Mega Projects in Transport and Development: Background in Australian Case Studies

Sydney Harbour Tunnel

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1. Introduction

This report is part of a research project to explore the treatment of complexity, uncertainty and risk in the planning of mega projects in Australian cities. It is undertaken by GAMUT on behalf of the Global Centre for Mega Projects in Transport and Development (OMEGA), Bartlett School of Planning at University College London.

The goal of this report is to provide essential background on a case study of the Sydney Harbour Tunnel mega-transport project, built as a public-private partnership on a build, own, operate and transfer (BOOT, or BOT) basis. This report summarises the background of the secondary research evidence obtained for the Sydney Harbour Tunnel. It is structured as follows:

- Key stages of transport and metropolitan planning in Sydney
- The details of Sydney Harbour Tunnel including
    - Background and history
    - Location/ map and key facts
    - Justifications for the project
    - Finance for the project
    - Decision making process and institutions responsible for the Sydney Harbour Tunnel

A specific bibliography of secondary research considered in relation to this project is presented at the end of the report.

2. Transport and Metropolitan Planning in Sydney

Sydney is the largest city of Australia and the capital of New South Wales (NSW). According to the 2001 national census, 3.9 million people reside in Sydney (ABS 2001). The metropolitan transport system in Sydney is primarily organised by the NSW State government (Low *et al.* 2003). The State government provides funding for most metropolitan arterial roads and public transport However, the federal government provides funding for national roads, some of which are also metropolitan. Local councils maintain local roads, and the private sector is sometimes involved in partnership in road construction and management.

The history of transport and metropolitan planning in Sydney started after World War II with the creation of the Cumberland County Council, essentially the Greater Sydney metropolitan authority (Kubler, 2005). The Council prepared the Sydney regional plan – *the Cumberland County Plan* in 1948, and this plan formally became state law in 1951. The radial network of expressways prepared by the NSW Department of Main Roads between 1938 and 1946 was given formal approval through the Cumberland County Plan (Webber 1988; Searle 1999). The Cumberland County Plan ensured that the radial pattern would guide freeway development for at least half a century (Searle 1999). The County of Cumberland was abolished in 1963 and its functions taken over by the State Planning Authority of the NSW Government, but the essentials of the Plan remained in place (NB the agency responsible for metropolitan planning changed many times between 1948 and 2006 as shown in Table 2 below).

The State Planning Authority, established in 1963, was given the responsibility of overseeing the orderly planning of the State (Briger 1988; Kubler 2005). In 1968 the

Authority prepared a strategic plan *Sydney Region Outline Plan 1970-2000, a Strategy for Development*. The Plan offered strategic guidance in a context of high rates of economic and demographic growth, identifying corridors of growth combined with suburban town centres, soon complemented by a matching metropolitan freeway network (Kubler 2005). The plan found that the existing transport system in Sydney is primarily radial in nature serving increased numbers of private vehicles (State Planning Authority 1968: p.40). Therefore, the Plan showed a firm commitment to road building, estimating that 350 miles of new freeway was required in the region. It was estimated that $2,600 million over 30 years or $87 million per year was required for the construction of targeted freeways (ibid: p.101). The cost of the land was separate from these costs. The radial system was further confirmed in the *Sydney Area Transportation Study* prepared in 1974 (Searle 1999). By this time the first stage of the freeway system had been built on either side of Harbour Bridge (ibid).

Table 1 Key Planning and Transport Policies in Sydney

Nos.	Year	Plan	Plan prepared by
1	1948	County of Cumberland Plan (1948—80)	County of Cumberland
2	1968	Sydney Region Outline Plan (1970-2000)	NSW State Planning Authority
3	1974	Sydney Area Transportation Study (1974-2000)	
4	1987	Roads 2000	Department of Main Roads
5	1988	Metropolitan Strategy/Sydney into its Third Century (1986-2011)	NSW Department of Environment and Planning
6	1991	Better Cities Program	Federal Govt.
7	1993	(draft) Integrated Transport Strategy	NSW Department of Transport
8	1993	(draft) Sydney's Future	NSW Department of Planning
9	1995	Cities for the 21st Century (1994-2021)	NSW Department of Planning
10	1998	Shaping our Cities (1999-2011/2016)	NSW Department of Urban Affairs and Planning
11	1998	Integrated Transport Plan for Sydney – Action for Transport 2010 (1998-2010)	NSW Department of Transport
12	2006	City of Cities – A Plan for Sydney's Future	NSW Department of Planning

