land use is a major general aviation aerodrome serving western Sydney. It currently handles approximately 200,000 annual aircraft movements (Second Sydney Airport Planners, 1997a).

Bankstown aerodrome is located approximately eight kilometres to the north of the Holsworthy Military Area and is 28 kilometres from the southern end.

Camden aerodrome is located approximately 20 kilometres to the west of Holsworthy.

Wedderburn air strip is located to the south-west of Holsworthy Military Reserve within the Dharawal State Recreation Area.

### *Water/Wastewater*

The Woronora Dam and associated catchment area is located immediately east of the Holsworthy Military Area under part of the Sydney Water supply.

A waste service disposal depot and recycling centre is situated next to the ANSTO site off New Illawarra Road, to the east of the Holsworthy Military Area.

The Army's sewage treatment works is located within army owned land to the east of the Holsworthy Military Area.

The Elizabeth Drive waste disposal and recycling centre is located in an old quarry near the confluence of Badgerys Creek and South Creek, immediately

to the west of the McGarvie Smith farm, approximately one kilometre from the boundary of the Badgerys Creek site.

### *Other Special Uses*

The ANSTO nuclear reactor is situated approximately three kilometres east of the closest Holsworthy Military Area boundary in Lucas Heights on the New Illawarra Road.

Other special uses in the vicinity of the proposed Badgerys Creek airport site include the Hubertus Country Club rifle club which is located near the corner of Elizabeth Drive and Badgerys Creek Road within the proposed airport site, the Sydney Catholic Garden Cemetery, located to the south of the proposed Badgerys Creek site and the Animal House division of the Ciba-Geigy Research Station, located to the east of the proposed airport site, off Western Road in Kemps Creek.

## **5.3 NOISE SENSITIVE LAND USES**

Noise sensitive land uses represent all those uses which experience greater acoustical sensitivity where lower noise level thresholds from aircraft overflights are appropriate for communication purposes (*Technical Paper No. 3*).

Land uses included within this category include:

- residential;
- hospitals;
- places of worship;
- aged facilities;
- educational institutions; and
- child care facilities.

Potential noise impacts on these land uses are addressed in detailed in *Technical Paper No. 3*.

## 5.4 LAND USES ON AIRPORT SITES

### 5.4.1 BADGERYS CREEK

The pattern of land use and ownership in Badgerys Creek derived its origins from Crown grants in the early 1800s. The current subdivision pattern is a mix of rural holdings, rural residential subdivisions and some larger government, commercial and industrial holdings. The land uses of the area are typical of most of the outer metropolitan areas of Sydney.

*Figure 5.2* shows the major land uses within the Badgerys Creek site (all options). This shows that land use on site is predominantly agricultural, including grazing, poultry, horse training, intensive cropping and rural residential.

A few commercial interests are located on-site, including the Leppington Pastoral Company, which sells organic fertilisers and Atomic Hire (which hires out moveable sheds). Boral Brickworks also occupy a part of the site. Other commercial uses on site tend to be related to the pastoral industry (Pington, Clisdell and Ferndale).

A notable agricultural use, to the east of the site is the Inghams Enterprises multiplication farm and the Kellers duck hatchery.

Other land uses on-site which fall within the special use or noise sensitive category are shown on *Figure 5.2*, and include:

- Badgerys Creek Primary School, on Badgerys Creek Road;
- Badgerys Creek Park, on Badgerys Creek Road;
- two cemeteries, on Pitt Street;
- Hubertus Country Club (rifle and pistol range), on Adams Road;
- Badgerys Creek Scouts Headquarters, on Badgerys Creek Road; and
- Telstra coastal communications station and Bringelly remote radio receiving station on Badgerys Creek Road.

The second most predominant use on-site is rural residential, accommodating a range of intensive cropping and market gardening. Included in this category is the Vicarys Winery.

Land uses of importance, not within the site itself, but immediately adjoining are listed in *Table 5.2*.

TABLE 5.2 LAND USES IN IMMEDIATE VICINITY OF BADGERYS CREEK AIRPORT SITES

Luddenham	Kemps Creek	Bringelly
<ul style="list-style-type: none"><li>▪ Holy Family Parish Centre Catholic Church and School</li><li>▪ Community Progress Hall</li><li>▪ Petrol station/shops/Post Office</li><li>▪ Luddenham Primary School</li><li>▪ Sales Park</li><li>▪ Luddenham Uniting Church</li><li>▪ St James Anglican Church and Cemetery</li></ul>	<ul style="list-style-type: none"><li>▪ Kemps Creek Park/Playground</li><li>▪ Kemps Creek Hall</li><li>▪ Kemps Creek Primary School</li><li>▪ Kemps Creek Fire Station</li><li>▪ Tennis courts</li><li>▪ Kemps Creek shopping centre</li><li>▪ three petrol stations</li></ul>	<ul style="list-style-type: none"><li>▪ Bringelly Primary School</li><li>▪ Cellars (bottleshop)</li><li>▪ Fitness centre</li><li>▪ Shops</li></ul>

Immediately north of the Badgerys Creek site is the University of Sydney, McGarvie Smith Farm and the Elizabeth Drive (Pacific Waste) Landfill site.

5.4.2 HOLSWORTHY MILITARY AREA

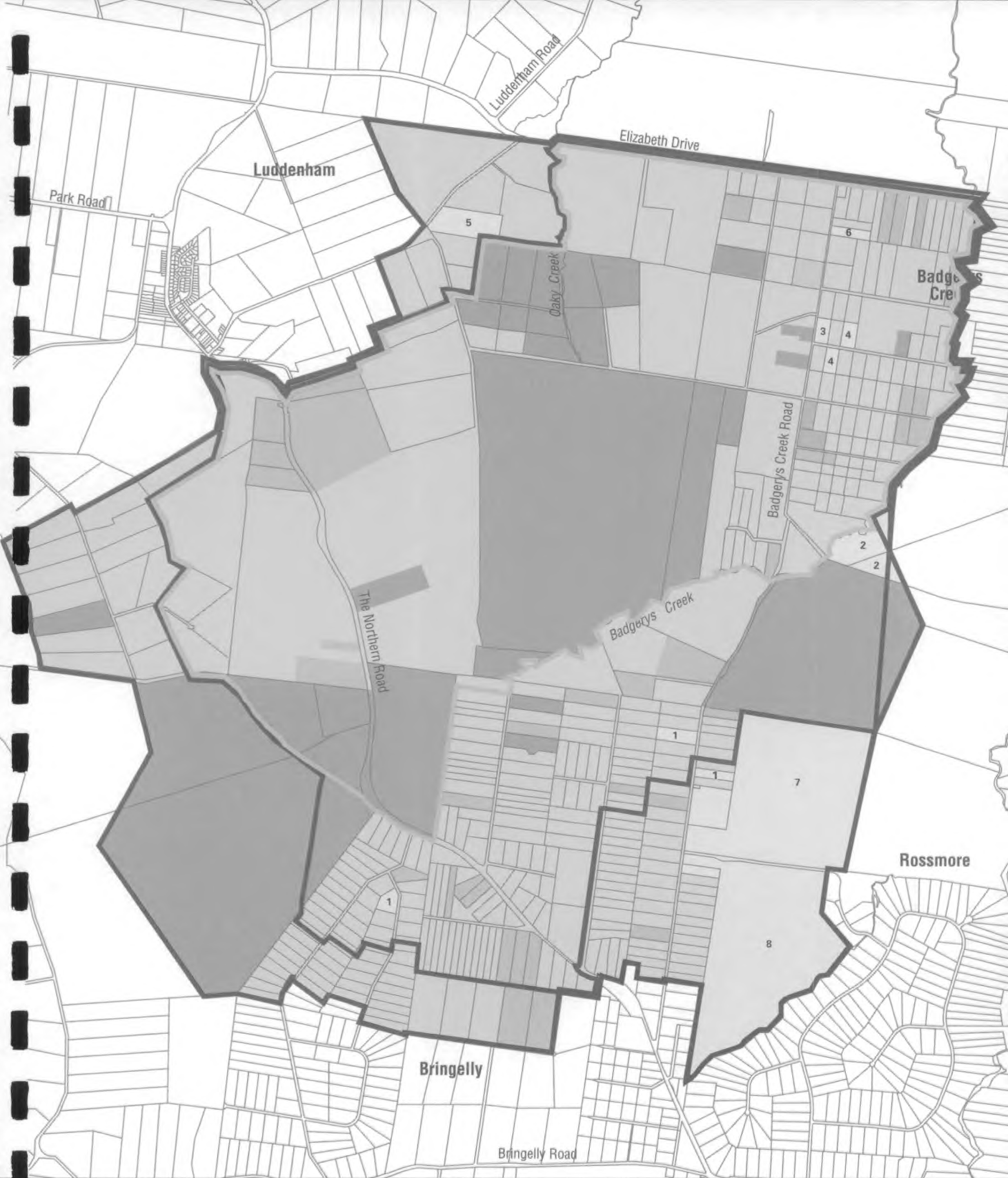
Figure 5.3 shows the existing land use pattern within the Holsworthy Military Area and indicates the type of activities conducted there.

The area occupies approximately 20,000 hectares, of which 19,000 hectares is actively used by the Australian Defence Force. The remaining 1,000 hectares are occupied by the O’Hares Creek catchment area, which has recently come under the control of the NSW National Parks and Wildlife Service, as it is known to contain significant floral, faunal and Aboriginal sites.

The Holsworthy Military Area is predominantly used for military training purposes. Facilities and areas used for these purposes include:

- field firing ranges (for live firing and non-firing activities);
- exercise areas;
- permanent and overnight bivouac areas;
- airfields and landing zones (restricted to certain areas);
- helicopter landing areas;





- |   |  |
|---|--|
| Boundary of Option A                          | Special Uses                                   |
| Boundary of Option B                          | Dog Kennels                                    |
| Boundary of Option C                          | Brickworks                                     |
| Agriculture-Livestock                         | Badgerys Creek Primary School                  |
| Agriculture-Cropping                          | Cemetery                                       |
| Rural and Residential (predominantly grazing) | Hubertus Country Club - Rifle and Pistol Range |
| Commercial                                    | Badgerys Creek Scouts Headquarters             |
| Open Space                                    | Telstra Coastal Communications Station         |
|   | Bringelly High Frequency Receiving Station     |

Figure 5.2  
**Badgerys Creek Land Uses**  
 Cadastral Source: Department of Land and Water Conservation



0Km 2.5Km

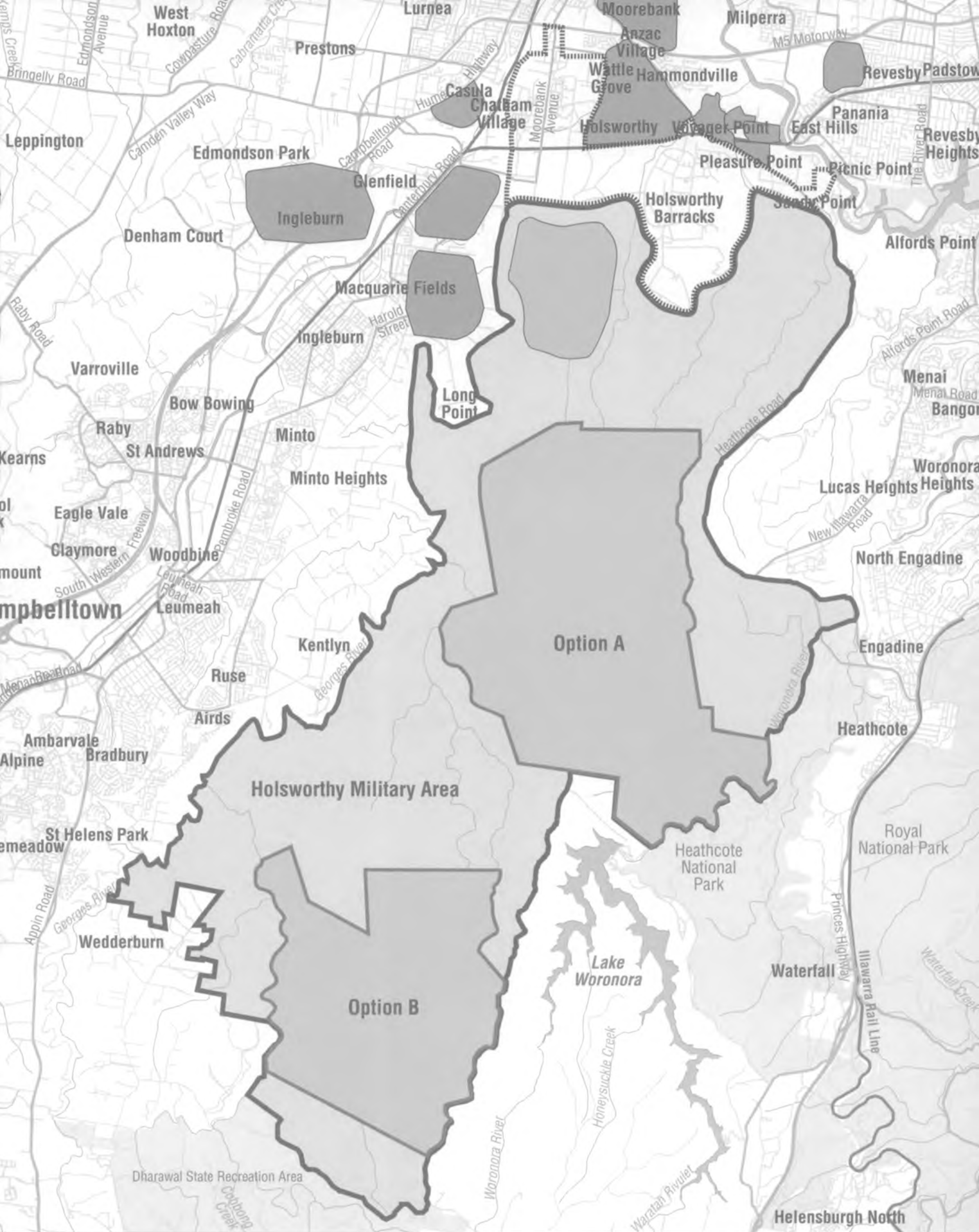


Figure 5.3

## Land Uses: Holsworthy Military Area

- Holsworthy Base Area
- Holsworthy Training Area
- Small Arms Firing Range
- Sites of Airport Options
- Suburbs containing Defence Housing Authority Properties



- small arms range complex and demolition ranges; and
- driver training area.

Structures on the field firing ranges consist of sentry sheds, control buildings, water tanks, safety and viewing structures, road culverts, bridges, ground trenches, bunkers and stop butts.

Substantial Defence facilities are located in the containment area north of the range, and comprise:

- operational, training and administrative facilities;
- army reserve training and administrative facilities;
- army residential properties;
- army recreational facilities;
- army field hospital;
- joint services storage facilities;
- Defence Housing Authority residences;
- army firing ranges; and
- army field training areas.

Residential accommodation on site is concentrated within barracks and single and two storey residential buildings. The main areas of Defence Housing Authority development serving the site, their size and function are listed in *Table 5.3*.

TABLE 5.3 RESIDENTIAL ACCOMMODATION SERVING HOLSWORTHY MILITARY AREA

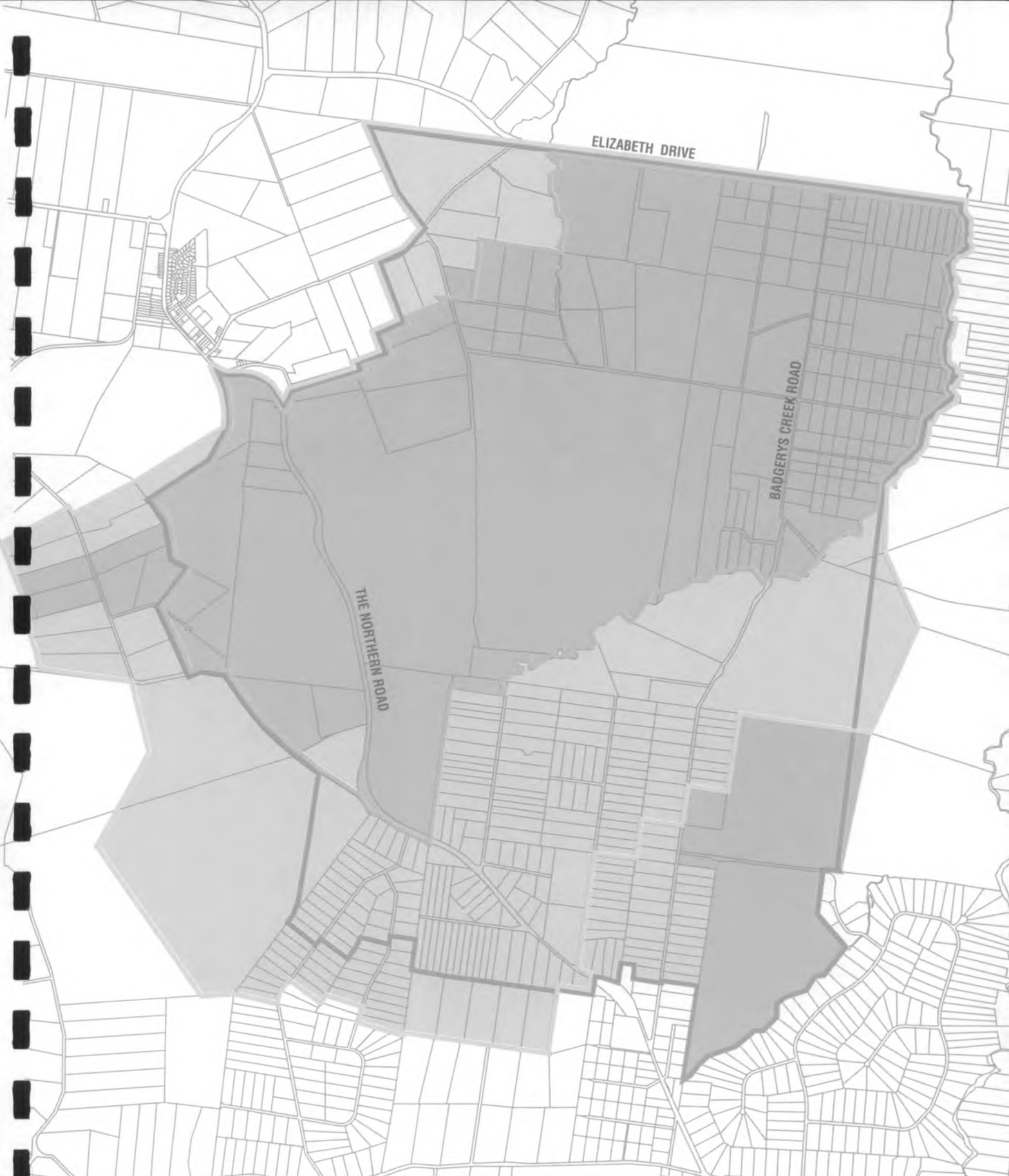
Name	Function	Facilities
Ingleburn	Defence Housing Authority Housing	298 residences
Wattle Grove/ Holsworthy Village	Residential accommodation for Defence and private sector	775 single and two storey residential buildings
Voyager Point	Redevelopment for residential purposes	Development Approval for 78 Defence residential properties
Moorebank	Residential accommodation for Defence and private sector	43 single and two storey residential buildings
Chipping Norton	Residential accommodation for Defence and private sector	32 single and two storey residential buildings
Macquarie	Residential accommodation for Defence and private sector	Single and two storey residential buildings
Casula	Residential accommodation for Defence and private sector	54 single and two storey residential buildings
Glenfield	Residential accommodation for Defence and private sector	40 single and two storey residential buildings
Macquarie Fields	Residential accommodation for Defence and private sector	8 single and two storey residential buildings
Picnic Point	Residential accommodation for Defence and private sector	16 single and two storey residential buildings
Panania	Residential accommodation for Defence and private sector	14 single and two storey residential buildings
Campbelltown	Residential accommodation for Defence and private sector	57 single and two storey residential buildings

Source: Department of Defence, 1997b.

5.5 LAND OWNERSHIP

5.5.1 BADGERYS CREEK

Appendix C lists all properties located within the boundary of all Badgerys Creek airport site options. Figure 5.4 shows the division between public (Commonwealth) land and private land. This shows that a majority of the site is in Commonwealth ownership (approximately 65 to 70 percent). This is due to the Commonwealth Government purchasing land since 1985, which covered the original proposed airport site (Option A). Many of the previous land holders have remained on this land, leasing it back from the Government



- Boundary of Option A
- Boundary of Option B
- Boundary of Option C
- Government-owned land
- Private-owned land

Figure 5.4  
**Badgerys Creek Land Ownership**  
*Cadastral Source: Department of Land and Water Conservation - Land Information Centre*



0Km

2.5Km

and continuing to operate. The other significant area of land which is owned by the Commonwealth of Australia is the Telstra coastal communication station and the Royal Australian Air Force remote receiving station to the east of Options B and C. The Commonwealth of Australia also owns land within Option B, to the south-west of the site.

Approximately 194 land owners would be affected either by full or partial acquisition of their properties for the implementation of Option B and approximately 206 for Option C.

The remaining land within the site of Options B and C is largely owned by separate private land holders. Some of these properties are owned by individuals within the same family who use the properties for joint commercial purposes, such as market gardening. Location of properties within the airport site is shown on *Figure C1 in Appendix C*.

### 5.5.2 HOLSWORTHY

Defence advise that approximately one third of the Holsworthy Military Area has been owned freehold by the Commonwealth of Australia since 1913. The remainder of the site was held by Defence under permissive occupancy arrangements until 1979 when it was acquired by the Commonwealth under the *Foreshores Agreement*.

It is understood that depth limitation applies to a majority of the site, whereby it is likely that land below this is vested in the State of NSW. Assuming this is the case, the Commonwealth has the power to compulsorily acquire the outstanding title, either through the *Lands Acquisition Act 1989* or by special legislation.

## 5.6 SUMMARY OF LAND USES

The sites of the proposed Second Sydney Airport are located in the west and south-west of Sydney. Both these areas exhibit broadly similar land use characteristics, namely:

- peripheral locations, with rapidly expanding urban release areas adjoining major sub-regional centres;
- large areas of open space, incorporating National Parks, State Recreation Areas, Water Catchment Areas and areas of Environment Protection; and
- a large number of rural residential properties with associated agricultural and market garden operations.

However, land uses on and in the immediate vicinity of each of the sites differ more extensively. *Table 5.4* summarises the main areas of differentiation.

TABLE 5.4 SUMMARY OF LAND USES ON AND IN IMMEDIATE VICINITY OF AIRPORT SITES

Land Use	Site		
	Badgerys Creek	Holsworthy Option A	Holsworthy Option B
Residential	Predominantly low density rural residential on and off site.	No residential development on site. Surrounding residential concentrated in new urban release areas. Rural residential areas to south-west of site.	No residential development on site. Surrounding residential concentrated in new urban release areas. Rural residential areas to south-west of site.
Commercial	Commercial operations focussed on individual operations, usually agriculturally related.	Commercial uses concentrated in adjoining designated employment and commercial areas.	Commercial uses concentrated in adjoining designated employment and commercial areas.
Rural	Predominantly rural land uses (residential, commercial and agricultural) on and adjoining airport site.	Areas to south-west predominantly rural. Site currently in bushland setting.	Areas to south-west predominantly rural. Site currently in bushland setting.
Open Space and Recreation	Limited open space on or adjoining airport sites. Regional recreational uses to west and south west, but not immediately adjoining.	No public areas of open space on site. However, large areas immediately adjoining site due to urban nature of surrounds. Regional recreational areas immediately adjoining site to east and south-east.	No public areas of open space on site. However, large areas immediately adjoining site due to urban nature of surrounds. Regional recreational areas immediately adjoining site to east and south-east.
Environment Protection	No areas on site or immediately adjoining.	Areas of Environment protection to south and east of site (water catchments).	Areas of Environment protection to south, east and west of site (water catchments).
Special Uses	Dispersed within immediate vicinity of site. Includes Department of Defence lands at Bringelly and Orchard Hills.	In close proximity to ANSTO nuclear reactor.	No major special uses adjoining proposed airport site.

In summary land uses on and in the vicinity of the proposed airport sites are reflective of the density and functions of the areas in which they are located. For Badgerys Creek, this is generally lower density, rural development with little urban influence (industrial, residential etc). For Holsworthy (both sites) land uses tend to be more varied with the more urban nature of the areas to the west, with consequent services and facilities, including community uses (schools, hospitals etc) and public open space and the areas of National Park and Recreation to the south and east.



## CHAPTER 6 EMPLOYMENT

### 6.1 EXISTING EMPLOYMENT

*Figure 3.3* shows the extent of the Second Sydney Airport employment land catchment area adopted for the purpose of this assessment. All local government areas located within this region, with the exception of Sutherland, are in western Sydney.

The western Sydney economy has grown considerably over the past 25 years, and there are now over 400,000 jobs in the region with a workforce of over 600,000. This represents 46 percent of the workforce of metropolitan Sydney. Job growth has increased substantially over the past 20 years, with 180,000 new jobs being created in western Sydney between 1971 and 1991 (Taskforce on Planning for the Sub-Region Surrounding Sydney West Airport, 1996). However, there continues to be dependence on jobs outside the region as growth in the workforce (as a result of population increase) continues to outstrip the number of jobs. This has resulted in relatively high unemployment rates which vary across the catchment from 9.2 percent in Fairfield/Liverpool includes Camden, Campbelltown, Fairfield, Liverpool and Wollondilly to 4.7 percent in St George/Sutherland (Australian Bureau of Statistics, 1996).

Factors attributing to this include:

- a young population and high number of young workers entering the labour force;
- a high proportion of persons from non-English speaking backgrounds; and
- a high number of blue collar workers and labourers.

Most employment within the western Sydney region is concentrated in manufacturing, wholesale, retailing and community services. A small agricultural and mining sector also exists in outlying areas (Taskforce on Planning for the Sub-Region Surrounding Sydney West Airport, 1996b). Comparison with the other local government areas within the Sydney metropolitan area reveals that:

- 18.4 percent of jobs are in manufacturing, compared with an average of 14.6 percent for the rest of Sydney;
- 42.8 percent of jobs are in wholesale, retail and recreation, compared with 36.5 percent for the rest of Sydney;

- 13.1 percent of jobs are in primary products and infrastructure compared to 9.1 percent for the rest of Sydney; and
- only 14.1 percent of jobs are in business and professional services compared with an average of 24.9 percent for the rest of Sydney.

Employment within the catchment area is concentrated in sub-regional centres, that is, Liverpool, Penrith and, Campbelltown, secondary centres (Fairfield, Blacktown, Bankstown), purpose built retail centres such as Macquarie Fields, Miranda and Blacktown mega centre and designated employment areas. A high proportion of people also commute out of the region to other centres and the Sydney central business district.

6.2 EXISTING EMPLOYMENT LAND

An assessment of existing employment lands within the employment land catchment area was conducted to establish their size, location and vacancy levels in order to determine their suitability to accommodate potential employment growth arising from the proposed Second Sydney Airport. A list of current areas of zoned employment land, their size and levels of vacancy are provided in Table 6.1.

TABLE 6.1      EMPLOYMENT LAND WITHIN SECOND SYDNEY AIRPORT EMPLOYMENT LAND CATCHMENT AREA

Local Government Area	Area of Zoned Employment Land	Total Area (Hectares)	Vacant Land (Hectares)
Bankstown	Chullora	236.6	25.9
	Greenacre	26.2	1.2
	Sefton	32.8	3.8
	Villawood	67.6	0
	Chester Hill	87.8	2.0
	Condell Park	28.3	1.1
	Revesby	178.2	5.6
	Showground	57.8	3.0
	Bankstown	33.7	2.2
	Padstow	104.7	9.9
	Mt Lewis	2.8	0.3
	Bankstown Airport	307.4	13.7
Sub Total		1,163.9	68.7

TABLE 6.1 CONTINUED

Local Government Area	Area of Zoned Employment Land	Total Area (Hectares)	Vacant Land (Hectares)
Blacktown	Riverstone	82.9	9.8
	Kings Park	209.2	32.5
	Seven Hills	188.6	22.3
	Mt Druitt	47.4	23.1
	Prospect	35.3	0.6
	Huntingwood	118.5	49.2
	Arndell Park	147.8	81.1
	Glendenning	138.8	81.4
	Rooty Hill	63.4	0
	Minchinbury	125.6	96.2
	Other (Flushcombe/Blacktown)	8.1	2.2
Sub Total		1,165.6	398.4
Camden	Smeaton Grange	224.7	202.1
	Graham Hill Road	38.1	7.5
	Camden Valley Way	11.1	3.0
	Other	17.3	1.3
Sub Total		291.2	213.9
Campbelltown	Minto	278.2 <sup>4</sup>	137.8
	Ingleburn	312.6 <sup>4</sup>	170.2
	Campbelltown	176.0 <sup>4</sup>	69.4
	Leumeah	0.7	0
Sub Total		767.5	377.4
Fairfield	Wetherill Park	603.8	161.8
	Smithfield	43.1	0.9
	Villawood	90.6	3.6
	Lansvale	59.7	7.5
	Bonnyrigg	9.7	4.1
	Guildford	14.3	0
	Cabramatta	3.9	1.0
Sub Total		825.1	178.9
Liverpool	Moorebank	193.5	2.1
	Chipping Norton	101.6	10.3
	Warwick Farm	40 <sup>1</sup>	1
	Orange Grove	40.7	0
	Prestons/Crossroads	264 <sup>1</sup>	138.4
	Hoxton Park	56 <sup>2</sup>	DNA
	Sappho Road	12.4	0
Sub Total		708.2	151.8

TABLE 6.1 CONTINUED

Local Government Area	Area of Zoned Employment Land	Total Area (Hectares)	Vacant Land (Hectares)
Penrith	Erskine Park	494.7	319.4
	Dunheved	244.1	29
	North Penrith	248.2	103.2
	Emu Plains	125.1	27.1
	St Marys	55.5	26.6 <sup>3</sup>
	Kingswood	19.5	0.2
	Other (City, Blaike Road, Mulgoa Road, Station Street)	87	1.1
Sub Total		1,274.1	506.6
Sutherland	Taren Point	166.8	14.2
	Miranda	8.8	1.1
	Kirrawee	57.2	3.5
	Kurnell	668.3	128.4
	Heathcote	4.86	1.6
	Lucas Heights	9.2	4.6
Sub Total		915.16	153.4
Wollondilly	Appin	10.1	0.6
	Picton	27.9	10.1
	Silverdale/Warragamba	61.3	44.3
	Bargo	1.8	0.7
	Maldon	106.7	33.3
Sub Total		207.8	89.0
Total		7,318.56	2,138.1

Source: Department of Urban Affairs and Planning (1996a) (from Sydney Water's Land Availability Data System) unless specified.

- Notes:
1. Liverpool City Council (1994).
  2. Greater Western Sydney Economic Development Board (1997).
  3. Penrith Council (1997).
  4. Campbelltown Council.
  5. DNA - Data not available.

Table 6.1 shows that the main areas of vacant land within the employment land catchment area are:

- Prestons/Crossroads, Liverpool;
- Erskine Park, Penrith;
- North Penrith, Penrith;
- Kurnell, Sutherland;

- Glendenning, Blacktown;
- Arndell Park, Blacktown;
- Smeaton Grange, Camden;
- Ingleburn, Minto and Campbelltown, Campbelltown; and
- Wetherill Park, Fairfield.

This area contains approximately 1,512 hectares of vacant land. The latest information on take up of employment land (Department of Urban Affairs and Planning, 1996a) indicates that while just over half of take up is in the general industry category, the high tech category has continued to grow, from zero take up in 1990/91 to 13 percent of land take up in 1995.

### 6.3 EMPLOYMENT LANDS DEVELOPMENT PROGRAM

The NSW Department of Urban Affairs and Planning monitors the supply and demand for employment land in Sydney through its *Employment Lands Development Program*. This program is produced each year (previously the Industrial Lands Development program), from surveys of each council area, based on statutory take up rates, that is, areas of vacant zoned land for which development consents were issued. The 1996 survey has been modified to include data from the Sydney Water Land Availability Data System (LADS). This is a computer based system used by Sydney Water to monitor how quickly land designated and zoned for urban purposes is developed. This represents the most reliable source of consistent information and has been utilised in the assessment of existing and future employment land availability.

The *Employment Lands Development Program* provides information on take up rates for specified industries, and the amount of total zoned and vacant land for each local government area. From this it is possible to establish trends for each local government area and throughout the employment land catchment area. *Table 6.2* summarises data published in the *Employment Lands Development Program* for the last eight years for local government areas identified within the catchment. It shows average take up rates by local government area over the period and estimates average take up for the catchment as a whole. Two sets of figures have been produced due to the change in monitoring resulting from the Sydney Water LADS program. The overall average is not, however, substantially altered.

From this, it can be seen that take up rates of employment land in the employment land catchment area have varied considerably over the past eight years, reflecting changes in the economic climate during this period and

throughout Sydney. The average take up figure, calculated from the totals for each local government area is 131 hectares for the period 1988 to 1996. Given the changing economic climate over the past eight years, from relatively buoyant during the late 1980s, early 1990s to recession during the early/mid nineties (a record high of almost 500 hectares was recorded in 1988/89 and a record low in 1991/92 of 69 hectares), it is considered that the average take up rate as stated is appropriate as a basis for calculating supply.

TABLE 6.2 EMPLOYMENT LANDS TRENDS WITHIN EMPLOYMENT LAND CATCHMENT AREA

Local Government Area	Average Take Up (88-95) (Hectares)	Average Take Up (88-96) (Hectares)
Bankstown	37	63
Blacktown	33	14
Camden	6	8
Campbelltown	18	-14
Fairfield	11	8
Liverpool	12	-0.4
Penrith	15	34
Sutherland	3	49
Wollondilly	-2	-0.1
<b>Total (average for all local government areas within catchment areas)</b>	<b>122</b>	<b>131</b>

Source: Department of Urban Affairs and Planning (1996a).

## 6.4 EXISTING SUPPLY AND DEMAND FOR EMPLOYMENT LAND

### 6.4.1 SUPPLY

Based on the Employment Lands Development Program (Department of Urban Affairs and Planning, 1996a), the amount of zoned employment land available within the Sydney metropolitan region is approximately 13,675 hectares. Within the defined Second Sydney Airport employment land catchment area the total amount of zoned land in 1996 was 6,880 hectares, of which 2,195 hectares was vacant. This means that 50 percent and 68 percent of zoned and vacant land, respectively, is located within the adopted employment catchments of the Second Sydney Airport. Over the past eight years, this

represents an increase in zoned employment land for this area of 1,219 hectares. Vacancy levels across the region have increased by 301 hectares.

Given average take up rates of 131 hectares, and the amount of vacant land within the catchment, it is estimated that there is sufficient employment land, to meet expected demands over at least the next 16 years. This assumes no development of the Second Sydney Airport and would depend on the rate of economic growth of Sydney.

While the overall supply of employment land has not changed considerably across Sydney, a change in the distribution of this land has been experienced, with inner established areas declining, compared to outer and fringe areas. This is reflective of Government policy to improve employment opportunities in the newer outer areas and facilitate residential development in older established areas. It is also reflective of land availability in the outer areas. At June 1996, of the seven local government areas with the largest quantities of vacant land, five were in the defined employment land catchment areas, being Bankstown, Fairfield, Penrith, Sutherland and Blacktown.

Specifically, several new major employment areas have emerged within the catchment areas over the past 5 to 10 years. These include Huntingwood and Arndell Park in Blacktown, Erskine Park in Penrith, and Prestons/Crossroads in Liverpool. Combined, these have contributed an extra 1,054 hectares to employment land within the catchment, and nearly eight percent of all available employment land within the Sydney region. Most of these are located along or proximate to major transport corridors in new release areas, where land is more readily available. The precise location of these and other employment areas within the catchment are shown in *Figure 6.1*.

#### 6.4.2 DEMAND

There have been some notable changes in demand for employment uses across the Sydney region over the past five years, with traditional industries such as machinery, engineering, electrical and chemical declining and high-tech and service industries experiencing relative increases (two percent in 1989 and five percent in 1992/93). Three sites within the employment land catchment areas had over 100 hectares of developable land (Kurnell (540 hectares), Wetherill Park (374 hectares) and Bankstown airport (294 hectares) (Department of Urban Affairs and Planning, 1996a).

Recently, warehouse and distribution firms have sought locations in the catchment, a result of cheaper land, easier and more accessible transport routes, larger green field sites with room for expansion and changing world practices. These trends are expected to continue and would possibly accelerate with the development of a Second Sydney Airport.

Following decline in the industrial property market in the five years prior to 1995, the market has experienced general stabilisation and is undergoing a modest recovery, although speculative activity is still suppressed. Industrial property analysts report strengthening demand for development in established areas and identify Villawood, Huntingwood and Chullora as amongst the most popular areas for new construction (Department of Urban Affairs and Planning, 1996a). However, given the reduced land availability within these areas (see *Table 6.1*), it is likely that this demand will shift to other established sites within the catchment.

The employment land catchment has capitalised on the relative short supply of employment land within the inner and central areas, to the extent that it has accounted for over 50 percent of total take up for the whole of the Sydney region over the past eight years, although this has still been relatively slow, attributed to, amongst other things, prohibitive up front costs of infrastructure. Much of this has been experienced within the local government areas of Blacktown, Fairfield, Penrith, Liverpool, and Campbelltown, although as indicated, supply of land within these areas has kept well abreast of demand. This excludes any increases associated with the development of an airport.

## 6.5 FACTORS AFFECTING DEMAND FOR EMPLOYMENT LAND

Past experience within Australia and overseas indicates that several factors influence the location of employment uses, and these vary according to the type of industry or organisation. For example, transport and distribution industries are reliant on good communications and access to maximise access to their markets, while high tech developments concentrate in areas of similar development, with high amenity facilities and usually in proximity to areas/facilities which maximise accessibility for their executives (for example, close to airports and high quality residential suburbs).

The main factors influencing demand can be summarised as follows:

- land size and price - availability of land for expansion, which is well serviced;
- location - varies, dependent on industry type, but usually relates to proximity to major transport routes, the central business district, residential areas, community facilities and linkages with other similar industries;
- amenity - some employment uses benefit from the provision of other facilities and services on site, such as child care, retail, or recreational provision (for example, golf courses), where this enhances the attractiveness of the area;





Existing employment lands



Figure 6.1

**Existing Employment Lands**

Land uses based on generalized zonings in planning instruments of each local council within the Planning Assessment Region.



0Km 10Km 20Km

- labour supply - dependent on the mix of skills required, for example, those with requirements for unskilled/tradespeople are usually attracted to outer areas of Sydney, such as Liverpool, Blacktown, Fairfield and Campbelltown, while those with professional skills are attracted to areas having greater proportions of professional and para professionals, such as the north shore and north-west Sydney; and
- availability of public transport - to serve employees and visitors without access to private transport.

Major determinants which serve to attract/distract certain types of employment use within the Second Sydney Airport catchment are shown in *Table 6.3*.

The table shows that traditionally this part of Sydney has served to attract certain types of employment use, with an overall concentration in the manufacturing and production sectors. This balance is more than likely to change, however, as land availability in established areas decreases, transport links to and within the catchment are improved and infrastructure costs are reduced. Coupled with the relative attractive environment (abundant housing, limited congestion and provision of open space and recreational opportunities) mean that the employment land catchment over the next few years will continue to capture its share of manufacturing/industrial uses and can expect to capitalise on the increase in service sector/hi-tech employment uses and development arising from the Second Sydney Airport.

TABLE 6.3 FACTORS INFLUENCING DEMAND FOR EMPLOYMENT LAND WITHIN SECOND SYDNEY AIRPORT EMPLOYMENT LAND CATCHMENT

Employment Uses	Factors Determining Relative Attraction of Catchment Area							Distance to	
	Good	Infrastructure and Servicing Constraints	Availability of Blue Collar Workers	Limited Skilled Workforce	High Quality Residential Suburbs	Large Areas of Vacant Employment Land	Access to Recreational Opportunities	CBD	Other Regional/Sub-Regional Centres
	Accessibility to major existing and proposed transport routes								
Warehousing/ Distribution/ Storage	✓ +	✓ -				✓ +			✓ +
Manufacturing/ Industrial		✓ -	✓ +			✓ +			
High Tech/ Research and Development	✓ +	✓ -		✓ -	✓ +	✓ +	✓ +		
Personal Services/ Banking/Property		✓ -		✓ -	✓ +	✓ +		✓ -	
Light industrial	✓ +	✓ -	✓ +			✓ +			

Notes:      ✓ +    Attracted  
                  ✓ -    Distracted

## CHAPTER 7 EXISTING SERVICES AND INFRASTRUCTURE

### 7.1 BADGERYS CREEK

Existing infrastructure within and adjoining the sites of the Badgerys Creek airport options is shown in *Figure 7.1* and described below.

#### 7.1.1 TRANSPORT

The sites of the proposed Badgerys Creek airport options are bounded by Elizabeth Drive to the north which connects to Wallgrove Road at Cecil Park. The Northern Road to the west of the site extends north to the M4 Motorway near Penrith where there is a grade separated interchange. Bringelly Road, to the south of the site, intersects with The Northern Road, runs parallel to Elizabeth Drive and connects with the Camden Valley Way at Edmondson Park.

Current proposed road upgrades in this area include:

- Wallgrove Road at Cecil Park which is to be upgraded as part of the Western Sydney Orbital Route which is to be developed in a number of stages connecting the M2 Motorway at Baulkham Hills with the M5 Motorway at Prestons;
- the M4 Motorway which is in the process of being widened from four to six lanes between Parramatta and Penrith; and
- recently announced plans by the NSW Government to proceed with the M5 East extension from King Georges Road to General Holmes Drive and the proposed Eastern Distributor.

There are two main railway lines in the region:

- the Main Western Rail Line extends from the city, west via Parramatta and Blacktown to Penrith and the Blue Mountains; and
- the Main Southern Rail Line and the East Hills Rail Line which intersect at Glenfield, south of Liverpool and extend south to Goulburn and Melbourne.

The recently completed Merrylands to Harris Park Y-link between the Southern and Western Rail Lines provides direct rail access to Parramatta from Liverpool and Campbelltown.

The sites of the Badgerys Creek airport options are not adjacent to either railway line. Existing transport links are described in more detail in *Technical Paper No. 13*.

#### **7.1.2 WATER**

Water supply around the site is provided by Sydney Water. There are two 150 millimetre diameter water mains laid in Elizabeth Drive which are fed from the Cecil Park reservoirs, nine kilometres to the east. These reservoirs are supplied by Prospect Reservoir. A new water filtration plant has been commissioned recently at Prospect to treat all water passing through Prospect Reservoir. The main Sydney Water supply pipeline from Warragamba Dam to Prospect passes five kilometres north of the site.

#### **7.1.3 WASTEWATER**

There is no sewerage infrastructure in the Badgerys Creek area. All existing sewers are discharged to septic systems prior to disposal. Sewage is then discharged into local waterways which include Badgerys Creek, Oaky Creek, South Creek, Thompson Creek and Cosgrove Creek. Sydney Water has long term plans for the region which falls within the Nepean-Hawkesbury River Catchment System. It plans to establish a major sewer main along South Creek which would drain from south to north with a sewage treatment works located on South Creek near the existing Sydney Water supply pipeline.

#### **7.1.4 ELECTRICITY**

A number of power lines of varying voltage are located along Elizabeth Drive on overhead poles. These lines feed back to the Sydney West Substation located north-east of the site off Wallgrove Road. A Transgrid 330 kilovolt transmission line from Yass to the Sydney West Substation traverses the western boundary of the site.

Electricity substations are located at Regentville and Wallgrove and bulk supply points are located at Sydney West and Regentville.

#### **7.1.5 TELECOMMUNICATIONS**

Telstra currently operates a telephone exchange located on Badgerys Creek Road, known as 'Bringelly Exchange', which is connected into the main Telstra networks via optical cable. A 60 pair fibre cable also exists along The Northern Road and terminates at Luddenham. Telstra is currently planning the installation of an extension to its existing Penrith-Regentville installation via optical fibre cable to Mulgoa. The Telstra towers to the south-east of the site will be demolished when the station is closed in 1997.



