

Standing Committee on State Development

Redevelopment and Remediation of the Rhodes Peninsula

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Terms of Reference

These terms of reference were referred to the Committee by the Hon Ian Cohen MLC in October 2001.

1. That the Standing Committee on State Development inquire into and report on plans, including Sydney Region Environment Plan 29, for redevelopment and remediation of the Rhodes peninsula, and in particular:
 - (a) the extent of land and water contamination at Rhodes and other contaminated land in the vicinity and the waters of Homebush Bay,
 - (b) the necessity for remediation of contaminated land and water, including the former Union Carbide site and land subject to reclamation in Homebush Bay,
 - (c) the cost of remediation,
 - (d) liability for the cost of remediation,
 - (e) any risk to existing and future residents,
 - (f) any risk to the environment, including terrestrial and marine fauna and flora,
 - (g) the effectiveness of transport plans, taking into account the proposed density of future development,
 - (h) the adequacy of public participation in the planning process,
 - (i) the health impacts of remediation and development, including any effect on the health of workers employed at Rhodes,
 - (j) any matters arising from, or incidental to, these terms of reference.

2. That the Committee report by 15 March 2002.

Committee Membership

The Hon Tony Kelly MLC	<i>Australian Labor Party</i>	Chair
The Hon Dr Brian Pezzutti RFD MLC	<i>Liberal Party</i>	Deputy Chair
The Hon Ian Cohen MLC	<i>The Greens</i>	
The Hon Henry Tsang MLC	<i>Australian Labor Party</i>	
The Hon Ian West MLC	<i>Australian Labor Party</i>	

Secretariat

Mr Robert Stefanic	Director/Senior Project Officer
Mr Steven Reynolds	Acting Director (to 15 April 2002)
Ms Annie Marshall	Committee Officer
Ms Cathy Nunn	Committee Officer

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Chair s Foreword

In conducting this inquiry, the committee faced three main complex issues concerning the Rhodes peninsula. Firstly, that any remediation activities will ensure the protection of human health and the environment. Secondly, that any development on the peninsula will be adequately served by public infrastructure and not adversely affect the surrounding community and environment. Finally, that community consultation is timely and effective.

The inquiry s terms of reference reflect concerns about contamination at the Rhodes peninsula and the proposed remediation activities. General concerns include, the extent of contamination, the standard to which the sites will be remediated and the methods and impacts of remediation. Although it may be technically possible to remediate land without subjecting human health and the environment to adverse risk, the committee wishes to ensure that this occurs in practice.

Adequate public transport infrastructure and community patronage underpins the success of large development projects. It is critical that government agencies not only implement measures to influence use of public transport but provide a commitment to reliable public transport infrastructure for the Rhodes community.

The adequacy of community consultation regarding remediation and redevelopment of the Rhodes peninsula was a recurring theme during the inquiry. Appropriate development should arise from good planning. Planning requires balancing a range of competing interests and achieving outcomes. The different merits of different cases must be evaluated and outcomes may not be those desired by all interest groups. The committee wishes to ensure that the Government agencies maintain probity and integrity in the evaluation process.

Rhodes Peninsula represents one of the most challenging projects in New South Wales as far as environmental assessment is concerned. If confidence in the ability of government agencies to protect the public interest is to be maintained, public participation and consultation should be a meaningful process that extends beyond legislative requirements.

The Standing Committee on State Development, in conducting this inquiry, has endeavoured to independently compile and review all relevant information that may not be available to the community. The committee has made 33 recommendations providing guidance to government agencies in respect of remediation, planning and development issues. Reflecting the committee s ongoing concern and commitment to the Rhodes community, the final recommendations in this report not only request annual reviews from relevant Ministers, but also compels the committee to review the issues raised in this report in five year s time.

In my capacity as Chairman, and on behalf of the members of the Standing Committee on State Development, I would like to thank the staff of the Committee s secretariat who worked on the inquiry. Appreciation is extended to the previous Acting Director, Mr Steven Reynolds, Director/Senior Project Officer, Mr Rob Stefanic, and the Committee Officer, Ms Annie Marshall for their invaluable research, analysis and administrative support.

I would also like to thank all those individuals and organisations who directed their time, interest and expertise to preparing submissions or appearing as witnesses before the Standing Committee during this inquiry.