In 1987, the Department of Main Roads (DMR) produced a new strategy, *Roads 2000*. The aim of the strategy was the designation of an orbital road around Sydney (Searle 1999). The strategy included new links which promised to relieve traffic congestion on the approaches to the Harbour Bridge. One of the extra links was a Harbour Tunnel proposed in 1986, which will be discussed in detail in the next section. As an alternative to urban sprawl in the 1980s, a new strategic plan, *Sydney into its Third Century* was prepared in 1988 by the Department of Environment and Planning (successor to the State PlanningAuthority). The main goal of the strategy was 'urban consolidation' connected with a road and rail network.

Under the State Government's neo-liberal ideology, two draft strategic planning documents *Integrated Transport Strategy* and *Sydney's Future* were published in 1993. The *Integrated Transport Strategy* combined the Road Authority's State Road Network Strategy and the State Rail Strategic Plan (Searle 2004). On the other hand, *Sydney's Future* remains focused on urban consolidation, with the urban area to be served by

increased public transport usage. These themes were taken up in the following metropolitan strategy *Cities for the 21st Century* prepared in 1995. The strategy is framed around an 'integrated urban management' approach which emphasis on process rather than fixed proposals (Searle 2004). The strategy is limited to a number of generalised arrows showing 'strategic transport opportunities', which did not differentiate the mode between road and rail.

More recently two metropolitan strategies *Shaping our Cities (1999)* and *City of Cities (2005)* have been prepared by the Department of Urban Affairs and Planning and Department of Planning respectively. These strategies continuously stressed higher density housing served by the public transport. Moreover, the *City of Cities* proposed a hierarchy of centres such as Sydney Global City (CBD), regional city centres (such as Paramatta), major centres and specialized centres connected by the railway network, bus corridors and an orbital motorway (Department of Planning 2005).

Table 2 Authorities Responsible for Town Planning in the Sydney Region

Date	Organisations	Act/Law governing the Authority
5 Apr 1945	Town and Country Planning Advisory Committee	Local Government (Town, Country and Planning) Amendment Act 1945
27 Jul 1945	Cumberland County Council	for Boundaries of the Cumberland Country District
2 Mar 1964	The State Planning Authority of New South Wales	State Planning Authority Act 1963
18 Nov 1974	NSW Planning and Environment Commission	NSW Planning and Environment Act 1974
1 Sep 1980	Department of Environment and Planning	The Environment Planning and Assessment Act 1979
1 Jul 1987	Department of Planning	The Environment Planning and Assessment Act 1979
Apr 1995	Department of Urban Affairs and Planning	The Environment Planning and Assessment Act 1979
1 Dec 2001	Planning NSW	The Environment Planning and Assessment Act 1979
2 Apr 2003	Department of Infrastructure, Planning and Natural Resources	The Environment Planning and Assessment Act 1979

Source: Several cited in Falk and Toon 2003

3. Sydney Harbour Tunnel

The Sydney Harbour Tunnel provides a road link between north and south of the Sydney Harbour. It is a 2.3 kilometres long, dual carriageway, road link between the Warringah Freeway, north of Sydney Harbour and the Cahill Expressway, south of the Harbour (NSW Auditor-General, 1994). The main aim of the Harbour Tunnel was to provide additional access between the northern and southern parts of Sydney which was possible until then only via the Harbour Bridge (Sharon: web). It was argued that the Tunnel would reduce congestion on the Harbour Bridge and its approaches, reduce travel distance and travel times on the Harbour crossing, and improve the reliability of the crossing (Sharon: web). Before commencing a detailed description, it will be useful to describe the evolution of the project.

3.1 History of the Harbour Crossing

The Sydney Harbour crossing has been a long standing traffic planning issue (NSW Auditor-General, 1994). One of the proposals to cross the harbour was the Harbour Tunnel on which debate started more than one hundred years ago. Sydney's traffic had become chaotic by the end of the nineteenth century. Roads were choked with bullock wagons, hansom cabs, drays and horse drawn carriages. In the 1880s the newspaper *Sydney Morning Herald* wrote quite often about long delays (Brian and Kennedy, 1993). Therefore, a tunnel was suggested as early as 1885 when it was realized that ferries were not the most efficient way to transport large numbers of people across the harbour (OSP 1992).