Figure 7.1

### Existing Services and Infrastructure Around Badgerys Creek

Source: Second Sydney Airport Planners, 1997c

- |  |  |  |
|--|--|--|
| Sydney Water<br>Major Supply Pipelines | Major Electricity<br>Transmission Lines        |  |
| Natural Gas Pipeline                   | Electricity Substation                         |  |
| Bringelly Telephone<br>Exchange        | Combination of Option A, B<br>and C boundaries |  |



Badgerys Creek is located in the Penrith (currently '02' ) zone, consequently STD charges apply to calls between the site and the Central Business District of Sydney. Telephone charge zones have been set on the basis of radial distance from the Central Business District and are effectively incorporated in regulations associated with the current telecommunications legislation.

### 7.1.6 NATURAL GAS

There is a medium gas main laid in Elizabeth Drive. The main Sydney-Moomba Gas supply pipeline passes to the east of the site at Cecil Park.

## 7.2 HOLSWORTHY

Existing infrastructure within and adjoining the Holsworthy Military Area is shown in *Figure 7.2* and described below.

### 7.2.1 TRANSPORT

The Holsworthy Military Area is located to the south of the M5 Motorway, east of the South Western Freeway/Hume Highway and bounded to the east by Heathcote Road. To the south the Campbelltown-Bulli (Appin) Road connects the F6 Southern Freeway to Appin/Wilton Road and the Hume Highway.

The M5 Motorway and South Western Freeway are both four lane dual carriageways. Heathcote Road has recently been widened to provide several overtaking lanes along its length from Holsworthy to New Illawarra Road.

There are no significant roads within the Holsworthy Military Area and roads from the site to major road accesses are only minor connections. The roads within the site have been constructed by the Army for access and are all unsealed, some only being suitable for four wheel drive access.

The East Hills Railway Line passes the northern boundary of the site between East Hills and Glenfield Stations and joins the Main South Line at Glenfield; connecting to Liverpool and south to Camden and Goulburn. The East Hills Railway Line is in the process of being upgraded from two sets of tracks to four sets to provide extra capacity. The amplification will gradually be implemented between Turrella and Riverwood. The East Hills Line will connect to the New Southern Railway (currently under construction) enabling train services from Campbelltown to the Sydney Central Business District to travel either via the existing line or via new stations at Sydney Airport International and Domestic terminals.

Neither of the Holsworthy airport sites has direct access to the rail line at the northern end of the Holsworthy Military Area.

A more detailed description of the existing transport network surrounding the Holsworthy Military Area is provided in *Technical Paper No. 13*.

### 7.2.2 WATER

Demand for water at the Holsworthy Military Area is generated by the Army and is supplied from the Sydney Water storage reservoir at Prospect. There is no dedicated supply and the pipe network only has small diameter mains based on the equivalent of domestic demand requirements. Woronora Dam is located to the south-east boundary of the site. This dam serves southern Sydney with potable water. There are no supply pipelines from this dam leading north within the Holsworthy Military Area and there are no other supply pipelines within the area.

### 7.2.3 WASTEWATER

There is an existing sewage treatment plant on the northern boundary of the Holsworthy Military Area serving the Army facilities. There is no spare capacity in this system and the plant does not provide full tertiary treatment. There are several pumping stations to transport sewage to the treatment plant. No sewage infrastructure exists throughout the remainder of the Military Area.

The sites of Holsworthy Option A and B are located within the Upper Georges River Catchment. The Sydney Water strategy is to transport dry weather flows from Glenfield and Liverpool sewage treatment works to Malabar sewage treatment works via the South Western Suburbs Ocean Outfall Sewer with excess wet weather flows discharged in a diluted state to Georges River. Sydney Water is carrying out investigations to formulate a long term strategy to cater for sewage generated by existing and future development in this wastewater catchment which is due to be completed in 1997.

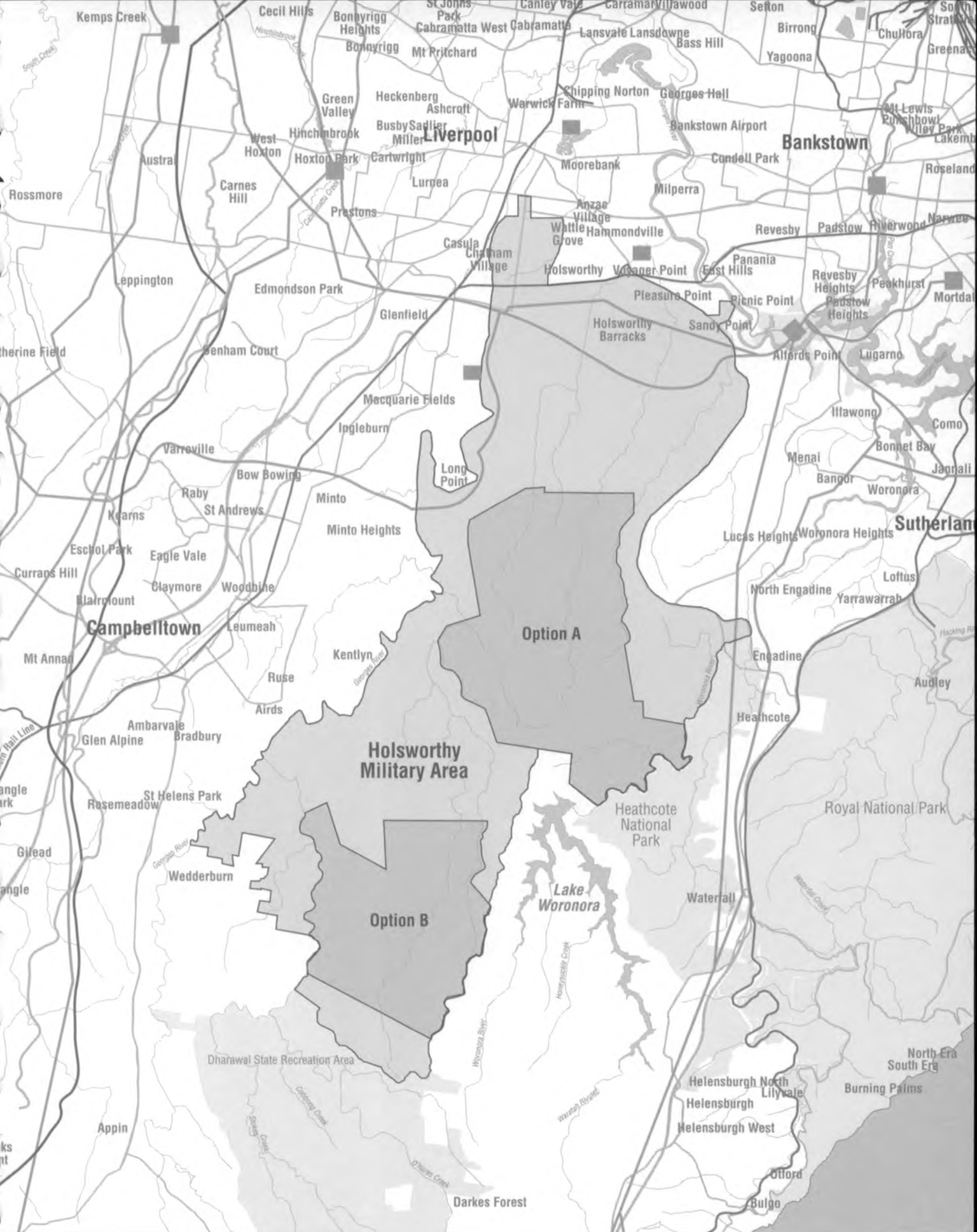
### 7.2.4 ELECTRICITY

#### *Holsworthy Option A*

The Holsworthy Option A site has two 11 kilovolt substations to serve the Army. These are provided by Integral Energy.

The closest bulk power supply point is located at Ingleburn where supply is available from a 330 kilovolt Transgrid line via 330/66 kilovolt transformers. A 330 kilovolt line exists to Transgrid's Sydney South substation. This Transgrid transmission line at Long Point and the Georges River crossing is located approximately four kilometres north of the proposed western runway for this airport option.





Major Water Supply Pipeline  
Sewage Treatment Works  
Electricity Transmission Lines

Electricity Substation  
Natural Gas Pipeline

Figure 7.2  
**Existing Services and Infrastructure  
Around Holsworthy Military Area**  
Source: Second Sydney Airport Planners, 1997c



### *Holsworthy Option B*

An adequate power supply is not readily available from the existing system to the Holsworthy Option B site. A bulk power supply substation is located at Camden which is supplied by two 132 kilovolt lines originating at Liverpool and Sydney West substations.

#### **7.2.5 TELECOMMUNICATIONS**

The Holsworthy Military Area is currently served by two Telstra exchanges at Liverpool and Holsworthy. The Army maintains two on site Private Automatic Branch Exchange (PABX) systems, one at Moorebank and one at Holsworthy. Telstra have a copper trunk cable in Anzac Road and a fibre optic back up in Heathcote Road. The Heathcote Road PABX is linked to the Heathcote Telephone Exchange by 300 pair copper cable. There are 40 in dial and 40 out dial lines to Liverpool Exchange from the Moorebank PABX. The Option A airport site is located within the Sydney telephone zone.

No telecommunications exist to the Option B airport site. The Campbelltown exchange is the nearest to the site. The main exchange is located in Liverpool. Option B is not located within the Central Sydney telephone zone but in the Campbelltown (currently '02') zone, consequently STD charges would apply to calls between the site and the Central Business District.

#### **7.2.6 NATURAL GAS**

Natural gas to the Holsworthy Military Area is supplied from two mains in Moorebank Avenue and Heathcote Road. Australian Gas Light Company maintain all gas supplies and equipment. There is capacity in the existing system to cope with a 100 percent increase in demand. All gas supplies are at a low pressure of 70 kilopascals to 210 kilopascals (Connell Wagner, 1997).

## CHAPTER 8 EXISTING SOCIAL CHARACTERISTICS

### 8.1 AREA OF IMPACT

All of the 15 local government areas within the Second Sydney Airport Assessment Region have been included in the social impact assessment, although it is probable that given the scale of the airport proposal and its influence on existing social structures, the social impacts would extend outside this area.

### 8.2 REGIONAL SOCIAL CHARACTERISTICS

Demographic statistics from the 15 local government areas have been analysed to determine the existing social environment which could potentially be impacted by any of the proposed five airport options. They were obtained from the Australian Bureau of Statistics 1991 Census, Department of Planning (1994) and the Department of Urban Affairs and Planning (1995a, 1996d). Statistics from the latest census conducted in 1996 were not available for analysis at the time of writing this Draft EIS. Statistics on existing population were updated using available information from local councils. Unemployment statistics for 1996 were obtained from the Department of Employment, Education, Training and Youth Affairs (1996).

The demographic statistics from the 1991 Census for each local government area were compared with those of the Sydney Statistical Division to assess key community characteristics in relation to one another and Sydney as a whole. The Sydney Statistical Division is a term used by the Australian Bureau of Statistics, and comprises all local government areas within the Sydney region. Wollongong local government area is not located within the Sydney Statistical Division, consequently it has been separated from some of the comparative analysis.

The following aspects of the existing social environment were analysed to provide an understanding of the potentially affected region:

- population and age structure;
- labour force status;
- ethnicity;
- education;

- household composition and status;
- household income; and
- journey to work.

All tables discussed in this assessment are provided in *Appendix D*.

8.2.1 POPULATION AND AGE STRUCTURE

Recent estimates (Department of Urban Affairs and Planning, 1996d) indicate that 3,739,000 people reside in the Sydney Statistical Division, (including the Central Coast), and 251,000 in the Wollongong Statistical Sub-division (Wollongong, Kiama and Shellharbour). The Sydney Statistical Division contains almost 25 percent of Australia’s total population.

Most of Sydney’s population growth has occurred on the periphery of the metropolitan area including areas surrounding Badgerys Creek and the Holsworthy Military Area, where land has been released for new housing estates.

*Table D1 in Appendix D* shows that in 1991, the Sydney Statistical Division had a population of 3,539,035 of which the 14 local government areas in the Second Sydney Airport Assessment region comprised 44 percent. At the same time, Wollongong local government area had 173,784 people.

TABLE 8.1 POPULATION FOR SECOND SYDNEY AIRPORT ASSESSMENT REGION

Area	1991 Population	Percentage of Population within the Sydney Statistical Division	Estimated Current Population
Assessment Region	1,557,462	44.0	1,677,967
Sydney Statistical Division	3,539,035	100	3,827,000 <sup>1</sup>
Wollongong	173,784		183,530 <sup>2</sup>

Source: Australian Bureau of Statistics Census (1991) (CDATA B05 Age by Sex (unless otherwise stated).

Notes:

1. Medium projected population for 1996 (Population projections Sydney Region Local Government Areas 1991 - 2021, 1995 Revision, Department of Urban Affairs and Planning.
2. 1995 Preliminary ERP figures from Illawarra Regional Information Service, 1997.

Of the local government areas examined, Blacktown has the largest population, comprising six percent of the total population of the Sydney Statistical Division. Sutherland, Fairfield, Bankstown and Penrith also contribute between four and six percent of population within the Sydney Statistical Division. With the exception of Sutherland and Fairfield, these local

government areas all contain significant new housing developments which have contributed to their large population.

The local government areas with the smallest proportion of the total Sydney Statistical Division are Camden and Wollondilly which are located on the outskirts of the Sydney region and are largely rural. Auburn and Hurstville also have smaller populations, as they comprise established suburbs and are smaller local government areas geographically.

The most recent population projections provided by the Department of Urban Affairs and Planning (1996d), and a number of local councils for 1995-1997 indicate that the populations of all local government areas have increased since 1991. This is mainly due to natural population increase, urban consolidation in established suburbs, and new housing estates in outer suburbs.

Table D2 in Appendix D shows the age structure of the local government areas examined. A summary of this is shown in Table 8.2.

TABLE 8.2 AGE STRUCTURE FOR SECOND SYDNEY AIRPORT ASSESSMENT REGION

Area	14 years and under	15 - 29	30 - 64	65 and over
	%	%	%	%
Second Sydney Airport Assessment Region	24.3	24.2	42.1	9.4
Sydney Statistical Division	21.1	24.5	43.1	11.3
Wollongong <sup>1</sup>	21.5	24.0	42.8	11.7

Source: Australian Bureau of Statistics (1991) (CDATA B05, Age by sex).  
Note: 1. Wollongong is not located within the Sydney Statistical Division.

With the exception of Parramatta, Hurstville and Bankstown, there is a higher percentage of persons within the 14 years and under category relative to the Sydney Statistical Division within the Assessment Region. This is attributed to the high number of young families residing in these areas as a result of cheaper land and subsequent lower cost housing. The local government areas with a lower proportion of persons in the under 14 age category are more established areas, where populations tend to be older, such as Hurstville.

Wollongong exhibits age characteristics comparable to the Sydney Statistical Division and is reflective of the range of opportunities and facilities for all age groups in this area.

Fifteen to 64 year olds comprise the majority of the total Sydney Statistical Division population in 1991. This age category was chosen as it represents the

proportion of persons of working age. Only a third of the local government areas in *Table D2 (Appendix D)* had a slightly higher proportion of people in these age groups. These were Liverpool, Holroyd, Fairfield, Hurstville and Sutherland. The Blue Mountains, Campbelltown and Wollondilly had the smallest proportion of their population in this category at this time.

In 1991, people aged 65 years and older made up 11.5 percent of the total Sydney Statistical Division population. The local government areas in *Table D2 (Appendix D)* which exceeded this level were Hurstville, Bankstown, Parramatta, Auburn, and the Blue Mountains. This shows that in 1991, these areas had a higher proportion of retirees amongst their populations than the Sydney Statistical Division average, because they either comprise long established areas, or provide a lifestyle and facilities which attract retirees. The local government areas which had a lower proportion of their population in this category were Campbelltown, Penrith, Blacktown, Liverpool, Fairfield, and Wollondilly. Most of these areas have new suburbs which attract younger populations as stated previously.

### 8.2.2 LABOUR FORCE STATUS

Statistics on income, employment, occupation, and industry have been selected to give a broad indication of the labour force characteristics of the south-west region of Sydney and Wollongong.

#### *Employment*

The most recent employment statistics have been obtained from the Economic and Labour Market Analysis Branch of the Department of Employment, Education, Training and Youth Affairs (1996). The statistical local areas used in this publication do not correspond to individual local government areas and include, in some instances, areas not the subject of this assessment. However, they do provide an appropriate indication of unemployment rates for the geographical locations associated with each proposed airport option.

Most of the statistical local areas listed in *Table D3 (Appendix D)* have higher unemployment levels than the Sydney region. Fairfield-Liverpool (12.6 percent) has an unemployment level twice that of the Sydney region (6.3 percent). Canterbury-Bankstown (10.9 percent) and Central Western Sydney (10.8 percent) also have relatively high levels of unemployment. St George-Sutherland (5.1 percent) and Outer Western Sydney (5.2 percent) have lower unemployment rates than the Sydney region.

The Sydney Statistical Division has a participation rate which was in the middle of the participation range of all the local government areas listed in *Table D3 (Appendix D)*. The outer south-western region of Sydney has a rate which was 7.5 percent higher than the Sydney region and outer western

Sydney has a rate 5.8 percent higher. The lowest participation rates were recorded in central western Sydney with a rate 6.4 percent lower than the Sydney region.

Figures for youth unemployment (Department of Employment, Education, Training and Youth Affairs, 1996) show similar trends for the 15-19 years age group as for the Sydney region as a whole, that is higher levels in Fairfield, Liverpool and Wollongong statistical areas and lower in St George/Sutherland and Canterbury-Bankstown.

### *Occupation*

*Table D4 (Appendix D)* shows the distribution, by occupation, across the assessment region. It is evident that south-west Sydney and Wollongong have a labour force which is generally less skilled than the Sydney Statistical Division, with the exception of Sutherland and the Blue Mountains.

Relevant matters relating to the occupation of persons within the social impact areas are:

- the labour force of south-western Sydney represents 41.6 percent of the Sydney Statistical Division;
- nearly half of labourers and tradespersons come from south-western Sydney;
- most local government areas within this region account for significantly less professionals and para professionals than for Sydney as a whole;
- there is a lower proportion of managers and administrators in most local government areas in the south-west region than for Sydney (exceptions are Wollondilly, Blue Mountains, Camden and Sutherland); and
- all other occupation categories are similar for the south-west as for Sydney.

Wollongong has the third largest labour force of all the local government areas assessed. The two other local government areas which have a significant labour force are Sutherland and Blacktown, whilst Camden, Wollondilly and Auburn have the lowest labour force reflecting their smaller populations.

### *Income*

The labour force of the local government areas in *Table D5 (Appendix D)* generally have lower incomes than the Sydney Statistical Division in 1991, where there was a higher representation in the \$0 - \$40,000 category and less

in the greater than \$40,000 category. Sutherland and the Blue Mountains were the only exceptions with higher incomes. This table is summarised in *Table 8.3*.

TABLE 8.3 ANNUAL INDIVIDUAL INCOME FOR SECOND SYDNEY AIRPORT ASSESSMENT REGION

Area	\$0- \$12,000 (%)	\$12,001- \$20,000 (%)	\$20,001- \$30,000 (%)	\$30,001- \$40,000 (%)	\$40,001- \$50,000 (%)	\$50,001- \$60,000 (%)	Over \$60,000 (%)
Assessment Region	38.4	16.4	19.1	9.5	3.4	1.4	1.2
Sydney Statistic Division	36.8	15.7	18.5	10.1	4.1	2.0	2.9
Wollongong <sup>1</sup>	44.1	15.2	15.5	9.0	3.5	1.8	1.6

Source: Australian Bureau of Statistics (1991) (CDATA 91 Table B28).

Note: 1. Wollongong is not located within the Sydney Statistical Division

### 8.2.3 ETHNICITY

Ethnicity has been assessed using statistics relating to birth place, fluency in English, language spoken in the home and the three primary languages spoken in each local government area and the Sydney Statistical Division.

The 1991 census reported that 1,001,241 (32.3 percent) of the population in Sydney were born in a non-English speaking country. *Table D6 (Appendix D)* indicates the multicultural nature of the population in the assessment region. *Table 8.4* summarises information presented in this table.

TABLE 8.4 BIRTHPLACE BY ORIGIN FOR SECOND SYDNEY AIRPORT ASSESSMENT REGION

Area	Australia and Oceania (%) <sup>1</sup>	Europe and USSR (%)	Middle East, North Africa, Africa (%)	Asia (%) <sup>2</sup>	North, Central and South America (%) <sup>3</sup>	Other (%) <sup>4</sup>
Assessment Region	71.6	13.7	3.9	6.9	1.4	2.4
Sydney Statistical Division	69.6	14.6	3.6	7.8	1.6	2.8
Wollongong <sup>5</sup>	72.8	20.9	1.3	2.4	0.9	1.7

Source: Australian Bureau of Statistics (1991) (CDATA91 Table B09).

Notes: 1. Includes Antarctica.  
2. Includes Southeast Asia, Northeast Asia, Southern Asia.  
3. Includes Northern America, South and Central America and the Caribbean.  
4. Other includes those 'not stated'.

Auburn and Fairfield had the largest mix of origins, the largest proportion being born in Australia, Oceania and Asia. A significant proportion of the



population of the local government areas listed were also born in Europe, the USSR, the Middle East, North Africa and Africa. Only a small proportion originated from North, South and Central America and the Caribbean. This is reflective of the trend for Sydney as a whole.

Each local government area has prevalent language groups and these differ from area to area. Overall, the most common non-English language groups in 1991 for the region were:

- Arabic;
- Chinese;
- Greek;
- Italian; and
- Spanish.

The three most spoken languages in the home, other than English for each local government area are listed in *Table D7 (Appendix D)*. In 1991, Auburn, Bankstown, Blacktown, Fairfield, Holroyd, Hurstville, Liverpool and Wollongong had populations which speak a large variety of languages. English was the predominant language in the Blue Mountains, Camden, Sutherland and Wollondilly.

#### 8.2.4 EDUCATION

The level of education of the population within the assessment region has been assessed using statistics relating to skill levels and school leaving age.

In 1991, the education levels of the people living in the local government areas listed in *Table D8 (Appendix D)*. Fairfield, Blacktown, Bankstown, Campbelltown, and Liverpool had the largest proportion of their population not qualified and the least proportion which were university educated. There was a higher level of skilled vocational workers in the assessment region than the Sydney Statistical Division, however there was a lower level of those with undergraduate or associate diplomas and basic vocational skills. The only exceptions were the Blue Mountains and Sutherland.

In 1991 school leaving ages within the assessment areas, listed in *Table D9 (Appendix D)* vary widely. Auburn and Fairfield had unusual statistics which may be a reflection of the high ethnicity in these areas and education programs in other countries. Auburn and Fairfield had a lower level of people who left school between the ages of 18 years or less, than the Sydney Statistical Division, yet a much higher proportion who left school at 19 years of age or

above. All areas had a larger proportion of the population who left school at 15 years of age or less, compared to Sydney Statistical Division, and all except Fairfield, Parramatta and Auburn had a lower proportion who left school at 19 years or more. All but three had a smaller proportion who left school at 16 years of age than the Sydney Statistical Division and all had a lower proportion who left school at 18 years of age, than the Sydney Statistical Division.

The areas which comprise younger populations have higher proportions of the population still at school than the Sydney Statistical Division.

### **8.2.5 HOUSEHOLD COMPOSITION AND STATUS**

Household composition and status was evaluated using statistics relating to property ownership, family type and household income.

*Table D10 (Appendix D)* shows that Auburn, Bankstown, Blue Mountains, Camden, Holroyd, Hurstville, Sutherland and Wollondilly had a higher proportion of the population who owned their own home in comparison to the Sydney Statistical Division in 1991. This is partly due to these areas having been established for a longer period of time and consist of older, wealthier populations. The remaining local government areas had a lower proportion of outright home ownership than the Sydney Statistical Division. However, most areas had a higher level of the population who were in the process of purchasing their home, in particular Campbelltown and Penrith, possibly due to a number of new housing estates and the younger age profile of the population.

Approximately half of the assessment region had a higher rate of rented and housing commission accommodation than the Sydney Statistical Division in 1991. Those areas which had particularly high levels were Campbelltown, Blacktown and Liverpool. Wollondilly and the Blue Mountains had the lowest levels in this category. Liverpool also had a very high proportion of accommodation provided by other government authorities in comparison to the Sydney Statistical Division and the other local government areas assessed.

*Table D11 (Appendix D)* shows the composition of each local government area by family type. Most of these had a higher proportion of one parent families than the Sydney Statistical Division. Blacktown, Campbelltown and Liverpool had particularly high proportions of single parent families which reflects the high numbers of rental and housing commission dwellings from *Table D10 (Appendix D)*. Camden and Wollondilly had a significantly smaller proportion of the population in one parent families. These statistics are summarised in *Table 8.5*.

TABLE 8.5 FAMILY TYPE FOR SECOND SYDNEY AIRPORT ASSESSMENT REGION

Area	One Parent Families <sup>1</sup>	Couples Without Offspring <sup>2</sup>	Two Parent Families <sup>3</sup>	Families of Other Related Individuals
Assessment Region	13.4	26.5	58.3	1.8
Sydney Statistical Division	13.3	30.0	54.4	2.3
Wollongong <sup>4</sup>	13.2	31.7	53.6	1.5

Source: Australian Bureau of Statistics (1991) (CDATA 91 Table B48).

Notes:

- 1. Includes dependent and other offspring and other related individuals.
- 2. Includes couples and other related individuals.
- 3. Includes dependent and other offspring and other related individuals.
- 4. Wollongong is not located within the Sydney Statistical Division.

Hurstville, Parramatta and the Blue Mountains were the only local government areas with a higher proportion of couples without offspring. Wollongong also had a high level. Most of the areas had higher proportions of the population in two parent families. Those with particularly high proportions were Wollondilly, Campbelltown, Camden and Fairfield, whilst only Parramatta and Hurstville had lower proportions than the Sydney Statistical Division.

Most of the assessment region had a lower proportion of families of other related individuals in 1991, than the Sydney Statistical Division. The exceptions were Auburn, which had a much higher proportion, followed by Holroyd and Parramatta.

Household income for the assessment areas is shown in *Table D12 (Appendix D)*. This shows that a higher proportion of households in the south-west earned less than \$30,000 compared to the Sydney Statistical Division, and a lower proportion of households earned more than \$50,000. Auburn, Parramatta and Wollongong had the highest proportions in the lowest income bracket, whilst Sutherland had the highest proportions in the highest income bracket.

8.2.6 JOURNEY TO WORK

Journey to work statistics were assessed to determine relative mobility within the region and patterns of transport use.

The Department of Urban Affairs and Planning (1995c) found that the propensity to use the car for journey to work increases as the distance from the Central Core (the Central Business District) increases. *Table D13 (Appendix D)* shows that vehicles were more commonly used within the assessment region than for the Sydney Statistical Division in 1991. The areas with particularly

high levels of vehicle use were Camden, Wollondilly and Wollongong, which all have limited public transport and are located on the periphery of the Sydney Region. Wollongong has a train service, however it only services one route (the Illawarra line to the Sydney central business district). Employment centres in western Sydney are well serviced by the railway network, consequently railway usage is higher in comparison to the Sydney region.

The train was a more popular mode of travel to work than the bus in the assessment region, in comparison to the Sydney Statistical Division. The highest proportion of train users were in Auburn, whilst the highest bus users were in the Sydney Statistical Division, closely followed by Parramatta.

The only areas with a higher proportion of workers walking to work, than the Sydney Statistical Division were Parramatta, Liverpool and Auburn, which all contain major employment centres in relatively close proximity to residential area.

#### **8.2.7 REGIONAL CHARACTER**

From community consultation which took place as part of the EIS process, it is apparent that issues relating to the character of communities likely to be directly affected by any of the airport options, are of concern.

The character of a community is dependent upon a range of factors relating to the physical, social and economic composition of the relevant area. For Badgerys Creek, factors contributing to community character have been identified as:

- the rural nature of the area, associated low density development and general peace and tranquillity;
- high dependency on agricultural produce (market gardening) and relative self sufficiency;
- established networks of families and businesses in the area, associated inter-dependence and reliance upon support networks; and
- inter-generational links, sometimes with a number of generations of the same family residing within the area.

Communities surrounding the Holsworthy Military Area are more urban than Badgerys Creek and, many are characterised by new residential release areas. These are interspersed with some rural residential communities in areas such as Minto Heights and Kentlyn. Areas to the west of the site are almost entirely urbanised, with associated services and facilities and a large number of public housing (medium density) developments, including Macquarie Fields and

Airds. The resultant social composition of these areas has emphasised dependency on local services and facilities, and greater community cohesion.

To the north of the Holsworthy Military Area, communities are characterised by a high Military presence, especially at Wattle Grove, Casula, Macquarie Fields and Ingleburn. As a consequence, there is a certain inter-dependence by local businesses and facilities on the military presence in the area.

To the east, suburbs are lower density and generally more affluent, characterised by large areas of open space and greenery. Further south, are established communities and coastal villages at Helensburgh, Otford and Stanwell Park.

Also to the east of the Military Area are large areas of native bushland and environment protection, namely the Royal and Heathcote National Parks, the Woronora Dam catchment area, the Georges River and the Dharawal State Recreation Area. These, and the native bushland on the military site itself, contribute to the non-urban atmosphere and general quality of life of this area.

8.3 SUMMARY OF SOCIAL CHARACTERISTICS

The local government areas in the Second Sydney Airport Assessment Region comprise nearly half of the population of the Sydney metropolitan area. Each local government area falls within three broad categories:

- older, established areas located in closer proximity to Sydney central business district;
- newer areas in fringe locations, characterised by new residential release areas; and
- areas characterised by a combination of both, located predominantly in peripheral areas or beyond the Sydney metropolitan area.

Table 8.6 lists each local government area by these categories.

TABLE 8.6 CATEGORIES FOR LOCAL GOVERNMENT AREAS WITHIN SECOND SYDNEY AIRPORT ASSESSMENT REGION

Older Established	Newer Fringe	Established Fringe
Auburn	Blacktown	Blue Mountains
Bankstown	Camden	Sutherland
Fairfield	Campbelltown	Wollondilly
Holroyd	Liverpool	
Hurstville	Penrith	
Parramatta	Wollongong	

The demographic and social characteristics of the Second Sydney Airport Assessment Region has been summarised into three broad categories, older established, newer fringe and established fringe, as set out in Table 8.7. Local government areas within the categories specified generally exhibit broadly similar demographic and social characteristics. In some instances, a local government area might fall within two of these categories (for example, Wollongong, Wollondilly).

TABLE 8.7 SUMMARY OF DEMOGRAPHIC AND SOCIAL CHARACTERISTICS OF SECOND SYDNEY AIRPORT ASSESSMENT REGION

Statistic	Older Established	Newer Fringe	Established Fringe
Population and Age Structure	Generally lower populations than average for assessment region. Higher proportion of elderly persons. Lower proportion of under 14 age group.	Larger population than other LGAs in assessment region. High proportion of under 14s. Lower proportion of over 65s.	Variable population sizes. Lower proportion of persons in working age group. Higher proportion in middle/retirement age groups.
Labour Force Status	High unemployment rates. Lower numbers of white collar workers. Average numbers in other occupations. Higher proportion of low income earners.	Higher unemployment rates. Higher numbers of labourers and trade persons. Fewer white collar workers. Lower proportion of high income earners.	Generally lower unemployment rates (below Sydney average). Higher number of managers and professionals. Higher proportion of high income earners.
Ethnicity	Large mix of origins. High number of persons of African/Asian descent.	High numbers of persons of European origin.	Predominantly of Australian or European origin.
Household Composition	High levels of home ownership. Higher numbers of two parent families.	Low numbers of home ownership. High numbers of one parent families.	High numbers of home ownership. Higher numbers of couples without offspring.
Journey to Work	High dependence on public transport.	Low dependence on public transport.	High numbers of vehicle drivers (car dependency).

Although the population across the Assessment Region is characterised by considerable diversity the general characteristics of the population may be summarised as comprising:

- a younger population profile than Sydney as a whole, with higher proportions of young families and persons 14 years and younger;
- higher rates of unemployment than the Sydney region;
- lower proportions of skilled workers such as managers and administrators, professionals and para professionals;
- lower income levels; and
- high levels of home ownership in older established local government areas, high levels of homes being purchased in newer fringe areas and greater proportions of persons occupying Department of Housing rental stock in some local government areas (Bankstown, Blacktown, Campbelltown, Liverpool, Parramatta and Wollongong).

The general characteristics do not reflect the often considerable diversity which exists within each local government area and the broad statistics described in this assessment mask areas and groups of greater affluence or social disadvantage.

# Part C

## Assessment of Impacts



## CHAPTER 9    IMPACTS OF BADGERYS CREEK AIRPORT OPTIONS

### 9.1    IMPACTS ON PLANNING

#### 9.1.1    METROPOLITAN PLANNING

Badgerys Creek was chosen as the site for the Second Sydney Airport in 1985 (Kinhill Stearns, 1985) and this announcement has influenced several long term land use and transport planning strategies developed by State and local governments over the past ten years. The extent to which land use decisions reflect this announcement is, however, more difficult to quantify.

Metropolitan and transport planning strategies produced in the decade since 1985 have highlighted Badgerys Creek as the proposed location for a Second Sydney Airport.

Support for long term transport corridors identified in the *Integrated Transport Strategy* (Department of Transport, 1995), including the Western Sydney Orbital, the upgrading of Elizabeth Drive and a possible Sydney West Airport Rail Link is partly and, in the case of Elizabeth Drive and the rail link, wholly dependant on an airport at Badgerys Creek.

The South Creek/Bringelly area has been identified as a long term urban option in successive metropolitan planning strategies. *Metropolitan Strategy - Sydney into its Third Century* (Department of Planning, 1988) identified Bringelly/South Creek Valley along with seven other areas as having potential to accommodate future population growth in the Sydney region.

The current metropolitan strategy, *Cities for the 21st Century* (Department of Planning, 1995) identifies South Creek/Bringelly along with Warnervale on the Central Coast and Rouse Hill in the north-west as the three long term urban development options in the Greater Metropolitan Region. The service infrastructure including transport routes, and the economic impetus associated with a Second Sydney Airport are assumed to be major catalysts for urban development in the area identified as South Creek/ Bringelly.

As noted in *Chapter 4*, several documents prepared by the NSW Department of Urban Affairs and Planning and local councils have highlighted concerns about air and water quality in the South Creek/Bringelly area. Urban development in the area is acknowledged to be dependant on a satisfactory resolution of these issues.

The following quote from *Sydney West Airport Sub-Region Draft Strategic Plan* (Taskforce on Planning for the Sub-Region Surrounding Sydney West Airport, 1996a) summarises those concerns.

‘However, the dominant potential disadvantages resulting from urban development within the SWA Sub-Region, as recognised in previous studies of this Sub-Region are:

- (a) its air quality conditions, related both to the impacts on it by the wider Sydney region, as well as the potential contribution of urban development within the Sub-Region to worsening conditions within the Hawkesbury-Nepean Basin; as well as
- (b) potential water quality impacts, related to the effects of urban stormwater run-off on the local creek system and ultimately, the Hawkesbury-Nepean River.

The challenge for the planning process for the SWA Sub-Region has been to identify an urban management and development approach which successfully addresses these significant constraints. If these solutions cannot be confidently achieved, then development of the SWA Sub-Region will be difficult to justify having regard for previous government decisions on South Creek Valley’.

While the South Creek/Bringelly area has been consistently identified as a long term urban development option in State and local government planning strategies, the sensitivity of the natural environment particularly in terms of air and water quality has delayed that development. It is possible that without the added impetus of a Second Sydney Airport at Badgerys Creek, the urban development of the South Creek/Bringelly area would become a lower priority in terms of metropolitan planning.

Furthermore, Liverpool City Council has publicly stated that it does not support any extension beyond the currently identified urban development program without a substantial commitment to transport infrastructure and employment generation.

The implications of removing the South Creek/Bringelly area from the long term growth options of the greater metropolitan region can only be speculative at this stage. However, a preliminary analysis indicates that without the identification of further release areas in the south-west sector of Sydney to replace the South Creek/Bringelly region, the choice of new residential areas in the greater metropolitan region would be biased to the north-west sector (Rouse Hill, St Marys ADI site) and the Central Coast.

TABLE 9.1 COMPARISON OF GROWTH BETWEEN LOCAL GOVERNMENT AREAS IN THE SYDNEY REGION

Local Government Area	Available Stock Five Year Program <sup>1</sup>	Percentage	Long Term Stock <sup>2</sup>	Percentage
Baulkham Hills	6,740	10	6,600	16
Blacktown	12,677	18	6,100	15
Camden	8,429	12	6,960	17
Campbelltown	4,345	6	4,000	10
Fairfield	2,313	3	0	0
Gosford	2,125	3	0	0
Hawkesbury	903	1	0	0
Hornsby	1,436	2	0	0
Liverpool	15,380	22	7,200	18
Penrith	5,027	7	0	0
Pittwater	30	0	6,400	16
Sutherland	1,979	3	3,500	9
Warringah	485	1	0	0
Wyong	8,495	12	0	0
<b>Total</b>	<b>70,364</b>		<b>40,760</b>	

Source: Department of Urban Affairs and Planning (1996d).

- Notes:
1. The Urban Development Program contains 70,360 potential lots of land expected to be serviced and zoned for development within the next five years.
  2. The Urban Development Program contains the equivalent of about 40,760 lots of land for which planning is not completed or which is not scheduled for servicing and rezoning within the next five years.

There is very little published research on the home buyers choice of residential location but anecdotal evidence from the development industry indicates a buyers preference for an area in the same region or an adjacent region to the current residence. The absence of a substantial long term growth sector in the south-west may mean limited choices for new home buyers.

The issues of environmental concern, especially water quality, faced by South Creek/Bringelly are similar to those which need to be addressed by all growth sectors which lie within the catchment of the Hawkesbury/Nepean River system. Solutions will be difficult and costly for all areas and need to be the subject of detailed assessment. Air quality concerns are discussed in detail in *Technical Paper No. 6*.

The development of the Second Sydney Airport at Badgerys Creek has been acknowledged as a major economic and employment impetus for the surrounding region (refer *Chapter 4*). Badgerys Creek has proximity to the labour markets of Penrith, Parramatta, Fairfield, Liverpool and Campbelltown where unemployment rates are well above the national average. The employment and economic impacts are discussed in more detailed in *Technical Paper No. 15* and *Section 9.3*.

In terms of its impact on the three key principles of the *Metropolitan Strategy*, an airport at Badgerys Creek may be evaluated as follows:

- ecological sustainability - the sensitivity of the region means that development and growth would need to be balanced with solutions for the air and water quality concerns;
- more compact cities - the efficient use of infrastructure such as the road and rail network which are planned to serve both the airport and the proposed urban village development supports the principle of generating maximum community benefit from these substantial capital works; and
- effective implementation - the long term planning scenarios of a Badgerys Creek airport as a focus for regional growth has been developed jointly by Commonwealth, State and local Governments. Planning documentation reflects this, although variation from the operating framework of Badgerys Creek Option A would require negotiation between all levels of Government.

### 9.1.2 REGIONAL PLANNING

While metropolitan planning direction is based on a complex interaction of population and employment growth balanced with environmental concerns and integrated infrastructure provision, the basis of regional planning in Sydney is the *Urban Development Program* as outlined in *Chapter 4*. This program identifies a rolling five year residential release schedule which is coordinated with the provision of transport and service infrastructure such as water, sewage treatment and electricity provision.

These release areas have in turn formed the basis of the regional land use scenarios (outlined in *Chapter 3*) developed to test the long term regional impact of each of the airport options. These future land use scenarios were compared to a base case of development that would be consistent with the State Government's existing metropolitan planning. The regional land use scenarios have also been used to assist in developing the traffic model detailed in *Technical Paper No. 13* and the projections of future land use used for noise impact assessment as outlined in *Technical Paper No. 3*.

It should be noted that while areas are included in the *Urban Development Program*, in some cases, there is a reasonable amount of uncertainty regarding their future development. For example, the West Menai area appears likely to be dropped from the program, Liverpool Council opposes the development of Edmondson Park without the provision of a rail line and substantial open space and there is ongoing discussion of future development of land north of Camden. There are also ongoing investigations into the large Australian Defence Industry site in Penrith and Blacktown local government areas.

The regional land use scenarios have been based on the following general assumptions:

- that all urban development program lands are available for development;
- that the western, south-western and southern areas of Sydney would at least maintain their present share of the residential growth projections for Sydney; and
- that the population projections developed by the Department of Urban Affairs and Planning are considered to be the desirable growth rates for these areas of Sydney and therefore the regional land use scenarios are primarily based on the realisation of these growth rates.

Under all four regional land use scenarios developed, 10 local government areas within the Second Sydney Airport Assessment Region do not differ from the population projections developed by the Department of Urban Affairs and Planning (1995a). These local Government areas and the population projections for 2006 and 2016 are shown in *Table 9.2*.

The changes assumed in each of the remaining five local government areas (Camden, Campbelltown, Liverpool, Sutherland and Wollondilly) are contained in *Tables 9.4* and *9.5* for the Badgerys Creek Options A and B (Land Use Scenario 1) and Badgerys Creek Option C (Land Use Scenario 2) respectively.

In preparing the *Sydney West Airport Sub-Region Draft Strategic Plan* (Taskforce on Planning for the Sub-Region Surrounding Sydney West Airport, 1995) based on Badgerys Creek, the taskforce of Commonwealth, State and local Government representatives undertook wide ranging strategic planning analysis and developed a draft long term planning scenario. This scenario includes a rail link between Glenfield and the Badgerys Creek airport site with the development of a number of substantial urban villages along its route.

TABLE 9.2 POPULATION PROJECTIONS

Local Government Area	1996	2006	2016
Auburn	52,000	63,000	68,000
Bankstown	166,000	176,000	185,000
Blacktown	236,000	257,000	271,000
Blue Mountains	75,000	80,000	83,000
Fairfield	192,000	210,000	218,000
Holroyd	84,000	87,000	90,000
Hurstville	68,000	71,000	74,000
Parramatta	140,000	145,000	151,000
Penrith	170,000	187,000	202,000
Wollongong	183,530	274,000	295,800

Source: Department of Urban Affairs and Planning (1995a).

### 9.1.3 BADGERYS CREEK AIRPORT OPTIONS FUTURE LAND USE SCENARIOS

A consideration in the development of future land use scenarios was the potential impacts of aircraft overflight noise.

The ANEC contours derived for each of the airport options are identified in *Technical Paper No. 3. Australian Standard 2021 - 1994 Acoustics - Aircraft Noise Intrusion - Building Siting and Construction* (Standards Association of Australia, 1994) has been applied to determine the suitability of specified buildings/land uses within each contour. A summary of this is contained in *Table 9.3*.

TABLE 9.3 BUILDING TYPE ACCEPTABILITY BASED ON ANEC CONTOURS

Building Type	ANEC Contour		
	Acceptable	Conditional	Unacceptable
House, home unit, flat, caravan park	Less than 20 ANEF <sup>1</sup>	20 to 25 ANEF <sup>2</sup>	Greater than 25 ANEF
Hotel, motel, hostel	Less than 25 ANEF	25 to 30 ANEF	Greater than 30 ANEF
Schools, university	Less than 20 ANEF <sup>1</sup>	20 to 25 ANEF <sup>2</sup>	Greater than 25 ANEF
Hospital, nursing home	Less than 20 ANEF <sup>1</sup>	20 to 25 ANEF	Greater than 25 ANEF
Public building	Less than 20 ANEF <sup>1</sup>	20 to 30 ANEF	Greater than 30 ANEF
Commercial building	Less than 25 ANEF <sup>1</sup>	25 to 35 ANEF	Greater than 35 ANEF
Light industrial	Less than 30 ANEF	30 to 40 ANEF	Greater than 40 ANEF
Other industrial	Acceptable in all ANEF zones		

Source: Australian Standard 2021-1994.