Hon Tony Kelly MLC

Chairman

Summary of Recommendations

Recommendation 1 26

That the NSW Environment Protection Authority (EPA) publish the rationale and justifications for remediation standards applied to Precincts B and C.

Recommendation 2 44

That the human health study conducted by URS Australia entitled, *Human Health and Environmental Risk Assessment of Sediments in Southeast Homebush Bay*, be made publicly available by the EPA and City of Canada Bay Council.

Recommendation 3 55

That the EPA should only approve a proposal for treatment using the direct thermal desorption (DTD) method if it is convinced that the treatment complies with all the relevant protocols regulating the treatment of dioxin and other organic chemicals.

Recommendation 4 55

That in the event of reports that emissions from treatment processes exceed established tolerance levels, the EPA develop an emergency communication plan to provide an effective and prompt response to meet safety concerns, including notification to all affected residents.

Recommendation 5 58

That if indirect thermal desorption (ITD) is identified by the EPA as the preferred treatment technology, the NSW Government should negotiate with Thiess Services to provide supplementary strategies over and above the \$20 million originally committed to remediate the proposed areas of Homebush Bay.

Recommendation 6 61

That the EPA frequently monitor records of site activities and report to the community liaison groups in order to maintain community confidence in responsible remediation activities.

Recommendation 7 61

That the EPA provide a rapid investigation response to adverse reports by the public during remediation activities.

Recommendation 8 64

That WorkCover ensures that the occupational health and safety strategy in the Remedial Action Plans for Precincts B and C and Homebush Bay incorporate strict requirements modelled on the Homebush Bay Olympic site remediation project.

Recommendation 9 64

That WorkCover regularly audit remediation activities for adherence to occupational health and safety guidelines.

Recommendation 10 67

The committee recommends that the EPA ensure that air quality control measures implemented by site remediators include:

- limiting open excavation face to a minimum to reduce potential dust and odour emissions
- covering all stockpile areas
- operation of specific odour control measures and odour suppressants
- inclusion of truck wash down areas to minimise dust disturbance from truck wheels
- use of water sprinklers to suppress dust sources and
- monitoring regimes and emergency triggers to be included in the operation of the treatment equipment if fugitive stack emissions occur.

Recommendation 11 68

That the EPA ensure the remediation proponents implement air monitoring measures both adjacent to precincts B and C as well locations further from the peninsula during remediation of those sites.

Recommendation 12 69

That results of air monitoring be made publicly available (including the website www.rhodesremediation.nsw.gov.au) as part of ongoing community communication and consultation programs.

Recommendation 13 70

That in the interest of public awareness, NSW Health provide leadership to any community liaison group created to examine health issues of concern.

Recommendation 14 76

That the Waterways Authority, as the owner of the land under Homebush Bay, further investigate measures to remediate dioxin hotspots and other known contaminants.

Recommendation 15 76

That during remediation and for 12 months after completion of remediation of Homebush Bay:

- sampling of sediment and fish from remediated and non-remediated areas occurs on a quarterly basis and
- data collected from sampling be incorporated in a future human health and ecological risk assessment.

Recommendation 16 76

That upon completion of remediation of Precincts B and C:

- the total fishing ban remain for a period of at least 12 months
- after 12 months, an independent detailed human health and ecological risk assessment be conducted sampling sediment and fish from remediated and non-remediated areas of Homebush Bay, and
- the ban remain until it is demonstrated that contaminant levels in fish are reduced to acceptable levels.

Recommendation 17 77

The committee recommends that the EPA, in conjunction with the appropriate regulatory authorities, closely monitor environmental controls and on-site management of remediation works to ensure that the integrity of the environment and the health and safety of workers and the public is not compromised. Environmental controls that should be monitored include:

- surface water, leachate and groundwater management and treatment controls
- erosion and sediment controls
- odour and dust controls and
- noise and traffic measurement and safety measures.

Recommendation 18 77

That the EPA encourage, where possible, the parties remediating Precincts B and C to coordinate remediation activities so that disruption to the community is minimised.

Recommendation 19 78

That the Rhodes Remediation website www.rhodesremediation.nsw.gov.au be updated and dedicated as a repository for all information of community interest concerning remediation in the area.

Recommendation 20 78

That the Waterways Authority link this Standing Committee on State Development report to the Rhodes remediation website.