In 1896, a study was prepared by Sir John Sulman, Sydney architect and town planner, to link the city and North Shore with a tunnel to ensure a free flow of traffic. The plan envisaged an underground railway between Milson's Point and King Street and a vehicular tunnel between Milson's Point and Circular Quay. The tunnels were rejected by the Parliament due to their cost of 600,000 pounds. The details of the tunnels 'The Proposed Harbour Tunnels' appeared in the *Sydney Mail* on 30th May 1896 (Brian and Kennedy 1993).

The effort to promote the tunnel was continuous from 1909 to 1912. However, after the opening of the Sydney Harbour Bridge in 1932, the tunnel plan disappeared for a short time (Brian and Kennedy 1993). Later, it was realized that Sydney needed another Harbour crossing to accommodate traffic (OSP 1992).

In 1954, the Labour member of Parliament Mr. H.C. Mallam proposed a tunnel. However, the Town and Country Planning Advisory Committee rejected Mallam's proposal (Brian and Kennedy 1993). The tunnel proposal appeared again in 1957 (NSW Auditor-General 1994). The reason was the same: increasing the capacity of cross harbour crossing required either extra an carriageway on the existing Harbour Bridge, a new bridge, or a tunnel (ibid). The State Government again rejected the proposal for a tunnel due to its cost of 20 million pounds (Brian and Kennedy 1993). To increase crossing capacity, the tram track on the Bridge was given over to road space in 1959. But, it was realized that an eight lane road would not satisfy the growing cross-harbour travel demand (OSP 1992).

In 1960, the Minister for Local Government. Mr. Hills rejected three proposals by an international firm for building a tunnel under the harbour. On the other hand, the Opposition Liberal Party promised to build new bridge or a tunnel, if elected in the 1964 State elections (Brian and Kennedy 1993). However this promise was not fulfilled when the Liberal Premier of NSW opposed the tunnel on financial grounds in 1970. Similarly, the Minister of Transport and Highways rejected a tunnel proposed by the Australian Transport Study Group in 1975. In 1979, two large Australian companies, Ampol Petroleum and Pioneer Concrete announced their intention to prepare a feasibility study for a harbour crossing. This effort took the form of a proposed bridge and tunnel to cross the harbour (OSP 1992).

In 1980, the newly elected Wran Labor Government called for expressions of interest to construct a second bridge crossing. Several solutions appeared such as a deck on the harbour bridge, but were rejected on economic and environmental grounds. In 1982, a

proposal for a tunnel costed at $700 million from Rozelle to St Leonards appeared and was dropped (Brian and Kennedy 1993).

Finally in 1986, the Sydney Company Transfield and a Japanese company Kumagai Gumi approached the NSW government to build a tunnel as a private investment in collaboration with the NSW Government (NSW Auditor-General 1994). This proposal was eventually accepted. The construction of Sydney Harbour Tunnel began in January 1988 and was completed in August 1992 and opened to the public in September 1992 (NSW Auditor-General 1994).

3.2 Location

The Sydney Harbour tunnel is located in a well-developed residential, commercial and industrial area leading to the Central Business District of Sydney (Neilson 1991). This area has great scenic, historical and cultural value (Sharon: web). The tunnel provides a 2.3 kms dual carriageway road link between north and south of Sydney Harbour connecting the Warringah Freeway and the Cahill Expressway (NSW Auditor-General 1994).

Figure 1 Location of Sydney Harbour Tunnel

Source: OSP 1992

Box 1 Key Facts about the Sydney Harbour Tunnel

Proponent	NSW Department of Main Roads
Companies involved	Transfield and Kumagai Gumi
Legislation	The Harbour Tunnel Act, 1987
Construction started	January 1988
Tunnel opened for public	September 1992
Total Contracted cost	AU$ 553.8
Actual construction cost	AU$ 738
Toll agreed in 1986	AU$ 1
Toll on 1992 start of tunnel	AU$ 2
Length of tunnel	2.3 km
Number of traffic lanes	4

Dimensions of driven tunnel	10.5 m wide x 9 m high
Year tunnel ownership will revert to NSW Government.	2022

3.3 Key Justification

Three main justifications for the Sydney Harbour Tunnel were presented. The brief detail of these justifications are as follows:

a) Traffic Congestion

The main reason for building the Sydney Harbour Tunnel was to increase the capacity for cross-Harbour movement (Sharon: web). Sydney Harbour Bridge has provided a connection between the CBD and Northern Sydney since 1932 (OSP 1992). In 1986, the Sydney Harbour Bridge was carrying 13,000 vehicles at peak hour, almost the same total as was carried at the opening of the bridge (ibid). The average annual weekday traffic (AADT) was 196,000 vehicles per day, and the figure was expected to reach 240,000 vehicles per day by the year 2000 (Neilson 1991). Transport planners believed that the existing harbour crossing had reached maximum capacity in both morning and evening peaks in 1986 (ibid).