- Notes:
1. The actual location of the 20 ANEF contour is difficult to define accurately, mainly because of variation in aircraft flight paths.
  2. Within 20 ANEF to 25 ANEF, some people may find that the land is not compatible with residential use. Land use authorities may consider that the incorporation of noise control features in the construction of residence is appropriate.
  3. There will be cases where a building of a particular type will contain spaces used for activities which would generally be found in a different type of building (for example, an office in an industrial building). In these cases *Table 9.3* should be used to determine site acceptability, internal design noise levels within the specific spaces should be separately determined.

In terms of residential development *Australian Standard 2021 - 1994* states that houses, home units and flats are acceptable in areas of less than 20 ANEF. Taking this as the benchmark, the impact of the ANEC contours in each of the local government areas in the Second Sydney Airport Assessment Region was assessed.

For the purposes of the development of the future land use scenarios a conservative approach to potential impacts of aircraft noise has been adopted by assuming that in the four rural areas that may be affected by aircraft noise equivalent to approximately 15 ANEC, the growth rates of residential development would be lower if the airport were developed. It was also assumed that it would be undesirable for new urban areas to be established that may be subject to this noise level. It has also been assumed that populations affected by levels of aircraft noise lower than 15 ANEC would not decline because of that impact. It is considered more likely that if noise sensitive residents move out of noise affected areas, new residents would nevertheless move in. The impacts of noise on property values is addressed in *Technical Paper No. 4*.

Rural and rural residential areas surrounding the sites of the Badgerys Creek Airport options within the local government areas of Penrith, Liverpool and

Fairfield would be affected by relatively high levels of noise. These areas were assumed to have lower growth rates than would have been expected if the airport did not proceed. Reducing these growth rates would, however, have only a marginal impact on the overall population forecast for the region. For example the population in the rural western areas of Liverpool local government area grew by only 2.3 percent between 1986 and 1991 (Liverpool City Council, 1994). A reduction in this growth rate would therefore not significantly affect overall population growth.

In Badgerys Creek Options A, B and C, the existing suburbs within the established metropolitan area and the future residential areas within the Urban Development Program are located in areas of less than 20 ANEC.

### *Badgerys Creek Options A and B*

The regional land use scenario outlined in the *Sydney West Airport Draft Strategic Plan* (Taskforce on Planning for the Sub-Region Surrounding Sydney West Airport, 1996a) has been adopted for the purposes of determining the regional impact of Badgerys Creek Options A and B. In addition, adjustments have been made to the urban development program in the area to reflect the assumption that the urban villages of Edmondson Park and Bringelly would absorb much of the regional residential demand anticipated in this area.

The regional land use scenario developed for Badgerys Creek Options A and B is shown in *Figure 9.1*. Only one scenario has been developed for Badgerys Creek Options A and B because the similar runway alignments are assumed to generate a common regional land use pattern.

The key features of this scenario and the regional impact of Badgerys Creek Options A and B are:

- the Urban Development Program would generally proceed as currently identified;
- rail access would be developed along the route identified in *Sydney West Sub-Region Draft Strategic Plan*; and
- two urban villages would initially be developed on that rail line, Edmondson Park (ultimate capacity 35,000 population) and Bringelly (ultimate capacity 30,000 population).

*Table 9.4* summarises the projections for the remaining local government areas within the Second Sydney Airport Assessment Region where there may be population changes under Badgerys Creek Options A and B.





Figure 9.1

# **Future Urban Land Use Assumptions to 2016 for Badgerys Creek Options A and B**

- |   |  |
|---|--|
| Future Urban (Urban Development Program)        | Existing Major Employment Areas Likely to be Influenced by Airport |
| Future Urban Village                            | Future Employment Area   |
| Proposed Western Sydney Orbital                 | Main Centres   |
| Existing Urban Areas (indicated by local roads) | Potential Rail Corridor  |



TABLE 9.4 BADGERYS CREEK OPTIONS A AND B - POPULATION PROJECTIONS

Local Government Area	1996 <sup>1</sup>	Without Airport <sup>1</sup> 2006	With Airport 2006	Without Airport <sup>1</sup> 2016	With Airport 2016
Camden	32,000	51,000	54,000	62,000	69,500
Campbelltown	152,000	158,000	158,000	162,000	160,000
Liverpool	120,000	154,000	156,000	178,000	185,000
Sutherland	201,000	211,000	211,000	222,000	221,000
Wollondilly	34,000	41,000	41,000	46,000	46,000
<b>Total</b>	<b>539,000</b>	<b>615,000</b>	<b>620,000</b>	<b>670,000</b>	<b>681,500</b>

Note: 1. Department of Urban Affairs and Planning (1995a) (Mid-Range Projections).

Changes in projected population growth in these local government areas (compared to the Department of Urban Affairs and Planning projections) is as follows:

- Camden’s growth increases by 3,000 people in 2006 and by 7,500 people by 2016. This increase is largely accommodated within the urban village of Bringelly located on the rail line to the airport. It is assumed that some development anticipated in the Springfarm/Elderslie area would be diverted to the urban village of Bringelly;
- Campbelltown’s growth is 2,000 people fewer in 2016 than the published projections on the basis that demand would be diverted to the urban villages of Edmondson Park and Bringelly;
- Liverpool increases by an additional 2,000 people by 2006 and by 7,000 people by 2016. This reflects additional growth in Edmondson Park. Growth in this area is assumed to be 7,000 people even without a Second Sydney Airport at Badgerys Creek. Therefore with the possible provision of a rail line through this area to an airport at Badgerys Creek, growth in Edmondson Park would be accelerated to a population of 14,000 by 2016; and
- Sutherland would experience a slight reduction in population as growth is diverted away from the West Menai area to the new urban villages.

It should be noted that the rate of growth of Edmondson Park and Bringelly would increase significantly after 2016 when they become the remaining focus of urban growth in their respective local government areas.

### *Badgerys Creek Option C*

The regional land use scenario developed for Badgerys Creek Option C is based on similar principles to those adopted for Badgerys Creek Options A and B, that is, a rail link between Glenfield and the Badgerys Creek airport and urban village development along that rail line.

However, in Badgerys Creek Option C, the main parallel runways are on a north/south alignment. This would place the urban village of Bringelly, identified in Badgerys Creek Options A and B, within the 20 to 25 ANEC. Therefore, the land use scenario developed for Badgerys Creek Option C attempts to mitigate the impact of the flight paths by planning an urban village at Rossmore rather than Bringelly.

The land use scenario developed for Badgerys Creek Option C is shown in *Figure 9.2*.

The key features of this scenario and the regional impact of Badgerys Creek Option C are:

- the Urban Development Program would generally proceed as currently identified;
- rail access would be developed along the shorter route identified, that is through Rossmore. While this alignment has a number of problems including the cost and delays associated with the acquisition of a corridor in an area of fragmented land ownership patterns, it provides an opportunity for major urban development along the rail corridor route but outside the area directly affected by the flight paths. In addition, this route is more direct than the route through Bringelly and may be less expensive; and
- two urban villages would initially be developed on that rail line, Edmondson Park (ultimate capacity 35,000 population) and Rossmore (ultimate capacity 30,000 population). The precise location of the Rossmore urban village would be the subject of detailed investigations including a review of the analysis completed for the *South Creek Valley Regional Environmental Study* (Department of Planning, 1991a).

*Table 9.5* summarises the projections for the local government areas within the Second Sydney Airport Assessment Region where there might be population changes as a result of Badgerys Creek Option C.



- |   |  |   |  |
|---|--|---|--|
| Future Urban<br>(Urban Development Program)     |  | Existing Major Employment Areas<br>Likely to be Influenced by Airport |  |
| Future Urban Village                            |  | Future Employment Area  |  |
| Proposed Western Sydney Orbital                 |  | Main Centres  |  |
| Existing Urban Areas (indicated by local roads) |  | Potential Rail Corridor   |  |

Figure 9.2  
**Future Urban Land Use  
 Assumptions to 2016  
 for Badgerys Creek Option C**

0Km 10Km

TM  
MN  
N

TABLE 9.5 BADGERYS CREEK OPTION C - POPULATION PROJECTIONS

Local Government Area	1996 <sup>1</sup>	Without Airport <sup>1</sup> 2006	With Airport 2006	Without Airport <sup>1</sup> 2016	With Airport 2016
Camden	32,000	51,000	52,000	62,000	61,500
Campbelltown	152,000	158,000	158,000	162,000	160,000
Liverpool	120,000	154,000	158,000	178,000	193,000
Sutherland	201,000	211,000	211,000	222,000	221,000
Wollondilly	34,000	41,000	41,000	46,000	46,000
<b>Total</b>	<b>539,000</b>	<b>615,000</b>	<b>620,000</b>	<b>670,000</b>	<b>681,500</b>

Note: 1. Derived from Department of Urban Affairs and Planning (1995a) (Mid-Range Projections).

Changes in projected population growth in these local government areas is as follows:

- Camden's growth decreases by 500 people in 2016. While Camden would accommodate some of the population growth of the Rossmore urban village this would be offset by growth diverted from the Springfarm/Elderslie area;
- Campbelltown's growth is 2,000 people fewer in 2016 than the published projections on the basis that demand would be diverted to the urban villages of Edmondson Park and Rossmore;
- Liverpool's growth increases by an additional 15,000 people by 2016. This additional growth is accommodated in Edmondson Park and Rossmore (part of which is in Liverpool local government area). Rossmore would total 12,000 people by 2016 and Edmondson Park would total 14,000 people; and
- Sutherland would experience a slight reduction in population growth as growth is diverted away from the West Menai area to the new urban villages.

#### 9.1.4 LOCAL PLANNING

##### *Liverpool Local Government Area*

Under the recently gazetted *Liverpool Local Environmental Plan, 1997* the zoning of the site of Badgerys Creek Option A has been deferred. However, the additional areas required to accommodate the sites of Badgerys Creek

Options B and C have been rezoned variously to 1(a) Rural and 5(a) Special Uses - Telecommunications. The Liverpool local government area zonings, current and proposed, for the Badgerys Creek sites are contained in *Section 4.2.3*.

A summary of the zonings currently applicable to the three Badgerys Creek airport sites are as follows:

- Option A airport site is zoned 1(a) Rural under *Interim Development Order 74* and 2(a1) Residential and 5(a) Special Uses - School under *Liverpool Planning Scheme Ordinance, 1972*;
- Option B airport site is zoned as for Option A, but the additional areas are zoned 1(a) Rural under *Liverpool Local Environmental Plan, 1997*; and
- Option C airport site is zoned as for Option A, but the additional areas are zoned 1(a) Rural and 5(a) Special Uses - Telecommunications under *Liverpool Local Environmental Plan, 1997*.

Under Federal legislation the land required for the Second Sydney Airport would be purchased under the *Lands Acquisition Act, 1989*.

#### *Camden Local Government Area*

The Camden local government area would be indirectly impacted by an airport at either Badgerys Creek Option A, B or C. The urban villages (either Bringelly or part of Rossmore) which may be developed along the railway line to an airport at Badgerys Creek would be located in Camden municipality. The development of these urban villages would require rezonings in accordance with the usual procedures established under the *Environmental Planning and Assessment Act, 1979*.

#### *Penrith Local Government Area*

The land within Penrith local government area to the north of the Badgerys Creek sites is predominantly zoned rural or rural residential. Other land uses within Penrith local government area in the vicinity of the airport sites are discussed in more detailed in *Chapter 9.2*.

#### *Rural Residential Zonings*

Liverpool, Camden and Penrith local government areas all have areas of rural residential zoning in the vicinity of the airport sites.

The densities permitted vary between the local government areas and are summarised in *Section 5.2.1*. Under these zonings there is the potential for Councils to permit the development of additional rural residential dwellings in areas potentially affected by aircraft noise in excess of 20 ANEC. While the Section 117 Direction, *G16 Airport Noise* limits additional rezonings, councils may wish to consider down zoning the worst affected areas to rural use.

9.2 IMPACTS ON LAND USES AND OWNERSHIP

9.2.1 LAND USE

The impact of an airport at Badgerys Creek on existing and committed land uses is outlined in this section.

*Residential Land Use*

Under *Australian Standard AS2021 - 1994*, Badgerys Creek Options A and B impact on the communities of Warragamba, Greendale, Silverdale, Luddenham, Kemps Creek, Horsley Park and Mount Vernon. These communities are located within the 20 or higher ANEC. The cross runway for Option B would also impact on Bringelly. The only community located within the 20 or higher ANEC under Option C would be Bringelly.

The main communities located within ANEC 20 noise exposure or higher are shown in *Table 9.6*.

TABLE 9.6 COMMUNITIES WITHIN ANEC 20, BADGERYS CREEK

Community	Badgerys Creek Option A	Badgerys Creek Option B	Badgerys Creek Option C
Warragamba	✓ <sup>1</sup>	✓	
Silverdale	✓	✓	
Wallacia			
Luddenham	✓		
Bringelly		✓	✓
Kemps Creek	✓	✓	

Note: 1.     ✓ Signifies part or all.

The developing release areas of Erskine Park and St Clair in Penrith, Cecil Park and Carnes Hill in Liverpool, Harrington Park and Narellan in Camden and Claymore and Blairmont in Campbelltown are identified as being the closest



to the Badgerys Creek airport sites. None are impacted by noise levels above ANEC 20 for any of the airport options for Badgerys Creek.

### *Rural Residential Land Use*

There are a significant number of rural residential properties that would potentially be affected by noise from the three Badgerys Creek airport options.

Without further land use planning restrictions there is the potential under current zonings for the development of a significant number of additional rural residential properties in noise affected areas.

There is a significant rural residential subdivision to the south of the Badgerys Creek site known as Kelvin Park Estate. Many of the properties within this subdivision are substantial and those within the western portion are within the 20 ANEC or higher for Badgerys Creek Option C.

### *Rural Land Use*

The Badgerys Creek area is a significant agricultural producer within the Sydney region. The rural production includes:

- grazing of beef cattle and agisted horses;
- intensive poultry and breeder stock production; and
- intensive market garden production including vegetables, fruit and flowers.

*Technical Paper No. 9* details the type of agricultural production currently carried out on the site of Badgerys Creek Options A, B and C and values that production at between \$1 million and \$3 million per annum. In the event that agricultural production ceased with the construction of an airport at Badgerys Creek, it is likely that other farms in the Sydney Basin would increase their production to fill the gap or the farmers would relocate within the Sydney Basin. The relocation of activities may be time consuming and costly and an alternative location may not have the same proximity to the Sydney markets. Other social impacts, as identified in *Chapter 12*, may also ensue.

### *Open Space and Recreation Land Use*

Most of the major areas of regional open space and facilities are not likely to be directly impacted by any of the three Badgerys Creek airport options.

One small park is located within the Badgerys Creek site (all options) (Badgerys Creek Park). This has an area of approximately two hectares and



includes an oval, hall and playground and would be removed for all the Badgerys Creek options.

The Blue Mountains National Park, Bents Basin and Burragorang State Recreation Areas are to the west of the Badgerys Creek airport sites. Visitor survey data shows significant annual usage (National Parks and Wildlife Service, 1994a and 1994b):

- Blue Mountains National Park, 2,200,000 visitors per year;
- Bents Basin State Recreation Area, 60,000 visitors per year; and
- Burragorang State Recreation Area with 50,000 visitors per year.

These and other significant areas of regional open space are shown on *Figure 9.3*.

While most of the major open space areas are not directly impacted by aircraft noise for the Badgerys Creek airport options, *Technical Paper No. 3* emphasises that users in these areas are likely to be more noise sensitive than residents in domestic situations. The technical paper refers to a number of noise surveys carried out in wilderness areas and several social surveys to determine the response of visitors to aircraft noise. In conclusion, it suggests that people in wilderness settings are approximately 10dB less tolerant of noise than in residential settings. This result is assumed to apply to users in the Blue Mountains National Park and the Bents Basin and Burragorang State Recreation Areas.

Of these the northern most part of the Bents Basin State Recreation Area is located within the 20 to 25 ANEC for Options A and B. Impacts on this Recreation Area are expected to be severe because picnic areas and camping grounds are located in this northern part of the Recreation Area.

The Hawkesbury/Nepean River System is a significant recreation resource in the western Sydney area (Department of Urban Affairs and Planning, 1995c). The implications for water quality in this river system of an airport at Badgerys Creek are addressed in *Technical Paper No. 7*.

### *Special Land Uses*

The impact of the Badgerys Creek airport options on the operation of Hoxton Park and Camden airports is detailed in the Draft EIS.

The two communications stations within the sites of Badgerys Creek Options B and C (Royal Australian Air Force remote receiving station and Telstra

Bringelly high frequency radio station) are proposed to be relocated before the end of the decade.

The Boral Brickworks on the eastern edge of the site of Badgerys Creek Option C would be partially acquired for this airport option. The ongoing operation of the Brickworks remains undetermined at this stage.

The Orchard Hills explosive storage facility for the Royal Australian Navy and Royal Australian Air Force and Holsworthy is discussed in *Technical Paper No. 10* and the *Interim Report of the Department of Defence* (Department of Defence, 1997b).

The University of Western Sydney (Nepean Campus) Mills Cross Radio Telescope is located to the north-west of the airport site. However, the University of Western Sydney advise that this facility will be relocated elsewhere within the next one to two months. Therefore there would be no impact on this facility.

Elizabeth Drive Waste Disposal is a non-putrescible site to the north of Badgerys Creek airport which is expected to be unaffected by the airport development.

## 9.2.2 LAND OWNERSHIP AND ACQUISITION

### *Land Ownership*

The Commonwealth Government owns a large portion of land in the Badgerys Creek area due to a previous acquisition program which commenced after the determination of the *Second Sydney Airport Site Selection Programme Draft Environmental Impact Statement* (Kinhill Stearns, 1985). *Figure 5.4* identifies the land which is already owned by the Commonwealth Government and the land acquisition boundaries for Badgerys Creek Options B and C.

*Appendix C* sets out details of all lots contained within each of the airport options and notes which of those would need to be fully or partially acquired. *Figure C1* also shows the location of the various lots within each of the airport options, the numbers corresponding to the relevant lot and DP numbers.

*Table 9.7* summarises the numbers of properties which would need to be acquired for each of the airport options.



TABLE 9.7 PROPERTIES REQUIRING ACQUISITION: BADGERYS CREEK OPTIONS A, B AND C

Option	Numbers of Lots Requiring Acquisition	Areas of Acquisition (Hectares)	Number of Landowners
Badgerys Creek Option A	0	0	0
Badgerys Creek Option B	201	1,735	194 <sup>1</sup>
Badgerys Creek Option C	215	2,006	206 <sup>1</sup>

Note: 1. Includes Commonwealth Government.

This shows that 201 lots (194 land owners) would be affected by either full or partial acquisition for Option B and approximately 215 lots (206 land owners) for Option C. Since Option A is entirely in Commonwealth ownership, there would be no acquisition required.

Properties are largely owned by separate private land holders, some of which appear to be owned by individuals within the same family, who may use the properties for joint commercial uses such as market gardening.

The major land owners who conduct commercial and industrial activities within the proposed acquisition area for options B and C include Commonwealth Government enterprises, public companies, and private companies. These land holders include:

- Hubertus Country Club;
  - Telecom;
  - Clisdell Pastoral Company Pty Ltd;
  - OTC Ltd;
  - Galaxy Import and Export Company;
  - Boral Bricks (NSW) Pty Ltd.
- Inghams Enterprises Pty Ltd;
  - Jareva Pty Ltd;
  - Pington Pastoral Company Pty Ltd;
  - Leppington Pastoral Company;
  - Naro Pty Ltd; and

Most land adjacent to the proposed acquisition area is privately owned. The landowners of properties which are used for commercial or industrial activities include:

- Commonwealth of Australia;
- Australian Native Landscape Pty Ltd;
- Ferndale Pastoral Company Pty Ltd;
- Sydney Roof Trusses Pty Ltd;
- Liverpool City Council;
- Ciba-Geigy Australia Ltd.
- Hughes and Sons Pty Ltd;
- P and L Medich Properties Pty Ltd and Peter Medich Properties Pty Ltd;
- Shipp Transport Company Pty Ltd;
- Steggles Ltd;
- Elladora Pty Ltd; and

None of these properties would need to be acquired for any of the Badgerys Creek options.

Large portions of land in the adjacent area which are used for non commercial activities are owned by the University of Sydney, the University of Western Sydney, the Department of Defence (Commonwealth Government), Liverpool City Council and the Trustees of the Vietnamese Catholic Community.

### *Land Acquisition*

All land requiring full or partial acquisition for the development of a Second Sydney Airport at Badgerys Creek would be subject to *The Lands Acquisition Act, 1989*. This Act sets out provisions for the acquisition of land by the Crown in right of the Commonwealth for a public purpose. Two forms of acquisition are possible under this Act:

- acquisition by agreement; and
- acquisition by compulsory process.

The former is possible where interest is available in the market or is owned by the Commonwealth (or a Commonwealth Authority). In this case, the Minister for Administrative Services has to certify that the acquisition would be a standard commercial transaction. An agreement on a price, the purpose to which the land is to be put and other details relating to the interest and situation of that land has to be laid before Parliament.

Where land is compulsorily acquired, the Act provides for entitlement to compensation. The amount to which an individual might be entitled is assessed with regard to such items as:

- the market value on the day of acquisition;
- any increase or decrease in the market value if an interest is severed; and
- the value, on the day of acquisition, of any financial advantage, additional to market value, to the person incidental to the persons ownership of the interest.

Costs incurred by the owner in this process are also normally met, such as any legal or professional costs. Where a claimant rejects the relevant Minister's offer of compensation, the amount is determined by arbitration, or failing this by Administrative Appeals Tribunal or Federal Court.

### **9.3 IMPACTS ON EMPLOYMENT**

This section applies to both Badgerys Creek and Holsworthy airport options, since the range of forecasts of employment growth relating to a Second Sydney Airport are common to both. Details of potential locations and impacts relating to Badgerys Creek are presented in this section and in *Section 10.3* for Holsworthy.

#### **9.3.1 DEFINITIONS OF AIRPORT AND NON-AIRPORT RELATED DEVELOPMENT**

This section defines the parameters and assumptions made in the employment land use assessment. Employment land use has been defined as incorporating all uses for which the second airport is expected to generate employment, including commercial, industrial and retail. The impact assessment does not attempt to differentiate between these, rather it considers overall impacts in terms of employment generation, and the repercussions this has in terms of demand for employment land.

For the purpose of this assessment, definitions of airport related and non-airport related development have been developed by reference to recent relevant studies of Sydney Airport (Institute of Transport Studies, 1997) and experience at Melbourne's Tullamarine Airport.

Airports are significant generators of direct and indirect commercial and industrial activity. It has been estimated (Institute of Transport Studies, 1997) that for every job created in the airport-related sector, another is created elsewhere in Sydney. Direct airport-related activities are those required to

operate the airport, to serve the passengers and freight passing through it and to serve airport traffic, 'where a change in the level of activity at the airport would have some observable effect on the level of operation of that establishment' (Institute of Transport Studies, 1993). The main commercial and industrial activities that generate direct economic effects are:

- international and major domestic airlines;
- general aviation, charter and commuter airlines;
- airport administration, customs, Airservices Australia, etc;
- commercial uses (retail, restaurants, offices);
- oil companies;
- airport concessionaries (car hire firms, duty free shops, souvenirs, food courts);
- airport support services (engineering workshops and other airport service contractors);
- air freight forwarders and customs agents;
- transportation (taxis, buses, etc);
- car parking; and
- accommodation.

Of these, not all would be located immediately on the airport site. Some, for example, accommodation, some air freight forwarders, and airport concessionaires, would be located in close proximity to the airport site, but not necessarily immediately on site. The extent to which these uses might be attracted to the Second Sydney Airport would also be dependent on the commitments of the airlines to a new site, and the extent of restrictions on the existing Sydney Airport site, such as capacity constraints (curfew, landing and take off restrictions), land availability and landing fees.

Based on a survey conducted during January and February 1996 (Institute of Transport Studies, 1997), just over two-thirds of airport-related industry might be located on site. This includes the major airlines, general aviation, airport Government services and security. *Table 9.8* shows trends for Sydney Airport related employment over the past 13 years.

*Table 9.8* shows that within the airport related employment category:

- airlines are, by far, the major employers;
- airport commerce and airport-associated industries generate significant employment;
- there has been a significant increase in total direct employment within the airline category;
- the air freight service sector (freight forwarders and customs agents) is a major industry which has more than doubled its employment in the period from 1989 to 1996;
- airport-related accommodation is growing rapidly; and
- the land transport services sector has shown very strong growth and latest employment figures suggest that it is becoming a major airport related industry.

From this it is possible to determine the type of airport related employment which might be located on and off the airport site.

On airport site activities commercially located within the terminal and apron precincts would be included in planning of the layout of airport facilities. Generally, the uses to be accommodated on site include:

- the major airlines;
- general aviation, charter and commuter airlines;
- airport government services and security; and
- associated activities, such as duty free shops, and some airport and airline support services.



TABLE 9.8 TRENDS IN AIRPORT RELATED EMPLOYMENT AT SYDNEY AIRPORT

Industry Sector	1983	1989	1993	1996
Major airlines	10,340	16,348	20,065	21,769
Other aviation	620	606	258	832
Airport administration	1,425	1,792	1,877	1,760
<i>Airport Commerce</i>				
Support Services		9,618	1,448	1,652
Airport Concessionaries		813	946	1,366
Air freight forwarders and customs agents	900	1,500	3,658	3,995
<i>Other Associated Services</i>				
Transport and taxis		313	977	1,383
Accommodation		215	462	752
<b>Total</b>	<b>14,900</b>	<b>22,548</b>	<b>29,691</b>	<b>33,509</b>

Source: Institute of Transport Studies, 1993 and 1997.

In the immediate vicinity of the airport, airport related activity would be from the following uses if industrial land was available:

- parking: one of the largest land requirements in the immediate vicinity of a Second Sydney Airport would be for parking of private vehicles. Given the proposed locations of both the Badgerys Creek and Holsworthy sites demand for medium and long stay parking is likely to be higher than that for Sydney Airport. In the short term, unused land in the vicinity of the airport may be developed for long stay parking then redeveloped for higher value land uses when demand justifies;
- hire cars: hire car companies operate as concessionaires within the terminal but also require land for storing and maintaining vehicles. This generates a demand for parking space close to the terminal but also for land nearby to store surplus vehicles and for maintenance and administration facilities. The scale of demand for land for hire car operations will be largely dependent on passenger volume and the relative mix of international, domestic and charter services at the airport;
- hotel accommodation: evidence from Sydney Airport indicates that supply of accommodation has increased significantly in the past five years. Given the proposed locations for a second Sydney airport, there

is likely to be demand for both budget and high standard accommodation nearby. Land requirements for the development of accommodation are variable, and would be largely dependent upon planning policies and other requirements. The scale of demand for land for this use will also be dependent on passenger volume and the relative mix of international, domestic and charter services;

- air freight and airport support services: both of these industry sectors tend to be characterised by a large number of small firms. Air freight and equipment also tends to have small volumes so that the land area required for each firm would also tend to be small. Industries of this type are generally located in industrial parks in close proximity to the airport and comprise a large number of small premises. However, it is unlikely that air freight forwarders will relocate their main operations to a second Sydney airport in the short term. Location at the Second Sydney Airport would also be dependent on the industry's relationship with other transport freight and be dependent on the relative distance from the Sydney central business district. Customs agents do not need to be located immediately at the airport, but might locate in the vicinity of the Second Sydney Airport;
- catering: airlines tend to operate their own catering facilities or contract other airlines. There is also an opportunity to out source to third party contractors. This would create demand for significant land requirements in the vicinity of the Second Sydney Airport, although this would not necessarily need to be on the airport site; and
- land transport services: the proposed locations for the Second Sydney Airport imply a strong demand for land transport services (bus, taxi, etc). Operators would require loading bays close to the terminal and may require land nearby to establish facilities for parking, drivers and administration. In land use terms, these have been allocated part of each master plan, and would serve this purpose for passenger collection and drop off while land off airport site would need to be allocated for administration, parking and maintenance.

Ultimately, a mature Second Sydney Airport would support a similar group of airport related activities as Sydney Airport. However, the scale and mix of activities and resultant land requirements would vary over time and in response to the passenger and traffic volume and the role played by the airport in the Sydney basin airport system.

### 9.3.2 EMPLOYMENT FORECASTS

Employment land catchment areas have been defined for each of the airport options, where there is likely to be a demand for airport related development.

They have been defined based on local government areas adjoining or in immediate proximity to each site, as described in *Section 3.2.2*.

Employment growth has been calculated by reference to these catchment areas and also takes account of the flow on effects to the wider Sydney area. A more detailed explanation of these catchments and anticipated employment growth within each is provided in *Technical Paper No. 15*.

The impact upon demand for additional employment land has been calculated directly from forecasts of employment growth presented in *Technical Paper No. 15*. This has been calculated for two scenarios:

- Air Traffic Forecast 2 (10 million passengers per annum by 2006 with subsequent growth being directed to the Second Sydney Airport); and
- Air Traffic Forecast 3 (same as above, but with more international flights directed to the Second Sydney Airport).

These correspond with those used for the traffic modelling exercise, thereby incorporating the 'worse case' scenario.

Table 9.9 below shows the employment forecasts estimated for these scenarios.

TABLE 9.9 EMPLOYMENT GROWTH FORECASTS: BADGERYS CREEK AND HOLSWORTHY AIRPORT OPTIONS<sup>1</sup>

Year	Direct Employment		Flow On Employment		Total
	On-Site	Airport Vicinity <sup>2</sup>	Airport Catchment <sup>3</sup>	Rest of Sydney	
2006	10,700	5,100	6,100	9,800	31,700
2016	35,300	13,000	18,600	29,900	96,800

- Notes:
1. Figures represent the approximate mid points in a range of projected employment forecasts (rounded to nearest 100).
  2. On site or within immediate catchment.
  3. Employment land catchment areas as described in Section 3.2.2.

This table shows employment growth expected as a result of development of a second Sydney airport at either Badgerys Creek or Holsworthy. It is acknowledged that there is a range of forecasts, and that actual employment growth for each airport option might vary. It also shows anticipated growth for airport related development (direct), within the catchment for each airport and within the rest of the Sydney region, as a consequence of the flow on effects of the airport (determined by means of a multiplier).

It should be noted that there is likely to be some overlap between the airport vicinity and airport catchment categories, in terms of the land requirements for each.

To translate these figures into land use areas and locations, the following steps were taken:

- calculate floorspace area required to accommodate employment growth, by reference to specified employment densities for airport related development;
- translate floorspace areas into land areas, by reference to recognised floorspace ratios for particular industries; and
- apportion land use areas to specific locations.

It was not possible to assess land requirements for individual employment categories, since little or no information exists on the matter specifically in relation to airport development. Any attempt to do so would be speculative, and potentially misleading. The method therefore seeks to project approximate land requirements for a range of potential industries. The actual requirement is likely to be anywhere in a range above or below the stated figures.

Assumptions as to the location of direct and flow on employment within the employment land catchment areas were made based on locations of existing available employment land and existing relationships between centres and employment land.

For airport related development, within the airport site and the immediately vicinity (off airport site), reference was made to the designation of commercial areas shown on the master plans for each option, previous studies for Badgerys Creek (Taskforce on Planning for the Sub-Region Surrounding Sydney West Airport, 1996b) and access and environmental considerations. The ability of existing employment areas within each catchment was also assessed by reference to their relative location and accessibility from each airport site and the amount of vacant land within each. Options for additional employment land were also made by reference to government policy (regional environmental plans for South Creek and Macarthur) and by reference to access corridors, linkages and other environmental considerations, such as proximity to residential areas and known environmental constraints.

9.3.3 EMPLOYMENT LAND REQUIREMENTS FOR THE SECOND SYDNEY AIRPORT PROPOSAL

Employment growth for Sydney, each airport catchment and the Second Sydney Airport site have been forecast in Section 9.3.2. These figures have been used as a basis for approximating land use requirements on and off each site, based on the methodology described. This was also done to determine approximate employment levels based on land availability within each site.

In translating this employment forecast to land use and floorspace requirements, employment densities for airport related industry likely to locate within or immediately adjoining an airport were considered, based on experience in Sydney as set out in Table 9.10.

TABLE 9.10 EMPLOYMENT DENSITIES FOR EMPLOYMENT USES IN SYDNEY

Building Type	Floorspace per Worker (square metres)
Multi-unit industrial <sup>1</sup>	66.7
High-tech industrial <sup>2</sup>	34.7
Transportation/freight	65.8
Office <sup>3</sup>	19.6

- Source: Department of Planning (1991c).
- Notes:

1.

Multi-unit industrial premises are typically smaller in area and contain mezzanine offices.

2.

High-tech industrial premises contain more office space than other industrial uses.

3.

Figure derived from Department of Planning surveys undertaken in 1988 and 1991 for regional and sub-regional centres, Mitchell McCotter (1992).

An average employment density for employment uses in the Sydney region of 46.7 square metres per worker has been assumed based on the figures in Table 9.10. Using the forecast employment growth this translates to the predicted floorspace areas in Table 9.11.

TABLE 9.11 FLOORSPACE REQUIREMENTS FOR EMPLOYMENT GROWTH AT SECOND SYDNEY AIRPORT

Area/Year	Forecast Employment Growth		Floorspace Area (Square metres)
Airport Vicinity	2006	5,092	237,796
	2016	12,979	606,119
Airport Catchment	2006	6,097	284,730
	2016	18,626	869,834
Rest of Sydney	2006	9,772	456,352
	2016	29,855	1,394,229

To ascertain the likely land area requirement to accommodate this floorspace, an assessment of floorspace ratios for commercial and industrial zones within local government areas in the employment land catchment was conducted. This indicates a range of floorspace ratios for business and industrial zones, ranging from 0.5:1 for light industrial zones (*Wollongong Local Environmental Plan, 1990*) to 0.6:1 for industrial uses (Liverpool City Council, 1994), 0.6:1 for cargo related uses (Liverpool City Council, 1994), 0.75:1 for special business (non-retail) (*Campbelltown City Council Interim Development Order No. 26, 1980*) and 1.5:1 for general business uses (*Wollongong Local Environmental Plan, 1990*). This gives an average floorspace ratio for airport related employment uses of 0.8:1. This was applied to the floorspace areas specified above, and the results are presented in *Table 9.12* below.

TABLE 9.12      SECOND SYDNEY AIRPORT LAND USE REQUIREMENTS (BADGERYS CREEK AND HOLSWORTHY)<sup>1</sup>

Area/Year		Land Area (Square metres)	Land Area (hectares)
Airport Vicinity	2006	297,245	30
	2016	757,649	76
Airport Catchment	2006	355,913	36
	2016	1,087,293	109
Rest of Sydney	2006	570,440	57
	2016	1,742,786	174
Total	2006		123
	2016		359

Note:                    1.        Excludes employment on airport site in terminal/airport buildings.

Provision of on-site employment refers to direct airport related development, and has been accounted for within the terminal buildings proposed as part of the master plans.

Airport vicinity employment also accounts for direct airport related development, in the form of freight forwarders, customs agents, hotels, hire car/transportation companies and the like. For some options not all of this can be accommodated within the airport sites themselves. There would therefore be some overlap between this category and the flow on employment within the employment land catchment area, in terms of where they might be located.

Table 9.13 shows the land requirement for airport related development within the immediate vicinity of the airport and the extent to which this can be accommodated within each airport site (for all options).

TABLE 9.13 EMPLOYMENT LAND REQUIREMENTS WITHIN AIRPORT SITES OR THEIR IMMEDIATE VICINITY

Option	Airport Related Developed Land Requirement <sup>1</sup> (Hectares)	Approximate Available Land <sup>2</sup> Within Airport Site (Hectares)	Airport Related Development Surplus/Deficit (Hectares)
Badgerys Creek A	76	0	-76
Badgerys Creek B	76	193.8	118
Badgerys Creek C	76	186.9	111
Holsworthy A	76	58.8	-17
Holsworthy B	76	50.6	-24

Notes:

1. From Table 9.12 (Airport Vicinity).
2. Airport master plans (Second Sydney Airport Planners, 1997a).

Table 9.13 indicates that the land available for airport related employment varies dependent on the airport option. This has repercussions in terms of demand for additional land within the airport catchment. Badgerys Creek Option A would require an additional 76 hectares within the catchment, Options B and C would not require any, and Holsworthy Options A and B would require 17 and 24 hectares respectively. This assumes that all such development would want to locate on the airport site, if available and serviced land was available at a competitive market price.

Flow on employment land requirements would also extend beyond the airport catchment to the rest of the Sydney metropolitan area. Based on the employment forecasts, this is estimated to create a demand for an extra 174 hectares beyond the immediate airport catchment areas, by 2016.

#### 9.3.4 LOCATION OF EMPLOYMENT LAND

Airport related development (direct employment) would be located on the airport site, within the terminal building, on areas designated for commercial purposes, within the airport boundary and within the immediate vicinity of the airport. Non-airport related development (flow on employment) would be located within the defined employment land catchment and disbursed throughout the rest of Sydney. Some might also locate within the airport boundary, where space permits (dependent on option) and where the site is readily serviced and cost competitive.

### *Badgerys Creek*

The amount of land required within the employment catchment varies significantly for Badgerys Creek, depending on the option. Since Option A does not have any commercial areas designated, all direct employment, excluding that within terminal buildings would have to be located off the airport site within the catchment area. This would be in addition to flow on employment forecast for the catchment. This results in a land area requirement of approximately 185 hectares.

The previous employment and economic development strategy (Taskforce on Planning for the Sub-Region Surrounding Sydney West Airport, 1996) nominated an employment area north of the site of the Badgerys Creek Airport options, on land north of Elizabeth Drive and between Mamre Road and Luddenham Road (the former CSIRO site). Given the proximity to the Badgerys Creek site and the relative lack of urban development within this area, this site would provide a suitable opportunity for the development of employment land for airport related development associated with the airport. This site would, if appropriate on environmental grounds, provide sufficient area to accommodate all airport related development. An environmental assessment of the appropriateness of this site to accommodate such development has not been undertaken. Opportunities for future employment lands may also become available if the rail link to Badgerys Creek is developed.

Badgerys Creek Options B and C both have commercial areas designated within the boundary of the airport site, as part of the master plans (Second Sydney Airport Planners, 1997a). For both options, this provides sufficient land to accommodate airport related development which requires a location within or immediately adjacent to the airport.

There would also be sufficient land to accommodate some flow on employment, not directly associated with the airport, but arising due to the flow on effects to other industries. The extent to which these industries might be attracted to the airport site itself is difficult to quantify as it will be dependent on a series of factors, including cost and the availability of readily serviced land. Some of this flow on employment might also be in the form of the extension of current operations within the catchment. For the purpose of this assessment, it has been assumed that approximately 6,000 employees would also locate on the site for Options B and C. This represents one third of the number of employees within this category and is consistent with experience at Sydney Airport (Institute of Transport Studies, 1997).

Subtracting this from the balance of flow on employment within the catchment, leaves 12,626 employees (equal to a land area of approximately



75 hectares) which would require location within the employment catchment area.

This represents a fairly limited employment land requirement within the catchment for Options B and C (due to adequate provision on site), and it is likely that existing zoned employment land within the catchment would accommodate this. In particular, there are significant tracks of vacant employment land at Erskine Park, approximately eight to 10 kilometres to the north-east of the airport site. This site is also well served in relation to the M4 Motorway and links to the proposed Western Sydney Orbital, via Elizabeth Drive.

Other existing zoned employment land with significant vacancies, which are likely to accommodate employment growth within the employment catchment area and in reasonable proximity to the sites of the Badgerys Creek Airport options are:

- Erskine Park, Penrith;
- Prestons, Liverpool;
- Crossroads, Liverpool;
- Huntingwood/Arndale Park, Blacktown;
- North Penrith, Penrith;
- Wetherill Park, Fairfield; and
- Minto/Ingleburn, Campbelltown.

The extent to which airport related and flow on employment for the catchment is disbursed between these, or other existing industrial and employment zones cannot be determined with any degree of certainty, since this would be dependent on other factors including individual business preferences, which are not subject of this assessment. However, given the employment forecasts, these sites can adequately accommodate the balance of employment growth arising from the development of a Second Sydney Airport at Badgerys Creek to 2016.

Given the extent of vacant employment land within the employment catchment area as a whole, there is sufficient area to accommodate the balance of flow on employment. Subtracting the amount of land calculated as being required for these purposes within the employment catchment area, (approximately 185 hectares for Option A), and given the average take-up rates throughout the catchment (131 hectares per year), there is still sufficient land

within the airport catchment to accommodate airport related (airport vicinity), flow on employment and development occurring through normal circumstances for the next 15 years.

It is unlikely, however, that all employment generation arising from the airport, would be located in one employment area, or within employment, industrial and commercial zones alone. An assumption has been made that a proportion of the employment generated would be accommodated within commercial centres throughout the employment catchment area. For Badgerys Creek, this is likely to be Liverpool, Campbelltown, Parramatta, Blacktown and Penrith. This is consistent with the Metropolitan Strategy to encourage the concentration of retail, commercial and service employment by supporting a hierarchy of centres, which include within the employment catchment, Liverpool, Bankstown, Penrith, Blacktown and Campbelltown (Department of Planning, 1995). It has therefore been assumed that 31 percent of employment generation within the employment catchment, will be located within nominated existing centres. *Table 9.14* shows approximate numbers of employees within each centre for these purposes.

TABLE 9.14      EMPLOYMENT GENERATION WITHIN EXISTING CENTRES: BADGERYS CREEK AIRPORT OPTIONS<sup>1</sup>

Centre	Badgerys Creek Option A	Badgerys Creek Option B	Badgerys Creek Option C
Liverpool <sup>2</sup>	3,900	1,500	1,500
Penrith <sup>3</sup>	1,000	300	300
Blacktown <sup>4</sup>	2,000	900	900
Campbelltown <sup>5</sup>	1,000	300	300
Parramatta <sup>6</sup>	2,000	900	900

- Notes:
1.

2.

3.

4.

5.

6.
- Rounded to nearest 100.

Assumes 40 percent share of employment within centres.

Assumes 10 percent share of employment within centres.

Assumes 20 percent share of employment within centres.

Assumes 10 percent share of employment within centres.

Assumes 20 percent share of employment within centres.

## CHAPTER 10 IMPACTS OF HOLSWORTHY AIRPORT OPTIONS

### 10.1 IMPACTS ON PLANNING

#### 10.1.1 METROPOLITAN PLANNING

The Holsworthy Military Area represents a significant land area (approximately 20,000 hectares) within the Sydney region. As the region has expanded, the potential of the Holsworthy Military Area to be redeveloped for urban purposes has been reviewed including its selection as an option in the *Second Sydney Airport Site Selection Programme Draft Environmental Impact Statement* (Kinhill Stearns, 1985). However, Badgerys Creek was chosen as the preferred option, and Holsworthy has remained in Defence use.

The decision to retain the site for military purposes has formed the basis for long term metropolitan planning in the area over the past decade. The structure of the urban development pattern in the area including the provision of transport infrastructure such as the M5 Motorway, reflect this.

While the development of an airport at the Holsworthy Option A site is likely to link with the established urban areas of Liverpool and Campbelltown, it is anticipated that the development of Holsworthy Option B in the south would act as a catalyst for further urban development in the southern fringes of the Sydney region.

The development of Holsworthy Option B may potentially result in significant infrastructure provision (transport and other services) in the southern Campbelltown area and this may in turn be complemented by urban development, particularly residential and employment lands.