Recommendation 21 91

That Planning NSW implement the recommendations of the NSW Audit Office report entitled *Performance Audit Report: Department of Urban Affairs and Planning, Environmental Impact Assessment of Major Projects in NSW* with a view to:

- comprehensively informing communities affected by a development to maintain public confidence in government processes and
- including community participation in shaping draft planning documents.

Recommendation 22 95

That the Waterways Authority and Environment Protection Authority coordinate and effectively resource the establishment of a reference group based on the Homebush Bay Environment Reference Group which includes membership drawn from developers, the community, environmental organisations, government agencies, academics and other specialists.

Recommendation 23 96

That the Waterways Authority significantly increase the content of the website www.rhodesremediation.nsw.gov.au to at least include the following information:

- the Environmental Impact Statements for the remediation of Precinct B, (including the adjacent area of Homebush Bay) and Precinct C when publicly available
- the Environmental Impact Statements for the development of Precincts A,B and C when publicly available
- functions and meetings of the Rhodes Peninsula Reference Group
- meetings of Community Liaison Groups and
- updates on remediation and redevelopment matters affecting the Rhodes peninsula.

Recommendation 24 105

That Transport NSW urgently review the assumptions made in the Transport Management Plan, to clarify whether or not estimated rail passenger loads can be adequately accommodated.

Recommendation 25 105

That the Transport Management Plan encompassing all forms of transport for the Rhodes peninsula be reviewed now and within 5 years time.

Recommendation 26 105

That Planning NSW, when considering large development projects, carefully consider transport planning in cooperation with Transport NSW, to ensure that:

- realistic assumptions are proposed in the Transport Management Plan and
- where public transport related infrastructure is required, that this can be provided before completion of the project.

Recommendation 27 106

That the Department of Education and Training conduct an independent review of future public education demand from Rhodes, Liberty Grove and Concord areas.

Recommendation 28 107

That the Waterways Authority ensures that community liaison groups formed during the remediation and redevelopment of the Rhodes peninsula include at least one representative from the Liberty Grove community.

Recommendation 29 109

That the Sydney Harbour and Parramatta River Catchment Management Board broadly publicise its objectives and plans for the river system and provide a period of at least 8 weeks for public consultation and participation.

Recommendation 30 110

That the committee:

- monitor the remediation and redevelopment activities at the Rhodes peninsula for a four year period (until 30 June 2006)
- consider issues arising from remediation and redevelopment
- table any additional report in the Legislative Council from time to time, and
- consider feedback from residents, local community groups, industry, unions, agencies and local government bodies.

Recommendation 31 110

That the Minister for Transport and Minister for Roads, as the Minister responsible for public transport planning, reports annually (up to and including 30 June 2006) to the committee to identify transport planning initiatives that will facilitate patronage of public transport to and from the Rhodes peninsula.

Recommendation 32 110

That the Minister for Transport and Minister for Roads, as the Minister responsible for the Waterways Authority, reports annually (up to and including 30 June 2006) to the committee on the progress of remediation of the bay area adjacent to the Rhodes peninsula.

Recommendation 33 110

That the Minister for the Environment provides to the committee, reviews annually documenting variations from environmental guidelines by remediation activities. The first review should commence from the year ended 30 June 2003. Reviews thereafter should be conducted annually up to and including 30 June 2006.