It was further argued that public transport was not the answer to this problem. The reason behind this thinking lies on figures that 46 per cent of north shore commuters already rely on public transport, and it was hard to increase their share of total travel (OSP 1992). However, it was believed that bus services would be improved because of the freer flowing conditions crossing the Harbour, which ultimately would improve travel time and reliability (Sharon: web). Therefore, for this reason, and in order to protect the aesthetic view of the Sydney Harbour Bridge, opera house and northern shore parkland, it was decided that the road tunnel was the best solution (Neilson 1991). These arguments can be found in the message from the NSW Premier at the opening of tunnel:

> ‘It is ironic that Sydney’s crown jewel, its Harbour, is also a barrier when it comes to traffic movement. To overcome that barrier and provide reasonable access to and from the city, it was necessary for either another bridge or a tunnel to be built. In a visual sense, the tunnel was the best option. It provides four more traffic lanes with very little impact upon landscape of the Harbour. The Government expects that motorists will see immediate benefits’ (NSW Premier’s message cited in OSP 1992: 1).

b) Economically Beneficial

The Department of Main Roads presented the Sydney Harbour Tunnel as an economically feasible project. The DMR claimed this justification on the basis of travel time saving, energy saving, reduced car accidents, and reduced vehicle operating costs (NSW Auditor-General 1994).

There are number of studies which have found that the tunnel is unjustifiable on economic grounds (NSW Auditor-General 1994). The Department of Environment and Planning found the travel time and energy savings were overestimated and indirect cost such as the loss of public transport patronage and the loss of parkland, were not included in the overall analysis. It was also argued that the distribution of costs and benefits was not fair. The

tunnel favoured motorists travelling across the Harbour and some property owners who benefited from enhanced property prices, at the cost of NSW taxpayers (DEP 1987). However, the Department of Main Roads rejected these arguments on the basis of funds invested by the private investor, Transfield-Kumagai.

c) Environmentally Beneficial

Under clause 57 of the Environmental Planning and Assessment Regulation, 1980, EIA/EIS is necessary before commencing a development project (Sharon 1990). Transfield-Kumagai hired engineering consultants Cameron McNamara to prepare the EIS for Sydney Harbour Tunnel (Sharon: web). They arrived at the conclusion that the project had little or no adverse environmental effects (ibid). Additionally, a cost-benefit analysis, as a part of the EIS, justified the project on the basis of reduced travel times for vehicles crossing the Harbour during times of congestion, energy savings because of reduced stop-starting when the Bridge is congested, reduced accidents and reduced vehicle operating costs.

However, the Department of Environment and Planning has rejected these arguments presented in the EIS as shown in Figure 2 (DEP 1987). The Department argued that the benefits do not really exceed the costs because the travel time and energy savings were overestimated and indirect costs such as the loss of public transport patronage and the loss of parkland were not counted, or were underestimated. Moreover, the EIS did not adequately study the impact of the construction of the Tunnel on the marine environment. In terms of distribution of costs and benefits, the Department found that the benefit goes only to motorists or property owners, while the costs will be borne by the New South Wales taxpayer if the toll fails to cover costs. The Department also raised the question of whether the Tunnel was fully funded by the private investors (ibid).

The North Sydney Municipal Council also conducted an independent inquiry for this project (Enersol 1989). This inquiry also found that Transfield-Kumagai consultants had overestimated the benefits and underestimated the environmental costs of the Tunnel project (ibid). Similarly, an inquiry conducted by the NSW Auditor General's Office in 1994, raised several questions about the arguments presented in the EIS and about the financial risks (NSW Auditor-General 1994).