If this pattern of development was to follow the development of Holsworthy Option B, a shift in the current metropolitan strategy would be required. To achieve this, a proportion of the urban development program currently focussed on the Liverpool and Fairfield local government areas could be redirected to the south Campbelltown area. The *Macarthur South Regional Environmental Study* (Department of Planning, 1991d) reviewed the urban capability of this region and identified capacity for a population of approximately 150,000 people. With an airport at Holsworthy Option B, the urban development of Macarthur South may commence at an earlier date than originally anticipated. A thorough review of the urban capability of Macarthur South is recommended. It is anticipated that the capacity of Menangle would be re-evaluated given its proximity to the Holsworthy Option B airport option.

At this stage it is difficult to define the impact of an airport at either of the Holsworthy sites on the long term operations of the Department of Defence. Therefore, the availability of the remainder of the site for redevelopment to other urban purposes is not clear. Nevertheless, preliminary analysis has shown that the urban capability of the Holsworthy Military Area is limited by the topography, unexploded ordnance and environmental considerations.

In terms of its impact on the three key principles of the *Metropolitan Strategy*, an airport at Holsworthy Option A or B may be evaluated as follows:

- ecological sustainability - *Technical Paper No. 7* and *Technical Paper No. 8* outline the qualities of this site which have been derived partly from the low impact use it has sustained for several decades. The development of an airport and associated infrastructure would severely impact on these qualities;
- more compact cities - the Holsworthy Military Area has limited potential to sustain associated urban development outside the airport boundaries. Therefore the opportunities for large scale urban initiatives including residential and employment uses to codevelop and share the transport and service infrastructure is limited; and
- effective implementation - the opportunities for cooperative redevelopment of the Holsworthy Military Area is difficult to determine at this stage. However, adjoining local government areas and the State Government have expressed strong opposition to airport development on this site and their cooperation in development and service provision cannot be assured.

The impact of an airport at Holsworthy Option A on the operations of Bankstown Airport is discussed in the Draft EIS.

### 10.1.2 REGIONAL PLANNING

As explained in *Section 9.1.2*, the Urban Development Program (Department of Urban Affairs and Planning, 1996c) identified in *Figure 4.8* forms the basis of regional planning. This program, in turn, forms the basis of the regional land use scenarios developed to determine the impact of the airport options on long term land use patterns.

Under all four regional land use scenarios developed, ten local government areas within the Second Sydney Airport Assessment Region do not differ from the population projections developed by the Department of Urban Affairs and Planning (1995a). These local government areas and the population projections for 2006 and 2016 are shown in *Table 9.2*.

The changes assumed in each of the remaining five local government areas (Camden, Campbelltown, Liverpool, Sutherland and Wollondilly) are contained in *Tables 10.2 and 10.3* for the Holsworthy Option A (Land Use Scenario 3) and Holsworthy Option B (Land Use Scenario 4) respectively.

The flight paths and the ANEC contours derived from each of the airport options are provided in *Technical Paper No. 3. Australian Standard 2021 - 1994 Acoustics-Aircraft Noise Intrusion - Building Siting and Construction* (Standards Association of Australia, 1994) has been applied to determine the suitability of specified buildings/land uses within each contour. A summary of building type acceptability is contained in *Table 9.3*.

In terms of residential development *Australian Standard 2021 - 1994* states that houses, home units and flats are acceptable in areas of less than 20 ANEF. Taking this as the benchmark, the impact generated by the noise contours in each of the local government areas potentially affected by Holsworthy Options A and B is summarised in *Table 10.1*.

TABLE 10.1 IMPACT OF HOLSWORTHY OPTIONS A AND B ANEC ON RESIDENTIAL DEVELOPMENT

Local Government Area	Impact on Urban Development Program Areas	Impact on Existing Residential Areas <sup>1</sup>
Liverpool	<ul style="list-style-type: none"><li>■ 20 ANEC (Holsworthy Option A) affects the southern corner of the Casula East release area</li></ul>	<ul style="list-style-type: none"><li>■ a part of the south-west corner of the Wattle Grove release area is within the 20 ANEC (Holsworthy Option A). The final development of Wattle Grove is committed and no decline in development is anticipated should Holsworthy Option A be selected</li></ul>
Campbelltown	<ul style="list-style-type: none"><li>■ the long term release areas of Mt Gilead and Menangle Park are impacted by parts of the 20-25 ANEC. (Holsworthy Option B)</li></ul>	<ul style="list-style-type: none"><li>■ 20-25 ANEC (Holsworthy Option A) impacts on Macquarie Fields, Glenfield and Ingleburn UDP areas. These areas are substantially developed at the present time.</li><li>■ 20 - 25 ANEC (Holsworthy Option B) impacts on the UDP areas of Airds, St Helens Park, Rosemeadow, Ambarvale, and Glen Alpine.</li><li>■ Rosemeadow and Glen Alpine are impacted by the 25-30 ANEC (Holsworthy Option B)</li></ul>

TABLE 10.1 CONTINUED

Local Government Area	Impact on Urban Development Program Areas	Impact on Existing Residential Areas <sup>1</sup>
		<ul style="list-style-type: none"><li>■ St Helens Park can anticipate noise exposure above 30 ANEC (Holsworthy Option B).</li><li>■ All these areas are substantially developed and/or committed with Glen Alpine and St Helens Park the only ones with remaining lot production capacity after the year 2000.</li></ul>
Sutherland		<ul style="list-style-type: none"><li>■ southern areas of Heathcote are impacted by 25-30 ANEC from the cross wind runway (Holsworthy Option A)</li></ul>
Wollongong		<ul style="list-style-type: none"><li>■ Helensburgh is impacted by 20-25 ANEC and partly by 25-30 ANEC from Holsworthy Option B</li><li>■ Stanwell Park impacted by 20 ANEC (Holsworthy Option B)</li></ul>

Notes: 1. The suburbs impacted by noise are identified in more detail in *Table 10.4*.

10.1.3 HOLSWORTHY AIRPORT OPTIONS FUTURE LAND USE SCENARIOS

*Holsworthy Option A*

The regional land use scenario developed for Holsworthy Option A is shown in *Figure 10.1*.

The key features of this scenario and the regional impact of Holsworthy Option A are:

- while the release areas of Macquarie Fields, Glenfield and Ingleburn are within the 20 - 25 ANEC, they are assumed to reach capacity given that they are substantially developed at the present time. Potential noise mitigative measures are discussed in *Technical Paper No. 3*;
- Liverpool would continue to accommodate a significant proportion of the future urban development in the area;
- in order to accommodate the anticipated population in the area, Edmondson Park would need to come 'on stream' by 2006. Unlike the Badgerys Creek options, no new urban villages are planned under this scenario. Under this scenario, all other release areas in Camden,



Figure 10.1  
**Future Urban Land Use  
Assumptions to 2016 for  
Holsworthy Option A**



Campbelltown, Liverpool and Fairfield would be under active development, and Edmondson Park would be required to satisfy residential demand in the area. This is contrary to the policy of Liverpool Council which considers that the development of Edmondson Park is only viable if accompanied by significant transport infrastructure such as the rail line proposed for the Badgerys Creek Options A, B and C; and

- the West Menai area is assumed to be deleted from the Urban Development Program.

Table 10.2 summarises the projections for the local government areas within the Second Sydney Airport Assessment Region where there may be population changes under this scenario.

TABLE 10.2 HOLSWORTHY OPTION A - POPULATION PROJECTIONS

Local Government Area	1996 <sup>1</sup>	Without Airport <sup>1</sup> 2006	With Airport 2006	Without Airport <sup>1</sup> 2016	With Airport 2016
Camden	32,000	51,000	52,000	62,000	67,000
Campbelltown	152,000	158,000	158,000	162,000	162,000
Liverpool	120,000	154,000	155,000	178,000	183,000
Sutherland	201,000	211,000	210,000	222,000	217,000
Wollondilly	34,000	41,000	41,000	46,000	46,000
<b>Total</b>	<b>534,000</b>	<b>615,000</b>	<b>616,000</b>	<b>670,000</b>	<b>675,000</b>

Note: 1. Based on Department of Urban Affairs and Planning (1995a) (Mid-Range Projections).

Changes in projected population growth in the three local government areas (compared to the Department of Urban Affairs and Planning projections) is as follows:

- Camden’s growth would increase by 1,000 people by 2006 and by 5,000 people by 2016. This is largely due to the Elderslie/Springfarm areas;
- Liverpool’s growth would increase by 5,000 people by 2016. This is largely accommodated in Edmondson Park. The small Pleasure Point release area is not assumed to proceed under Holsworthy Option A. While not directly noise affected, this release area is only in the early planning stages and could conceivably be removed from the program;
- Sutherland’s growth is reduced by 5,000 people with the removal of West Menai. While not directly noise affected, the development of



such a substantial release area in proximity to the airport would possibly be re-evaluated; and

- Campbelltown and Wollondilly have no changes.

### *Holsworthy Option B*

The regional land use scenario developed for Holsworthy Option B is shown in *Figure 10.2*.

The key features of this scenario and the regional impact of Holsworthy Option B are:

- the Urban Development Program would continue as identified in Liverpool and Fairfield;
- while the release areas of Airds, St Helens Park, Rosemeadow, Ambarvale and Glen Alpine are within the 20 - 25 ANEC, it is assumed that they would reach capacity given that they are substantially developed at the present time. Potential noise mitigative measures are discussed in *Technical Paper No. 3*;
- long term release areas of Menangle Park and Mt Gilead would be withdrawn from development on the basis that they are wholly or partly within the 20 - 25 ANEC; and
- the Macarthur South Region (Department of Planning, 1991d) would come '*on stream*' to accommodate the dwelling demand anticipated in the area. As stated earlier, the provision of considerable infrastructure and employment associated with the development of Holsworthy Option B may result in a review of the directions of metropolitan growth. For the purposes of this assessment it has been assumed that development in Macarthur South would commence by 2006.

While it has been assumed that there would be an increased demand for residential development in the south-western region of Sydney caused by the development of Holsworthy Option B, it is noted that the Macarthur South area, while being developed on a rail line, would be remote from major employment opportunities. This would especially be the case if the major road access to Holsworthy Option B was from the M5 Motorway rather than the South Western Freeway, south of Campbelltown.

*Table 10.3* summarises the projections for the local government areas within the Second Sydney Airport Assessment Region where there may be population changes under this scenario.



Figure 10.2

**Future Urban Land Use  
Assumptions to 2016 for  
Holsworthy Option B**

Future Urban (Urban Development Program)		Existing Major Employment Areas Likely to be Influenced by Airport	
Future Urban Village		Main Centres	
Proposed Western Sydney Orbital			
Existing Urban Areas (indicated by local roads)			

TABLE 10.3 HOLSWORTHY OPTION B - POPULATION PROJECTIONS

Local Government Area	1996 <sup>1</sup>	Without Airport <sup>1</sup> 2006	With Airport 2006	Without Airport <sup>1</sup> 2016	With Airport 2016
Camden	32,000	51,000	52,000	62,000	58,000
Campbelltown	152,000	158,000	155,000	162,000	156,000
Liverpool	120,000	154,000	154,000	178,000	181,000
Sutherland	201,000	211,000	210,000	222,000	222,000
Wollondilly	34,000	41,000	43,000	46,000	58,000
<b>Total</b>	<b>539,000</b>	<b>615,000</b>	<b>617,000</b>	<b>670,000</b>	<b>675,000</b>

Note: 1. Based on Department of Urban Affairs and Planning (1995a) (Mid Range Projections).

Changes in projected population growth in these local government areas (compared to the Department of Urban Affairs and Planning projections) is as follows:

- Camden's growth would be 4,000 fewer at 2016. This is because growth at Elderslie and Springfarm is assumed to be diverted to Macarthur South to ensure the latter area achieves a reasonable rate of development;
- Campbelltown's growth would be reduced by 6,000 with the growth of Mt Gilead and Menangle Park being diverted to Macarthur South;
- Liverpool's growth would increase by 3,000 by 2016. Again Edmondson Park would need to come 'on-stream' to absorb this level of growth; and
- Wollondilly growth would increase by about 12,000 by 2016. This would largely be within the first urban village development of Macarthur South, which is presumed for the purposes of this exercise to be located on the rail line.

#### 10.1.4 LOCAL PLANNING

##### *Local Government Area Zonings*

The three local government areas which adjoin the Holsworthy Military Area are Liverpool, Campbelltown and Sutherland. As outlined in Section 4.2.3 none of the local planning instruments applicable to the Holsworthy site permit the operation of a commercial airport.

A summary of the relevant zonings are as follows:

- under *Liverpool Local Environment Plan, 1997* the site is zoned 7(b) Environment Protection - Bushland and 6(b) Recreation - Private;
- under *Sutherland Local Environmental Plan, 1993* the site is zoned 5(a) Special Uses - Military Area; and
- under *Campbelltown Interim Development Order No. 15* the site is zoned 5(a) Special Uses - Military Reserve and 5(a) Special Uses - Water Catchment.

Normally within these zones, the development of an airport at Holsworthy Options A or B would require local government rezonings. However, development of an airport by the Commonwealth on Commonwealth land would not be subject to this requirement.

## 10.2 IMPACTS ON LAND USES AND OWNERSHIP

### 10.2.1 LAND USE

Given the size of the Holsworthy Military Area, there is a significant range of adjoining land uses in the area. These include, residential, rural residential, rural, open space and special uses.

The impact of an airport at Holsworthy on the existing and committed land uses is outlined in this section.

#### *Residential Land Use*

Under *Australian Standard AS2021-1994 Acoustics - Aircraft Noise Intrusion - Building Siting and Construction* (Standards Association of Australia, 1994), Holsworthy Option A would impact on the urban release areas of Macquarie Fields, Glenfield, Ingleburn and Wattle Grove. Holsworthy Option B impacts on the newly established urban release areas of Airds, St Helens Park, Rosemeadow, Ambarvale and Glen Alpine.

The main communities impacted by the 20 or higher ANEC are shown in *Table 10.4*.

TABLE 10.4 COMMUNITIES WITHIN 20 ANEC, HOLSWORTHY AIRPORT OPTIONS

Community	Holsworthy Option A	Holsworthy Option B
Helensburgh (& Helensburgh West)		✓
Stanwell Park		✓
Airds		✓
Bradbury		✓
St Helens Park		✓
Rosemeadow		✓
Wedderburn		✓
Mt Gilead		✓
Ambarvale		✓
Glen Alpine		✓
Macquarie Fields	✓	
Chatham Village	✓	
Glenfield	✓	
Casula	✓	
Long Point	✓	
Ruse	✓	
Ingleburn	✓	
Wattle Grove	✓	
Kentlyn	✓	
Heathcote	✓	
Minto Heights	✓	
Helensburgh West	✓	

*Rural Residential Land Use*

As a developing region on the fringe of the Sydney metropolitan area there is substantial rural residential development in the vicinity of the Holsworthy airport sites, primarily in the Minto Heights, Kentlyn and Wedderburn areas which would be noise impacted by Holsworthy Option B. Restrictions on further development may need to be applied to the areas worst affected by noise.

### *Rural Land Use*

The rural areas in the east of Campbelltown municipality are covered by a variety of zonings including Rural 1(a), Rural 1(b) and Environment Protection Plateau 7(l). Development is largely in the form of small holdings where orchards and a variety of market garden crops are produced. The Wedderburn area is noise affected under Holsworthy Option B and may potentially be impacted by an access route to this airport option.

### *Open Space and Recreation Land Use*

Significant recreation and open space uses adjoin the Holsworthy Military Area, including the Royal National Park, Heathcote National Park and the Dharawal State Recreation Area. In addition, the Woronora Dam Catchment Area which permits restricted public access adjoins the south-eastern part of the Holsworthy site. These areas and major facilities within them are indicated on *Figure 10.3*.

Visitor survey data from the NSW National Parks and Wildlife Service (1994a) shows that 520,000 people visited the Royal National Park in 1994. Further assessment of impacts on this and other regional recreational and open space facilities for this option are presented in *Chapter 12*.

The popular North Wollongong beaches of Stanwell Park and Wombarra would be impacted by low level aircraft noise.

The Stanwell Tops area is a well known hang gliding site. The impact of an airport at Holsworthy on this facility is discussed in *Chapter 12*.

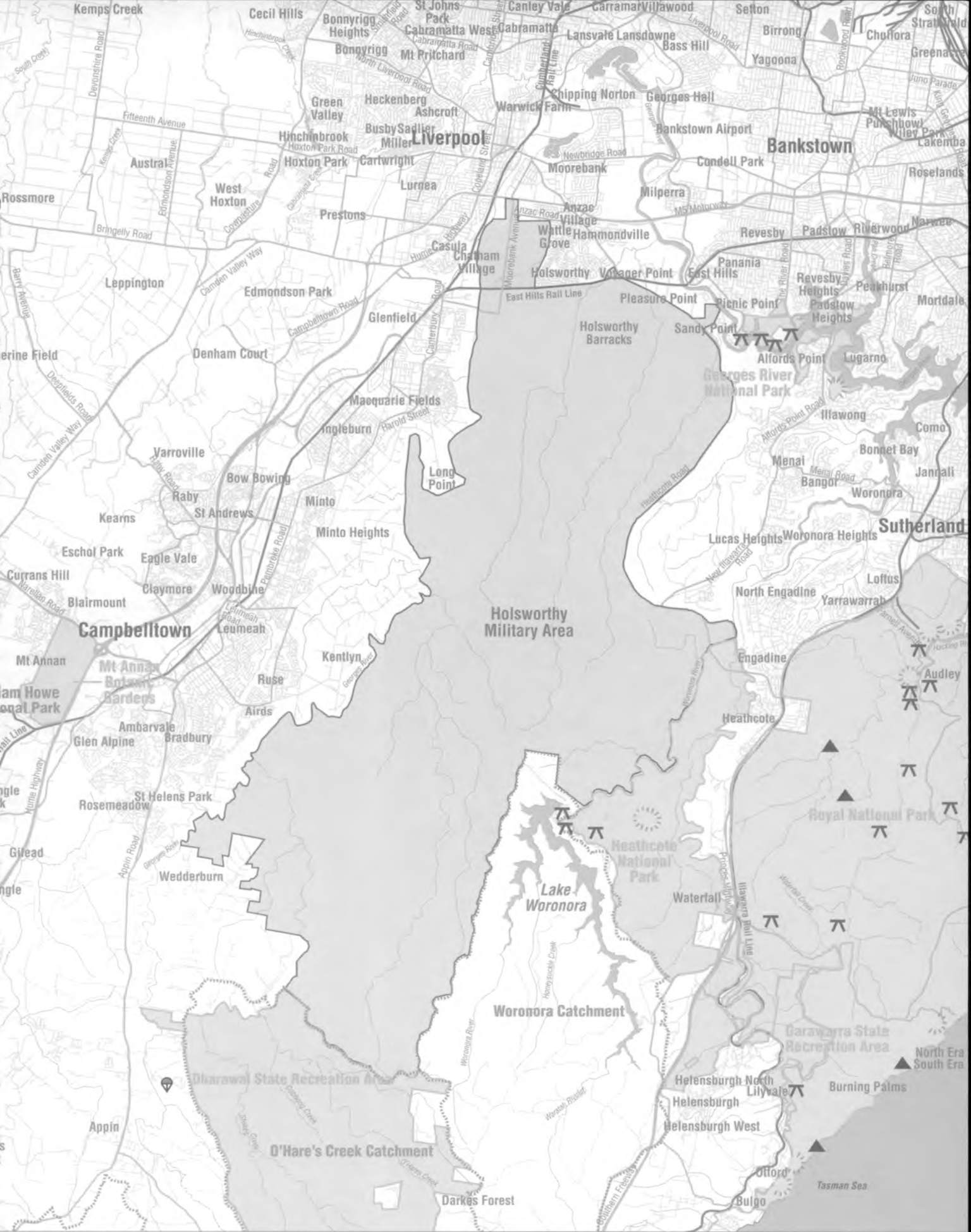
### *Special Land Uses*

The Australian Nuclear Science and Technology Organisation operates a 10 MW nuclear research reactor at Lucas Heights in Sutherland Shire Council to the east of the Holsworthy site. Current restrictions in adjoining land and airspace includes an exclusion zone of 1.6 kilometres radius for residential use and restricted airspace to a radius of one nautical mile and a height of 2,000 feet above sea level. The impact of an airport at Holsworthy on this facility is discussed in *Technical Paper No. 10*.

## **10.2.2 OWNERSHIP AND ACQUISITION**

### *Ownership*

The Holsworthy Military Area including Lot 1 of DP 835745 is owned by the Commonwealth of Australia for Defence purposes. Since the whole of the site



Parks managed by NSW National Parks and Wildlife Service  
 Proposed regional parks  
 Protected water catchment areas managed by Sydney Water

Picnic areas  
 Camping grounds  
 Lookouts  
 Airfields used for recreation

Figure 10.3  
**Regional Open Space in the Vicinity of Holsworthy Military Area**



for Holsworthy Options A and B is in Commonwealth ownership, there would not be a requirement to acquire land from a private interest.

No consideration has been given to acquisition required for any of the access options, not situated on Commonwealth land. This would be the subject of detailed consideration if and when the preferred access options are defined, if either of the Holsworthy options is chosen for the site of the Second Sydney Airport.

Acquisition

Since the sites of each of the Holsworthy options is in Commonwealth ownership (Department of Defence), no land would need to be acquired and the provisions of the *Land Acquisition Act 1989* do not apply. Land to which the depth limitation applies can be compulsory acquired by the Commonwealth, through the above Act or by Special Legislation.

10.3 IMPACTS ON EMPLOYMENT

The employment forecasts for Holsworthy Options A and B are the same as Badgerys Creek. These are presented in *Table 9.9*. The main difference arises due to the amount of commercial space designated on site (Second Sydney Airport Planners, 1997a) for airport related development. This means that not all such development can be accommodated on either of the proposed Holsworthy sites, and would require locations within the vicinity of the airport (either option) within the catchment area. This would be in addition to flow on employment forecast within the catchment. *Table 10.5* shows the land requirements within the catchment area as a result of this. The method of estimating this is the same as for Badgerys Creek, as presented in *Tables 9.9, 9.10 and 9.11*.

TABLE 10.5 LAND REQUIREMENTS WITHIN HOLSWORTHY CATCHMENT FOR AIRPORT RELATED AND FLOW ON EMPLOYMENT (2016)

Option	Employment	Land Requirement (Hectares)
Holsworthy Option A	21,532 <sup>1</sup>	125
Holsworthy Option B	22,937 <sup>1</sup>	134

Note: 1. Balance of Airport Vicinity and Airport Catchment employment forecasts (*Table 9.13*), minus employment to be located on site on designated commercial areas.

As for Badgerys Creek, there are existing zoned employment sites within the Holsworthy employment land catchment area with significant tracks of vacant



land within them which are likely to attract employment generated by a Second Sydney Airport:

- Smeaton Grange, Camden (Holsworthy Options A and B);
- Minto/Ingleburn, Campbelltown (Holsworthy Options A and B); and
- Prestons/Cross Roads, Liverpool (Holsworthy Option A).

All these sites have sufficient vacant land in which to accommodate employment arising from the airport (airport related and flow on employment within the catchment) which are located within reasonable distance of each respective airport option, assuming all access options and existing roads are available, to attract such development.

The extent to which these or other proximate employment zones within the catchment, attract such development has not been calculated. However, given current vacancy levels within the catchment (total 2,138 hectares from *Table 6.1*) and average take-up rates of 131 hectares per year, there is also sufficient land within these sites, including any airport related development to cater for demand, for another 15 years (assuming an employment land requirement within the catchment of 134 hectares).

In all probability, other sites within the Holsworthy catchment would also likely attract some of the development arising from the Second Sydney Airport, albeit limited, where vacancies exist. To this extent, the impact of airport related and flow on employment arising from the development of a Second Sydney Airport at either of the Holsworthy options, within the catchment, is considered to be limited, and the supply of vacant employment land to accommodate such is considered to be more than sufficient.

As for Badgerys Creek an assumption has been made that 31 percent of the land requirement would concentrate within existing commercial centres. This is in accordance with the NSW Department of Urban Affairs and Planning's support for a hierarchy of centres (Department of Planning, 1995).

These centres are Campbelltown, Bankstown and Liverpool. Unlike Badgerys Creek, however, the amount of employment likely to be attracted to these centres would vary, dependent on the option. *Table 10.6* shows approximate numbers of employees within each centre for airport related and flow on employment within the catchment area.

TABLE 10.6 EMPLOYMENT GENERATION WITHIN EXISTING CENTRES: HOLSWORTHY AIRPORT OPTIONS<sup>1</sup>

Centre	Holsworthy Option A	Holsworthy Options B
Campbelltown	2,000 <sup>2</sup>	3,600 <sup>3</sup>
Bankstown	1,400 <sup>4</sup>	700 <sup>5</sup>
Liverpool	3,300 <sup>6</sup>	2,900 <sup>7</sup>

- Notes:
1.

Rounded to nearest 100.
2.

Assumes 30 percent share of employment within centre
3.

Assumes 50 percent share of employment within centre
4.

Assumes 20 percent share of employment within centre.
5.

Assumes 10 percent share of employment within centre.
6.

Assumes 50 percent share of employment within centre.
7.

Assumes 40 percent share of employment within centre

# CHAPTER 11 OFF AIRPORT SITE INFRASTRUCTURE REQUIREMENTS

## 11.1 BADGERYS CREEK OPTIONS

Many alternatives for the provision of road and rail access, water, wastewater, electricity, telecommunications, aviation fuel and natural gas have been considered for the Badgerys Creek airport options. Where nominated only the preferred proposals are described in this chapter. Other alternatives that were considered and rejected during the investigations and the justification for this are documented in Second Sydney Airport Planners (1997b).

### 11.1.1 ROAD ACCESS

Road access to the Badgerys Creek airport options is required to provide high standard links for airline passengers and business operators who wish to use the airport.

For the three options the proposed road access would be similar, as shown on *Figure 11.1*. The main road access for passengers, meeters and greeters, freight and some commercial traffic would be Elizabeth Drive, based on the completion of the Western Sydney Orbital. An EIS was released in 1995 proposing the upgrade of Elizabeth Drive (Rust PPK, 1995). That proposal was for a high standard, six lane road linking the proposed entrance to the airport with Wallgrove Road and the proposed Western Sydney Orbital. For the three airport options, it is now considered that eight lanes would be needed along Elizabeth Drive to accommodate the proposed traffic flow.

Existing villages would be provided with service roads and over bridges along the route to facilitate connections between the two sides of Elizabeth Drive. There would be a major grade separated interchange at the entrance to the airport off Elizabeth Drive, which would connect to the main terminal, car park and airport freight, support and commercial areas. Grade separated interchanges would also be required at Mamre Road and the Western Sydney Orbital. The Western Sydney Orbital proposal is part of an emerging high standard orbital road linking major employment and residential areas of Sydney. The development of this road is presently the subject of separate environmental investigations (PPK Environment & Infrastructure, in preparation; Sinclair Knight Merz, in preparation).

A second access road to the airport options would also be required along Bringelly Road. This road would be used as the principal access to the maintenance and general aviation facilities proposed for the southern areas in

each of the Badgerys Creek airport options and would connect to The Northern Road and the proposed Western Sydney Orbital. The Northern Road would be upgraded as far as its connection to the M4 Motorway, south of Penrith. The Northern Road and Bringelly Road would initially be widened and have alignment improvements for four lanes in Stage 1 and ultimately six or eight lanes.

For all three airport options, The Northern Road would need to be relocated within the airport site to allow the construction of runways and other airport facilities. The extent of the relocation varies between options. Badgerys Creek Road is also proposed to be closed for Option C and partly closed for Options A and B. The need to create a new connection between The Northern Road and Elizabeth Drive to replace Badgerys Creek Road has also been considered.

Improvements required to other roads in the region as a direct result of developing an airport at any of the Badgerys Creek options are minimal, however include the need for a direct access route (of at least four lanes) from the airport site to the M4 Motorway. This could connect with the M4 Motorway at either Mamre Road or at the site of the future Werrington Arterial (connecting the M2 Motorway to the M4 Motorway) to the west of Mamre Road, as shown on *Figure 11.1*.

#### **11.1.2 RAIL ACCESS**

Alternatives for providing rail access to an airport at Badgerys Creek have been the subject of investigation by the State and Commonwealth Governments over recent years.

A rail connection is proposed from the Cumberland and East Hills rail lines at Glenfield to the airport options as shown on *Figure 11.1*. It would connect to the Southern Rail Line to maintain service levels in south-western Sydney.

The main rail corridor under consideration passes through Edmondson Park and Bringelly. Because the alignment of the runways proposed in Option C affects the potential for residential development around the proposed stations of the new rail line, an alternative rail corridor direct from Rossmore to the airport site is being considered for this option.

The State Government is considering the long term potential of connecting the rail line north to the Main Western Line near Werrington.

The rail line would be constructed as a dual track system at grade except in the vicinity of the airport itself where there are several options being considered including:

- a cut and cover or driven tunnel under the airport;



- an at grade rail line with spur line into the airport terminal; and
- an interchange shuttle bus from the railway station to the airport terminal.

Further investigation is needed to determine the preferred proposal for the final rail connections at the airport.

### 11.1.3 WATER

Development of the airport options would introduce a range of facilities with a demand of up to 30 megalitres of water per day (based on one megalitre per day, per one million persons per annum). The Stage 1 development demand has been estimated at ten megalitres per day. These demands include airport related commercial development but exclude any new residential development as a result of the airport.

The proposal for providing water to the three airport options is a new connection from the Warragamba pipeline. This would comprise a 450 millimetre diameter pipeline for Stage 1, with a second pipeline of the same diameter for the Master Plan from a new water filtration plant which would need to be constructed east of The Northern Road and north of Elizabeth Drive. Other works required include a booster pumping station at the off take, and a pumping station and storage reservoirs at the water filtration plant. The location of these works are shown on *Figure 11.2*.

Sydney Water has already allowed for an off take on the Warragamba pipeline in its planning. A booster station would be required during periods of peak flow, however it is likely that for some periods of the year gravity flow to the proposed water filtration plant would be possible.

### 11.1.4 WASTEWATER

There are numerous airport related facilities that would require sewerage services. It is estimated that these facilities would have a loading of 7.5 megalitre per day for Stage 1 and 22.5 megalitres a day for the Master Plan.

There are two feasible alternatives for providing sewage facilities to the airport options as follows:

- Alternative 1 - a new Sydney Water sewage treatment works on South Creek connected to the airport site by a nine kilometre gravity pipeline; and

- Alternative 2 - establish on site sewage treatment and effluent management to tertiary level, requiring construction of a sewage treatment works requiring three hectares of land.

These are shown on *Figure 11.2* and would require more detailed assessment of engineering, environmental and economic issues in order to reach a firm proposal. They would both incorporate tertiary treatment including nutrient removal and disinfection. Alternative 1 would be discharged to South Creek and a portion of treated effluent would be discharged to Badgerys Creek for Alternative 2. Alternative 2 would have to meet NSW Environment Protection Authority requirements.

### *Management of Treated Effluent*

The disposal of effluent on land by irrigation was investigated however due to the prohibitive requirement of large areas of land and storage ponds this was not considered further.

Reuse of treated effluent is proposed for all three options including irrigation, toilet flushing and fire fighting. The treatment levels proposed for sewage would render the sewage appropriate for this use, although it is unlikely that 100 percent of the effluent would be used on the airport site. A 750 millimetre pipeline would be required for creek disposal for Stage 1 with duplication of this pipeline for the Master Plan.

### **11.1.5 ELECTRICITY**

Research into the existing and potential requirements of an airport of the magnitude of the Second Sydney Airport proposal has been undertaken previously as part of investigations into Sydney Airport (Sinclair Knight/Bechtel Aviation, 1990). The need to avoid unnecessary interruptions and costly upgrading at later stages means that much of the infrastructure development would be based on Master Plan capacity.

It has been assumed that each airport option would have essentially the same facilities and allowance has been made for a railway traction power supply and an estimate for commercial development adjacent but external to the airport options.

The total connected electrical load for all facilities was assessed at approximately 95 megavolt amps. As the total load is never actually in operation at the same time, a diversity of loads would always occur, enabling a maximum demand (less than the total load) of approximately 80 megavolt amps. The incoming power supply would therefore need to be 66 kilovolts or higher.



- |                        |  |   |  |
|------------------------|--|---|--|
| Water Pipeline         |  | Electricity Transmission Line                 |  |
| Water Filtration Plant |  | Existing Electricity Substation               |  |
| Booster Pump Station   |  | Fuel Pipeline                                 |  |
| Wastewater Pipeline    |  | Fuel Storage Facility                         |  |
| Sewage Treatment Works |  | Realigned 330kV Electricity Transmission Line |  |

Figure 11.2  
**Required Off Airport Site Infrastructure  
 for Badgerys Creek Options**

Source: Second Sydney Airport Planners, 1997c  
 Note: Separate environmental assessments would be required for these infrastructure works. Suggested routes for infrastructure are indicative only.





Cogeneration was also considered as a potential power source. Cogeneration refers to production of heat and power from one fuel source, for example natural gas. A cogeneration plant could be located on the airport and could replace the incoming power system for temperature control purposes and some electrical power requirements. All standby generation systems for emergency power would still be required.

Previous planning for the Badgerys Creek airport site included power supply to the airport at 132 kilovolts. A tie line between the bulk supply points at Sydney West and Regentville substations would supply a 132/22 kilovolt zone substation at the airport site. *Figure 11.2* indicates the proposed route for the power supply. The route follows existing transmission line easements and the main roads around the airport to access substations at Regentville and Wallgrove.

For all airport options a section of the proposed 132 kilovolt line would be underground along Elizabeth Drive to maintain the Obstacle Limitation Surface clearance. In addition, the existing Transgrid 330 kilovolt transmission line located within the western part of the proposed airport options would need to be relocated. An indicative route for the relocation of this line was determined by Transgrid in a previous study (Pacific Power, 1992) and is shown on *Figure 11.2*.

#### **11.1.6 TELECOMMUNICATIONS**

Given the extent of existing and proposed infrastructure, Telstra has sufficient capacity to provide for all airport options either by simple extension of existing installations or by utilising spare ducts already installed. Airport Options B and C would however require relocation of the existing Bringelly Exchange and its associated cables. The proposed location of these are shown on *Figure 11.2*.

#### **11.1.7 AVIATION FUEL**

Aviation fuel is currently supplied to airlines at major Australian airports by a consortium of fuel companies who operate a storage facility. The storage facility is usually supplied by road tanker for smaller user airports and supply pipeline for larger user airports. AvGas would be supplied for piston engined aircraft which is mainly for general aviation and regional airlines.

Road, rail and pipeline supply alternatives are available for the supply of Jet A1 aviation fuel to the Badgerys Creek airport options. Road delivery presents a public risk with regard to accidents on the road because of the number of daily deliveries required. A rail link would not be viable for the short distances involved from refineries to the airport sites. Also, there are no aviation fuel loading facilities at any oil company rail gantries in Sydney.

Experience at major airports in Australia and overseas indicates that a dedicated fuel pipeline is necessary. The source of supply for all three airport options would be the Shell Clyde Refinery near Parramatta.

The supply of Avgas would be limited and therefore delivery to the airport by road tanker, as for Bankstown Airport and Sydney Airport, would be the most cost effective. Avgas is manufactured in Geelong, Victoria and would be road tanked to Sydney along routes specified by the NSW Roads and Traffic Authority.

### *Supply Pipeline Route Options*

The proposed supply pipeline route for all three airport options would be either directly from the Clyde Refinery via the M4 Motorway, the proposed Western Sydney Orbital and Elizabeth Drive, or via the shorter route from the Plumpton storage facility as shown on *Figure 11.2*. With either route, advantage would be taken of road construction activity required for the airport, minimising construction activity specifically for the pipeline. A one metre wide easement would typically be required for a 300 millimetre supply pipeline which would need to be approximately 30 kilometres long.

#### **11.1.8 NATURAL GAS**

The supply of natural gas to the airport options would be required for catering, temperature control equipment and hot water boilers for the major facilities. As discussed previously, natural gas also provides the opportunity for cogeneration.

Gas would be supplied to the airport options by underground high pressure pipelines in the range of 3,600 to 7,000 kilopascals connecting into the existing natural gas pipeline as it currently exists in Sydney.

The proposed gas pipeline route is shown on *Figure 11.2*. The pipeline, approximately nine kilometres long, would be laid in the Elizabeth Drive road corridor and connect to the main Sydney-Moomba natural gas pipeline adjacent to the intersection of Elizabeth Drive with the proposed Western Sydney Orbital. An existing secondary gas main laid in Elizabeth Drive is not rated for high pressure gas transmission and would need to be replaced.

## **11.2 HOLSWORTHY OPTIONS**

Many alternatives for the provision of road and rail access, water, wastewater, electricity, telecommunications, aviation fuel and natural gas have been considered for the Holsworthy airport options. Where nominated only the preferred proposals are described in this chapter. Other alternatives that were

considered and rejected during the investigations and the justification for this are documented in Second Sydney Airport Planners (1997b).

### 11.2.1 ROAD ACCESS

A number of alternatives exist for providing road access to both Option A and Option B airport sites within the Holsworthy Military Area as shown in *Figure 11.3*.

The road access corridors being considered that apply to Options A and B are:

- Alternative 1 (and 5) - a route from the M5 Motorway via Moorebank Avenue;
- Alternative 2 - the extension of Cambridge Avenue to provide a link between the South Western Freeway and the main northern access corridor that would use Moorebank Avenue;
- Alternative 3 - a route from Heathcote Road in the east. This may need to be carried out in conjunction with the completion of a previously proposed road link connecting Heathcote Road to Alford's Point Road. Also, it is likely that any proposed connection to Heathcote Road could only proceed in conjunction with a more direct connection to either the M5 Motorway or the South Western Freeway, at least in the long term; and
- Alternative 4 - a route which would generally follow a power line easement located between Ingleburn and Minto. This corridor also provides a link between the Holsworthy options and the South Western Freeway.

Option B may incorporate a combination of a road corridor from the west connecting the airport to the South Western Freeway south of Campbelltown (Alternative 6) and also a road corridor from the north-east connecting the airport to Heathcote Road (Alternative 7).

A combination of these alternatives has been considered. Additional improvements required to the road network as a direct result of developing an airport at either Option A or Option B with these alternative access scenarios are shown on *Figures 11.4* and *11.5* respectively.

### 11.2.2 RAIL ACCESS

The proposed rail access to Option A would involve connection to the East Hills rail line between Holsworthy and Glenfield Stations as shown on *Figure 11.3*.

It may be possible to provide a Y-link between the East Hills rail line, the Cumberland rail line and the proposed rail line to the airport to provide maximum access to the airport site to both the city and major centres such as Liverpool, Parramatta and Blacktown.

There are two alternatives for the proposed rail access for Option B. Option B could be linked directly to the Main Southern rail line south of Macarthur or be serviced by a rail line to the north which would link into the East Hills and Cumberland rail lines.

The rail lines would be provided mostly within the same corridors as the road access proposals. It is also anticipated that, where practical, other services would be provided within these corridors such as electricity, water, sewerage, natural gas, telecommunications and fuel pipelines.

### **11.2.3 WATER**

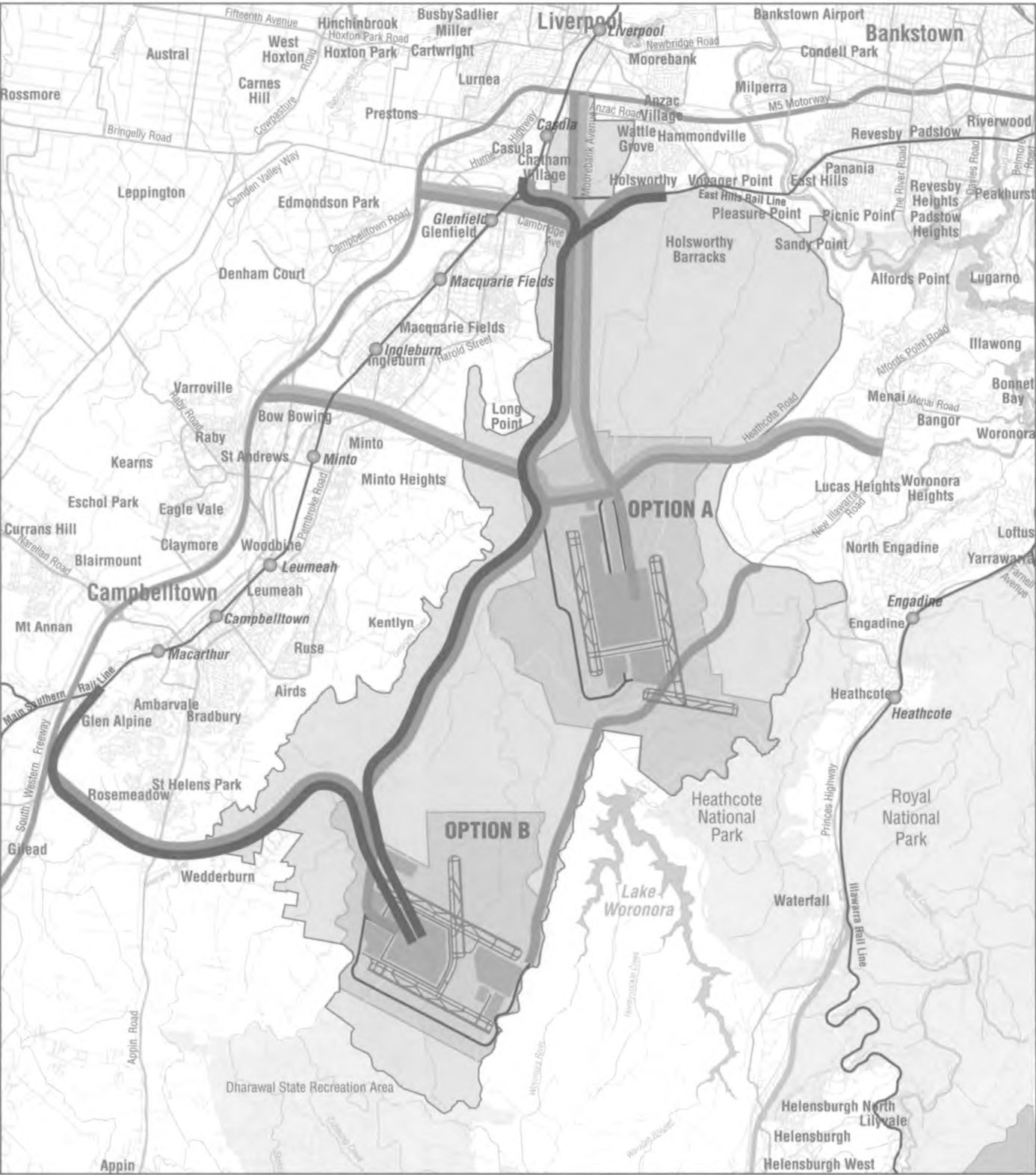
Three alternatives were assessed for supplying water to Option A. The preferred proposal is to supply water from the Macarthur Water Filtration Plant via a new pipeline and pumping station. Macarthur Water Filtration Plant has sufficient capacity to serve the proposed airport in both the short and the long term. This proposal is shown on *Figure 11.6*.

Similarly, three alternatives were also assessed for supplying water to Option B. The preferred proposal is also indicated on *Figure 11.6*, and is similar to the preferred proposal for Option A. Water would be supplied from the Macarthur Water Filtration Plant via a new pipeline and pumping station. The proposed route would deviate to the airport site from Victoria Road, and then north along an existing vehicular track.

### **11.2.4 WASTEWATER**

Sydney Water is currently developing a long term strategy to cater for sewage generated by existing and future development in the Upper Georges River wastewater catchment. This work is due to be completed in 1997. Several alternatives are being investigated and include continuing to transfer dry weather flow (both treated and untreated) to Malabar; effluent reuse (non-potable and potable); on site treatment; and treatment and discharge to the Georges River.

One of the alternatives under consideration is the upgrade of the Liverpool Sewage Treatment Works to tertiary level and transport treated effluent to Malabar via a new pipeline bypassing Malabar Sewage Treatment Works. Dry weather flows from Glenfield and Holsworthy Sewage Treatment Works would be transported to Liverpool for treatment.