Glossary

Benthic	a plant or animal that lives on the floor of a lake or sea
Billion	thousand times a million - 10^9
bw	bodyweight
Congener	One of a number of closely related chemicals derived from the same parent compound
Dioxins	Term used to refer to PCDDs, or sometimes more specifically to TCDD or more broadly to PCDDs, PCDFs and other closely related substances - in all there are several hundred congeners. They are POPs, and are unintended by-products of some human activities. About 30 congeners (including PCDFs and co-planar PCBs) are considered to have significant toxicity.
FAO	Food and Agriculture Organisation
Furans	Term used to refer to PCDFs
g	Gram
Hexachlorobenzene	A POP previously used as a pesticide, also a waste product from some industrial processes.
LOAEL	Lowest observable adverse effect level
MRL	maximum residue level
mg	milligram = 10^{-3} gram (0.001 g)
µg	microgram = 10^{-6} gram (0.000 001 g)
NOAEL	no observable adverse effect level
ng	nanogram = 10^{-9} gram (0.000 000 0001 g)
PCBs	Polychlorinated biphenyls, a group of related chemicals previously used widely in insulating oils in electrical equipment, but also unintended by-products of some human activities. They are POPs and some PCBs are similar to dioxins and furans in structure and properties.
PCDDs	Polychlorodibenzodioxins, commonly known as dioxins, a group of related chemicals that are usually present as mixtures and found as minor impurities among other chemicals. They are poorly water soluble but highly soluble in lipids (fats and oils) and, therefore, accumulate in lipids of living organisms and bioaccumulate through the food chain. They are POPs that are unintended by-products of some human activities.
PCDFs	Polychlorodibenzofurans, commonly known as furans, closely related to PCDDs and sometimes included with them as dioxins. They are POPs.
pg	Picogram = 10^{-12} gram (0.000 000 000 001 g)
POPs	Persistent Organic Pollutants, chemical substances that persist in the environment, bioaccumulate through the food web, and pose a risk of causing adverse effects to human health and the environment
ppt	parts per trillion
TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin, the most widely studied and toxic dioxin congener
TCDF	2,3,7,8-tetrachlorodibenzofuran, a furan congener closely related to TCDD
TDI	tolerable daily intake
TEF	toxic equivalency factors
TEQ	toxic equivalents
Trillion	million times million - 10^{12}
TWI	tolerable weekly intake
UNEP	United Nations Environment Program
WHO	World Health Organisation

Chapter 1 Introduction

Background to this inquiry

1.1 On 24 October 2001 the Legislative Council passed a resolution¹ referring the following terms of reference to the Standing Committee on State Development:

1. That the Standing Committee on State Development inquire into and report on plans, including Sydney Region Environment Plan 29, for redevelopment and remediation of the Rhodes peninsula, and in particular:
 - (a) the extent of land and water contamination at Rhodes and other contaminated land in the vicinity and the waters of Homebush Bay,
 - (b) the necessity for remediation of contaminated land and water, including the former Union Carbide site and land subject to reclamation in Homebush Bay,
 - (c) the cost of remediation,
 - (d) liability for the cost of remediation,
 - (e) any risk to existing and future residents,
 - (f) any risk to the environment, including terrestrial and marine fauna and flora,
 - (g) the effectiveness of transport plans, taking into account the proposed density of future development,
 - (h) the adequacy of public participation in the planning process,
 - (i) the health impacts of remediation and development, including any effect on the health of workers employed at Rhodes,
 - (j) any matters arising from, or incidental to, these terms of reference.
2. That the Committee report by 15 March 2002.

1.2 This reporting date was amended by the Legislative Council to 15 April 2002², to 31 May 2002³ and then to 28 June 2002.⁴

¹ *Minutes of Proceedings of the Legislative Council, No 128, 2nd Session of the 52nd Parliament.*

² *Minutes of Proceedings of the Legislative Council, No 141, 2nd Session of the 52nd Parliament.*

³ *Minutes of Proceedings of the Legislative Council, No 9, 3rd Session of the 52nd Parliament.*

⁴ *Minutes of Proceedings of the Legislative Council, No 14, 3rd Session of the 52nd Parliament.*

Conduct of this inquiry

1.3 In conducting this public inquiry the committee endeavoured to:

- facilitate broad and diverse public participation,
- generate public and stakeholder discussion, and
- achieve the above aims in a cost effective manner.

1.4 The committee applied four mechanisms to achieve these aims. Firstly, the committee agreed to advertise its terms of reference inviting public submissions in major Sydney suburban print media delivering to areas inclusive of and bordering on the Rhodes peninsula. Advertising was also placed in print media in the Sydney Metropolitan area.⁵ A list of publications and locations of advertisements appears below.