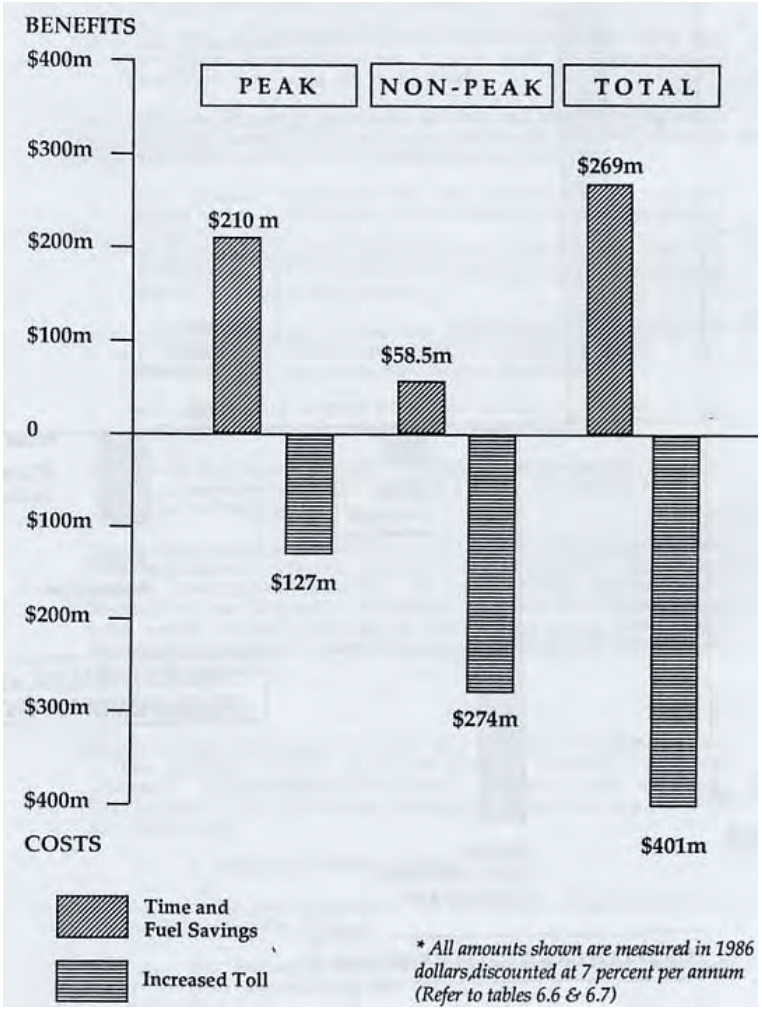

Figure 2 Sydney Harbour Tunnel: Estimated Benefits and Costs for Motorists 1987-2021

Source: DEP 1987

In short, there a number of studies were commissioned between 1986 and 1987 to examine the necessity of a harbour tunnel. They differed considerably in their conclusions as to the feasibility of the tunnel (Table 3).

Table 3 Justification of Sydney Harbour Tunnel

Type of Study	Consultants	Client Department	Conclusion	Remarks
Economic Studies	Travers Morgan	NSW Dept. of Main Roads	Tunnel is not economically justifiable	
Economic Studies	Gutteridge Haskins & Davey Pty Ltd	Transfield-Kumagai /Gumi, and Dept. of Main Rods	Tunnel is economically justifiable	Tunnel is justifiable on travel time, economic, energy and air quality grounds (p.15 cited NSW Auditor-General 1994: 257)
Economic Studies	Unisearch/ EIA Report	Dept. of Environment and Planning	Tunnel is not economically justifiable	'Technical deficiencies or contradictions which when summed lead to doubtful conclusions in support of the project' (NSW Auditor-General 1994:257)
EIA /EIS	Cameron McNamara	Transfield-Kumagai/ Dept. of Main Roads	Tunnel is environmentally justifiable	
EIA/EIS	Internal	Dept. of Environment and Planning	Tunnel is not environmentally justifiable	
EIA/EIS	Enersol Consulting Engineers	North Sydney Municipal Council	Tunnel is not environmentally justifiable	

Source: NSW Auditor-General 1994

3.4 Finance for Sydney Harbour Tunnel

Sydney Harbour Tunnel was completed on a BOT basis (OSP 1992). The construction of the tunnel was carried out by a joint venture comprising Kumagai Gumi Co Ltd, a Japanese-based corporation and Transfield, an Australian privately owned construction group (NSW Auditor-General 1994). The companies jointly created a Sydney Harbour Tunnel Company Ltd. (SHTC) to complete and operate the tunnel (NSW Auditor-General 1994). The BOT agreement between SHTC and NSW government was signed on 29 June 1987 and secured through an Act of Parliament (OSP 1992). The construction of Sydney Harbour Tunnel began in January 1988 and the tunnel was opened to the public in September 1992 (NSW Auditor-General 1994).