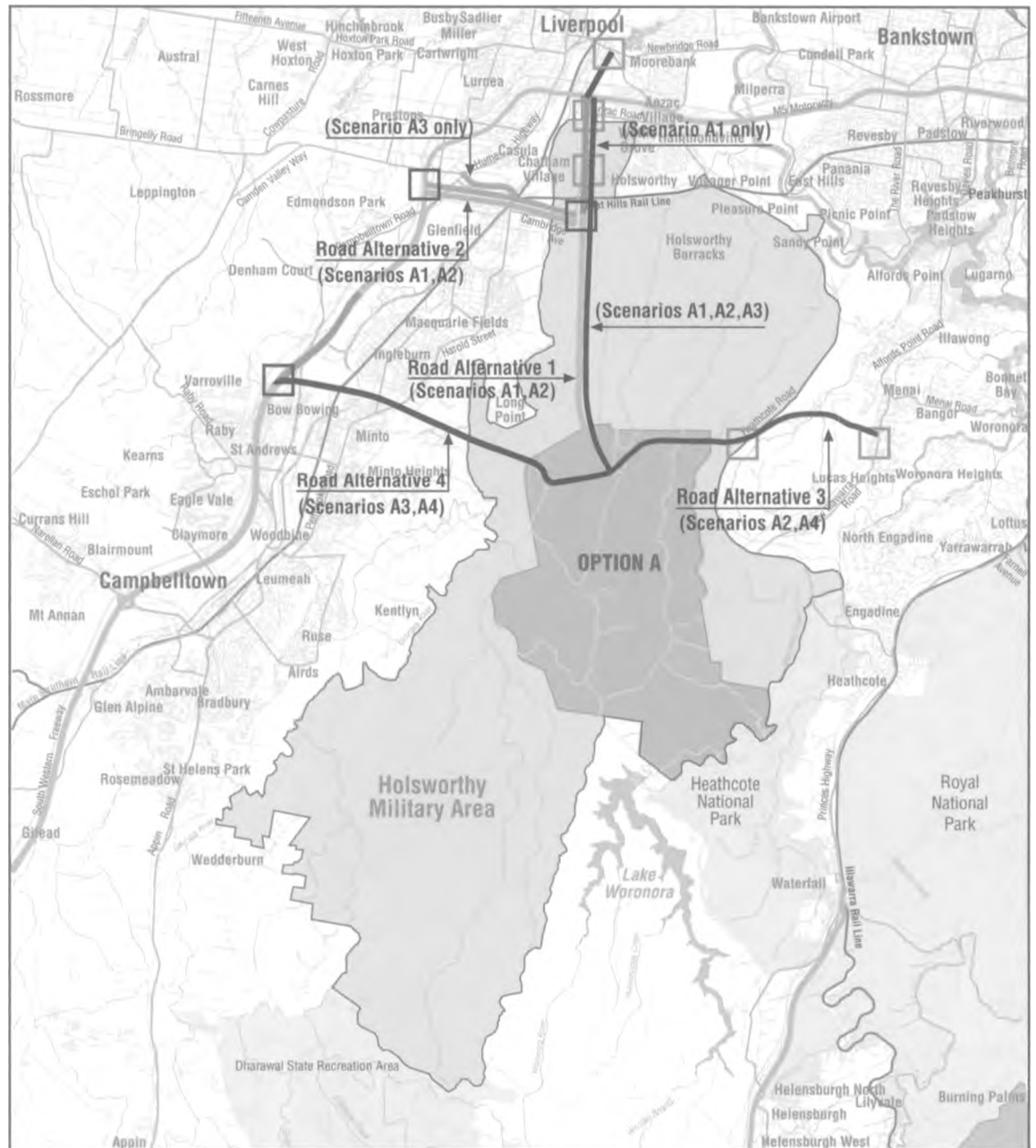


- Potential Road Access to Option A —
- One or a combination of these access corridors may be used
- Potential Road Access to Option B —
- One or a combination of these access corridors may be used
- Potential Rail Access to Option A —
- Potential Rail Access to Option B —
- Only one corridor would be required

Figure 11.3  
**Road and Rail Access Alternatives to Holsworthy Options**

Note: Access corridors are indicative only and not drawn to scale  
 Actual roads and rail lines would be narrower



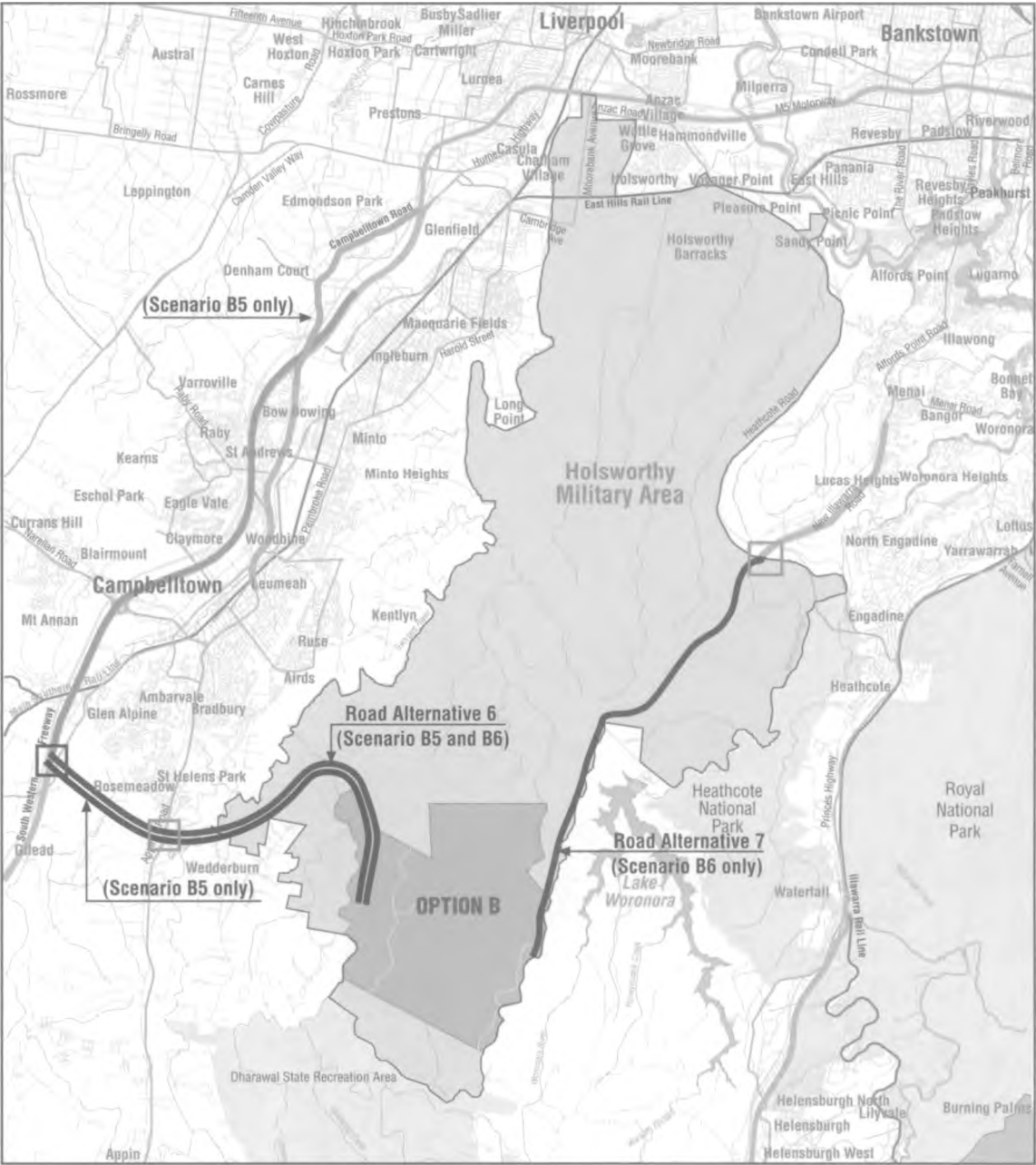


- |                     |                          |  |  |
|---------------------|--------------------------|--|--|
| Two lanes by 2006   | Grade separation by 2006 |  |  |
| Four lanes by 2006  | Grade separation by 2016 |  |  |
| Six lanes by 2006   |                          |  |  |
| Four lanes by 2016  |                          |  |  |
| Six lanes by 2016   |                          |  |  |
| Eight lanes by 2016 |                          |  |  |

Figure 11.4  
**Proposed Road Improvements for  
 Holsworthy Option A  
 Alternative Access Scenarios (A1,A2,A3,A4)**

Note: Road corridors are indicative only and not drawn to scale. Actual roads would be narrower.



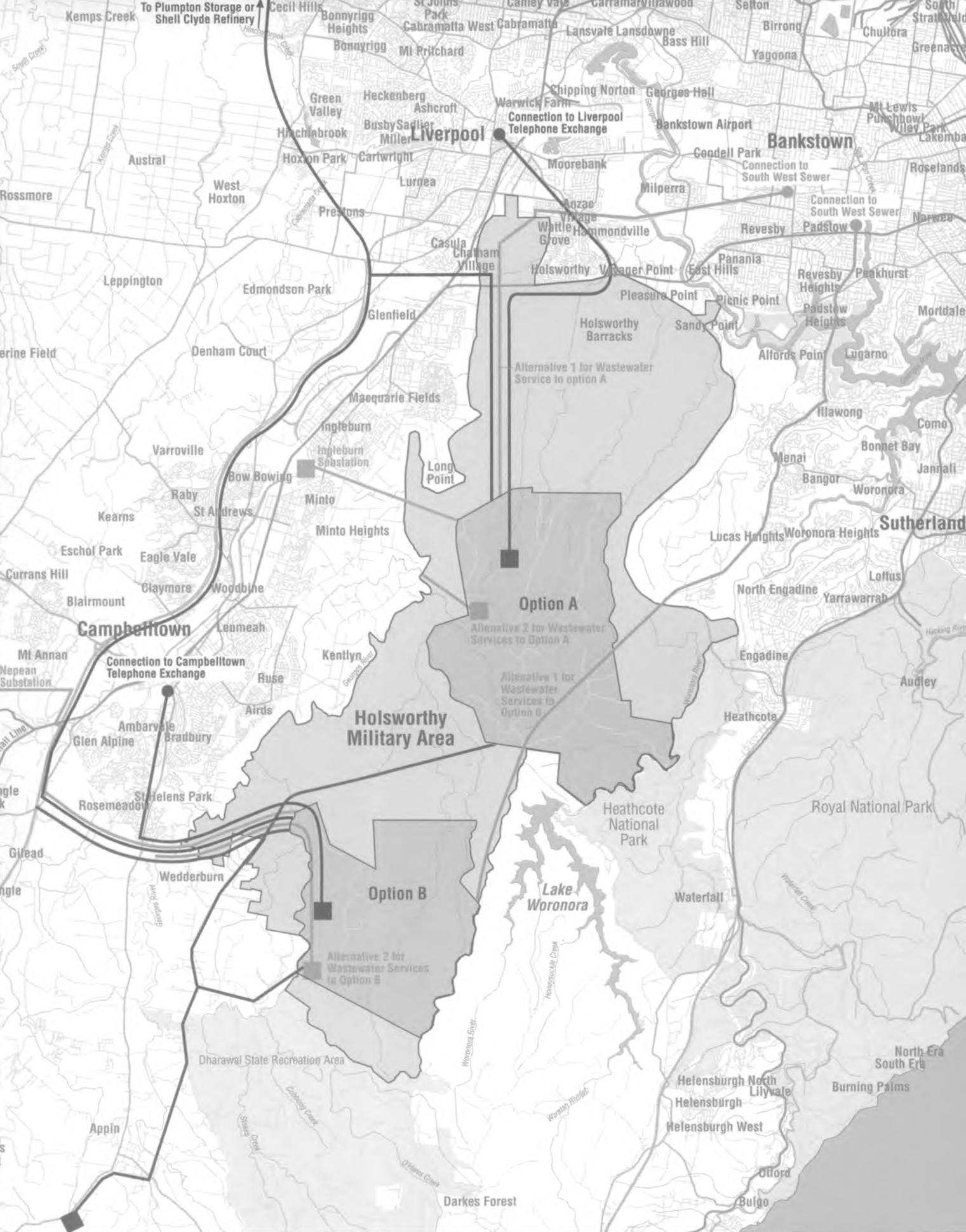


- |                     |                          |  |
|---------------------|--------------------------|--|
| Four lanes by 2006  | Grade separation by 2006 |  |
| Four lanes by 2016  | Grade separation by 2016 |  |
| Six lanes by 2006   |                          |  |
| Six lanes by 2016   |                          |  |
| Eight lanes by 2016 |                          |  |

Figure 11.5  
**Proposed Road Improvements for Holsworthy Option B**  
**Alternative Access Scenarios (B5 and B6)**  
 Note: Road corridors are indicative only and not drawn to scale. Actual roads would be narrower.







**Figure 11.6**  
**Required Off Airport Site Infrastructure**  
**for Holsworthy Options**

Source: Second Sydney Airport Planners, 1997c  
 Note: Separate environmental assessments would be required for these works. Suggested routes for infrastructure are indicative only.





Another alternative is to upgrade Glenfield Sewage Treatment Works to tertiary level. A major upgrade would however be required to accommodate flows for the proposed Second Sydney Airport.

Sydney Water is also considering converting Glenfield Sewage Treatment Works to a purely stormwater treatment works. This would preclude treatment of Second Sydney Airport sewage at this sewage treatment works.

On site sewage treatment and effluent management is a further alternative which would treat sewage to tertiary level, requiring a three hectare area for the sewage treatment works.

The selection of the most appropriate alternative for treating and disposing of wastewater from both Option A and B can only be undertaken when Sydney Water have concluded its investigations. The level of effluent treatment required would depend on the alternative selected and the quality of the receiving waters to which excess effluent would be discharged. The sewage treatment works would be required to meet NSW Environment Protection Authority requirements and extensive environmental investigations would be required to confirm the feasibility of the preferred strategy.

Disposal of treated effluent on land is not considered feasible for similar reasons as those stated for the Badgerys Creek airport options. Reuse of treated effluent is also proposed as discussed for the Badgerys Creek airport options, with disposal of excess effluent to the Georges River.

#### **11.2.5 ELECTRICITY**

The closest bulk power supply point to Option A is located at Ingleburn where supply is available from a 330 kilovolt Transgrid line via 330/66 kilovolt transformers. The transformer capacity is adequate although additional 66 kilovolt switchgear would need to be provided for the airport feeders.

Electricity supply to Option A would follow the route of the existing 330 kilovolt line to Transgrid's Sydney South substation past Long Point, and across Georges River, then diverting across Harris Creek and along the proposed airport access road to the airport substation as shown on *Figure 11.6*.

An adequate power supply is not readily available from the existing system in the area of Option B. A bulk power supply substation is located at Camden which is supplied by two 132 kilovolt lines originating at Liverpool and Sydney West.

In order to supply electricity to Option B, the 132 kilovolt lines would need to be augmented and additional transformer capacity installed. Supply to the airport substation would be at 66 kilovolt and the transmission line would

generally follow the proposed road and rail access corridor from the South Western Freeway to the site. The route from the Nepean Substation would connect to the transmission line crossing the Mt Annan Botanical Gardens and follow this easement to the proposed road access corridor to the airport site. This route is shown on *Figure 11.6*.

Similar to the Badgerys Creek airport options, cogeneration is also a possibility.

#### **11.2.6 TELECOMMUNICATIONS**

Telecommunications preliminary planning has been based on the full Master Plan capacity of the airport sites and much of the infrastructure development would need to be based on these requirements, for example provision of spare conduits, to avoid unnecessary interruptions during later upgrading.

For Option A, there is an existing telephone exchange at Holsworthy relatively close to the proposed access road which would be used to feed the new airport. This exchange would be upgraded and additional cabling installed from the main Liverpool exchange to Holsworthy. *Figure 11.6* indicates proposed infrastructure for Options A and B.

Provision of telecommunication services to Option B is proposed at the existing Campbelltown exchange and possibly also the trunk cabling to the main Liverpool exchange. Cabling would comprise multi-fibre optical cable and the route would generally follow existing roads and the proposed road and rail access corridors.

#### **11.2.7 AVIATION FUEL**

Aviation fuel is currently supplied to airlines at major Australian airports by a consortium of fuel companies who operate a storage facility. The storage facility is usually supplied by road tanker for smaller user airports and supply pipeline for larger user airports. AvGas would be supplied for piston engined aircraft which is mainly for general aviation and regional airlines.

Road, rail and pipeline supply alternatives are available for the supply of Jet A1 aviation fuel to the Holsworthy airport options. Road delivery presents a public risk with regard to accidents on the road because of the number of daily deliveries required. A rail link would not be viable for the short distances involved from refineries to the airport sites. Also, there are no aviation fuel loading facilities at any oil company rail gantries in Sydney.

Experience at major airports in Australia and overseas indicates that a dedicated fuel pipeline is necessary. The source of supply for all three airport options would be the Shell Clyde Refinery near Parramatta.

The supply of Avgas would be limited and therefore delivery to the airport by road tanker, as for Bankstown Airport and Sydney Airport would most cost effective. Avgas is manufactured in Geelong, Victoria and would be road tanked to Sydney along routes specified by the NSW Roads and Traffic Authority.

### *Supply Pipeline Route Options*

The proposed routes to both Options A and B would follow the M4 Motorway and the proposed Western Sydney Orbital to minimise contact with residential areas and maximise construction in new road corridors. Where the proposed Western Sydney Orbital intersects with the M5 Motorway/South Western Freeway, the pipeline route would follow the proposed airport access road (Alternative 2) to Option A or the South Western Freeway to the Option B access road (Alternative 5 or Alternative 6) as shown on *Figure 11.6*.

#### **11.2.8 NATURAL GAS**

The proposed pipeline route to Option A is shown on *Figure 11.6*. The connection point is at the CrossRoads at Liverpool. A primary main at 3,600 kilopascals pressure would be laid in the proposed road corridor planned for Glenfield Road and Cambridge Avenue (Alternative 2) and the airport access road through the Holsworthy Military Area. The pipeline route would be approximately 18 kilometres in length.

The proposed pipeline route to Option B is also shown on *Figure 11.6*. The main would connect to the Sydney-Moomba gas pipeline and follow the proposed road corridor to the South Western Freeway (Alternative 6). The pipeline route would be approximately 10 kilometres.

## **11.3 OVERVIEW OF ENVIRONMENTAL ISSUES AND MANAGEMENT**

Environmental impacts arising from off airport site infrastructure developments associated with the Second Sydney Airport proposal have not been assessed as part of this Draft EIS. All of the infrastructure proposals would be the subject of separate environmental assessment processes under NSW legislation. This would in most cases involve the preparation of an Environmental Impact Statement or a Review of Environmental Factors under the *Environmental Planning and Assessment Act 1979*.

The following sections do however provide a preliminary discussion of the environmental issues relevant to each infrastructure proposal for both the Badgerys Creek and Holsworthy options. This information contributes in particular to understanding the potential cumulative impacts likely to arise as

a result of each of the five airport options, and the types of management measures that may be necessary to mitigate potential adverse impacts.

As noted previously, many alternatives for the provision of off airport site infrastructure have been considered (Second Sydney Airport Planners, 1997b). For this preliminary issues discussion only the preferred proposals have been addressed for water, wastewater, electricity, telecommunications, aviation fuel and natural gas, however all of the road and rail access alternatives have been addressed.

## 11.4 ENVIRONMENTAL ISSUES - BADGERYS CREEK OPTIONS

Developing the Badgerys Creek airport options has significant advantages for regional planning and development in terms of off airport site infrastructure proposals. Potential environmental impacts that arise from the provision of this infrastructure would however need to be properly managed to minimise adverse impacts particularly on the physical and biological environment and the social environment. As most of the proposals are within existing or proposed road corridors, potential impacts would primarily be associated with road construction and upgrading.

### 11.4.1 ROAD ACCESS

#### *Elizabeth Drive*

The proposed road access along Elizabeth Drive linking with the proposed Western Sydney Orbital utilises routes already proposed primarily to achieve planning objectives that are unrelated to the development of the Second Sydney Airport.

The environmental impacts of upgrading Elizabeth Drive to four lanes and ultimately to six lanes have been assessed in an Environmental Impact Statement released in 1995 (Rust PPK, 1995). The major environmental issues associated with upgrading the road to this standard include:

- potential increases in traffic noise;
- potential local air quality impacts;
- clearing of roadside vegetation. The conservation value of this vegetation is however fairly low and it has low value as fauna habitat as it is highly fragmented and isolated from large contiguous tracts of bushland;

- land acquisition outside of the existing road corridor and resultant social impacts;
- the need for further Aboriginal archaeological testing to determine the significance of areas identified as having potential archaeological deposits;
- improved standard of access to local roads; and
- some inconvenience to local residents due to severance and access restrictions.

### *Proposed Western Sydney Orbital*

The proposed Western Sydney Orbital is currently subject to separate environmental investigations as it is part of a larger program of transport improvements for the Sydney region (PPK Environment & Infrastructure, in preparation; Sinclair Knight Merz, in preparation). Apart from forming an integral part of the main connection to the proposed Second Sydney Airport at both the Badgerys Creek and Holsworthy sites, it is part of the National Highway link through Sydney and is also an important component of Sydney's road network, completing a high standard orbital road linking major employment and residential areas of Sydney.

The major potential environmental impacts of this proposal include:

- the need for further Aboriginal archaeological testing to determine the significance of areas identified as having potential archaeological deposits along the southern section of the proposed route;
- impacts on Aboriginal sites along the northern section of the proposed route including the need to salvage an area of archaeological significance;
- non-Aboriginal heritage issues associated with the Sydney Water Supply Canal, Old Windsor Road, and the World War 2 RAAF Base, and the need to destroy several identified sites having low heritage significance;
- disturbance and removal of vegetation around Hinchinbrook and Cabramatta Creeks;
- potential impacts on a threatened flora species at Kings Park and in the area of Cobham Street, Horsley Park;

- reduction of the flood storage capacity of Maxwell's, Cabramatta and Hinchinbrook Creek floodplains;
- restriction of the presently undesirable flood breakouts which occur near Hoxton Park Road and Bernera Road;
- local and regional land use and planning impacts including impacts on Prestons residential release area in Liverpool local government area;
- property acquisition and severance;
- traffic and transport benefits including reducing traffic congestion on surrounding roads, improvements to road safety, provision of transport links to Liverpool urban release areas and provision of a high standard north-south link for the national and regional movement of freight and people;
- visual impacts especially in the southern part of the proposed route near Prestons and within the open space and special purposes corridor west of Hoxton Park Airport; and
- benefits to the local and regional economy including employment.

Numerous environmental management measures are however proposed as part of the Western Sydney Orbital to mitigate and reduce the magnitude of many of these impacts (PPK Environment & Infrastructure, in preparation; Sinclair Knight Merz, in preparation).

### *Bringelly Road*

The existing Bringelly Road corridor has similar constraints as those identified for Elizabeth Drive, although the potential impacts of upgrading this road on local access and residential amenity may be greater.

The major issues associated with the proposal to upgrade Bringelly Road are:

- potential impacts on properties and residences along Bringelly Road which are located in many places within 100 metres of the existing road edge;
- need to remove creekside vegetation of numerous creeks traversed by the road. These areas of vegetation would have greater conservation value than other roadside vegetation which is mostly disturbed and fragmented;

- potential impacts of upgrading the intersection with The Northern Road including impacts on Bringelly Public School and other developments such as a service station and local shops located at this intersection; and
- severance, local access and amenity impacts on the suburb of Rossmore, including impacts on Rossmore Public School.

Due to the likely significance of local access and severance issues, a new road corridor may need to be identified for this proposed airport access. This would be investigated further during detailed design.

### *The Northern Road*

Potential environmental issues as a result of the proposal to upgrade The Northern Road are:

- severance, local access and amenity impacts on the suburb of Luddenham including potential heritage impacts on several churches and a cemetery located in close proximity to the road;
- impacts on the Leppington Pastoral Company land holding;
- acquisition and access impacts on Penrith Golf Course;
- access impacts on the Royal Australian Air Force Munitions Depot located on the eastern side of the road at Orchard Hills; and
- access considerations for new residential development currently occurring at Mulgoa.

As the majority of the road corridor north of Elizabeth Drive to the M4 Motorway is relatively undeveloped, there is unlikely to be any significant impacts on either the natural or the built environment as a result of upgrading the road in this location.

The proposal to relocate that section of The Northern Road within the proposed airport option boundaries would have impacts on some rural properties. Environmental management of potential water quality impacts where the road crosses creeks would be an important consideration.

### *Other Required Road Improvements*

A direct access route from the airport site to the M4 Motorway would need to be established probably by upgrading Luddenham Road and connecting it to the M4 at the site of the future Werrington Arterial to the west of Mamre Road.

Impacts likely to be associated with this upgrading include changes to some private accesses; construction impacts such as dust, traffic disruptions and detours; impacts to roadside vegetation; and issues surrounding the creation of a new corridor in the northern section to connect with the M4 Motorway such as land acquisition and severance.

#### 11.4.2 RAIL ACCESS

Provision of a rail link to the Badgerys Creek options would assist in facilitating urban development to the south and east of Badgerys Creek in both the Liverpool and Camden local government areas. These areas are identified in the current metropolitan strategy *Cities for the 21st Century* (Department of Planning, 1995) as growth areas along with some areas included in the Urban Development Program. The rail link is identified in the *Draft Strategic Rail Plan* (State Rail Authority, 1994). The *Sydney West Airport Sub Region Draft Strategic Plan* (Taskforce on Planning for the Sub Region Surrounding Sydney West Airport, 1996) indicates that a rail connection to an airport at Badgerys Creek is however only financially viable if it is supported by urban development. A rail line would also offer significant advantages to developing areas south of Penrith because it could be extended north to provide a cross regional link to the Main Western Rail Line. As it uses Glenfield as a transfer station, it would also provide additional capacity for the developing areas of Campbelltown (such as Menangle Park and Mt Gilead) and eventually Macarthur South.

Potential environmental impacts of developing a rail line for Badgerys Creek Options A and B or Option C are associated with the sensitive nature of the Hawkesbury Nepean catchment area and the South Creek valley, particularly in relation to air and water quality issues. Construction of a rail line and the consequent urban development that is planned around this rail line potentially has disadvantages. These disadvantages would include impacts on air quality conditions across the wider Sydney region and the potential contribution to worsening conditions in the catchment; and water quality impacts related to the effects of urban stormwater runoff on the local and regional creek systems (Taskforce on Planning for the Sub Region Surrounding Sydney West Airport, 1996). Ozone in particular is a regional air quality issue particularly around this region where exceedances of the air quality goal have been recorded at Bringelly, Campbelltown and Liverpool.

Other potential environmental issues and constraints relating to the proposed rail link are the impacts on local flooding, and issues related to the fragmented land holdings in the area such as severance and land acquisition. Opportunities, however, exist in the potential utilisation of large land holdings for urban village development such as the Department of Defence land at Ingleburn and part of the Leppington Pastoral Company property.



### 11.4.3 WATER

The proposal for a new water filtration plant north of the Sydney Water Supply pipeline would most likely provide capacity to service developing urban areas in the south of Penrith local government area including Glenmore Park.

The proposed water supply pipeline is located for most of its length within The Northern Road corridor that is proposed to be upgraded as part of the Second Sydney Airport proposal and Littlefields Road. Environmental impacts are therefore likely to be those associated with the upgrading of The Northern Road as discussed in Section 11.4.1. Construction of a new booster pumping station and water filtration plant would require acquisition of land. North of the Sydney Water Supply pipeline this could impact on several dwellings and construction of the water filtration plant may impact on farm dams in the area. Overall, the area in which these developments are proposed comprises cleared land which has previously been used for agriculture and is currently used partly for grazing.

### 11.4.4 WASTEWATER

Development of a sewage treatment works on South Creek is compatible with Sydney Water's current long term strategy for the region. Potential environmental issues associated with construction of this works and a pipeline to the Badgerys Creek airport options are:

- acquisition of land and creation of an easement;
- environmental management during construction and operation particularly in relation to water quality; and
- visual impacts.

Introducing this sewerage infrastructure to a region that is currently unsewered may also benefit other future developments.

### 11.4.5 ELECTRICITY

The proposed 132 kilovolt transmission lines are located along existing roads and electricity easements. Environmental impacts are therefore associated with the upgrading of Elizabeth Drive, The Northern Road and construction of the proposed Western Sydney Orbital. The proposal is consistent with previous planning for this area by Integral Energy.

The relocation of the existing 133 kilovolt transmission line located within the airport options has also been the subject of an earlier study (Pacific Power, 1992). The potential environmental issues of relocating this line in accordance

with the most feasible long term option described in Pacific Power (1992) include impacts on:

- visual and scenic amenity;
- agricultural land; and
- land acquisition as a result of the need to create an easement.

#### **11.4.6 TELECOMMUNICATIONS**

Relocation of the Bringelly Exchange for either Options B and C has the potential for land acquisition impacts, and impacts on visual and residential amenity. The proposed new locations for this telephone exchange are further south than existing and therefore closer to existing residential populations. This however may not be a significant issue given that the new locations are adjacent to the proposed boundary of the airport for both Options B and C.

#### **11.4.7 AVIATION FUEL**

The proposal for a fuel pipeline from either the Clyde refinery or the Plumpton storage facility would follow existing or proposed roads in order to take advantage of road construction activity to minimise impacts related specifically to the construction of the fuel pipeline. This also minimises the need for land acquisition and potential impacts on residential areas. The management of potential environmental impacts would be important for this proposal both during construction and operation particularly water quality impacts where the route traverses Oaky Creek, Badgerys Creek, South Creek and Kemps Creek and is close to Prospect Reservoir.

#### **11.4.8 NATURAL GAS**

The proposal for a new natural gas supply pipeline to connect to the Moomba-Sydney main pipeline would follow Elizabeth Drive and would therefore also take advantage of road construction activity required to upgrade this road. Environmental impacts of this specific proposal would therefore be minimised.

### **11.5 ENVIRONMENTAL ISSUES - HOLSWORTHY OPTIONS**

The off airport site infrastructure proposals for the Holsworthy options would offer limited benefits for regional planning and development of areas surrounding the Holsworthy Military Area.

### 11.5.1 ROAD AND RAIL ACCESS

The proposals for road and rail access to the Holsworthy options have no positive impacts for regional planning. There is very limited opportunity for the rail alternatives for both airport options to serve any other trip purposes than the airport and they offer no opportunities for linking with the existing rail network beyond the airport sites. The proposed road access alternatives involve quite large sections of road within the Holsworthy Military Area that are essentially spurs, providing limited road network benefits, however have the potential for significant impacts on both the social and physical environment.

These potential environmental issues are discussed below.

#### *Road Alternative 1*

The widening of Moorebank Avenue mostly has the potential to impact on Defence facilities and activities. These are addressed further in *Chapter 27* of the Draft EIS.

#### *Road Alternative 2*

The extension and upgrading of Cambridge Road would be undertaken within an existing electricity transmission line easement. This easement is however in close proximity to existing development and bushland. Potential impacts include changes to the Glenfield waste depot access and the possible need to acquire land; loss of open space from Georges River Nature Reserve; water quality and flooding issues related to Georges River; community severance and land acquisition; and potential noise impacts on the suburb of Glenfield.

#### *Road Alternative 3*

The development of this corridor would impact on existing flora and fauna and potentially impact on ANSTO facilities and land holdings to the south.

#### *Road Alternative 4*

This road corridor follows an existing transmission line easement. Similar to the impacts likely from Road Alternative 2, community severance and associated indirect impacts on noise and air quality are possible for the suburbs of Minto, Bow Bowing and Ingleburn. Other potential impacts include water quality issues associated with Myrtle Creek and Georges River; impacts on vegetation; impacts on local open space; and local access changes.

### *Road Alternative 6 and Rail Alternative 1 to Option B*

This alternative for the provision of both road and rail access to Option B has the potential for many adverse impacts, particularly on the physical and biological environment. The vegetation in this area is contiguous and the development of a transport corridor here would cause fragmentation of the habitat, which may lead to other impacts on flora and fauna such as weed invasion, increased frequency of road kills and impacts on riparian vegetation. Other likely environmental issues are land acquisition; loss of agricultural land; water quality and flooding issues; effects on visual amenity; and noise and air quality issues for surrounding suburbs such as Wedderburn, St Helens Park and Rosemeadow.

A further issue that could be significant is the impact on fauna and its habitat, especially koalas. The proposed transport corridors would add to the creation of a barrier between Wedderburn, the Military Area and O'Hares Creek Catchment and would restrict fauna movement.

### *Other Required Road Improvements*

Additional road improvements required as a direct result of the airport development include the widening of the South Western Freeway at various locations, the upgrading of Campbelltown Road and the widening of Alford's Point Road to eight lanes. The majority of impacts associated with these road improvements would relate to potential land acquisition, increased noise and air quality impacts and local access changes.

### **11.5.2 WATER**

Potential environmental issues associated specifically with the provision of the proposed water supply to Options A and B are minimised because the majority of the new pipeline is along either existing or proposed road corridors. The proposed pumping station is also located on the existing water filtration plant site. Impacts on vegetation, fauna, property (land acquisition) and the visual amenity of the area due to the need to clear vegetation and create an easement may occur where the pipeline is not within a road corridor, west of Lysaghts Road. This would contribute to the fragmentation of habitat in this area, potentially affecting koalas in the area and increasing the potential for weed invasion.

Upgrading the Macarthur Water Filtration Plant could also provide benefits to the community as a whole as it may have some capacity to serve developing and planned urban areas in the south of Campbelltown (Mt Gilead and Menangle Park) and the Macarthur south area.

### 11.5.3 WASTEWATER

The alternatives proposed for the provision of sewage services to Options A and B are consistent with Sydney Water's current investigations into developing a long term strategy for sewage treatment and disposal in the Upper Georges River wastewater catchment.

The alternatives of either upgrading Liverpool or Glenfield Sewage Treatment Works could have a positive impact on future urban development within the Upper Georges River catchment as these works could have the capacity to serve an additional population as well as the proposed airport.

Environmental impacts of any new pipelines are likely to be minimal as they would be constructed in the proposed access corridors. Construction impacts would therefore be those associated with road construction activity.

### 11.5.4 ELECTRICITY

For Option A, the proposed electricity transmission line would follow an existing transmission line easement from Ingleburn to the boundary of the Military Area. From this point it would follow the proposed access corridor to the airport site. As a result of this route alignment, this proposal would have minimal environmental impacts as it traverses an already disturbed environment.

The proposed transmission line route for Option B also follows the proposed airport access corridor westward from the South Western Freeway. However, east of the freeway to the Nepean substation, the proposed route traverses Mount Annan Botanic Gardens and the northern part of Menangle Park. Environmental issues associated with this section of the proposal include:

- impacts on vegetation and fauna including increasing the potential for the invasion of exotic species into the Botanic Gardens;
- impacts on visual amenity particularly within the Botanic Gardens;
- social and recreational impacts on users of the Botanic Gardens such as picnickers and bushwalking;
- severance of the Botanic Gardens; and
- property impacts in Menangle Park including land acquisition, severance of rural properties and access issues.

#### **11.5.5 TELECOMMUNICATIONS**

Proposed routes for new cabling required for Options A and B would follow existing roads and the proposed access corridors to the airport sites. This minimises impacts specifically resulting from the provision of telecommunications infrastructure. Impacts including noise, dust, general inconvenience for the community, visual and traffic disruptions are likely to occur associated with construction of the road corridor.

#### **11.5.6 AVIATION FUEL**

The proposed routes for the fuel pipeline required for Options A and B would follow existing roads and the proposed access corridors to the airport sites. This minimises impacts specifically resulting from the provision of these pipelines including the need for land acquisition and potential impacts on residential areas. The management of potential environmental impacts would be important for this proposal both during construction and operation particularly water quality impacts where the route traverses watercourses and is close to Prospect Reservoir. Construction impacts are likely to be short term.

#### **11.5.7 NATURAL GAS**

Potential environmental issues associated specifically with the provision of the proposed natural gas pipelines to Options A and B are minimised because the majority of the new pipeline is along either existing or proposed road corridors. For Option A the pipeline would be within the proposed access corridor (Alternative 2) and for Option B, within the proposed access corridor (Alternative 6).

### **11.6 SUMMARY OF POTENTIAL ENVIRONMENTAL ISSUES OF PROPOSED OFF AIRPORT SITE INFRASTRUCTURE**

The ability of the off airport site infrastructure proposals to serve surrounding development and therefore provide regional planning benefits for other development areas differs significantly between the Badgerys Creek and Holsworthy airport options.

The main reasons for this are firstly that existing planning already undertaken by State and local Governments for the Badgerys Creek sub-region assumes the development of an airport at Badgerys Creek. Urban development in this region has therefore been planned to avoid many adverse environmental impacts from an airport and to take advantage of opportunities provided by additional infrastructure, in particular a proposed rail link. Secondly, many of the infrastructure proposals for the Holsworthy options involve corridors within

the Military Area solely to serve the development of an airport. Further urban development proposed for Campbelltown and Wollondilly local government areas would in most cases not benefit significantly from the provision of this infrastructure.

For the Badgerys Creek options, many environmental impacts of developing the off airport site infrastructure proposals are associated with road construction, and can be controlled by implementing appropriate environmental management measures.

This is in contrast to the Holsworthy options where the proposed alternative road and rail corridors are mostly located in new corridors from the edge of the Military Area to link with the existing transport network. As a result, impacts on the physical, biological and social environments are in some cases likely to be higher and require significantly more environmental controls.

## CHAPTER 12 SOCIAL IMPACTS

### 12.1 INTRODUCTION

The *Environmental Planning and Assessment Regulation 1994* states that the social and economic impact of certain proposed developments or activities have to be addressed in environmental impact statements. Social impact assessment seeks to contribute to a decision making process which balances social, economic and environmental objectives. It also helps to ensure that community views and expectations are taken into account in the planning of developments, particularly large, controversial developments.

#### 12.1.1 DEFINITION OF SOCIAL IMPACT

There are several definitions of social impact, but generally it is accepted that they represent significant events experienced by people as changes in one or all of the following:

- people's way of life - how they live, work, play and interact with one another on a day to day basis;
- their culture - shared beliefs, customs and values; and
- their community - its cohesion, stability, character, services and facilities.

Social impact therefore focuses on the human (social) environment and interactions within it, and anticipates the effects of a development or proposal that is likely to affect people's living, working and leisure environments.

Social impacts will differ, depending on the type of development proposed and the range of issues associated with it. Social impacts can also be defined within the EIS process, whereby the affected communities assist in defining issues and priorities. Social impact should, therefore, not be based on an academic approach to social research, rather be based on the range of issues identified by community response and arising from investigations conducted as part of the environmental assessment process.

For this proposal, consultations with potentially affected communities have taken place whilst preparing the Draft EIS. *Technical Paper No. 1* provides details of the extent and nature of the consultation process adopted and the major issues arising from the consultation. The parameters of this social impact assessment have been defined from the issues raised during that



process including issues which are addressed in detail in other Technical Papers including:

- *Technical Paper No. 3 - Noise;*
- *Technical Paper No. 4 - Property Values;*
- *Technical Paper No. 6 - Air Quality;*
- *Technical Paper No. 7 - Water; and*
- *Technical Paper No. 10 - Hazards and Risks.*

Major developments can have a mix of social benefits and negative social impacts, whereby a community may benefit as a whole from a development, individuals may experience negative repercussions. This can lead to social inequities, which need to be carefully assessed and measures taken to ensure that these are balanced as far as possible. The *Local Government Social Impact Assessment Handbook* (NSW Local Government Association, 1995) identifies potential issues and impacts related to major transport infrastructure proposals, such as airports. These include possible impacts on:

- demography;
- land use patterns;
- formal and informal community structures and networks;
- residential amenity and quality of life;
- community safety;
- access to services or facilities;
- community severance;
- mobility of older people and people with a disability; and
- sites of cultural significance.

In addition, there are likely to be specific impacts related to the location of each of the airport options for the Second Sydney Airport proposal and in relation to the services and facilities provided within each of the communities nearby. It is therefore necessary to consider both impacts at a wide, regional level and also more specific impacts on individuals. The extent of these is explained in the following sections.

## 12.2 POTENTIAL NATURE OF SOCIAL IMPACTS

### 12.2.1 EFFECTS ON COMMUNITIES

A community can be defined in several terms, based on its social characteristics, physical components, demographic composition or common needs and facilities. In relation to the Second Sydney Airport, it is likely that the potential impacts of the airport options would be related to the physical composition of the affected communities relating to:

- change in access patterns;
- effects on residential amenity and/or character;
- severance or instability; and
- changes to traffic patterns.

In addition, it is likely that due to the need to relocate new urban release areas in some instances, that the provision of services to existing and proposed communities might be altered as a result of the proposal.

A physical community is generally disrupted when the environment outside the home, that is the public domain, is threatened in some way in terms of accessibility or provision. These areas generally serve common purposes for the community at large, in terms of social, recreational, educational and essential needs. The needs of the members of these communities can only be met as a consequence of their common geographical location.

The concept of community interest about the affects of a development assumes that for different sectors of that community, there are shared interests and demands for certain activities and facilities which can be shared with others like themselves. The provision and satisfaction of those specific needs of groups pursuing similar lifestyles is the factor which might be at risk by change or development. Loss of access to community facilities or services can therefore pose a potential social impact to that community. Since there can be substantial personal investment in locating within a certain community, due to the facilities which are provided there, most members of the community have a common interest in the stability of the physical environment and a change to this could threaten the stability of a community significantly. The stronger direct links and shared interests within a community, the greater the impact is likely to be.

### 12.2.2 EFFECTS ON INDIVIDUALS

Individuals are impacted in a different way to the community as a whole. This is usually through more direct impacts which affect the individuals status or well being. The most significant of these are usually:

- displacement or effects on individual properties;
- the resultant dislocation, uncertainty and, in some cases, hardship which may result; and
- individual responses to certain issues, such as noise and air quality (that is, effects on individual health).

Social impacts relating to these issues can either occur during construction or operation of a major infrastructure development. Construction impacts in particular involve temporary dislocation to community patterns and activities and can cause disruption and inconvenience during such times. These too have to be considered in this social impact assessment.

## 12.3 IMPACTS OF BADGERYS CREEK OPTIONS

### 12.3.1 CONSTRUCTION IMPACTS

Construction impacts associated with the development of the Second Sydney Airport at Badgerys Creek relevant to the social environment are considered in detail in *Technical Papers No. 3, 6, 10 and 13*. The major impacts would be experienced within the immediate locality of the proposed airport site and within the area bounded by Elizabeth Drive, Badgerys Creek Road, The Northern Road and Adams Road. The main impacts within this area relate to:

- traffic - construction traffic for plant and equipment and construction workers;
- air quality - dust and emissions from construction vehicles and from construction activities on the site;
- vibration - from construction vehicles and from construction activities on the airport site;
- noise - construction traffic and from construction activities on the site;
- water quality - from stormwater runoff from construction areas; and
- lighting - from construction activities during the night.

Measures to ensure that any adverse impacts comply with relevant environmental criteria and licences would be implemented. However, disruption to the general peace and quiet of the area would be experienced, especially where there are noise sensitive uses such as Kemps Creek and Luddenham Primary Schools. Significant construction traffic would be generated, which would have an adverse impact on the character and amenity of land uses adjoining major roads.

### 12.3.2 OPERATIONAL IMPACTS

#### *Changes to Population Distribution*

Changes to the expected distribution of future populations may occur to take advantage of perceived urban development opportunities and to minimise the effects of aircraft noise. The extent of these changes would depend on State and local Government responses to the airport. The Badgerys Creek options would create opportunities to establish new urban villages on a potential rail line to the airport sites. This may increase the planned population growth of Liverpool and Camden local government areas. As a result, growth may be diverted from other areas such as Campbelltown and Sutherland local government areas.