The Sydney Harbour Tunnel contracted construction cost was AU$ 553.8m in dollars (1987 dollars) and funded by three sources:

1. AU$486 million issue for 30 year inflation-index bonds underwritten by Westpac.
2. A loan of AU$ 40 million from the joint venture partners.

3. A AU$ 223 million interest free loan from the NSW Government (OSP 1992).

However, the actual cost of the Sydney Harbour Tunnel was AU$ $738 million in 1992, of which $560 million was in fixed construction costs (Brian and Kennedy 1993). Although it was presented that the Sydney Harbour Tunnel was a privately financed and operated project, the NSW Auditor-General noticed that the NSW Government has a vested interest in this project. The main interest was the transfer of the tunnel to the Government after 30 years. That is why the NSW Government. issued AU$223 million loan to the private consortium, SHTC (NSW Auditor-General 1994).

NSW Government proceded with the tunnel on the basis of two broad financial criteria:

1. The Harbour crossing toll should not exceed AU$ 1 in 1986 prices.
2. Construction, financing and operation of the project should be a private venture facilitated by a lease of public property for a fixed period (NSW Auditor-General 1994). Once debt-free, and worth an estimated AU$2 billion current, the tunnel will transfer to the NSW government in 2022 (Brian and Kennedy 1993).

The construction and the first 30 years of operation of the Tunnel is to be financed by revenue from tolls paid by vehicles traveling south in the Tunnel and on the Harbour Bridge. The tolls committed were AU$1 in 1986 (on the Bridge) and are indexed to increase with inflation (Sharon: web). The Auditor General's Report noted that the first criteria was not met, as the toll was doubled to AU$ 2, in contrast AU$ 1.45 upon opening of tunnel to the public (NSW Auditor-General 1994).

The Auditor General's Report also observed that most of the risks in relation to the tunnel were borne by the State (NSW Auditor-General 1994), as were the benefits received. It was further noticed that if the projection of traffic volumes will turn out not to be accurate in future than the majority of the cost will be borne by the Authority (ibid).

3.5 The Decision Making Process and Institutions Responsible for the Sydney Harbour Tunnel

Transfield and Kumagai-Gumi approached the NSW Government through the Department of Main Roads (now Roads and Traffic Authority) in 1986 to build a tunnel to cross the Sydney harbour on BOT basis. These companies offered to design, construct, finance and operate the Sydney Harbour Tunnel (Neilson 1991).

In March 1986 the Premier of New South Wales, Neville Wran, announced that a feasibility study for the Tunnel provided by a private consortium of Transfield and Kumagai-Gumi was favourable (Sharon: web). As the Transfield-Kumagai Joint Venture proposed the project directly to the NSW government, the normal tendering procedure was not followed (NSW Auditor-General 1994: 250).

Transfield-Kumagai hired a firm, Cameron McNamara, to prepare the EIS in compliance with the Environment and Planning Act 1979 (Sharon: web). Later an EIS prepared by the Joint Venture, went on public display from December 1986 to February 1987 (Sharon: web). There were 463 submissions made in response to the EIS. Thirty four of these were from Government Departments and local councils. Additionally there were four petitions with a total of 250 signatures on them. By far the majority of submissions and the petitions opposed the Harbour Tunnel proposal (ibid). In the light of submitted EIS and

consultation, the Department of Environment and Planning recommended that the Tunnel should not proceed and viable alternatives should be considered (Sharon: web).

The Minister for Roads, Mr Laurie Brereton, criticized the DEP report and he was supported by the Premier, then Mr Barry Unsworth. In April 1987 the NSW Government announced that it had given approval for the Tunnel. The Harbour Tunnel Act, 1987, was passed later that year (Sharon: web). Under the Sydney Harbour Tunnel (Private Joint Venture) Act 1987, the Commissioner for Main Roads was given the power of sole determining authority in relation to design, construction and operation of the Tunnel (NSW Auditor-General 1994). Moreover, this Act waived many obligations of the Department of Main Roads under the Environment Planning & Assessment Act, 1979 (ibid). Ultimately the Department of Main Roads prepared its own EIA in 1987 to comply with the EP&A Act and concluded that the tunnel was environmentally acceptable and economically viable (ibid). Transfield- Kumagai established a 'Sydney Harbour Tunnel Company Limited (SHTCL) to contract and operate the tunnel (NSW Auditor-General 1994: 250).