While these changes to future planned populations would not be significant over the whole of the south and south-west regions of Sydney, Liverpool local government area may experience substantially more growth than is currently planned by the NSW Department of Urban Affairs and Planning. The creation of new urban release areas would impact on the existing rural environment and increase demands for urban services and facilities.

Changes to the population of the community surrounding the Badgerys Creek airport sites would also occur. This would result from the relocation of residents currently leasing property within the boundaries of Option A, acquisition of properties within the extended boundaries of Options B and C, and potential acquisition of residential properties within the 35 ANEC. Displaced residents may relocate within the existing area or further afield. Potentially, this relocation could reduce the demand for existing services and facilities within the area to the extent that some may close. This would impact on the quality of life of remaining residents.

#### *Change in Access Patterns*

The sites of the Badgerys Creek options are relatively well self contained. Currently, there are very few roads across the site, the exception being Badgerys Creek Road which links The Northern Road to Elizabeth Drive. Due to limited residential development within the immediate area, and the availability of other access roads, this road is not heavily utilised. While this

might be inconvenient to residents of both, other alternative roads exist within the immediate vicinity which could be utilised, including The Northern Road, Devonshire Road and Western Road/Ramsay Road/May Avenue.

Most local access constraints are associated with the proposed road upgrades to Elizabeth Drive and Bringelly Road and the railway line, if developed. While detailed impacts of these proposals are not being considered as part of the Draft EIS if any of the Badgerys Creek options are pursued, obvious impacts on the local community would be associated with the change in traffic patterns to accommodate the upgrade. Communities likely to be affected include Bringelly, Rossmore, Kemps Creek and Mount Vernon.

Improvements to regional accessibility would be expected with the development of upgraded access corridors, as described, and the proposed rail link.

Pedestrian access and movement within the area would not be jeopardised. This is due to the existing rural nature of the site and surrounds, and current dependence on other modes of transport, such as cars and buses. There would be disruption to pedestrian access to current services and facilities at Badgerys Creek, as these would cease to exist under all Badgerys Creek options.

Where pedestrian access is required to the proposed airport site, provisions for safe crossing, with the increase in traffic, would have to be made from Elizabeth Drive, The Northern Road and Bringelly Road.

Regarding public transport, existing service provision is likely to remain and with the presence of an international airport in this location be upgraded. Services from the Sydney central business district and other regional centres would be provided to serve the airport, which would provide improved services to residents in the immediate vicinity of the proposed airport options. Estimates of travel times to and from the Sydney central business district suggest between 60 and 74 minutes, and for Parramatta, 38 and 42 minutes during the morning peaks. For rail, it is estimated to be approximately 45 minutes to Central and 30 minutes to Parramatta, assuming current services.

### *Effects on Residential Amenity/Character*

Residential amenity is a subjective description of how residents perceive their surroundings and way of life. It is characterised by a range of factors, including lifestyle, accessibility, visual appearance and access to open space. Changes to all or one of these factors can undermine the amenity of community, the extent of which can be different for different people.

Badgerys Creek and the site of the proposed Second Sydney Airport, are currently characterised by a rural setting, with uses reflecting the rural nature

of the area, including grazing of livestock, market gardens and other agricultural activities. The presence of an international airport on this site would dramatically alter this character.

A major issue raised by the community relates to the lifestyle impacts and the degradation of the peace and quiet associated with rural living. Communities which would be impacted considerably in this regard, include Luddenham, Silverdale, Badgerys Creek, Kemps Creek, Bringelly and Warragamba.

In particular, increased noise in these communities would undermine the existing rural character and problems generally associated with urban locations would be experienced, such as increased traffic volumes, degradation of air quality and diminished visual quality.

The character and amenity of an area is also characterised by the facilities and services available and access to them. In particular community character is reflected by the amount of open space within an area. Table 12.1 lists local open space which would be impacted by the proposed airport at Badgerys Creek.

TABLE 12.1 IMPACTS ON LOCAL OPEN SPACE DUE TO BADGERYS CREEK AIRPORT OPTIONS

Severe Impacts	Moderate Impacts	Loss
Bringelly Recreation Reserve (including community centre) Sales Park (includes play area, and Luddenham Hall) Luddenham Showground (includes Bringelly Racing Pigeon Club) Luddenham Croatia Soccer Club Luddenham Park Freeburn Park, Luddenham Kemps Creek Reserve Eugenie Byrne Park (Silverdale)	Wallacia Golf Club Blaxlands Crossing Reserve Wallacia Reserve Fowler Reserve	Badgerys Creek Park (including hall and play area)

For Badgerys Creek Options A and B local areas of open space within the 20 ANEC for 2016 include:

- Kemps Creek Reserve (Kemps Creek); and
- Eugenie Byrne Park (Silverdale).

For Option C the ANECs for 2016 indicate that the Bringelly Recreation Reserve, is within the 30 ANEC and the Luddenham Croatia Soccer Club is within the 20 ANEC. Impacts on these areas of open space use are therefore expected to be extreme and their functions are likely to be compromised. This

could reduce the areas of useable open space available within the local community, and residents and employees might choose to travel further afield for such facilities.

Areas of regional open space which would be impacted upon to some degree, by increased noise, include the Blue Mountains National Park, Bents Basin State Recreation Area, the Warragamba Special Area and the proposed Western Sydney Regional park. In particular, Bents Basin, with a current patronage of 60,000 visitors per year, would be severely affected by Options A and B, due to the location of camping and picnic facilities at the northern extremity of the State Recreation Area.

While planned facilities and visitation to the proposed Western Sydney Regional Park is not known, this would also be impacted by additional noise from Options A and B. Most of the Warragamba Special Area (including Warragamba Dam which attracts 370,000 visitors per year) is also located within the 20 ANEC (2016) for these options.

Other such areas also likely to be affected, given the preliminary flight paths include Nattai, Wollemi and Kangara Boyd National Parks in Wollondilly.

### *Community Severance/Instability*

Severance of communities normally occurs when that community is divided physically, either through restrictions in accessibility to and from the community or through reduction or depletion of services and facilities necessitating reliance on other communities.

As noted, the site of the proposed Second Sydney Airport at Badgerys Creek is relatively self contained. As such, the main community which would experience severance is Badgerys Creek itself. This would cease to exist under all airport options. Loss of this community would also result in the severance of family and business networks especially where additional land not previously identified, is required under Options B and C.

Specific services and community uses which would be displaced are as follows:

- Badgerys Creek Public School;
- Badgerys Creek Scouts Headquarters;
- The Hubertus Country Club (Liverpool Rifle Club);

- Badgerys Creek Post Office and Convenience Store; and
- two cemeteries.

Displacement of these uses would mean that the resident population would have to rely on other facilities and services provided elsewhere. This is particularly inconvenient where the public school is concerned. Currently 45 students attend this school, all of which live within Badgerys Creek (on the proposed airport site or surrounding area). While some of these students would have to relocate in any event (due to their place of residence being on the airport site), the balance of students would also be required to relocate to an alternative primary school. *Table 12.2* shows the closest alternative public schools, their capacity and current numbers of students attending.

TABLE 12.2 ALTERNATIVE PUBLIC SCHOOLS TO BADGERYS CREEK IN PROXIMITY TO AIRPORT SITE

School	Capacity	Current Attendance	Comment
Kemps Creek Public School	170	202	Since 1985, the school has grown in size to accommodate students from Badgerys Creek (which has decreased in size) The school is therefore currently operating above capacity.
Wallacia Public School	180	136	Full capacity only available with additional buildings (demountables).
Bringelly Public School	1,000	173	Large school grounds increase ability to provide for extra students.
Luddenham Public School	75	64	

Source: Telephone conversations with head teachers of respective schools.

The closest school to the Badgerys Creek site and the current Badgerys Creek Public School is Kemps Creek Public School. As shown in *Table 12.2*, this is currently operating beyond its current capacity, and could only accommodate additional students if further teachers and buildings were made available to accommodate these. The next closest school is at Bringelly, approximately five kilometres away. This school has the capacity to accommodate more students, subject to the provision of additional teachers and buildings.

Both Luddenham and Wallacia Public Schools have the ability to accommodate further students, but these are both in excess of seven to eight kilometres away from the current Badgerys Creek School. Therefore, it would appear that the schools in closest proximity to the existing school are currently



at or above capacity and would require additional teachers and buildings to accommodate any surplus students arising from the closure of Badgerys Creek School. This does not take account of additional students, originating from new sub-divisions in Bringelly (Kelvin Park Estate) or potential requirements to accommodate additional population growth, due to the Badgerys Creek options. Access to these would also be more difficult and inconvenient for local residents of Badgerys Creek.

Removal of other services and facilities within Badgerys Creek would also inconvenience proximate residential populations. However most residential uses upon which these facilities depend would have to be relocated due to their location on the airport site. Most of these services/facilities are also present in adjoining communities at Kemps Creek, Luddenham and Bringelly, including post offices, parks, community halls, shops and churches. It should be noted that at present there are no places of worship within any of the sites of the Badgerys Creek options.

Severance to the community would primarily be due to the proposed road upgrades and rail alignments necessary to access the airport. In particular Kemps Creek, Rossmore, Bringelly and Luddenham, would be affected and some disruption to local access to schools and facilities would be expected. In some cases severance to land in the same ownership might occur. Conversely, these improvements offer the potential for improved access and infrastructure within the area to the benefit of those communities.

### *Displacement and Effects on Individual Properties*

The main effects relating to displacement and affects on property arise from:

- acquisition of properties on each of the airport sites;
- potential reduction in value of properties arising from increased aircraft overflight noise and environmental degradation; and
- loss in agricultural production (employment) on each of the airport sites.

As discussed in Section 9.2.2, all properties required for Option A have already been acquired by the Commonwealth Government. Current activities and operations on this site are therefore leased, whereby the lease holder is aware of the proposed future intention of their properties. For Options B and C, additional properties would need to be acquired to accommodate additional land required for those particular options. Table 12.3 shows the numbers of dwellings on each of the sites for the Badgerys Creek Options.

TABLE 12.3 ESTIMATED NUMBER OF DWELLINGS AND POPULATION ON BADGERYS CREEK SITES IN 1996

Option	Number of Dwellings	Estimated Population
Badgerys Creek A	162	538
Badgerys Creek B	320	1,062
Badgerys Creek C	360	1,195

Notes: 1. Based on average occupancy rate of 3.32.

This table shows that for Option B an additional 158 dwellings would need to be acquired and for Option C, 198. This effectively means the displacement of approximately 1,062 and 1,195 extra people for these options assuming all dwellings are inhabited. In reality it is likely to be less than this figure due to vacancies.

In addition displacement might occur where properties are voluntarily acquired due to increased aircraft noise. Depending on the option and the mode of airport operation, this could include up to 53 properties. Some residents might also choose to relocate (if a viable option) due to individual reaction to noise.

The secondary effects of the relocation of properties from the airport site or losses arising from people moving away from the area, include:

- diminished demand and potential closure of community services;
- increased hardship arising from social upheavals, such as change in school facilities and jobs; and
- decreased morale and lack of community spirit.

Properties located within the 25 to 35 ANEC might be eligible for insulation to mitigate the effects of noise. However, in all likelihood, the value of these properties would still decline and while residents within these areas would not be displaced they would be effected by a devaluation of their properties. Evidence presented in *Technical Paper No. 4*, suggests that depreciation can be anything up to 24 percent within the 15 to 35 ANEC. This can lead to additional hardship, where people might want to relocate, but due to the devaluation of their properties are prevented from doing so, or otherwise have to accept a property elsewhere of a reduced value and standard and not necessarily offering the same lifestyle advantages.

Conversely, potential also exists for land values in the immediate vicinity of the airport to increase due to the removal of current planning uncertainty and

their prime location and potential attraction, especially to commercial interests.

Regarding the displacement and loss of value arising from displacement of agricultural activities on site, some of the existing agricultural operations could be expected to re-establish elsewhere which would reduce the potential loss of production from the region (*Technical Paper No. 9*). Aircraft noise and increased dust could effect a number of properties in close proximity to the site and cause some loss in production. The extent of this has not been quantified and can only be speculative at this stage.

Further displacement may occur where properties are acquired to upgrade roads accessing the airport. The extent and number of these is not known, and would be subject to further detailed analysis should any of the Badgerys Creek options be pursued.

### *Effects on Individual Health*

The impacts on the health of individuals has been raised during the consultation process in the preparation of this Draft EIS. Issues raised include:

- lack of sleep;
- depression;
- stress;
- pollution;
- asthma; and
- mental health.

Assessment of these and other potential health effects are described in *Technical Papers No. 3* and *No. 6*.

Current knowledge does not allow many potential health impacts of aircraft noise to be reliably measured or predicted. However, some evidence suggests potential effects as follows:

- auditory health - oral discomfort and pain, hearing loss;
- non-auditory psychological health - balance, startle reflex and orienting response, cardio-vascular health and perinatal health;

- performance and activity - sleep disturbance, voice communication impairment and interference with tasks; and
- psychological health.

Groups likely to be more vulnerable include children, people with poor command of English (particularly relevant given the ethnic composition of the assessment region), shift workers, the sick, people who are at home a lot and the elderly.

Evidence on sleep disturbance, suggests that an international airport would be expected to induce one or two awakenings per night (*Technical Paper No. 3*). Other effects on noise include conversation disturbance and annoyance, which tends to be dependent on whether existing environments are noise affected.

Based on research and review of other data in *Technical Paper No. 3*, the following proportions of persons are estimated to be affected by noise.

TABLE 12.4 ESTIMATED PROPORTIONS OF PEOPLE AFFECTED BY NOISE

Year	Moderately Affected	Seriously Affected
	%	%
2006	67	28
2016	45	12

Source: Technical Paper No. 3.

The reason for the reduction in numbers of persons affected is explained by increased familiarity with the noises created by an airport and the fact that new persons residing in the area would be aware of the airport’s presence and are therefore likely to be more noise tolerant than existing residents who initially would not be used to increased noise levels.

Due to the relatively limited numbers of residents in the Badgerys Creek area, the potential for adverse health effects would not be expected to be as great as for more urban locations.

*Other Social Impacts*

In addition to the social impacts listed above, are other impacts associated with the social well being of persons within the immediate communities affected by the airport options, or upon persons carrying out activities within the area. Primarily, these have been identified by reference to community consultation and fall into two main categories:

- effects on recreation and outdoor activities (including tourism); and
- effects on lifestyle.

Regarding the former, several activities have been identified as being important within the assessment region, in addition to activities which take place within the aforementioned National Parks and State Recreation areas. These are horse riding (in the vicinity of Campbelltown/Camden) and hang gliding at Stanwell Park (Bald Hill). In particular, hang gliding is likely to be impacted upon by the presence of an international airport.

Other impacts arising from the development of the proposed airport at Badgerys Creek are those related to lifestyle, and in particular the peace, quiet and general rural living conditions experienced by persons in immediate proximity to the airport site and the assessment region. As stated, the presence of an international airport would diminish the attributes generally associated with rural living, primarily due to additional noise, increase in traffic and general reductions in the overall amenity of the area visually, physically and socially.

## 12.4 IMPACTS OF HOLSWORTHY OPTIONS

### 12.4.1 CONSTRUCTION IMPACTS

#### *Changes to Population Distribution*

Construction impacts associated with the development of a Second Sydney Airport at either of the Holsworthy options are considered in detail in Technical Papers relating to air quality, noise, traffic and hazards and risk. The major impacts would be experienced within the immediate locality of the sites, and in particular, access corridors to them. While these have not been determined with any degree of certainty at the present time, they are likely to be via access corridors proposed for roads serving the airport. For example, to service Option A, there are four possible alternatives:

- Alternative 1, via Moorebank Avenue;
- Alternative 2, via Cambridge Avenue;
- Alternative 3, via Heathcote Road; and
- Alternative 4, via Minto and South Western Freeway.

For Option B, there are two alternatives in addition to those listed above, including one via Rosemeadow, Wedderburn and the South Western Freeway and one from Heathcote Road/New Illawarra Road.

The main impacts expected due to construction of an airport on either of the Holsworthy sites would be common to both and relate to:

- traffic - construction traffic for equipment and construction workers;
- air quality - from vehicles attending and departing the construction site and from construction activities on the site itself;
- vibration - from vehicles attending and departing the site and from construction work on the site itself;
- noise - from vehicles attending and departing the construction site, and from construction activities on the site itself;
- water quality - from runoff from construction areas; and
- lighting - from construction activities during night time hours.

Due to the relative remote locations of both the proposed Holsworthy sites, the actual impacts of construction itself, from noise, dust, vibration, lighting etcetera are expected to be minimal. The major impacts would be related to construction traffic attending and departing the sites, including the transportation of machinery and construction workers themselves. Precise details of construction activities are given by the Second Sydney Airport Planners (1997a).

#### 12.4.2 OPERATIONAL IMPACTS

##### *Changes to Population Distribution*

Changes to planned residential development may occur to minimise the impacts of aircraft noise from the Holsworthy airport options. The changes would likely be relatively minor for Holsworthy Option A. It may be appropriate to remove the proposed Menai urban release area from the urban development program due to the effects of aircraft overflight and ground operation noise. There is, however, some uncertainty about the suitability of that area for urban development and its deletion from the program is under consideration by State Government authorities.

Residents surrounding Holsworthy Option A that would experience the higher levels of aircraft overflight noise such as Casula, Wattle Grove, Holsworthy, Macquarie Fields, Glenfield, Long Point, Heathcote and Helensburgh West

may desire and choose to relocate. This may cause considerable financial hardship and social dislocation. Costs may, in many cases, prevent relocation. Options available to public housing tenants would be limited.

Two long term urban release areas would be located within the estimated 20 to 25 ANEC for Holsworthy Option B, namely Menangle Park and Mt Gilead. It is likely that these would be withdrawn from the urban development program and that dwelling demand would be fulfilled elsewhere. One option to meet this demand may be the development of the Macarthur South release area in Wollondilly local government area. Other release areas such as Edmondson Park in Liverpool local government area may also absorb some of the lost development potential. This would involve a significant re-distribution of planned residential populations. Additional demands would be placed on community services and facilities and proposed transport networks would need to be reassessed.

Similar to the effects of Holsworthy Option A, residents impacted by higher levels of aircraft overflight noise may desire and choose to relocate. Communities most affected would include Leumeah, Kentlyn, Ruse, Airds, Bradbury, Ambarvale, Glen Alpine, St Helens Park, Rosemeadow, Wedderburn, Darkes Forest, Helensburgh North, Helensburgh, Lillyvale, Otford, Stanwell Tops and Stanwell Park.

### *Change in Access Patterns*

#### *Holsworthy Option A*

The site of Holsworthy Option A is relatively well self contained and there is no public access within the Military Area. As such, the site of the airport would cause very little disturbance to access patterns within the immediate location of the site or to the surrounding communities.

The major disruption to access from the location of the proposed airport on the site would be to military operations within the Holsworthy Military Area. Details of impacts on defence are presented in *Chapter 27* of the Draft EIS. Most of the major facilities are located to the north of the Holsworthy Military Area at Holsworthy Barracks and Moorebank. Therefore major changes in access patterns would not be required. The main impediment to access would be related to private roads within the military area used for the transportation of personnel and equipment across the site, on private roads such as National Park and Old Coach Roads. This would in turn cause disruption to military operations on airport site with potential impacts as set out in *Chapter 27* of the Draft EIS.

The major impacts would arise from the access corridors (road and rail) which would be required to service the airport. The precise location of these is not

known at present and would be pursued further if this particular option is chosen. At that time, a detailed impact assessment of the access corridors would be conducted and the effects on access patterns within the Military Area considered as part of this.

Regional improvements to transport networks required to service the airport would likely create limited benefits to communities surrounding the Holsworthy Military Area. The traffic generated by the airport would likely exacerbate potential road network capacity problems on the M5 Motorway, Alford's Point Road and the major crossings of the Georges River at Sylvania and Taren Point. Options for a rail line to service the Holsworthy airport options would also not likely benefit any surrounding communities.

### *Holsworthy Option B*

The site of the proposed airport on the Option B site would cause minimal disturbance to access within the site itself, due to the fact that it is currently not accessible to the public and no major roads or thoroughfares exist within this area.

The major disruption expected would be related to impacts on the military operations on the airport site (*Chapter 27 of the Draft EIS*) although it should be noted that operations within the southern part of the Military Area where Option B is located, are minimal, most being conducted to the north or within the middle of the site.

The major disruption to access would arise due to the access corridors serving the airport in this location. Again, the precise route/alignment is not known at present time and would only be pursued further, if this option were chosen.

Pedestrian access and movement on either of the proposed Holsworthy sites would not be jeopardised, since currently, there is no public access to or within the Military Area.

Generally, accessibility to this region would be expected to improve due to the provision of new roads, potential rail access and the associated improvement in public transport serving the area especially from Sydney central business district and other regional centres. For example, it is estimated that journey times to and from Sydney CBD (dependent on road alternative) would be approximately 63 minutes for Option A and 82 minutes for Option B. For rail (with one transfer) this would be anything between 50 and 73 minutes for Option A to Central, and 66 to 86 minutes for Option B (refer *Technical Paper No. 13*).



However, due to the relative isolation of the options within the Military Area, the access corridors would not benefit existing and proposed communities to the same extent as those for the Badgerys Creek options.

*Effects on Residential Amenity/Character*

*Holsworthy Option A*

There is currently no residential development on the site of the Holsworthy Military Area, other than that associated with the military use of the site. Therefore, there would not be an impact on the amenity or character of residential properties from development on the proposed airport site. Impacts on the Defence use of the site are considered in *Chapter 27* of the Draft EIS.

The major effects of the proposal on residential amenity and character are related to noise and the effects upon the lifestyle of residents caused by this. Other issues, usually associated with more urban locations, such as increase in traffic volumes, degradation of air quality and diminished visual quality all contribute to undermining the residential amenity and character of an area.

The main communities which would experience an increase in noise from aircraft, are listed in *Section 12.4.2*. The main local areas of open space and recreation and the extent to which these are likely to be affected within these areas are set out in *Table 12.5*.

TABLE 12.5 HOLSWORTHY OPTION A - IMPACT ON LOCAL OPEN SPACE

Severe Impacts	Moderate Impacts	Minor Impacts
Georges River Nature Reserve	Glen Regent Reserve Casula	Slessor Park, Heathcote
Wombat Willows, Glenfield	Lalor Reserve, Glenfield	
	Salisbury Reserve, Glenfield	
	Glenfield Park, Glenfield	
	Childs Reserve, Glenfield	
	Blinman Park, Glenfield	
	Trobriand Park, Glenfield	
	Fifth Avenue Reserve, Macquarie Fields	
	Geranium Park and Hyacinth Reserves, Macquarie Fields	
	Macquarie Fields Park, Macquarie Fields	
	Tharawal Park, Casula	
	Gandangara Park, Casula	
	Several Pocket Parks (Glenfield, Casula, Macquarie Fields)	

As indicated, several areas of local open space would be affected by the development of a proposed airport on the Holsworthy Option A site. This is particularly relevant, since use of these facilities is reliant on outdoor activity which are more susceptible to the affects of noise than activities taking place within buildings. Therefore, impacts on these areas are expected to be extreme, and their functions are likely to be compromised. This may reduce the use of such areas whereby current users would be forced to seek or pursue recreational activities elsewhere. This might involve the need to travel greater distances and place increased pressure on such areas. It would also be to the inconvenience of local residents.

Large areas of the Heathcote National Park are located within the 20 and 25 ANEC and some fall within the 30 ANEC. This could have severe repercussions on the use of the Park as a regional facility (people tending to divert to other parks with less/no noise disturbance) especially given heightened sensitivity to noise within such areas.

In particular, several walking tracks within the Heathcote National Park are located within the 20 ANEC. Facilities within this area include Eckersley Ford, Battery Knob, Gunners Cave and Dingo Cave. Other regional facilities within the Heathcote National Park, but not within the 20 ANEC which would still be affected include the St George Area Scouts and Training Centre, off Freeman Road.

Only a small part of the Royal National Park is located within the 20 ANEC. However, flight paths associated with the cross runway of Holsworthy Option A (Preliminary Flight Paths, May 1997) indicate that both Heathcote National Park and the Royal National Park would experience overflight by aircraft. The extent to which this might effect usage of these facilities can only be speculative, since it would be dependent on individual response to aircraft noise. However, since people attending these facilities generally go to experience peace and quiet, it is estimated that they would be at least 10 dB less tolerant of noise than in a normal residential environment (*Technical Paper No. 3*).

Of particular importance in relation to this option, are the impacts on hang gliding at Stanwell Park (Bald Hill) since this is located directly under the flight paths of the main parallel runways and the cross runway for this option.

It is estimated (Stanwell Park Hang Gliding Club, 1997) that approximately 1,900-2,400 persons per year use this facility (excluding spectators). In turn, this generates demand for other services and facilities, including local restaurants, kiosks and other food-oriented businesses.

This facility is considered by some as one of the main areas within Australia for coastal soaring due to the fact that Bald Hill and the Illawarra escarpment provide a near perfect combination of relevant conditions for hang gliding.

Currently, hang glider and paraglider pilots are subject to airspace restrictions dependent over which sector of the Illawarra escarpment they are flying. Generally however, this is below 2,500 feet immediately south and north of the site and below 5,000 feet south of the site to Mount Kiera.

Since this facility is within 20 kilometres of the end of the runways for this option, it is likely that aircraft approaching or departing would be close to or below this limitation (*Technical Paper No. 3*). In all likelihood, the two could not co-exist and the use of the Stanwell Park hang gliding area might have to cease or operations markedly reduced. This not only has impacts on local use but regional and international users as well.

#### *Holsworthy Option B*

The main communities which would experience an increase in noise from the potential development of Holsworthy Option B, are noted in *Section 12.4.2*. As a result, it is likely that residential amenity of these areas would be undermined, potentially resulting in a reduction in population, should people choose to relocate.

The main areas of local open space and recreation which would be impacted by the development of an airport in this location are shown in *Table 12.6*.

As previously specified, the use of these areas of open space are likely to be undermined and current users may be forced to visit other areas, where aircraft noise is not a problem. This would inconvenience residents of these locations and would have social ramifications in terms of disruption. This could also have repercussions on the use of other nearby services and facilities, such as local shops, whereby a reduction in the use of local open space might reduce the demand for these.

Regional open space affected by Holsworthy Option B includes:

- Garawarra State Recreation Area;
- Woronora Dam and catchment area;
- Mount Annan Botanic Garden; and
- Heathcote National Park.

TABLE 12.6 HOLSWORTHY OPTION B - IMPACT ON LOCAL OPEN SPACE

Severe Impacts	Moderate Impacts	Minor Impacts
Helensburgh Park, Helensburgh	Otford Farm, Helensburgh	Centenary Park, Campbelltown
Rex Jackson Park, Helensburgh	Lloyd Place, Otford	Baden Powell Reserve, Bradbury
Symbio Koala Gardens, Helensburgh	Rizal Park, Rosemeadow	Macleay Reserve, Bradbury
Charles Harper Park, Helensburgh	Denfield Green	Worrell Park, Ruse
Rosemeadow Reserve	Several Pocket Parks (St Helens Park)	Cock Reserve, Ruse
St Helens Park	Claremont Ave Park, Glen Alpine	Glenlee Horse Riding Farm, Menangle Park
Georges River Nature Reserve	Mandurama Reserve, Glen Alpine	Mount Huon Park, Campbelltown
Moncrieff Reserve	Canidius Reserve, Rosemeadow	Rosalind Park, Menangle Park
Flynns Reserve, Bradbury	Octavia Park, Rosemeadow	Bald Hill Headland Reserve, Stanwell Park
Dickens Reserve, Ambarvale	Campbelltown Golf Course	
Rixon Hill Reserve, Ambarvale	Werribee Park, Glen Alpine	
Thomas Acres Reserve	Heritage Park, Glen Alpine	
Southern District Tennis Association	Merino Park, Airs	
Noorumba Reserve and Fishers Ghost Equestrian Club, Gilead	Flynns Reserve, Airs	
Pocket Parks, Glen Alpine	Summers Park, Airs	
Riverside Reserve, Airs	Kevin Wheatly Reserve, Airs	
Wedderburn Outdoor Resource Centre	K L Jarvis Field, Airs	
	Valley Reserve	
	Soldiers Settlement Reserve, Ruse	
	Waminda Oval, Waminda	
	Fred Sheather Park, Ambarvale	
	Copperfield Reserve, Ambarvale	
	Riley Park Airs	
	Ruse-Satsukino Park, Ruse	
	Smiths Reserve, Ruse	
	RJ Sargeant BEM Oval, Leumeah	
	J Peters Field, Ruse	

### *Community Severance/Instability*

Severance of communities normally occurs when a community is divided physically. This can occur either through restrictions in accessibility to and from the community or through a reduction or depletion of services and facilities within that community. In some cases this necessitates a community rely on services and facilities elsewhere.

For both Holsworthy options, each site is self contained and as such no existing communities would experience severance.

As indicated previously, severance of existing communities is more likely to occur from the development of access corridors servicing the airport. The impacts of these are not considered in this Draft EIS and would be considered further if either of the Holsworthy options is pursued.

Dependent upon which access corridor is chosen, the Department of Defence uses on the airport site are likely to experience severance. This is particularly so of the rail access corridor and road Alternatives 1 and 2. Generally, Holsworthy Option A would cause disturbance to defence operations on the airport site and this is likely to undermine the ability of the site to serve its function for military training. The Department of Defence have not expressed a view as to whether they would relocate should either of the Holsworthy options be pursued. However, it is anticipated that there would need to be full or at least partial relocation of some activities and personnel on the airport site.

Instability within a community might also arise due to increased noise from aircraft and traffic. In particular, a large number of community facilities, special uses and noise sensitive uses would be impacted upon for both Holsworthy options. Details of these are presented in *Technical Paper No. 3* and include:

- aged care facilities;
- pre-schools and schools;
- community/youth centres;
- places of worship; and
- libraries.

*Table 12.7* shows approximate numbers of each of these facilities which are likely to be impacted on for both Holsworthy options.

While some of these uses might be eligible for insulation, others might not. It is not possible to determine the acceptability of increased aircraft noise or the extent to which individuals may choose to utilise these facilities, either with or without insulation. Services and such facilities could, however, potentially suffer as a result of reduction in use and demand. This could lead to further community severance, as residents look elsewhere for alternatives. It could also lead to pressure on similar facilities elsewhere (such as schools and pre-schools) where they operate near or at capacity.

TABLE 12.7 IMPACTS ON COMMUNITY USES FOR BOTH HOLSWORTHY OPTIONS<sup>1</sup>

Option	Aged Care	Pre-Schools	Education/ Schools	Places of Worship	Community/ Youth Centres	Libraries
Holsworthy A	5	4	6	0	0	0
Holsworthy B	4	8	19	6	3	1

Notes: 1. Area assessed does not include Metropolitan Water Catchment Area.

*Displacement and Effects on Individual Properties*

*Holsworthy Option A*

It is unlikely that any private properties would need to be acquired either compulsorily or voluntarily for this option. There are no residential properties on the site of the proposed airport and there are no residential properties within the 35 ANEC. Therefore, no residential development would be displaced under this option.

Displacement might occur where individuals choose or are able to relocate due to the effects of increased noise. This may be especially so where properties are located within the 20 ANEC, and which do not presently experience aircraft noise. The extent to which this might be the case, cannot be ascertained with any degree of confidence.

Values of properties are likely to depreciate by a factor of up to 24 percent within the 15 to 35 ANEC (*Technical Paper No. 4*). This could lead to hardship on the part of individuals concerned, where they may experience a reduction in the value of their property combined with a resultant decrease in amenity. An individual or family’s ability to afford to move to other similar alternative accommodation in these circumstances would be reduced.

The secondary effects of the relocation are the same as those outlined under the Badgerys Creek options. In summary, these are:

- diminished demand for services;

- potential closure of services and facilities (such as primary schools, shops etc);
- social upheaval (change in jobs, schools and facilities); and
- decreased morale and lack of community spirit.

Alternatively, some land values may increase due to proximity to an international airport, especially for commercial purposes, where noise is not so much of an issue.

### *Holsworthy Option B*

There are no residential properties on the site of the proposed Holsworthy B option, and therefore there would be no requirement to compulsorily acquire under this option. However, up to nine residential properties are located within the 35 ANEC. In accordance with previous practice, it is therefore likely that these properties would be acquired voluntarily in order to mitigate the impacts of noise on individuals residing there. While this represents a small number, those individuals having to relocate, albeit voluntarily, would still experience upheaval, especially if a change of schools or employment was required.

As for Option A, the extent to which persons might relocate due to the effects of noise can not be substantiated. However, with large areas of urban development either adjoining or close to the Holsworthy Military Area, the numbers of persons choosing to take this course of action would likely be more than for the Badgerys Creek options. This would result in displacement and potential hardship as described.

The flight paths associated with this option also indicate that extensive areas of southern Campbelltown and Camden would be affected to some degree by aircraft noise. Operation of the cross wind runway also indicates that significant parts of Ingleburn, Campbelltown to the north and areas along the south coast, between the Royal National Park and Wollongong would experience differing degrees of noise due to aircraft overflight.

### *Effects on Individual Health*

The impacts on the health of individuals has been raised during the consultation process in the preparation of the Draft EIS. Issues raised include:

- lack of sleep;
- depression;

- stress;
- pollution;
- asthma; and
- mental health.

The full extent of anticipated impacts on individual health cannot be reliably ascertained. *Technical Papers No. 3* and *No. 6* provide some detail as to anticipated impacts. Potential effects include:

- auditory health - oral discomfort and pain, hearing loss;
- non-auditory psychological health - balance, startle reflex and orienting response, cardio-vascular health and perinatal health;
- performance and activity - sleep disturbance, voice communication impairment and interference with tasks; and
- psychological health.

Groups likely to be more vulnerable include children, people with poor command of English (particularly relevant given the ethnic composition of the assessment region), shift workers, the sick, people who are at home a lot and the elderly.

Affection by noise includes sleep disturbance, whereby the operation of an international airport would be expected to induce one or two awakenings per night (*Technical Paper No. 3*), conversation disturbance and annoyance, which tends to be dependent on whether existing environments are noise affected.

Based on the research and review of other data in *Technical Paper No. 3*, the following proportions of persons are expected to be affected by noise.

TABLE 12.8 ESTIMATED PROPORTIONS OF PEOPLE AFFECTED BY NOISE

Year	Moderately Affected %	Seriously Affected %
2006	67	28
2016	45	12

Source: Technical Paper No. 3.



The reason for the reduction in numbers of persons effected is explained by increased familiarity with the noises created by an airport and the fact that new persons residing in the area would be aware of the airports presence and are therefore likely to be more noise tolerant than existing residents who are currently not subjected to increased noise levels.

Given the extent of urban development adjoining and in the vicinity of the Holsworthy Military Area, the potential impacts on health are likely to be greater than those for Badgerys Creek.

### *Other Social Impacts*

In addition to the social impacts listed above, community consultation conducted in the preparation of the Draft EIS has raised the following issues directly associated with the Holsworthy options. These are:

- impacts on already socially disadvantaged areas around Campbelltown and Liverpool;
- learning difficulties arising from increased aircraft noise; and
- impacts of the potential relocation of Defence activities and personnel.

It is acknowledged that there are large areas of public housing within the Campbelltown and Liverpool local government areas. In particular, areas at Macquarie Fields and Airds would experience additional noise from both Holsworthy options. The effects of this and the issue of learning difficulties are discussed in *Technical Paper No. 3*.

Individuals or groups living within these communities who may be particularly vulnerable to these impacts would include persons on low incomes and the unemployed many of whom may be unable to move away due to cost factors and potential lack of alternative public housing availability or choice. This housing may be eligible for insulation, dependent upon whether it is located within the relevant ANECs, as for other residences.

The main impacts arising from the potential relocation of Defence activities relate to the social impacts on the wider civilian community due to the potential change to the military function of the area.

Approximately 3,000 military personnel reside within the Holsworthy Military Area (Department of Defence, 1995). Including partners and dependents the population of the Holsworthy Military Area and surrounds is approximately 6,000.

Most of the military personnel live in Holsworthy although a large number also live off site in local communities such as Ingleburn, Casula, Macquarie Fields and Wattle Grove. Just over nine hundred children of military personnel attend some form of educational establishment off the Military Area. The Holsworthy Military Area is important to the wider community, in terms of use and integration of services (housing, schools, community facilities) and expenditure within local communities.

Removal of some or all of the military operations at Holsworthy could potentially have effects on demand for services and facilities within the local area and expenditure within them. The character of these areas could also be effected by the relocation of military personnel and their families. This would be to be disbenefit of remaining residents who may experience a decline in the provision of services, with greater reliance, and associated inconvenience, on alternative provision elsewhere.

## 12.5 ENVIRONMENTAL MANAGEMENT

The development and operation of an international airport on either of the proposed sites would incur differing degrees of social impacts, and would be experienced at the local, regional and even state/national/international levels. This reflects the size of the development, the extent of the regional assessment area and the presence of some major regional resources within this region. To ameliorate these impacts, there would need to be various environmental management measures, targeted at specific impacts, communities or in some cases, facilities.

These would need to be implemented during both the construction and operation stage of the proposed airport. During construction, the following measures are recommended:

- once design and construction requirements are known, affected communities along the major access routes and in proximity to the site, should be consulted to ascertain specific community concerns and to advise the community as to activities, times and methods to be employed during the construction period. This would assist in allaying fears and uncertainty through lack of information. A community liaison group should be appointed with a representative to establish a direct point of contact with the community, where changes are considered to airport operation or to maintain ongoing feedback from the community;
- prior to construction, consultation with affected communities should be conducted to establish major thoroughfares/pedestrian ways which

will need to be avoided or alternative measures taken to ensure these are maintained or alternative arrangements made;

- each site and access should be adequately secured to preserve the safety of nearby residents;
- appropriate measures to reduce noise, vibration, dust and other impacts associated with construction should be taken where they directly affect residences. These measures should ensure compliance with Environment Protection Authority licence requirements and standards. Monitoring prior to and during the construction period should also be conducted to ensure that these standards are continually adhered to; and
- residents should be notified through the appointed liaison group, where any unforeseen inconvenience or disruption is proposed. This should occur at the earliest opportunity, and if necessary, residents within affected areas should be advised individually through mechanisms such as letterbox drop/mail etc.

Environmental management during the operational phase of the proposed airport involves aspects associated with land use and specific impacts. Measures to ameliorate or manage these impacts are recommended where criteria or licence requirements etcetera are expected to be exceeded or where individual impacts would be extreme. These measures are discussed in detail in each of the respective technical papers. In summary, these include:

- prevent zoning of noise affected land for residential and noise sensitive purposes;
- voluntarily acquiring properties which would be severely impacted by aircraft noise (within 35 ANEC);
- insulating properties within 25 to 30 ANEC to reduce the impacts of noise from aircraft;
- ensuring ongoing monitoring of noise and pollution levels to ensure that these remain within recognised standards;
- ongoing monitoring of traffic and movements of dangerous goods, to ensure that they are not passing through residential streets;
- conducting a series of post-operation audits on affected communities, to assess relative affects, including demand for facilities, closures of facilities and use of remaining facilities; and

- ensuring that alternative facilities in non-noise affected areas have sufficient capacity to accommodate additional use, or where they do not, that further facilities are provided.

In addition, specific measures would need to be taken in relation to some of the regional facilities and areas of open space. In particular, there may be a need to relocate some facilities (for example, picnic areas, barbecue areas, resource centres and walking tracks) which are either directly under flight paths or within the 20 ANEC. Consequently, there would need to be communication between the airport operators and the management bodies of these areas, including the National Parks and Wildlife Service, Sydney Water and the Department of Land and Water Conservation.

A community hotline should also be available, to deal with complaints upon the opening and ongoing operation of the proposed airport. A register of complaints should be kept and processed through a database, to ensure that community concerns are receiving ongoing attention, especially where new issues emerge.

Where specific activities might be affected (for example, the Stanwell Park Hang Gliding Club) liaison should be established with these groups, prior to the airport becoming operational, to seek to properly manage the coexistence of the two facilities.

## 12.6 SUMMARY OF POTENTIAL SOCIAL IMPACTS

The potential social impacts of the proposed Second Sydney Airport fall into three main categories:

- the effects on individuals;
- the effects on communities; and
- the effects on specific areas or facilities.

Impacts upon individuals are primarily related to the effects of aircraft noise, individual response to this, potential decreases in the value of properties and the effects on individual health. The extent to which individuals respond to increased noise and decline in amenity cannot be quantified since it is dependent on a series of factors which vary dependent on individual response.

The decrease in house values has been highlighted as a problem where individuals wish to relocate, but are reluctant to do so due to a decrease in the value of their existing homes and the possibility of incurring a financial loss.

The effects on communities have been highlighted in relation to character and amenity, severance or disruption caused by a decrease in demand for services and facilities, and a reduction in the use of certain facilities, such as open space. Due to the extent of urban areas in the vicinity of the Holsworthy Military Area, effects on existing communities are likely to be accentuated compared to the Badgerys Creek options which are located in rural residential areas.

The large areas of local and regional open space and the effects of noise on these would also undermine the character and amenity of communities in relation to the Holsworthy options.

The main regional facilities which would be affected by the airport options are Bents Basin State Recreation Area and Warragamba Dam Special Area for the Badgerys Creek options and Heathcote and Royal National Parks, Woronora Dam, Garawarra State Recreation Area and Mount Annan Botanic Garden for the Holsworthy options. All of these would be affected to some degree by noise, which could have repercussions on their future use and visitation. One particular facility, the Stanwell Park hang gliding area, would be severely impacted by the development of either of the Holsworthy options, due to flight paths associated with each.

Overall, the direct impacts of any of the airport options are limited, due to the relative isolation of both sites and the little or lack of residential development on any of these. This would minimise community severance with the exception of the direct impacts on the community of Badgerys Creek.

The main impacts arise due to individual response to aircraft noise, increased traffic and other environmental factors associated with the operation of an international airport. At this stage, this cannot be gauged accurately. However, the major social impacts associated with this are:

- potential relocation of future urban release areas and existing individuals, with resultant change to the population distribution within the assessment region;
- subsequent change in demand for community services and facilities and potential closure of some of these, leading to community blight;
- the potential impacts arising from severance due to the access corridors required to service the airport; and
- the reduction in the attractiveness or amenity of community facilities, in particular open space and recreation uses.

# Part D

**Environmental Management**

## CHAPTER 13 ENVIRONMENTAL MANAGEMENT

### 13.1 ENVIRONMENTAL MANAGEMENT STRATEGY

An environmental management strategy to address the general planning, land use and social impacts identified in this technical paper is suggested to mitigate the related issues of noise impacts, air and water quality impacts and traffic impacts. This would be developed further once the preferred option is chosen.

The statutory planning framework including State Environmental Planning Policies, Regional Environmental Plans, Local Environmental Plans, and Development Control Plans would need to be used to guide appropriate land use relationships. Changes in land use zonings may be required to regulate the land uses permitted within the identified noise affected areas.

#### *Noise*

*Table 9.3* summarises appropriate uses based on the ANEF zones and contained in *Australian Standard 2021 - 1994*. This standard should be applied to new development within the noise affected area of the proposed airport.

It is recommended that a noise management plan be prepared to mitigate the effects of noise from the airport to incorporate recommendations as set out in *Technical Paper No. 3*. The plan would employ a variety of measures including operational noise controls, remedial measures and land use planning controls. Ongoing monitoring and community consultation should be a central part of this plan.

#### *Air and Water Quality*

The *Metropolitan Air Quality Study* (Environment Protection Authority, 1996) which published the results of a three year study in 1996 highlighted that because of Sydney's topography and wind movement patterns the south-west area including Liverpool, Campbelltown, Camden and Wollondilly is a receptor of pollutants from the eastern part of the Sydney metropolitan area.

The potential impact of the development of a Second Sydney Airport and associated urban development on the current level of air pollution is outlined in *Technical Paper No. 6*, along with the structure of an air quality management plan.

The relationship between urban form, private car use and the related pollution impacts has been widely discussed in recent years. The development of significant urban village areas (as proposed under Badgerys Creek Options A, B and C and Holsworthy Option B) to accommodate the expected population increase would provide the opportunity to monitor the influence of the form of urban development on the use of public and private transport. The ongoing monitoring program would be an essential part of this analysis.

Potential water quality impacts would ultimately relate to the impacts on the Hawkesbury Nepean River and its tributaries. A water quality management plan would closely monitor the effects of urban stormwater runoff and the level of treatment of all effluent in the area before discharge into the Hawkesbury Nepean system.

### *Planning Controls*

Significant investigations have been undertaken into an appropriate strategic planning response to the development of an airport similar to the Badgerys Creek Options A and B by a joint Commonwealth, State and local Government taskforce. The principles arising from those investigations would not be inconsistent with the expanded scale of the airport when compared to previous Badgerys Creek airport proposals. Should Badgerys Creek Options A or B proceed the principles of this strategic planning exercise would need to be made available for public comment and finalised. The statutory planning framework to put into effect these principles would then need to be developed.

Many of the principles developed by the taskforce could also be applied to the development of Badgerys Creek Option C. Further investigation into the development of an urban village in the Rossmore area would be required.

A new strategic planning exercise would need to be undertaken prior to the development of either of the Holsworthy options. While Holsworthy Option A does not have a major impact on the *Urban Development Program*, new release areas would need to be found to replace Mt Gilead and Menangle Park should Holsworthy Option B proceed.

At a more local level, restrictions on further urban development around the airport options would need to be put into place. Presently, directions made under Section 117 of the *Environmental Planning and Assessment Act, 1979* are the main instruments used to ensure that urban development does not encroach close to the existing Badgerys Creek airport site. These controls are based on *Australian Standard 2021 - 1994*. The history of decision making regarding the development of an airport at Badgerys Creek and uncertainty about how the airport may develop and expand in the future suggests that a more conservative approach to land use planning is required close to the



potential airport site. Greater restrictions outside of the developed 20 ANEC may be appropriate.

### *Social Impacts*

Management of social impacts would include implementing a cross section of planning, land use and environmental measures, as identified. In addition some specific measures to ameliorate the effects of the airport both during construction and operation are suggested:

- appointment of community liaison groups to advise on particular concerns and maintain ongoing contact with airport operators;
- prepare pre-construction audit to establish key community facilities and thoroughfares which would need to be avoided or specific alternative measures taken during construction;
- ensure communities are advised of progress/changes to construction schedules at all times;
- establish contact between airport operators and key recreation/open space management bodies to identify noise affected areas and facilities and make provision for relocation where necessary;
- establish a community hotline for complaints during the construction and operation of the airport;
- conduct post-operation audits on affected communities to assess relative affects and make provision for changes to management procedures, for example, relating to traffic in residential streets.

## **13.2 MONITORING**

Monitoring of key parameters is an essential part of an environmental management strategy.

In addition to indicators of noise, air and water quality and traffic, key land use indicators which require ongoing monitoring include:

- rate of development of the urban development release areas;
- rate of development of employment zones;
- form of development and related transport usage; and
- rate of rural residential development.

# Part E

**Overview and Comparison  
of Airport Options**

## CHAPTER 14 OVERVIEW OF POTENTIAL PLANNING, LAND USE AND SOCIAL IMPACTS

### 14.1 PLANNING

Areas in proximity to the Badgerys Creek airport sites have long been identified for urban development in several metropolitan planning strategies. However, recent reports acknowledge concerns associated with the development capacity of this area, including potential air quality and water quality impacts.

Without the impetus of a Second Sydney Airport at Badgerys Creek, it is probable that areas identified for associated urban development would become a lower priority. Conversely, the development of an airport at Badgerys Creek would likely increase demand for urban development, including residential, commercial uses and associated infrastructure. The impact of an airport at Badgerys Creek on long term metropolitan planning strategies can be summarised as:

- potential impacts on environmental sensitivity of the area, which would need to be resolved;
- potential support for metropolitan strategy principle of a more compact city through the more efficient use of infrastructure and development of communities based on urban village concepts; and
- effective implementation and coordination across all levels of government to manage urban development associated with an airport at Badgerys Creek.

Overall, development of a Second Sydney Airport at Badgerys Creek supports long term metropolitan and regional planning strategies for the region, in conjunction with other regional initiatives, such as those advocated by the Greater Western Sydney Economic Development Board.

The main impacts on long term planning of the area are associated with the need to redistribute urban release areas, identified in the urban development program so as to avoid undue aircraft noise.

The decision to retain the Holsworthy Military Area for Defence purposes has formed the basis for long term metropolitan planning in this area over the past decade. The structure of urban development including infrastructure provision reflects this.

While the development of an airport at the Holsworthy Option A site is likely to link well with established urban areas of Liverpool and Campbelltown, the development of Holsworthy Option B could potentially result in the need for significant infrastructure provision which would be expected to act as a catalyst for further urban development in the southern fringes of the Sydney region.

If this was so, a shift in the current metropolitan strategy would be required to redirect the focus of urban development from Liverpool and Fairfield to the south Campbelltown area.

While the *Macarthur South Regional Environmental Study* (Department of Planning, 1991d) explores the development potential of that particular region, the capacity of this area to accommodate urban development would need to be reviewed in detail.

The current zoning of the Holsworthy Military Area does not permit an airport. Rezoning of the site would not be required for use of Commonwealth land for a Commonwealth purpose.

## 14.2 RESIDENTIAL

An airport at Badgerys Creek would have minimal impact on the existing established residential areas of Sydney. Similarly, the future residential areas, as advocated in the urban development program, are not directly impacted by airport development.

However, several small communities in the vicinity of the airport site would be adversely affected by Badgerys Creek airport development. The towns of Warragamba, Silverdale, Luddenham and Kemps Creek would all experience aircraft noise in excess of 20 ANEC under Badgerys Creek Options A and B. Under Badgerys Creek Option C, Bringelly village would be noise affected.

There is significant rural residential development within the three local government areas surrounding the airport sites. The distribution of rural residential properties reflects densities much greater than current zonings would indicate and many of these homes would be affected by aircraft noise greater than the 20 ANEC. It appears that land use planning restrictions may be necessary to restrict further rural residential development in noise affected areas.

All the Badgerys Creek airport options present excellent opportunities for new residential development in the form of urban villages with a mixture of residential densities to be built along the proposed rail link to the airport site.

Preliminary analysis has shown that both the airport development and the residential development are necessary for the financial viability of the rail link.

The regional land use scenarios developed to assess the long term land use impacts of the various airport options assume that the urban village development would provide additional impetus to residential demand in the area. Consequently, the population projections developed for the local government areas adjoining the airport (Camden, Liverpool and Campbelltown) have assumed a population at 2016 that is 11,500 greater than the projections from the Department of Urban Affairs and Planning for the same period.

An airport at both Holsworthy Option A and Option B would impact on established residential areas in Campbelltown, Liverpool, Sutherland and Wollongong. In the case of Holsworthy Option A, the communities of Wattle Grove, Macquarie Fields, Glenfield, Ingleburn, Long Point, Heathcote and Helensburgh West are impacted by noise at 20 ANEC or higher. Under Holsworthy Option B the Campbelltown communities of Airds, St Helens Park, Bradbury, Rosemeadow, Ambarvale, Mt Gilead and Glen Alpine are within the 20 ANEC. The Wollongong communities of Helensburgh and Stanwell Park are also within the 20 ANEC of Holsworthy Option B. Possible noise mitigation measures are discussed in *Technical Paper No. 3*. Rural residential development in the Minto Heights, Wedderburn and Kentlyn areas is similarly noise affected by Holsworthy Option B.

The regional land use scenario developed for Holsworthy Option A reflects that there is little opportunity for associated significant urban village development utilising infrastructure and transport corridors developed for the airport. Population projections developed on the basis of Holsworthy Option A are 5,000 people greater than the Department of Urban Affairs and Planning assumptions for 2016.

Under Holsworthy Option B, the long term urban development program areas of Mt Gilead and Menangle Park are potentially noise affected and are not included in the regional land use scenario developed for this option. The development of Holsworthy Option B is assumed to give impetus to the long term residential option of Macarthur South growth area and the regional land use scenario reflects the development of a first stage of that proposal. The population projection developed for the scenario is 5,000 people greater than the Department of Urban Affairs and Planning projections for 2016.

### 14.3 EMPLOYMENT

The employment impacts of a Second Sydney Airport are primarily the same for each option in terms of potential employment generation. It is estimated that a total of 96,752 jobs would be created by a Second Sydney Airport, for both airport related and flow on employment for either the Badgerys Creek or Holsworthy options. The effect that this might have, or the extent to which jobs might transfer from Sydney Airport has not been considered in this Technical Paper.

The requisite area of land to accommodate this employment growth (excluding requirements within terminal buildings themselves) is estimated at approximately 359 hectares by 2016.

For each airport option the main difference in impact arises when the location of this employment land is considered. This is directly related to the amount of commercial land allocated on the Master Plans (Second Sydney Airport Planners, 1997a) for each option and where airport related and flow on employment might be located. This indicates a difference of some 193 hectares, from none allocated for Badgerys Creek Option A to 193 hectares allocated for Badgerys Creek Option B. Allocations for the Holsworthy options are 58 and 50 hectares for Holsworthy Options A and B respectively. This is important, since it determines the amount of airport related employment which might be located within the airport site and the subsequent requirement within the wider employment catchment.

As a result, demand for land within the employment catchment areas varies dependent on the airport option. The demand for employment land within the catchment area would therefore be greatest for Badgerys Creek Option A, and least for Badgerys Creek Option B, whereby this would need to be accommodated on existing or new employment land. Such a site has been previously identified on the former CSIRO site, north of Badgerys Creek (Taskforce on Planning for the Sub-Region Surrounding Sydney West Airport, 1996). Alternatively, opportunities for additional employment development might present themselves if the rail link to Badgerys Creek is pursued.

This means that within the employment catchment, Badgerys Creek Option A will have a greater impact on the overall supply of employment land than for Options B and C, and Holsworthy Options A and B assuming no further employment land is designated.

This needs to be considered in the context of the large areas of vacant employment land which exist within the employment catchment areas and the relatively modest land requirement resulting from all options. Even for the worst case scenario (Badgerys Creek Option A), there is sufficient employment

land to accommodate employment growth within the catchment for the next 15 years.

Sites likely to capture a substantial share of employment growth within the catchment are as follows:

- Erskine Park, Penrith (Badgerys Creek options);
- Prestons/Cross Roads, Liverpool (Badgerys Creek options/Holsworthy Option A);
- Smeaton Grange, Camden (Holsworthy Options A and B);
- Minto/Ingleburn, Campbelltown (Badgerys Creek options/Holsworthy Options A and B);
- Wetherill Park, Fairfield (Badgerys Creek options);
- North Penrith, Penrith (Badgerys Creek options); and
- Huntingwood/Arndale Park/Glendenning, Blacktown (Badgerys Creek options).

In accordance with State Government policy, a proportion of the employment growth within the catchment is also assumed to locate within established commercial centres. For Badgerys Creek these are Liverpool, Campbelltown, Parramatta, Blacktown and Penrith and for Holsworthy Options A and B, Campbelltown, Blacktown and Liverpool.

The employment generated from a Second Sydney Airport would have little overall effect on the supply of employment land within the employment catchment, and throughout Sydney, for all airport options. The increase in employment within each catchment would have positive repercussions, as demonstrated by the flow on affects to the rest of the Sydney region, and within the catchment itself, as demand for other services and facilities are created.

## 14.4 SPECIAL AND NOISE SENSITIVE USES

Impacts upon special land uses on or in the vicinity of the Badgerys Creek airport sites would be negligible. The two communication stations within the site will be relocated before the end of the decade and the University of Western Sydney mills cross radio telescope is to be relocated within the next three months.

The Elizabeth Drive Waste Disposal is a non-putrescible site and would be unaffected by the airport development.

Details of impacts upon Defence interests in the area are presented in the *Interim Report of the Department of Defence* (Department of Defence, 1997b).

The major special land use in the vicinity of the Holsworthy Military Area is the Australian Nuclear Science and Technology Organisation 10MW Nuclear Research Reactor at Lucas Heights. Detailed analysis of the impacts of the proposed airport on this facility are discussed in *Technical Paper No. 10*.

## 14.5 OPEN SPACE AND ENVIRONMENT PROTECTION

All airport options impact to a degree on areas of local and regional open space and environment protection. The greatest impacts on areas of local open space occurs where noise infringes on existing urban areas. Consequently, the Holsworthy options would have a greater impact than the Badgerys Creek options, and in turn, Holsworthy Option B would have a greater impact than Option A.

Several areas of regional open space and recreation would be impacted by the proposed Second Sydney Airport at either site. For Badgerys Creek Options A and B the Bents Basin State Recreation Area and Warragamba Special Areas are both located within the 20 ANEC. In addition, the Blue Mountains National Park and the Nattai, Wollemi and Kangara Boyd National Parks would also be impacted upon to some degree by increased noise.

Holsworthy Option A would impact upon Heathcote and Royal National Parks, both of which are located within the 20 ANEC. A major recreational facility, the Stanwell Park hang gliding club at Bald Hill, would also experience adverse impacts, being located directly under the flight paths of the main parallel runways and cross wind runway for this option.

For Holsworthy Option B, the Garawarra State Recreation Area, the Woronora Dam Catchment Area and Mount Annan Botanic Garden are located within the 20 ANEC. The Stanwell Park hang gliding area would also be impacted (as specified above).

In some cases, especially where major facilities are located within the 20 ANEC or higher, visitation to these areas might experience some decline. This applies to the Bents Basin State Recreation Area, the Warragamba Special Area (Badgerys Creek Options A and B) and the Heathcote National Park (Badgerys Creek Option A).



# References

## REFERENCES

ADI Limited and Lend Lease Development (1996), *ADI St Mary The Environmental and Urban Development Masterplan, A Major Contribution to Regional Conservation and Better Urban Outcomes*.

Airservices Australia (1996), *The Long Term Operating Plan for Sydney (Kingsford Smith) Airport and Associated Airspace - Report Summary*, Commonwealth of Australia, Canberra.

Australian Bureau of Statistics (1991) *CDA91 - 1991 Census Data*, Australian Bureau of Statistics, Sydney.

Australian Bureau of Statistics (1996), *Labour Force: New South Wales and Australian Capital Territory*, ABS Catalogue No. 6201.1.

Australian Bureau of Statistics (1997), *Estimated Resident Population of Statistical Local Areas, New South Wales at 30 June*, Australian Bureau of Statistics Catalogue No. 3210.1.

Blacktown City Council, *Growing With Pride*.

Blacktown City Council (1988), *Blacktown Local Environment Plan 1988*. October, 1988.

Blacktown City Council (1992), *Development Control Plan, Development in the Industrial Zones*, 1992.

Blacktown City Council (1995), *Blacktown Development Control Plan, 1992 (Amendment No. 15)*. October, 1995.

Camden Council (1992), *Camden Local Environmental Plan No. 48*.

Campbelltown Council (1974), *Campbelltown Interim Development Order No. 13*.

Campbelltown Council (1974), *Campbelltown Interim Development Order No. 15*.

Campbelltown Council (1977), *Campbelltown Interim Development Order No. 21*.

Campbelltown Council (1977), *Campbelltown Interim Development Order No. 23*.

Campbelltown Council (1978), *Campbelltown Interim Development Order No. 24*.

Campbelltown Council (1978), *Campbelltown Interim Development Order No. 28*.

Campbelltown Council (1980), *Campbelltown Interim Development Order Integrated Transport Strategy 26*.

Campbelltown Council (1980), *Campbelltown Interim Development Order No. 29*.

Campbelltown Council (1980), *Campbelltown Interim Development Order No. 32*.

Campbelltown Council (1981), *Campbelltown Local Environmental Plan No. 1*.

Coalition of Liberal and National Parties (1996), *Putting People First, Coalition Policy on Sydney Airport and Sydney West Airport*, Commonwealth of Australia, Canberra.

Connell Wagner (1997), *Regional Infrastructure*, report prepared for Airplan, Airplan, 1997.

Cumberland County Council (1948), *The Planning Scheme for the County of Cumberland NSW*. Report to The Honourable JJ Cahill, Minister for Local Government, 27 July, 1948.

Department of Defence (1995), *Australian Defence Force Family Census*, Department of Defence, Canberra.

Department of Defence (1997a), *Future Directions for the Management of Australia's Defence: Report of the Defence Efficiency Review*, Department of Defence, Canberra, March 1997.

Department of Defence (1997b), *Impact on Defence of the Second Sydney Airport Proposal, Interim Report*, Department of Defence, May 1997, Canberra.

Department of Employment, Education, Training and Youth Affairs (1996), *Australian Regional Labour Markets*, Number 77, December Quarter 1996.

Department of Environment and Planning (1986), *Macarthur Regional Environmental Study*, Department of Environment and Planning, Sydney.

Department of Housing and Urban Development (South Australia) (1994), *Human Services Planning Kit*.

Department of Planning (1973), *The New Cities of Campbelltown, Camden and Appin: Structure Plan*, Department of Planning, Sydney.

Department of Planning (1988), *Metropolitan Strategy - Sydney Into its Third Century*, Department of Planning, Sydney.

Department of Planning (1990), *South Western Sydney, A Vision for Environmentally Sensitive Development*, Department of Planning, Sydney.

Department of Planning (1991a), *South Creek Valley Regional Environmental Study*, Department of Planning, Sydney.

Department of Planning (1991b), *South Creek Valley Draft Regional Environmental Plan*. Department of Planning, Sydney.

Department of Planning (1991c), *Employment Monitoring of Commercial Centres and Industrial Areas*. Prepared by JLW Research and Consultancy Pty Ltd.

Department of Planning (1991d), *Macarthur South Regional Environmental Study*, Department of Planning, Sydney.

Department of Planning (1992), *Revised South Western Sydney Strategy*, Department of Planning, Sydney.

Department of Planning (1993a), *Sydney Regional Environmental Plan No. 20 - Hawkesbury Nepean River*. Department of Planning, Sydney.

Department of Planning (1993b), *Sydney Regional Environmental Plan No. 27 - Wollondilly Regional Open Space*. Department of Planning, Sydney.

Department of Planning (1993c), *Sydney's Future: A Discussion Paper on Planning the Greater Metropolitan Region*, Department of Planning, Sydney.

Department of Planning (1994), *Population Projections: Non-metropolitan Local Government Areas in New South Wales 1991-2021*, 1994 Revision.

Department of Planning (1995), *Cities for the 21st Century*, Department of Planning, Sydney.

Department of Transport (NSW) (1995), *Integrated Transport Strategy for the Greater Metropolitan Region*, NSW Government Printer.

Department of Transport and Regional Development (1996), *Location and Development of the Second Sydney Airport, The Proposal*, 5 August 1996, Sydney West Airport Taskforce, Canberra.

Department of Urban Affairs and Planning (1995a), *Population Projections, Sydney Region Local Government Areas 1991-2021*, 1995 Revision.

Department of Urban Affairs and Planning (1995b), *Hawkesbury Nepean Draft Environmental Planning Strategy*, Department of Urban Affairs and Planning, Sydney.

Department of Urban Affairs and Planning (1995c), *Journey to Work - Journey to Work in the Greater Metropolitan Region - 1991 Data Analysis Economic Aspects of Metropolitan Planning*: Technical paper, 1995

Department of Urban Affairs and Planning (1995d), *State of the Region: A review of recent trends and their strategic planning implications for the Sydney - Newcastle - Wollongong Greater Metropolitan Region in 1995*, published 1996).

Department of Urban Affairs and Planning (1996a), *Employment and Industrial Lands Development Program (1988-1996)*, Department of Urban Affairs and Planning, Sydney.

Department of Urban Affairs and Planning (1996b), *Sydney Residential Land - Urban Development Program - 1996 Regional Consultations*, Department of Urban Affairs and Planning, Sydney.

Department of Urban Affairs and Planning (1996c), *Sydney Residential Land Urban Development Program - The 1995/96-1999/2000 Program*, Department of Urban Affairs and Planning, Sydney.

Department of Urban Affairs and Planning (1996d), *Population Trends: A Review of Recent Population Trends in New South Wales*, Number 15, 1996.

Department of Urban Affairs and Planning (1996e), *State of the Region - A Review of Recent Trends and Their Strategic Planning Implications for the Sydney-Newcastle-Wollongong Greater Metropolitan region in 1995*, 1996.

Environment Protection Authority (1996), *Metropolitan Air Quality Study*, 1996.

Fairfield City Council, *Smithfield, Wetherill Park - Sydney West's Industry Centre*.

Federal Airports Corporation (1995), *Airport Engineering Innovation, Best Practice and the Environment*, October 1995.

Formby J. (1988), *Social Impact Assessment in Australia: Institutional Constraints and Possibilities for Change*, in Hindmarsh, Hindloe, McDonald and Rickson (Eds) 1988, *Papers in Assessing the Social Impacts of Development*, Conference held by Institute of Applied Environmental Research, Griffith University, Brisbane.

Greater Western Sydney Economic Development Board (1997), *Australia Starts There - for Investment Profile*.

Greater Western Sydney Economic Development Board Investment Profile (1997),

Hassall and Associates (1997), *Draft Agricultural Impact - Second Sydney Airport Environmental Impact Statement*. Prepared for Rust PPK, March 1997.

Illawarra Regional Information Service (1997), *A Statistical Guide to the Illawarra Region*.

Institute of Transport Studies University of Sydney (1993), *Economic Significance of Sydney Airport*, prepared for the Federal Airports Corporation.

Institute of Transport Studies University of Sydney (1996), *Economic Significance of Sydney (Kingsford Smith) Airport Final Report*, prepared for Federal Airports Corporation, Sydney.

Institute of Transport Studies University of Sydney (1997), *Report on the Economic Significance of Sydney International Airport*.

Kinhill Stearns (1985), *Second Sydney Airport, Site Selection Programme, Draft Environmental Impact Statement*, Kinhill Stearns and the Department of Aviation.

Kinhill (1990), *Draft Environmental Impact Statement - Proposed Third Runway Sydney (Kingsford-Smith) Airport*, Federal Airports Corporation.

Liverpool and Penrith City Councils (1993), *Accelerating the Development of Badgerys Creek Airport: The Freight Option and New Policy Initiatives*, November, 1993.

Liverpool City Council (1972), *Liverpool Planning Scheme Ordinance 1972*.

Liverpool City Council (1974), *Liverpool Interim Development Order, 1974*.

Liverpool City Council (1994a), *An Analysis of Supply and Demand of Industrial Land in Liverpool*, Draft Report, November 1994.

Liverpool City Council (1994b), *Liverpool Rural Lands Study*, prepared for Liverpool City Council by Don Fox Planning Pty Ltd, May 1994.

Liverpool City Council (1995a), *Population Estimates for Liverpool Local Government Area*.

Liverpool City Council (1995b), *Section 94 Contributions Plan No. 6 Cabramatta Creek, Carnes Hill and Prestons*.

Longworth and McKenzie (1986), *Survey of Existing and Potential Recreational Uses of the Water Board's Catchments and Storages* (for Metropolitan Water Sewerage and Drainage Board).

Manidis Roberts Consultants (1990), *Hoxton Park Stage II Release Area Open Space Strategy*.

Minister for Transport and Regional Development (1996), *Media Release, "Environmental Impact Statement for Holsworthy"*, 21 May, 1996.

Mitchell McCotter (1992), *Section 94 Study for Commercial and Industrial Development*. Prepared for Botany Municipal Council.

National Institute for Economic and Industry Research and Economic and Energy Analysis (1996), *Sydney West Airport Sub-Region Employment and Economic Development Strategy*.

National Parks and Wildlife Service (1988), *Blue Mountains National Park. Draft Plan of Management*. National Parks and Wildlife Service, Hurstville.

National Parks and Wildlife Service (1994a), *Royal National Park, Heathcote National Park and Garawarra State Recreation Area. Draft Plan of Management*. National Parks and Wildlife Service, Hurstville.

National Parks and Wildlife Service (1994b), *Visits to National Parks and Wildlife Areas 1994 Data*, National Parks and Wildlife Service, Hurstville.

National Parks and Wildlife Service (1995a), *The Nattai Reserves System. Draft Plan of Management*. National Parks and Wildlife Service, Hurstville.

National Parks and Wildlife Service (1995b), *Thirlmere Lakes National Park. Draft Plan of Management*. National Parks and Wildlife Service, Hurstville.

Pacific Power (1992), *Relocation of Sydney West to Yass 330 kV Transmission Line - Preliminary Study*, prepared for Department of Transport and Communications, Sydney.

Peddle Thorpe Architects (1995), *Liverpool Area Master Plan*, January 1995.

Penrith City Council (1990), *Local Environmental Plan 201 (Rural Lands)*.

Penrith City Council (1994a), *Penrith Development Control Plan, 1994 (Industrial Lands)*.

Penrith City Council (1994b), *Draft Penrith Local Environmental Plan 1994 (Industrial Lands)*.

Penrith City Council (1995), *Mt Vernon Estate Section 94 Contributions Plan*.

Penrith City Council (1997), *Register of Industrial Land*.

PPK Environment & Infrastructure (in preparation), *Western Sydney Orbital - Prestons to Cecil Park Environmental Impact Statement*, for the NSW Roads and Traffic Authority and Commonwealth Department of Transport and Regional Development, Sydney.

Roads and Traffic Authority (NSW) (1994), *The Draft State Road Network Strategy*, Roads and Traffic Authority, Sydney.

Roseth J. (1988), "Housing and People in the Sydney Region: Review on Prognosis", in *Planner* Vol. 3, No. 7 December 1988, pp25-28.

Rust PPK (1995), *Elizabeth Drive Environmental Impact Statement: Upgrade of Elizabeth Drive from East of Mamre Road to Luddenham Road*, prepared for NSW Roads and Traffic Authority/Commonwealth Department of Transport.

Second Sydney Airport Planners (1997a), *Second Sydney Airport Planning and Design*, prepared for the Commonwealth Department of Transport and Regional Development.

Second Sydney Airport Planners (1997b), *Regional Infrastructure Report*, prepared for the Commonwealth Department of Transport and Regional Development.

Senate Select Committee on Aircraft Noise in Sydney (1995), *Falling on Deaf Ears? Report of the Senate Select Committee on Aircraft Noise in Sydney*, Commonwealth of Australia.



Sinclair I, "Planning on the Rural - Urban Fringe, paper presented by Ian Sinclair, Manager Strategic Planning, Wollondilly Shire Council, University of NSW School of Town Planning, Planning Law and Practice Short Course, November 1994.

Sinclair Knight/Bechtel Aviation (1990), *Sydney Airport Draft Planning Strategy, Working Papers 2-6*, April 1990, for the Federal Airports Corporation.

Sinclair Knight Merz (in preparation), *Western Sydney Orbital - Cecil Park to West Baulkham Hills Environmental Impact Statement*, for the NSW Roads and Traffic Authority and Commonwealth Department of Transport and Regional Development, Sydney.

Snowy Mountains Engineering Corporation (1995), *Water Cycle Management Plan: Sydney West Airport Sub-Region, Draft Final Report*.

Standards Association of Australia (1994), *Australian Standard 2021-1994, Acoustics-Aircraft Noise Intrusion - Building Siting and Construction*, Standards Association of Australia.

Stanwell Park Hang Gliding Club (1997), prepared for Rust PPK.

State Planning Authority (1968), *Sydney Region Outline Plan*, State Planning Authority, Sydney.

State Rail Authority (NSW) (1994), *State Rail Strategic Plan 1994-2016*, CityRail, Sydney.

Sutherland Shire Council (1996a), *Sutherland Shire Local Environmental Plan, 1993 (as amended)*.

Sutherland Shire Council (1996b), *Sutherland Shire Housing Strategy 1996-2011*.

Sydney Water (1997), *Assessment of Recreational Access in Sydney Water Special Areas*. Sydney Water Corporation, Sydney South.

Sydney West Airport Sub-region Taskforce (1995), *Sydney West Airport Sub-Region Strategic Plan Final Report*, July 1995.

Symonds Travers Morgan and MSJ Keys Young (1996), *Sydney West Airport Sub-Region Integrated Transport and Urban Design Strategy*, June 1996.

Taskforce on Planning for the Sub-Region Surrounding Sydney West Airport (1995), *Sydney West Airport Subregion Strategic Plan Stage 1 Investigations, Final Report*, July 1995.

Taskforce on Planning for the Sub-Region Surrounding Sydney West Airport (1996a), *Sydney West Airport Draft Strategic Plan*, April 1996.

Taskforce on Planning for the Sub-Region Surrounding Sydney West Airport (1996b), *Sydney West Airport Sub-Region Employment and Economic Development Strategy*, prepared by National Institute for Economic and Industry Research and Economic and Energy Analysis.

Travers Morgan (1995), *Sydney West Airport Rail Link: Financial and Economic Evaluation*.

UBD (1993), Map 252 Sydney Western Section 11th Edition (UBD, Macquarie Park).

Western Sydney Regional Organisation of Councils (1995), *Draft Transport and Industry in Western Sydney*, December 1995.

Wilkinson Murray (1997), *Noise Technical Paper 9 - Second Sydney Airport Environmental Impact Statement*, Rust PPK, Sydney.

Wolfe (1983), *Social Impact Assessment*, in Finsterbusch, K. and Wolfe, CP (Eds), 1977, *Methodology of Social Impact Assessment*, Dowden, Hutchinson and Ross, Pennsylvania.

Wollondilly Council (1991), *Wollondilly Local Environmental Plan 1991*.

Wollondilly Shire Council (1996), *Wollondilly Draft Residential Development Strategy, A Growth Management Concept*, December 1996.

Wollongong City Council (1990), *Wollongong Local Environmental Plan 1990*.

Wollongong City Council (1995), *Wollongong Profile. A Data Base for Community Planning*. Wollongong City Council, Wollongong.

# Appendices

## **Appendix A**

---

QASCO Photogrammetry  
Methodology

## Appendix A

### QASCO Photogrammetry Methodology

As part of the planning and land use study undertaken for the Second Sydney Airport EIS, QASCO, a company specialising in surveying, mapping, land information systems and aerial photography was commissioned to undertake photogrammetry for the areas defined as the Community Assessment Areas. A description of the methodology used for this photogrammetry to estimate the number of existing residential dwellings and other special uses is described below.

#### Scope of Work

The scope of work undertaken by QASCO to complete this exercise was confined to the boundaries of the Community Assessment Areas as defined in *Chapter 3*. Using photogrammetry QASCO were to categorise data obtained from aerial photographs into the following categories:

- residential dwellings;
- residential multi-dwellings;
- educational institutions;
- churches;
- hospitals;
- retirement villages; and
- nursing homes.

The detailed methodology of how this data was obtained is as follows.

#### Methodology

1. The most recently available photography for the area of study (that is the Community Assessment Areas) was obtained at a scale of 1:50,000. The date of the photography used for these areas differs slightly depending on whether existing photography was available or whether additional photography was needed to be re-flown. The dates of the photography used ranged from 30 January 1996 to 15 January 1997. The necessary prints and diapositives of this photography were then obtained to assist in the photogrammetry.

2. The first step in the mapping process was aerial triangulation. The purpose of triangulation is to ensure that all photography is related to the same coordinate system. While no ground control was undertaken for this exercise it is considered appropriate that each photographic model be related to the scale coordinates from the Land Information Centre topographical mapping on as accurate a basis as is possible without obtaining new ground control. This is the mapping information used in the Geographic Information System developed for this Draft EIS. The results of the triangulation showed variations over the total study area of up to seven metres.
3. Following triangulation and using cultural data as supplied by the Land Information Centre, various models were set in a stereoplotter. As both sets of data were based on the same coordinate system (Australian Map Grid Coordinates) it was evident immediately that there was a good correlation between the cultural data and the triangulation results.
4. Extraction of the data on an individual basis was then undertaken. As outlined previously there were seven categories of data collected including residential dwellings (detached), residential dwellings (multiple), educational institutions, churches, hospitals, retirement villages and nursing homes. In some areas it was possible to identify an individual dwelling as part of a larger complex. This was possible by identifying separate backyards etc. Where it was possible to make such an identification the dwelling was categorised as residential dwelling (detached). Where it was obvious that there were multiple dwellings, however these were in an apartment or unit block it was not possible to specify the individual number of units in each complex. Where this was the case the dwelling was labelled as only one multi-dwelling.
5. Prior to the commencement of data collection each specialist photogrammetric operator was provided with a copy of the most recent Sydney street guide. This document together with the specialists own photo interpretation knowledge was used as a basis for completion of the mapping and allocation of land use categories.
6. Quality assurance of the data provided by QASCO was undertaken by relevant personnel of Rust PPK to ensure that the entire coverage was mapped and also that the data was provided in the correct categories.
7. Additional data on some special uses and an extra category - child care - that could not be identified by photogrammetry was then entered into the data base by Rust PPK. This data was obtained by examining Council community profiles and other information supplied by Councils and also by examining NSW government lists of state and private schools; state and private hospitals; registered nursing homes, retirement villages and child care/daycare centres. These lists were considered to represent the best available information and the data only reflects that included on these lists. They are as follows:

- NSW Department of School Education (1996), *Directory of Government Schools in NSW*.
- Catholic Education Commission NSW (1996), *Directory of Catholic Schools and Colleges in NSW and ACT*.
- The Association of Independent Schools of NSW Limited (1997), *Independent Schools in NSW*.
- List of Technical and Further Education (TAFE) Colleges in the Yellow Pages (1997, p.2,777).
- Universities Admissions Centre (1997), *Universities Admission Centre Guide - List of Tertiary Institutions*.
- Camden Council (1996), *Community Directory*.
- Wollondilly Shire Council (1997), *Community Directory*.
- Bankstown Council (1996), *Community Directory*.
- Fairfield City Council (1993), *Community Services Directory*.
- Wollongong Council (1997), *Community Information Directory, Volumes 1 and 2*.
- Blue Mountains Council (1997), *Community Directory*.
- Blacktown City Council (1996), *Community Information Directory*.
- Liverpool Community Aid and Resource Centre (1992), *Community Directory*.
- Sutherland Shire council (1996), *Community Directory*.
- Campbelltown City Council (1997), *Campbelltown Community Information*.
- Holroyd City Council (1996/97), *Holroyd Community Services Directory*.
- NSW Health Department (1996), *Public Hospitals in NSW*.
- NSW Health Department (1996), *Licensed Establishments - List of Nursing Homes, Private Hospitals and Day Procedure Centres Licensed at 1 July, 1996*.
- Lady Gowrie Corporation Child Care Advisory Service (1996), *Child Care/ Kindergarten List* (referred to by NSW Department of Community Services).

### **Accuracy of Data**

The final level of accuracy of the data collected is commensurate with and equal to both the existing 1:100,000 topographic mapping and cultural data supplied by the Land Information Centre. No ground survey was undertaken for this exercise as the new data fitted very well with the existing data. In view of the relationship of the two sets of data, the results obtained within the triangulation process are an indication of the overall accuracy obtained. That is, the area of variation could be up to seven metres across the study area.

The additional data on special uses was input differently into the Geographic Information Systems database and as such it is not as spatially accurate as the work undertaken by QASCO. For the purposes of this study however, all data is located accurately enough to aggregate it into the correct Community Assessment Area for noise assessment purposes.





Indicates density of dwellings in 1996

Figure A1  
Example of QASCO Photogrammetry Output



0Km 1Km

## **Appendix B**

---

Regional Open Space and  
Recreational Facilities

TABLE B1 RECREATIONAL FACILITIES AND OPEN SPACE FOR LOCAL GOVERNMENT AREAS WITHIN THE SECOND SYDNEY AIRPORT ASSESSMENT REGION

Local Government Area	Active Recreation Facilities <sup>2</sup>	Passive Recreation Facilities <sup>1</sup>		Total
		Council-Managed Open Space <sup>3</sup>	Major Non-Council Open Space <sup>4</sup>	
Auburn	9	10		19
Bankstown	52	241	102	395
Blacktown		104		104
Blue Mountains	55			55
Camden		102	4	106
Campbelltown	403	260		663
Fairfield		33		33
Holroyd	64	214	29	307
Hurstville	42			42
Liverpool	115	280	2	397
Parramatta	35	319	7	361
Penrith	155	284	1	440
Sutherland	116	900	40	1,056
Wollondilly	83	102	3	188
Wollongong	44	383	9	436

## Notes:

1. Omissions signify where details were not available.
2. Includes indoor sports centres, tennis courts, swimming pools etc.
3. Local open space under council management.
4. Open space areas such as National Parks, State Recreation Areas, golf courses, school sports fields, university grounds, Military Reserves.

TABLE B2 OPEN SPACE AND MAJOR RECREATIONAL FACILITIES: BADGERYS CREEK

Classification	Management Body	Name	Suburb	Local Government Area
<b>Badgerys Creek Open Space</b>				
<b>Local</b>				
Council-managed parks and reserves	Liverpool City Council	Craik Park	Austral	Liverpool
	Liverpool City Council	Scott Park	Austral	Liverpool
	Liverpool City Council	Bringelly Recreation Reserve	Bringelly	Liverpool
	Liverpool City Council	Soccer field	Cecil Park	Liverpool
	Liverpool City Council	Bill Anderson Reserve	Kemps Creek	Liverpool
	Liverpool City Council	Ramsay Rd Reserve	Kemps Creek	Liverpool
	Liverpool City Council	Operett Park	Kemps Creek	Liverpool
	Liverpool City Council	Sales Park	Luddenham	Liverpool
	Liverpool City Council	Luddenham Showground	Luddenham	Liverpool
	Liverpool City Council	Luddenham Park	Luddenham	Liverpool
	Liverpool City Council	Freeburn Park	Luddenham	Liverpool
	Liverpool City Council	Rossmore Park	Rossmore	Liverpool
	Liverpool City Council	Rossmore Grange	Rossmore	Liverpool
	Liverpool City Council	Carrington Park	West Hoxton	Liverpool
	Liverpool City Council	Godfrey Park	West Hoxton	Liverpool
	Penrith City Council	Blaxlands Crossing Reserve	Wallacia	Penrith
	Penrith City Council	Reserve	Wallacia	Penrith
	Private	Wallacia Golf Course	Wallacia	Penrith
	Private	Glenmore Heritage Valley Golf Course	Mulgoa	Penrith
<b>Regional</b>				
National Parks and State Recreation Area	NSW National Parks and Wildlife Service	Thirlmere Lakes		Wollondilly
		Blue Mountains		Blue Mountains
		Nattai		Wollondilly
		Wollemi		
		Kanangra-Boyd		
		Bargo		Wollondilly
		Yerranderie		Wollondilly
		Burraborang		Wollondilly
		Nattai		Wollondilly
		Bents Basin		Wollondilly, Liverpool

Classification	Management Body	Name	Suburb	Local Government Area
Nature Reserves		Kemps Creek Nature Reserve <sup>1</sup>	Kemps Creek	Liverpool
		Mulgoa Nature Reserve <sup>1</sup>	Mulgoa	Penrith
Public Gardens	Royal Botanic Gardens, Sydney (NSW Department of the Environment)	Mount Annan Botanic Garden	Mount Annan	Camden
Water Catchments	Sydney Water	Warragamba Special Area	(NA)	Wollondilly
<b>Badgerys Creek Major Recreational Facilities</b>				
Aerodrome		Camden Aerodrome	Cobbitty	Camden
Leisure Centres	Liverpool City Council	Whitlam Leisure Centre	Liverpool	Liverpool
		Michael Wender Aquatic & Recreation Centre	Miller	Liverpool
Racecourses	Australian Jockey Club	Warwick Farm Racecourse	Warwick Farm	Liverpool
Waterways		Hawkesbury-Nepean River	Various	Camden, Liverpool, Penrith
		Warragamba Dam	Warragamba	Wollondilly
		Penrith Lakes Scheme	Penrith	Penrith
		Long Neck Lagoon	?	?

Notes:           1.       Proposed open space.