The Opposition Liberal Party, led by Mr Nick Greiner, campaigned against the Tunnel. However, after being elected in May 1988 the Greiner Government decided to go ahead with the Tunnel (Sharon: web). The Harbour Tunnel was completed in 1992.

In 1994, an inquiry was completed by the NSW Auditor General Report on the Sydney Harbour Tunnel. The Auditor General found many flaws in the justification of the tunnel. He concluded that 'Guidelines on Private Sector Participation in Infrastructure Provision' had not been followed in this project (NSW Auditor-General 1994). He also found that Sydney Harbour Tunnel was completed simply because the Government of the day and the Authority were eager to pursue the project (NSW Auditor-General 1994:258).

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Key Links

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http://www.rta.nsw.gov.au/
http://www.sta.nsw.gov.au/
http://www.tidc.nsw.gov.au/

Appendix - I

Name of Consultants Involved in the Sydney Harbour Tunnels

Nos.	Name of Consultants	Job
1	Travers Morgan	Economic Studies
2	Gutteridge Haskins & Davey Pty Ltd	Economic Studies
3	Unisearch	EIA
4	Cameron McNamara	EIA
5	Enersol Consulting Engineers	EIA
6	Devine Erby Mazlin	Architects for the Project
7	Coffey & Partners	Geotechnical Consultants
8	Wargon Chapman Partners	Design Manager for the Project, and Designers of the route and of the Ventilation Stations
9	Macdonald Wagner-Freeman Fox	Designers of the IMT
10	John Conneil-Mott Hay Anderson	Designers of the land tunnels
11	Gutteridge Haskins Davey, Maunsell Partners, Parsons Brinckerhoff International	Designers of the tunnel services

Source: Neilson 1991 and NSW Auditor-General 1994

Appendix - II

List of People Useful to Contact for Research on Sydney Harbour Tunnel

Name	Affiliations	Role/Remarks
Private Investors		
Mr Liam Bathgate	Public Affairs Manager, Sydney Harbour Tunnel Transfield-Kumagai Joint Venture	These are the people who are responsible for designing, financing and constructing the Tunnel
Academics		
Emeritus Professor Ross Blunden	Foundation Professor of Traffic Engineering, University of New South Wales	
Mr Jim Donovan	Action for Public Transport, University of Sydney	Action for Public Transport is opposed to the Tunnel
Professor David Hensher	Director, Institute of Transport and Logistics, School of Management and Public Policy, University of Sydney	Professor Hensher is an expert in transport economics
Dr Alan Jones	Research Scientist, Head of Division of Environmental Science, The Australian Museum	Dr Jones is an expert on marine ecology
Professor John Toon	Department of Urban & Regional Planning, University of Sydney	Professor Toon is an expert in planning and environmental law
Community		
Ms Jenny Corner	Spokesperson for Save Our Sydney, North Shore resident.	Save Our Sydney no longer exists but it was formed to oppose the Tunnel
Ms Alison Lloyd	North Shore resident	Ms Lloyd is opposed to the Tunnel
Ms Caron Morrison	Spokesperson for the Coalition for Urban Transport Sanity (CUTS)	is opposed to the Tunnel
Government / Politicians		
Mr Alan Finlay	Manager Transport Policy, NRMA (NSW Roads and Motorists Association)	The NRMA lobbies government for increased funding for roads and supports the Tunnel
Mr Bruce Judd	Manager, Tunnel Project, Harbour Tunnel Group, Dept of Main Roads, DMR (the DMR is now the Roads and Traffic Authority, RTA)	The DMR supported the Tunnel

Mr Richard Smyth	Richard Smyth Planning Consultants	Mr Smyth was Director of the Department of Environment and Planning at the time
Mr Ted Mack	MP for North Sydney, then Mayor of North Sydney	Mr Mack is opposed to the Tunnel and his Council ran a public inquiry into the Tunnel
Consultants		
Dr John Gerofi	Enersol Consulting Engineers, Engineering consultant	Dr Gerofi conducted the North Sydney Municipal Council Inquiry on behalf of the Council
Mr Alf Neilson	Director, Wargon Chapman Partners	Wargon Chapman are engineering consultants to Transfield-Kumagai Joint Venture
Dr Dennis Zines	Principal, Manager, Environmental Projects, Sinclair Knight & Partners (EIS consultants)	Sinclair Knight & Partners the EIS consultants

Source: Sharon website

Appendix - III

Political Affiliation of Governments in the State of NSW

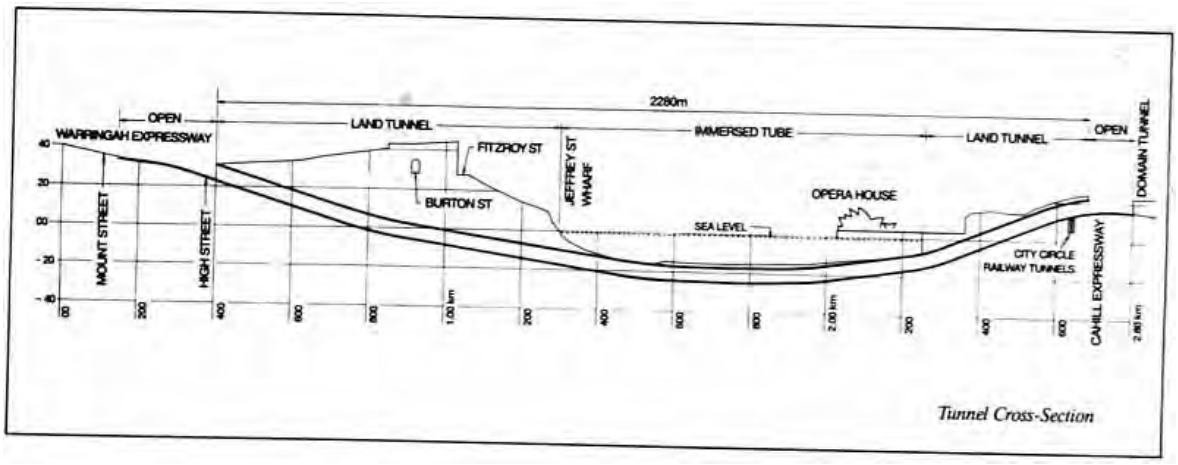
Decade	Commonwealth				NSW			
	From	To	PM	Party	From	To	PM	Party
1940s	7 Oct 1941	5 Jul 1945	John Curtin	LB	16 May 1941	6 Feb 1947	William John McKell	LB
	6 Jul 1945	13 Jul 1945	Francis Michael Forde	LB	6 Feb 1947	2 Apr 1952	James McGirr	LB
	13 Jul 1945	19 Dec 1949	Joseph Bendict Chifley	LB				
1950s	19 Dec 1949	26 Jan 1966	Robert Gordon Menzies	LIB	2 Apr 1952	22 Oct 1959	John Joseph Cahill	LB
					23 Oct 1959	30 Apr 1964	Robert James Heffron	LB
1960S	26 Jan 1966	27 Dec 1967	Harold Edward Holt	LIB	30 Apr 1964	13 May 1965	John Brophy Renshaw	LB
	19 Dec 1967	10 Jan 1968	John McEwen	LIB	13 May 1965	3 Jan 1975	Robin William Askin	LIB
	10 Jan 1968	10 Mar 1971	John Grey Gorton	LIB				
1970s	10 Mar 1971	5 Dec 1972	William McMahon	LIB	3 Jan 1975	23 Jan 1976	Thomas Lancelot Lewis	LIB
	5 Dec 1972	11 Nov 1975	Edward Gough Whitlam	LB	23 Jan 1976	14 May 1976	Sir Eric Archibald Lewis	LIB
	11 Nov 1975	11 Mar 1983	John Malcolm Fraser	LIB	14 May 1976	4 Jul 1986	Neville Kenneth Wran	LB
1980s	11 Mar 1983	19 Dec 1991	Robert James Hawke	LB	4 Jul 1986	25 Mar 1988	Barrie John Unsworth	LB
					25 Mar 1988	24 Jun 1992	Nicholas Frank Greiner	LIB
1990s	20 Dec 1991	11 Mar 1996	Paul John Keating	LB	24 Jun 1992	4 Apr 1995	John Joseph Fahey	LIB
	11 Mar 1996	Present	John Winston Howard	LIB	4 Apr 1995		Robert John Carr	LB

Source: Several cited in Falk and Toon 2003

Appendix - IV

Location and X-Section of Tunnel

Source: Brian and Kennedy 1993: Title



Source: Brian and Kennedy 1993: 91