TABLE B3 REGIONAL OPEN SPACE AND MAJOR RECREATIONAL FACILITIES: HOLSWORTHY MILITARY AREA

Classification	Management Body	Name	Suburb	Local Government Area
National Parks	NSW National Parks and Wildlife Service	Georges River		Sutherland, Hurstville, Bankstown
		Royal		Sutherland
		Heathcote		Sutherland
		Botany Bay		Sutherland
State Recreation Areas	NSW National Parks and Wildlife Service	Garawarra		Sutherland
		Dharawal		Campbelltown, Wollondilly, Wollongong
Public Gardens	Royal Botanic Gardens, Sydney (NSW Department of the Environment)	Mount Annan Botanic Garden	Mount Annan	Camden
Water Catchments	Sydney Water	Woronora Special Area	NA	Campbelltown, Sutherland, Wollongong
		O'Hares Creek Special Area	NA	Campbelltown, Sutherland, Wollongong
		Devines Weir Special Area	NA	Wollondilly
		Metropolitan Special Area	NA	Wollongong, Wingecarribee, Wollondilly
Holsworthy Major Recreational Facilities				
Aerodrome		Camden Aerodrome	Cobbitty	Camden
Waterways	Maritime Services Board, Liverpool, Fairfield, Hurstville and Sutherland Councils, NSW National Parks & Wildlife Service	Georges River	Various	Liverpool, Fairfield, Hurstville and Sutherland
	Liverpool City Council, Fairfield City Council	Chipping Norton Lakes Scheme		Liverpool, Fairfield

Classification	Management Body	Name	Suburb	Local Government Area
Sports Centres	Campbelltown City Council	Eagle Vale Leisure Centre	Eagle Vale	Campbelltown
		Macquarie Fields Indoor Sporting Complex	Macquarie Fields	Campbelltown
		Campbelltown Swimming Centre	Campbelltown	Campbelltown
		Campbelltown-Airds Indoor Sports Centre	Campbelltown	Campbelltown
		Campbelltown City Council Bicycle Education Centre	Campbelltown	Campbelltown
	Racecourses	Menangle Park Paceway	Menangle Park	Campbelltown

## **Appendix C**

---

Badgerys Creek: Properties Within  
Proposed Airport Options B and C



TABLE C1 BADGERYS CREEK - PROPERTIES WITHIN AIRPORT OPTIONS B AND C

Ref No. <sup>1</sup> (Refer to Figure C1)	Property Description	Area of Property	Option B	Option C	Part Acquisition Option B	Part Acquisition Option C
1	Lot 106 DP 846962	42.480 hectares		✓		
2	Lot 281 DP 571171	10.78 hectares		✓		
3	Lot 1 DP 623799	10.380 hectares		✓		
4	Lot 3 DP 623799	19.090 hectares		✓		
5	Lot 2 DP 623799	10.120 hectares		✓		
6	Lot 1 DP 1451	6.847 hectares		✓		
7	Lot 7 DP 250030	10.170 hectares		✓		
8	Lot 6 DP 250030	10.170 hectares		✓		
9	Lot 2 DP 851626	91.500 hectares	✓		✓	
10	Lot 20 DP 258581	10.110 hectares	✓			
11	Lot 15 DP 258581	10.110 hectares	✓			
12	Lot 16 DP 258581	10.110 hectares	✓			
13	Lot 21 DP 258581	10.110 hectares	✓			
14a	Lot 22 DP 258581	10.110 hectares	✓			
14b	Lot 17 DP 258581	10.110 hectares	✓			
14c	Lot 23 DP 259698	10.110 hectares	✓			
14d	Lot 33 DP 259698	10.110 hectares	✓			
14e	Lot 32 DP 259698	10.110 hectares	✓			
14f	Lot 14 DP 2650	4.047 hectares	✓	✓		
14g	Cnr Lot 2 Section C DP 1451	4.628 hectares		✓		
14h	Lot 2 DP 208160	8.684 hectares		✓		
14i	Lot 1 DP 208160	0.11 hectares		✓		
14j	Lot 1 DP 109666	220.2 hectares		✓		✓
14k	Lot 1 DP 90328	114.9 hectares		✓		
14L	Lot 1 DP 851626	11.918 hectares	✓	✓		
15	Lot 24 DP 259698	10.110 hectares	✓			
16	Lot 25 DP 259698	10.110 hectares	✓			
17	Lot 28 DP 259698	10.110 hectares	✓			
18	Lot 27 DP 259698	10.110 hectares	✓			
19	Lot 26 DP 259698	10.110 hectares	✓			
20a	Lot 102 DP 812653	13.620 hectares		✓		
20b	Lot 103 DP 812653	185.9 hectares	✓	✓	✓	✓
20c	Lot 104 DP 812653	329 hectares	✓	✓	✓	✓
21	Lot 92 DP 27550	2.220 hectares	✓	✓		
22	Lot 93 DP 654182	2.195 hectares	✓	✓		
23	Part Lot 94 DP 27550	2.092 hectares	✓	✓		
24	Lot 95 DP 27550	1.991 hectares	✓	✓		
25	Lot 91 DP 27550	2.540 hectares	✓	✓		
26	Lot 90 DP 27550	2.342 hectares	✓	✓		

Ref No. <sup>1</sup> (Refer to Figure C1)	Property Description	Area of Property	Option B	Option C	Part Acquisition Option B	Part Acquisition Option C
27	Lot 89 DP 27550	2.169 hectares	✓	✓		
28	Lot 88 DP 27550	2.025 hectares	✓	✓		
29	Lot 87 DP 27550	2.025 hectares	✓	✓		
30	Lot 86 DP 27550	2.025 hectares	✓	✓		
31	Lot 85 DP 27550	2.025 hectares	✓	✓		
32	Lot 84 DP 27550	2.025 hectares	✓	✓		
33	Lot 83 DP 27550	2.025 hectares	✓	✓		
34	Lot 82 DP 27550	2.025 hectares	✓	✓		
35	Lot 81 DP 27550	2.025 hectares	✓			
36	Lot 80 DP 27550	2.025 hectares	✓			
37	Lot 79 DP 27550	2.025 hectares	✓			
38	Lot 78 DP 27550	2.025 hectares	✓			
39	Lot 77 DP 27550	2.025 hectares	✓			
40	Lot 76 DP 27550	2.065 hectares	✓			
41	Lot 75 DP 27550	2.102 hectares	✓			
42	Lot 74 DP 27550	2.032 hectares	✓			
43	Lot 73 DP 27550	2.124 hectares	✓			
44	Lot 133 DP 27550	2.027 hectares	✓			
45	Lot 132 DP 27550	2.092 hectares	✓			
46	Lot 131 DP 27550	2.092 hectares	✓			
47	Lot 130 DP 27550	2.027 hectares	✓			
48	Lot 129 DP 27550	2.032 hectares	✓			
49	Lot 128 DP 27550	2.031 hectares	✓			
50	Lot 127 DP 27550	2.030 hectares	✓	✓		
51	Lot 126 DP 27550	2.029 hectares	✓	✓		
52	Lot 125 DP 27550	2.028 hectares	✓	✓		
53	Lot 124 DP 656837	2.055 hectares	✓	✓		
54	Lot 123 DP 27550	2.041 hectares	✓	✓		
55	Lot 98 DP 27550	2.291 hectares	✓	✓		
56	Lot 96 DP 27550	2.045 hectares	✓	✓		
57	Lot 97 DP 27550	2.410 hectares	✓	✓		
58	Lot 99 DP 27550	2.102 hectares	✓	✓		
59	Lot 122 DP 27550	2.120 hectares	✓	✓		
60	Lot 121 DP 27550	2.026 hectares	✓	✓		
61	Lot 120 DP 27550	2.049 hectares	✓	✓		
62	Lot 119 DP 27550	2.041 hectares	✓			
63	DP 118 DP 27550	2.026 hectares	✓			
64	Lot 117 DP 27550	2.025 hectares	✓			
65	Lot 116 DP 27550	2.023 hectares	✓			
66	Lot 115 DP 27550	2.032 hectares	✓			

Ref No. <sup>1</sup> (Refer to Figure C1)	Property Description	Area of Property	Option B	Option C	Part Acquisition Option B	Part Acquisition Option C
67	Lot 114 DP 27550	2.035 hectares	✓			
68	Lot 111 DP 27550	2.106 hectares	✓			
69	Lot 110 DP 27550	2.063 hectares	✓			
70	Lot 109 DP 27550	2.061 hectares	✓			
71	Lot 108 DP 27550	2.041 hectares	✓			
72	Lot 107 DP 27550	2.028 hectares	✓			
73	Lot 106 DP 27550	2.028 hectares	✓			
74	Lot 105 DP 27550	2.027 hectares	✓			
75	Lot 104 DP 27550	2.032 hectares	✓			
76	Lot 103 DP 27550	2.042 hectares	✓			
77	Lot 102 DP 27550	2.042 hectares	✓	✓		
78	Lot 101 DP 27550	2.041 hectares	✓	✓		
79	Lot 100 DP 27550	2.123 hectares	✓	✓		
80	Lot 13 DP 2650	4.047 hectares	✓	✓		
81	Lot 121 DP 703911	2.023 hectares	✓	✓		
82	Lot 122 DP 703911	2.023 hectares	✓	✓		
83	Lot 11 DP 2650	4.047 hectares	✓	✓		
84	Lot 10 DP 2650	4.047 hectares	✓	✓		
85	Lot 9 DP 2650	4.047 hectares	✓	✓		
86	Lot 21 DP 634150	2.023 hectares	✓	✓		
87	Lot 20 DP 634150	2.023 hectares	✓	✓		
88	Lot 1 DP 552004	2.023 hectares	✓	✓		
89	Lot 2 DP 552004	2.023 hectares	✓	✓		
90	Lot 6 DP 2650	4.047 hectares	✓	✓		
91	Lot 5 DP 2650	4.047 hectares	✓	✓		
92	Lot 1 DP 250684	2.209 hectares	✓	✓		
93	Lot 2 DP 250684	2.169 hectares	✓	✓		
94	Lot 4 DP 250684	2.023 hectares	✓	✓		
95a	Lot 3 DP 250684	2.167 hectares	✓	✓		
95b	Lot 5 DP 250684	2.024 hectares	✓	✓		
96	Lot 6 DP 250684	2.827 hectares	✓	✓		
97	Lot 17 DP 2650	4.047 hectares	✓	✓		
98	Lot 16 DP 2650	4.047 hectares	✓	✓		
99	Lot 15 DP 2650	4.047 hectares	✓	✓		
100	Lot 14 DP 2650	4.047 hectares	✓	✓		
101	Lot 1 DP 579701	4.255 hectares	✓	✓		
102	Lot 2 DP 579701	3.838 hectares	✓	✓		
103	Lot 11 DP 2650	4.047 hectares	✓	✓		
104	Lot 10 DP 2650	4.047 hectares	✓	✓		
105	Lot 1 DP 580067	2.023 hectares	✓	✓		

Ref No. <sup>1</sup> (Refer to Figure C1)	Property Description	Area of Property	Option B	Option C	Part Acquisition Option B	Part Acquisition Option C
106	Lot 2 DP 580067	2.023 hectares	✓	✓		
107	Lot 30 DP 634876	2.023 hectares	✓	✓		
108	Lot 31 DP 634876	2.023 hectares	✓	✓		
109	Lot 7 DP 2650	4.047 hectares	✓	✓		
110	Lot 6 DP 2650	4.047 hectares	✓	✓		
111	Lot 1 DP 249262	2.023 hectares	✓	✓		
112	Lot 2 DP 249262	2.023 hectares	✓	✓		
113	Lot 3 DP 249262	2.023 hectares	✓	✓		
114	Lot 4 DP 249262	2.023 hectares	✓	✓		
115	Lot 5 DP 249262	2.023 hectares	✓	✓		
116	Lot 6 DP 249262	2.254 hectares	✓	✓		
117	Lot 1 DP 126776	2.024 hectares	✓	✓		
118	Lot 10 DP 249262	2.276 hectares	✓	✓		
119	Lot 11 DP 249262	2.230 hectares	✓	✓		
120	Lot 12 DP 249262	2.280 hectares	✓	✓		
121	Lot 8 DP 249262	2.023 hectares	✓	✓		
122	Lot 9 DP 249262	2.023 hectares	✓	✓		
123	Lot 181 DP 806012	3.989 hectares	✓	✓		
124	Lot 19 DP 2650	4.046 hectares	✓	✓		
125	Lot 20 DP 2650	4.046 hectares	✓	✓		
126	Lot 21 DP 2650	4.046 hectares	✓	✓		
127	Lot 1 DP 247273	2.185 hectares	✓	✓		
128	Lot 1 DP 851877	2.185 hectares	✓	✓		
129	Lot 3 DP 247273	2.185 hectares	✓	✓		
130	Lot 44 DP 581187	2.185 hectares	✓	✓		
131	Lot 45 DP 581187	2.183 hectares	✓	✓		
132	Lot 9 DP 247273	2.124 hectares	✓	✓		
133	Lot 8 DP 247273	2.124 hectares	✓	✓		
134	Lot 7 DP 247273	2.124 hectares	✓	✓		
135	Lot 6 DP 247273	2.122 hectares	✓	✓		
136	Lot 27 DP 2650	4.047 hectares	✓	✓		
137	Lot 28 DP 2650	4.047 hectares	✓	✓		
138	Lot 29 DP 2650	4.047 hectares	✓	✓		
139	Lot 142 DP 625519	12.140 hectares	✓	✓		
140	Lot 141 DP 625519	10.440 hectares	✓	✓		
141	Lot 1 DP 235845	2.999 hectares	✓	✓		
142	Lot 1 DP 234403	1.621 hectares	✓	✓		
143	Lot 2 DP 234403	2.014 hectares	✓	✓		
144	Lot 3 DP 234403	1.998 hectares	✓	✓		
145	Lot 4 DP 234403	3.500 hectares	✓	✓		

Ref No. <sup>1</sup> (Refer to Figure C1)	Property Description	Area of Property	Option B	Option C	Part Acquisition Option B	Part Acquisition Option C
146	Lot 5 DP 234403	2.010 hectares	✓	✓		
147	Lot 6 DP 234403	2.023 hectares	✓	✓		
148	Lot 1 DP 656922	1.483 hectares	✓	✓		
149	Lot 2 DP 235845	2.023 hectares	✓	✓		
150	Lot 3 DP 235845	2.023 hectares	✓	✓		
151	Lot 4 DP 235845	2.023 hectares	✓	✓		
152	Lot 5 DP 235845 (Coal only Lot 1 DP 854083)	2.023 hectares	✓	✓		
153	Lot 6 DP 235845	2.024 hectares	✓	✓		
154	Lot 7 DP 835845	2.245 hectares	✓	✓		
155	Lot 8 DP 835845	2.072 hectares	✓	✓		
156	Lot 9 DP 235845	2.028 hectares	✓	✓		
157	Lot 10 DP 235845	2.030 hectares	✓	✓		
158	Lot 11 DP 235845	2.031 hectares	✓	✓		
159	Lot 12 DP 235845 (Coal only Lot 1 DP 854082)	2.032 hectares	✓	✓		
160	Lot 13 DP 235845	2.034 hectares	✓	✓		
161	Lot 4 DP 584424	2.035 hectares	✓	✓		
162	Lot 3 DP 584424	2.037 hectares	✓	✓		
163	Lot 2 DP 550072	2.039 hectares	✓	✓		
164	Lot 1 DP 550072	2.039 hectares	✓	✓		
165	Lot 8 DP 2650	4.084 hectares	✓	✓		
166	Lot 7 Section 6 DP 2650	4.089 hectares	✓	✓		
167	Lot 6 DP 2650	3.946 hectares	✓	✓		
168	Lot 5 DP 2650	3.348 hectares	✓	✓		
169	Lot 4 DP 2650	2.481 hectares	✓	✓		
170	Lot 1 DP 784803	2.064 hectares	✓	✓		
171	Lot 2 DP 653059	2.071 hectares	✓	✓		
172	Lot 15 DP 255216	11.560 hectares	✓			
173	Lot 14 DP 255216	10.120 hectares	✓			
174	Lot 13 DP 255216	10.120 hectares	✓			
175	Lot 12 DP 255216	10.120 hectares	✓			
176	Lot 11 DP 255216	10.120 hectares	✓			
177	Lot 1/3 DP 576709	40.040 hectares	✓	✓		
178	Lot 2 DP 201966	28.190 hectares	✓	✓		
179	Lot 180 DP 806012	18.729 hectares	✓	✓		
180	Lot 102 DP 628610	5.789 hectares	✓	✓		
181	Lot 20/21 DP 2650	6.109 hectares	✓	✓		
182	Lot 19 DP 2650	3.035 hectares	✓	✓		
183	Lot 18 DP 2650	3.035 hectares	✓	✓		
184	Lot 101 DP 700081	2.023 hectares	✓	✓		

Ref No. <sup>1</sup> (Refer to Figure C1)	Property Description	Area of Property	Option B	Option C	Part Acquisition Option B	Part Acquisition Option C
185	Lot 102 DP 700081	2.023 hectares	✓	✓		
186	Lot 103 DP 700081	2.023 hectares	✓	✓		
187	Lot 1 DP 243539	2.023 hectares	✓	✓		
188	Lot 2 DP 243539	2.023 hectares	✓	✓		
189	Lot 3 DP 243539	2.023 hectares	✓	✓		
190	Lot 4 DP 243539	2.023 hectares	✓	✓		
191	Lot 5 DP 243539	2.023 hectares		✓		
192	Lot 6 DP 243539	2.023 hectares		✓		
193	Lot 6 DP 235917	2.023 hectares		✓		
194	Lot 5 DP 235917	2.023 hectares		✓		
195	Lot 4 DP 235917	2.023 hectares		✓		
196	Lot 3 DP 235917	2.023 hectares		✓		
197	Lot 2 DP 235917	2.023 hectares		✓		
198	Lot 1 DP 235917	2.023 hectares		✓		
199	Lot 3 DP 567978	2.023 hectares		✓		
200	Lot 2 DP 567978	2.023 hectares		✓		
201	Lot 1 DP 567978	2.023 hectares		✓		
202	Lot 5 DP 2650	3.030 hectares		✓		
203	Lot 6 DP 233269	2.023 hectares		✓		
204	Lot 5 DP 233269	2.023 hectares		✓		
205	Lot 4 DP 233269	2.134 hectares		✓		
206	Lot 3 DP 233269	2.260 hectares		✓		
207	Lot 2 DP 233269	2.317 hectares		✓		
208	Lot 1 DP 233269	2.051 hectares		✓		
209	Lot 101 DP 628610	6.429 hectares	✓	✓		
210	Lots 22/23 DP 2650	6.098 hectares	✓	✓		
211	Lots 24/25 DP 2650	6.070 hectares	✓	✓		
212	Lot 26 DP 2650	3.035 hectares	✓	✓		
213	Lot 27 DP 2650	3.035 hectares	✓	✓		
214	Lot 28 DP 2650	3.035 hectares		✓		
215	Lot 29 DP 2650	3.035 hectares		✓		
216	Lot 30 DP 2650	3.035 hectares		✓		
217	Lot 31 DP 2650	3.035 hectares		✓		
218	Lot 32 DP 2650	3.035 hectares		✓		
219	Lot 33 DP 2650	3.035 hectares		✓		
220a	Lot 34 DP 2650	3.040 hectares		✓		
220b	Lot 35 DP 2650	3.040 hectares		✓		
221	Lot 36 DP 2650	3.035 hectares		✓		
222	Lot 37 DP 2650	3.035 hectares		✓		
223	Lot 38 DP 2650	4.856 hectares		✓		

Ref No. <sup>1</sup> (Refer to Figure C1)	Property Description	Area of Property	Option B	Option C	Part Acquisition Option B	Part Acquisition Option C
224	Lot 39 DP 2650	3.136 hectares		✓		
225	Lot 101 DP 572133	2.023 hectares		✓		
226	Lot 102 DP 572133	2.023 hectares		✓		
227	Lot 103 DP 572133	2.023 hectares		✓		
228	Lot 1 DP 566346	2.023 hectares		✓		
229	Lot 4 DP 244113	2.023 hectares		✓		
230	Lot 3 DP 244113	2.023 hectares		✓		
231	Lot 2 DP 244113	2.023 hectares		✓		
232	Lot 1 DP 244113	2.023 hectares		✓		
233	Lot 8 DP 243457	2.023 hectares		✓		
234	Lot 7 DP 243457	2.023 hectares		✓		
235	Lot 6 DP 243457	2.023 hectares		✓		
236	Lot 5 DP 243457	2.919 hectares		✓		
237	Lot 4 DP 243457	2.023 hectares		✓		
238	Lot 3 DP 243457	2.023 hectares		✓		
239	Lot 2 DP 243457	2.023 hectares		✓		
240	Lot 1 DP 243457	2.023 hectares		✓		
241	Lot 8 DP 583841	1.867 hectares		✓		
242	Lot 9 DP 583841	2.023 hectares		✓		
243	Lot 19 DP 2650	1.939 hectares		✓		
244	Lot 20 DP 2650	2.974 hectares	✓	✓		
245	Lot 21 DP 2650	2.984 hectares	✓	✓		
246	Lot 1 DP 924386	1.975 hectares	✓	✓		
247	Lot 1 DP 924387	1.980 hectares	✓	✓		
248	Lot 1 DP 656830	1.975 hectares	✓	✓		
249	Part Lot 1 DP 376252	173.600 hectares	✓	✓	✓	✓
250(2)	Lot 1 DP 373863 pt Lot 34 DP 752016	200.000 hectares	✓	✓	✓	✓
251	Lot 272-274 DP 803167	21.065 hectares		✓		

- Note 1: Numbers which have a letter of the alphabet in consecutive order represent blocks of land which are owned by the same landowner.
- Note 2: Boral Bricks (NSW) Pty Ltd who own the land, also own a number of adjoining portions of land which total approximately 200 hectares.






Airport Option B   
 Airport Option C   
 Property Identifier 

Figure C.1  
**Badgerys Creek Land Acquisition**  
 Source: Department of Land and Water Conservation Information Centre, Liverpool City Council

Figure C.1 indicates properties which are listed in Table C.1 Badgerys Creek - Properties within Airport Options B and C  
 A number followed by a series of letters indicates portions of land which are owned by the same landholders  
 Land numbered "14" is government owned. Land within the Option B boundary without numbers is Commonwealth owned and was purchased for the construction of airport Option A

Note (1)  
 Note (2)  
 Note (3)



0Km  2.5Km



## **Appendix D**

---

### Demographic Profile Tables

TABLE D1 POPULATION FOR SECOND SYDNEY AIRPORT ASSESSMENT REGION

Local Government Area	1991 Population	Percentage of Population Within the Sydney Statistical Division	Estimated Current Population
Auburn	48,576	1.4	51,600 <sup>1</sup>
Bankstown	153,942	4.3	165,700 <sup>2</sup>
Blacktown	211,671	6.0	235,600 <sup>3</sup>
Blue Mountains	69,380	2.0	74,800 <sup>4</sup>
Camden	22,528	0.6	34,277 <sup>5</sup>
Campbelltown	137,786	3.9	152,400 <sup>6</sup>
Fairfield	175,152	4.9	189,000 <sup>7</sup>
Holroyd	79,088	2.2	84,300 <sup>8</sup>
Hurstville	63,831	1.8	68,200 <sup>9</sup>
Liverpool	98,158	2.8	110,000 <sup>10</sup>
Parramatta	132,803	3.8	139,600 <sup>11</sup>
Penrith	149,789	4.2	170,200 <sup>12</sup>
Sutherland	184,420	5.2	198,000 <sup>13</sup>
Wollondilly	30,338	0.9	34,290 <sup>14</sup>
<b>Total</b>	<b>1,557,462</b>	<b>44.0</b>	<b>1,677,967</b>
Sydney Statistical Division	3,539,035	100	3,827,400 <sup>15</sup>
Wollongong	173,784		183,530 <sup>16</sup>

Source: Australian Bureau of Statistics Census (1991) (CDATA B05 Age by Sex. Unless otherwise stated).

- Notes:
- 1-4 Medium projected population for 1996. Source: Population Projections Sydney Region Local Government Areas 1991-2021, 1995 Revision, Department of Urban Affairs and Planning.
  - 5 Figure estimated for January 1997. Source: Camden Residential Strategy, Camden Council.
  - 6 Medium projected population for 1996. Source: Population Projections Sydney Region Local Government Areas 1991-2021, 1995 Revision, Department of Urban Affairs and Planning.
  - 7 Population estimated for 1996-1997 based on new housing approved and taken up.
  - 8 -9 Medium projected population for 1996. Source: Population Projections Sydney Region Local Government Areas 1991-2021, 1995 Revision, Department of Urban Affairs and Planning.
  - 10 Source: Population Estimates for Liverpool Local Government Area June 1992-June 1995, Liverpool City Council. Statistic for June 30 1995.
  - 11-12 Medium projected population for 1996, Department of Urban Affairs and Planning (1995a).
  - 13 Estimated projection for 1996. Sutherland Shire Council (1996).
  - 14 Figures projected for 30 June 1996 based on Australian Bureau of Statistics (1991) (Population Census and Building Applications for new dwellings received by Wollondilly Shire Council).
  - 15 Medium projected population for 1996, Department of Urban Affairs and Planning (1995a).

16      1995 Preliminary ERP figures from Illawarra Regional Information Service (1997).  
Wollongong is not located within the Sydney Statistical Division.  
The latest population statistics in Table 8.1 have been obtained from local councils where possible.

TABLE D2 AGE STRUCTURE FOR SECOND SYDNEY AIRPORT ASSESSMENT REGION

Local Government Area	Proportion aged 0-14 (%)	Proportion aged 15-29 (%)	Proportion aged 30-64 (%)	Proportion aged 65+ (%)
Auburn	22.0	25.2	40.6	12.1
Bankstown	21.1	23.6	42.4	13
Blacktown	27.2	25.8	41.1	5.7
Blue Mountains	25.3	19.4	43.6	11.7
Camden	25.6	23.6	42.3	8.5
Campbelltown	31.6	24.9	39.2	4.4
Fairfield	24.9	25.9	42.1	6.9
Holroyd	21.0	25.7	42.6	10.8
Hurstville	18.0	23.6	42.8	15.6
Liverpool	24.6	27.3	41.5	6.5
Parramatta	20.1	25.1	42.4	12.4
Penrith	28.4	25.1	41	5.7
Sutherland	22.1	23.0	44.5	10.3
Wollondilly	28.6	21.2	42.9	7.2
Sydney Statistical Division (SSD)	21.1	24.5	43.1	11.5
Wollongong <sup>1</sup>	21.5	24.0	42.8	11.6

Source: Australian Bureau of Statistics (1991) (CDATA B05 Age by Sex).

Note: 1. Wollongong is not located within the Sydney Statistical Division.

TABLE D3 UNEMPLOYMENT AND PARTICIPATION RATES FOR SECOND SYDNEY AIRPORT ASSESSMENT REGION, DECEMBER, 1996

Region <sup>1</sup>	Unemployment Rate (Percent)	Participation Rate (Percent)
St George-Sutherland	5.1	67.9
Canterbury-Bankstown	10.9	59.8
Fairfield-Liverpool	12.6	60.5
Outer South Western Sydney	7.5	71.8
Central Western Sydney	10.8	57.9
Outer Western Sydney	5.2	70.1
Blacktown-Baulkham Hills	6.5	68.8
Wollongong <sup>2</sup>	10.1	61.6
Sydney Region	6.3	64.3

Source: Department of Employment, Education, Training and Youth Affairs (1996).

- Notes:
1. St George-Sutherland comprises Hurstville, Kogarah, Rockdale and Sutherland Shire statistical local areas.  
Canterbury-Bankstown comprises Bankstown and Canterbury statistical local areas;  
Fairfield-Liverpool comprises Fairfield and Liverpool statistical local areas.  
Outer South Western Sydney comprises Camden, Campbelltown and Wollondilly statistical local areas.  
Central Western Sydney comprises Auburn, Holroyd and Parramatta statistical local areas.  
Outer Western Sydney comprises Blue Mountains, Hawkesbury and Penrith statistical local areas.  
Blacktown-Baulkham Hills comprises Blacktown and Baulkham Hills statistical local areas; and Wollongong comprises Kiama, Shellharbour and Wollongong statistical local areas.
  2. Wollongong is not located within the Sydney Region.

TABLE D4 OCCUPATION FOR SECOND SYDNEY AIRPORT ASSESSMENT REGION

Local Government Area	Managers and Administrators (%)	Professionals and Para Professionals (%)	Tradespersons (%)	Clerks (%)	Sales and Personal Service (%)	Plant and Machine Operators, Drivers (%)	Labourers, Related Workers (%)	Others (%)	Total Labour Force
Auburn	5.2	14.2	15.1	16.9	9.9	11.3	19.0	8.3	17,022
Bankstown	7.8	14.8	16.6	20.1	12.7	8.4	12.7	6.9	61,960
Blacktown	6.9	13.6	16.0	18.9	11.9	10.0	15.9	6.8	85,442
Blue Mountains	10.7	28.9	12.7	15.2	13.5	4.3	9.5	5.1	29,057
Camden	11.8	19.1	15.5	15.7	12.5	8.4	10.9	6.2	10,290
Campbelltown	8.0	16.0	15.3	19.5	13.3	8.8	12.3	6.7	54,055
Fairfield	5.6	10.2	17.9	15.5	10.8	12.6	18.6	8.8	63,131
Holroyd	7.2	15.0	16.2	19.6	12.8	8.7	14.1	6.5	34,185
Hurstville	9.6	19.9	14.0	20.5	12.8	6.2	10.7	6.3	29,341
Liverpool	7.5	12.0	17.0	17.7	12.0	11.0	14.7	8.1	39,602
Parramatta	8.8	21.0	13.1	19.1	12.6	6.7	12.3	6.3	57,027
Penrith	8.4	15.3	15.6	19.1	13.5	9.0	12.7	6.7	65,025
Sutherland	12.2	21.3	13.8	19.7	14.6	5.1	7.7	5.6	90,460
Wollondilly	12.0	16.2	16.8	14.5	11.6	9.0	14.0	6.0	12,675
Sydney Statistical Division	10.9	21.0	12.9	17.7	13.6	6.4	11.1	6.4	1,562,622
Proportion of Sydney Statistical Division	32.3	32.7	49.7	43.5	38.7	55.5	48.8	44.0	41.6
Wollongong <sup>1</sup>	7.4	20.4	15.9	14.1	12.8	9.5	13.4	6.6	68,451

Source: Australian Bureau Statistics (1991) CDATE91 Table B2.2.

Note: 1. Wollongong is not located within the Sydney Statistical Division, consequently it has been excluded from calculations relating to "proportion of Sydney Statistical Division".

TABLE D5 ANNUAL INDIVIDUAL INCOME FOR SECOND SYDNEY AIRPORT ASSESSMENT REGION

Local Government Area	\$0- \$12000 (%)	\$12001- \$20000 (%)	\$20001- \$30000 (%)	\$30001- \$40000 (%)	\$40001- \$50000 (%)	\$50001- \$60000 (%)	Over \$60,000 (%)	Total <sup>1</sup>
Auburn	43.0	18.0	17.9	6.1	1.7	0.6	0.4	37,889
Bankstown	42.3	16.3	18.4	8.3	2.8	1.0	0.8	121,472
Blacktown	37.0	17.2	20.7	8.9	2.8	1.0	0.6	154,067
Blue Mountains	40.6	14.9	16.8	11.7	4.5	1.9	1.8	51,879
Camden	36.2	15.6	18.7	10.3	4.1	2.3	2.2	16,675
Campbelltown	35.5	16.5	20.3	10.4	3.5	1.3	1.0	94,358
Fairfield	41.3	18.6	18.0	6.1	1.9	0.6	0.4	131,661
Holroyd	39.2	16.5	20.2	9.1	3.1	1.1	0.8	62,437
Hurstville	38.1	16.2	19.7	10.5	3.9	1.7	1.9	52,356
Liverpool	38.2	17.7	20.4	7.8	2.4	0.9	0.7	74,041
Parramatta	39.0	15.3	18.9	9.8	3.8	1.7	1.6	106,045
Penrith	34.9	16.1	21.4	11.0	3.7	1.4	0.9	107,110
Sutherland	34.1	14.7	18.9	12.4	5.4	2.7	3.3	143,636
Wollondilly	38.3	15.3	17.4	10.1	4.1	2.0	1.7	21,537
Sydney Statistical Division (SSD)	36.8	15.7	18.5	10.1	4.1	2.0	2.9	2,792,097
Wollongong <sup>2</sup>	44.1	15.2	15.5	9.0	3.5	1.8	1.6	136,430

Source: Australian Bureau of Statistics (1991) CDATA91 Table B28.

Note: 1. Includes "Not stated".  
2. Wollongong is not located within the Sydney Statistical Division.

TABLE D6 BIRTHPLACE BY ORIGIN FOR SECOND SYDNEY AIRPORT ASSESSMENT REGION

Local Government Area	Australia and Oceania (%) <sup>1</sup>	Europe and USSR (%)	Middle East, North Africa, Africa (%)	Asia (%) <sup>2</sup>	North, Central and South America (%) <sup>3</sup>	Other (%) <sup>4</sup>
Auburn	53.0	10.8	12.1	19.3	1.6	3.3
Bankstown	69.0	13.8	6.9	7.5	0.8	2.0
Blacktown	70.9	14.4	3.6	7.1	1.2	2.7
Blue Mountains	81.1	13.9	0.6	1.4	0.8	2.2
Camden	81.9	13.6	0.8	1.3	0.4	2.0
Campbelltown	75.3	13.0	3.0	4.5	1.8	2.5
Fairfield	47.4	16.7	5.3	23.0	4.8	2.8
Holroyd	70.3	15.2	5.8	5.2	1.1	2.4
Hurstville	74.6	13.3	3.0	6.6	0.8	1.8
Liverpool	68.7	16.4	3.6	5.7	2.6	3.1
Parramatta	69.5	11.5	6.5	8.7	1.2	2.6
Penrith	75.8	15.6	1.9	3.8	0.8	2.1
Sutherland	82.6	10.9	1.3	2.5	0.7	1.9
Wollondilly	82.9	13.0	0.5	0.6	0.5	2.6
Sydney Statistical Division	69.6	14.6	3.6	7.8	1.6	28.6
Wollongong <sup>5</sup>	72.8	20.9	1.3	2.4	0.9	1.7

Source: Australian Bureau of Statistics (1991) CDA91 Table B09.

- Notes:
1. Includes Antarctica.
  2. Includes Southeast Asia, Northeast Asia, Southern Asia.
  3. Includes Northern America, South and Central America and the Caribbean.
  4. Other includes those "not stated".
  5. Wollongong is not located within the Sydney Statistical Division.

TABLE D7 THREE PRIMARY LANGUAGES SPOKEN AT HOME FOR SECOND SYDNEY AIRPORT ASSESSMENT REGION

Local Government Area	Language	Percent
Auburn	English only	40.6
	Arabic	12.0
	Chinese	10.2
	Turkish	7.2
	Other	30.0
Bankstown	English only	63.5
	Arabic	10.1
	Greek	4.4
	Vietnamese	4.1
	Other	18.1
Blacktown	English only	73.0
	Arabic	2.5
	Maltese	2.3
	Italian	1.7
	Other	20.3
Blue Mountains <sup>1</sup>	English only	92.9
	German	1.0
	Other	6
Camden <sup>1</sup>	English only	88.3
	Italian	2.9
	Maltese	1.0
	Other	7.1
Campbelltown	English only	81.6
	Arabic	2.2
	Spanish	2.0
	Italian	0.9
	Other	14.9
Fairfield	English only	36.9
	Vietnamese	9.8
	Chinese	8.7
	Italian	6.9
	Other	42.3
Holroyd	English only	68.1
	Arabic	7.3
	Maltese	3.9
	Italian	3.3
	Other	17.5
Hurstville	English only	73.3
	Greek	4.9
	Chinese	4.7
	Arabic	2.8
	Italian	2.8
	Other	11.5



Local Government Area	Language	Percent
Liverpool	English only	65.6
	Italian	6.0
	Arabic	3.7
	Spanish	3.0
	Other	21.6
Parramatta	English only	69.6
	Arabic	8.2
	Chinese	3.6
	Greek	1.5
	Italian	1.5
	Other	17.1
Penrith	English only	83.9
	Italian	1.3
	Maltese	1.2
	Arabic	1.1
	Other	12.7
Sutherland	English only	88.8
	Greek	1.5
	Italian	1.3
	Chinese	1.2
	Other	6.9
Wollondilly <sup>1</sup>	English only	91.1
	Italian	1.1
	Other	8.0
Sydney Statistical Division	English only	72.2
	Arabic	3.2
	Chinese	3.4
	Italian	2.8
	Other	18.6
Wollongong <sup>2</sup>	English only	78.0
	Italian	3.9
	Macedonian	3.5
	Greek	1.5
	Other	13.3

Source: Australian Bureau of Statistics (1991) CDATE91 Table B11  
 Languages with a representation of less than one percent and those "not stated" have been included in the "other" category.

Note: 1. Languages which represented less than one percent were not included in Table 8.7.  
 2. Wollongong is not located within the Sydney Statistical Division.

TABLE D8 EDUCATION LEVELS WITHIN SECOND SYDNEY AIRPORT ASSESSMENT REGION

Local Government Area	University <sup>1</sup> %	Under-graduate or Associate Diploma %	Skilled Vocational %	Basic Vocational %	Not Qualified %	Other <sup>2</sup> %	Total
Auburn	5.0	3.3	8.1	2.6	63.7	17.3	37,859
Bankstown	4.0	3.4	11.8	3.2	63.8	13.8	121,496
Blacktown	4.1	3.3	10.8	3.5	64.9	13.3	153,911
Blue Mountains	11.1	8.4	11.6	5	50.9	13.1	51,864
Camden	6.3	5.3	13.3	3.6	59.6	11.7	16,695
Campbelltown	3.9	4.0	12.1	4.3	62.9	12.9	94,359
Fairfield	2.9	2.4	9.3	2.7	68.4	14.3	131,499
Holroyd	4.6	3.6	11.8	3.5	63.3	13.2	62,410
Hurstville	7.7	4.9	12.5	4.2	57.2	13.6	52,379
Liverpool	2.9	2.9	11.7	3.1	65.3	14.1	74,071
Parramatta	8.2	4.9	10.1	3.9	58.7	14.3	106,119
Penrith	4.3	4.0	12.8	4	63	11.9	107,068
Sutherland	8.4	6.4	14.5	5.4	52.2	13.1	143,643
Wollondilly	4.9	5.0	14.4	4.1	58.4	13.1	21,600
Sydney Statistical Division	9.6	5.3	10.1	4	56.8	14.3	2,791,917
Wollongong <sup>3</sup>	6.7	5	12.7	4.1	59.6	12	136,329

Source: Australian Bureau of Statistics (1991) CDATA91 Table B16.

- Notes:
1. Comprises Higher degree, Post graduate diploma and Bachelor degree.
  2. Comprises "Inadequately described and "Not stated".
  3. Wollongong is not located within the Sydney Statistical Division.

TABLE D9 AGE LEFT SCHOOL FOR SECOND SYDNEY AIRPORT ASSESSMENT REGION

Local Government Area	15 Years or Less %	16 Years %	17 Years %	18 Years %	19 Years or More %	Still at School %	Did not go to School %
Auburn	31.4	13.4	9.1	11	13.4	4.7	4.1
Bankstown	39.8	17.7	9.6	10.1	6.7	4.8	2.3
Blacktown	37.8	20.9	9.8	9.2	7.1	5	1.2
Blue Mountains	31.7	22.1	16.4	14	3.6	5.2	0.3
Camden	38.9	22.9	12.9	10.1	2.3	5.3	0.7
Campbelltown	35.7	23.3	11.1	9.6	5.2	6.4	0.9
Fairfield	30.8	15.4	9	10.9	12.7	5.8	4.8
Holroyd	38.8	20	10.6	10	5.6	4.6	1.7
Hurstville	37.5	18.3	12.9	12.1	6.3	4.5	1.1
Liverpool	38.2	20	10.1	9.3	6.4	4.6	1.8
Parramatta	33.8	17.9	12.7	12.3	8	4.4	1.7
Penrith	37.1	24.6	11.2	9.6	4.4	5.3	0.6
Sutherland	35.1	21.6	15.2	13	3.6	5	0.4
Wollondilly	39.2	24.2	11.8	9.1	2.6	4.8	0.4
Sydney Statistical Division	31.5	18.5	14.8	13.4	7.4	4.7	1.4
Wollongong <sup>2</sup>	38.5	21.7	11.7	10.9	3.7	4.4	1.2

Source: Australian Bureau of Statistics (1991) CDATA 91 Table B15.

- Notes:
1. Includes those "not stated".
  2. Wollongong is not located within the Sydney Statistical Division.

TABLE D10 NATURE OF OCCUPANCY - OCCUPIED PRIVATE DWELLINGS FOR SECOND SYDNEY AIRPORT ASSESSMENT REGION

Local Government Area	Owned (%)	Being Purchased (%)	Rented - Housing Commission (%)	Other Government Authority (%)	Other <sup>1</sup> (%)	Total
Auburn	42.3	19.7	3.9	1.8	32.3	15,233
Bankstown	47.6	23.9	10.7	0.8	17.0	49,811
Blacktown	28.0	40.2	14.4	0.7	16.7	63,805
Blue Mountains	41.9	36.3	1.2	1.1	19.5	24,144
Camden	40.1	35.6	3.3	0.6	20.4	7,009
Campbelltown	22.4	43.8	17.1	1.1	15.6	40,259
Fairfield	35.3	30.2	7.6	1.2	25.5	50,645
Holroyd	44.1	23.8	7.3	0.7	24.0	26,669
Hurstville	49.9	22.0	3.8	0.7	23.5	22,997
Liverpool	29.1	27.1	14.5	5.1	24.2	30,519
Parramatta	37.4	24.0	10.1	1.2	27.3	46,050
Penrith	29.7	44.8	5.0	0.9	19.6	46,080
Sutherland	45.5	32.2	2.4	0.5	19.5	62,029
Wollondilly	39.0	40.5	1.3	0.8	18.4	9,391
Sydney Statistical Division	38.9	26.4	5.8	1.1	27.5	1,219,792
Wollongong <sup>2</sup>	44.4	22.1	10.1	0.6	22.9	60,981

Source: Australian Bureau of Statistics (1991) CDATA91 Table B47.

- Notes:
1. Includes "Not stated".
  2. Wollongong is not located within the Sydney Statistical Division.

TABLE D11 FAMILY TYPE FOR SECOND SYDNEY AIRPORT ASSESSMENT REGION

Local Government Area	One Parent Families <sup>1</sup>	Couples Without Offspring <sup>2</sup>	Two Parent Families <sup>3</sup>	Families of Other Related Individuals	Total
Auburn	13.6	27.7	55.6	3.2	11,482
Bankstown	13.4	29.1	55.7	1.9	40,381
Blacktown	16.7	21.7	60.0	1.6	54,621
Blue Mountains	13.0	30.9	54.7	1.4	17,948
Camden	9.7	26.7	62.5	1.1	5,763
Campbelltown	17.7	19.1	62.2	1.1	34,976
Fairfield	13.5	21.5	62.9	2.1	43,741
Holroyd	14.1	27.3	56.0	2.6	20,913
Hurstville	12.1	33.8	51.8	2.3	17,297
Liverpool	16.2	23.7	58.3	1.7	14,534
Parramatta	14.5	30.7	52.3	2.5	33,549
Penrith	13.3	22.8	62.6	1.4	38,777
Sutherland	10.4	29.2	59.0	1.5	49,485
Wollondilly	9.7	26.3	63.0	1.1	7,887
Sydney Statistical Division	13.3	30.0	54.4	2.3	891,042
Wollongong (4)	13.2	31.7	53.6	1.5	46,492

Source: Australian Bureau of Statistics (1991) CDATE91 Table B48.

- Notes:
1. Includes dependent and other offspring and other related individuals.
  2. Includes couples and other related individuals.
  3. Includes dependent and other offspring and other related individuals.
  4. Wollongong is not located within the Sydney Statistical Division.

TABLE D12 ANNUAL HOUSEHOLD INCOME FOR SECOND SYDNEY AIRPORT ASSESSMENT REGION

Local Government Area	Less than \$8,000	\$8,001- \$16,000	\$16,001- \$30,000	\$30,001- \$50,000	\$50,001- \$100,000	More than \$1,000,000	Total <sup>1</sup>
Auburn	8.2	14.2	19.8	20.9	15.2	1.2	14,800
Bankstown	7.6	14.0	17.8	20.8	19.0	2.3	49,069
Blacktown	5.2	10.9	17.8	24.0	19.8	1.7	62,398
Blue Mountains	6.8	14.0	19.7	23.0	20.5	2.3	23,660
Camden	5.1	9.8	15.7	22.5	24.1	3.5	6,875
Campbelltown	3.8	10.9	17.8	25.4	21.0	1.8	39,450
Fairfield	5.5	11.4	19.4	22.5	15.9	1.5	49,534
Holroyd	6.4	13.4	18.2	21.9	19.6	2.1	26,034
Hurstville	6.5	13.2	17.9	22.0	21.3	3.8	22,642
Liverpool	6.8	11.5	19.2	22.4	17.0	1.6	29,642
Parramatta	8.2	12.8	17.3	20.8	20.9	3.5	44,974
Penrith	4.5	9.4	17.8	26.1	21.8	1.9	45,232
Sutherland	4.9	9.1	14.8	21.6	27.1	6.1	60,892
Wollondilly	5.5	10.0	17.8	24.1	20.7	2.6	9,176
Sydney Statistical Division	6.3	11.8	17.6	21.2	21.0	5.2	1,188,685
Wollongong <sup>2</sup>	8.0	15.7	19.4	20.2	17.3	2.2	60,097

Source: Australian Bureau of Statistics (1991) CDATA91 Table B29.

- Notes:
1. Includes "Partial income stated" and "no incomes stated".
  2. Wollongong is not located within the Sydney Statistical Division.

TABLE D13 JOURNEY TO WORK<sup>1</sup> FOR SECOND SYDNEY AIRPORT ASSESSMENT REGION

Local Government Area	Vehicle Driver	Vehicle Passenger	Train	Bus	Walk	Other <sup>2</sup>	Total <sup>3</sup>
Auburn	43.5	8.8	22.6	4.1	4.9	16.0	17,606
Bankstown	53.3	8.3	13.7	4.6	3.0	16.9	64,302
Blacktown	50.3	9.7	15.3	5.4	2.5	16.8	91,256
Blue Mountains	49.1	8.2	14.7	3.0	3.4	21.6	30,181
Camden	58.3	8.1	5.2	3.0	3.2	22.2	10,589
Campbelltown	50.1	9.1	16.7	4.7	1.9	17.4	57,488
Fairfield	52.1	11.1	12.2	6.1	2.2	16.4	66,312
Holroyd	53.2	8.9	12.3	6.0	2.6	17.0	35,770
Hurstville	49.2	6.8	20.0	4.7	2.7	16.6	30,670
Liverpool	51.7	9.6	10.2	5.4	4.6	18.6	41,282
Parramatta	51.1	8.0	14.0	6.3	4.1	16.5	59,231
Penrith	51.9	9.3	13.3	4.4	2.2	18.9	69,176
Sutherland	56.5	7.2	13.7	2.2	2.3	18.1	94,052
Wollondilly	60.1	7.8	5.1	1.6	3.5	22.0	12,997
Sydney Statistical Division	49.2	7.7	12.5	8.1	4.1	18.5	1,621,868
Wollongong <sup>4</sup>	58.1	10.1	5.6	3.0	3.8	19.5	68,500

Source: Australian Bureau of Statistics (1991) CDATE91 Table B26.

- Notes:
1. Question allowed multiple answers.  
The table excludes visitors, and usual residents who were absent on census night.
  2. Comprises Ferry/tram, Taxi, Motor bike/ motor scooter, bicycle, other, worked at home, did not go to work, not stated.
  3. Total figure estimated from numbers of responses in Table B26 of CDATE91.
  4. Wollongong is not located within the Sydney Statistical Division.