Table 1.1 Publications, position and date of advertising of committee s terms of reference ⁶

Publication	Position	Insertion date	Estimated circulation
Metropolitan			
The Sydney Morning Herald	Early General News	Saturday 3 November 2001	249,668
Suburban			
Drummoyne Five Dock & District News	Early General News	Tuesday 6 November 2001	45,000
Inner Western Suburbs Courier	Early General News	Monday 5 November 2001	74,241
Glebe & Inner Western Weekly	Early General News	Wednesday 7 November 2001	77,127
The Weekly Times (Gladesville	Early General News	Wednesday 7 November 2001	43,000
Foreign Language			
O Kosmos (Greek)	Early General News	Wednesday 7 November 2001	66,650
La Fiamma (Italian)	Early General News	Wednesday 7 November 2001	22,000
Sing Tao (Chinese)	Early General News	Wednesday 7 November 2001	20,000
Ad Diyar (Arabic)	Early General News	Wednesday 7 November 2001	47,000
El Telegraph (Lebanese)	Early General News	Wednesday 7 November 2001	22,000
Chieu Duong (Vietnamese)	Early General News	Wednesday 7 November 2001	98,000
Spanish Herald (Spanish)	Early General News	Wednesday 7 November 2001	23,305

⁵ Standing Committee on State Development, *Minutes of the Proceedings, No 42*, 25 October 2001, Item No 3.

⁶ Government Advertising Agency, Department for Public Works and Services, *Media Rate List*, July 2001 to June 2002.

- 1.5 The combined print media circulation for the committee s terms of reference was 787,991 at a cost of \$8,294.58.⁷
- 1.6 Secondly, the committee utilised the Parliament of New South Wales web site <http://www.parliament.nsw.gov.au> to enable visitors to generate and forward electronic submissions to the committee.
- 1.7 The committee received 30 submissions and a further 16 supplementary submissions. A list of submissions received appears in Appendix 3.
- 1.8 Thirdly, the committee disseminated details of inquiry commencement, terms of reference and scheduling of its public hearing to numerous media outlets across the Sydney Metropolitan area. As it is cost prohibitive for the committee to advertise in all print media within a relevant area, media releases were distributed to print, television and radio media in an effort to consult as widely as possible. As a result, the committee placed a high reliance on suburban and non-English language media to provide exposure about the inquiry.
- 1.9 Finally, the committee conducted two public hearings on 7 February 2002 and 8 February 2002 receiving evidence from 23 key witnesses (one appearing twice) over more than 10 hours. A statistical summary of evidence received is presented in Table 1.2 and Table 1.3 respectively. A list of witnesses who appeared before the Committee is detailed as Appendix 4.

Table 1.2 Number and percentage of submissions by organisation type

Organisation type	No. of submissions	Percentage of total
Private citizen	8	26.7%
Private organisation / Business or interest group	13	43.3%
Government agency / local Council	9	30%
TOTAL	30	100.0%

Table 1.3 Number and percentage of witnesses by organisation type

Organisation type	No. of witnesses	Percentage of total
Private organisation / Business or interest group	13	59.1%
Government agency / local Council	9	40.9%
TOTAL	22	100.0%

- 1.10 The committee considered the Chair s draft report at its meetings on 19 and 20 June 2002.

⁷ Actual reach (or number of persons) who were exposed to the advertising would be less given duplication of readership.

Structure of this report

- 1.11** The terms of reference to this inquiry reflect uncertainty in the community regarding not only the existing contamination at the Rhodes peninsula, but also the proposed remediation activities. The general concerns include:
- the extent of contamination
 - the standard to which the sites will be remediated
 - the methods of remediation and
 - the impacts of remediation.
- 1.12** Chapter two will address the first of these concerns in the context of historical land uses at Rhodes.
- 1.13** Chapter three examines the chemical contaminants of concern to the land areas at Rhodes as well as the adjacent area of Homebush Bay.
- 1.14** Chapter four outlines the environmental regulation applicable to contaminated land and includes a history of environmental regulation over Precincts A, B, C and Homebush Bay.
- 1.15** Chapters five, six and seven specifically address risks of harm to human health and the environment and remediation issues including the present risk from contaminants, proposed remediation standards and technology, and potential impacts of remediation on human health and the environment.
- 1.16** Chapters eight, nine and ten examine development and planning based issues. Specifically, chapter eight outlines the planning controls and requirements applicable to proposed activities on the Rhodes peninsula. Chapter nine investigates the adequacy of public consultation conducted by government agencies and private developers. Chapter ten considers specific issues related to the proposed residential and mixed use development.
- 1.17** The committee makes 33 recommendations for the NSW Government to consider.
- 1.18** The Standing Committee on State Development, in conducting this inquiry, has endeavoured to independently compile and review all relevant information to provide the community with an easily accessible reference document.

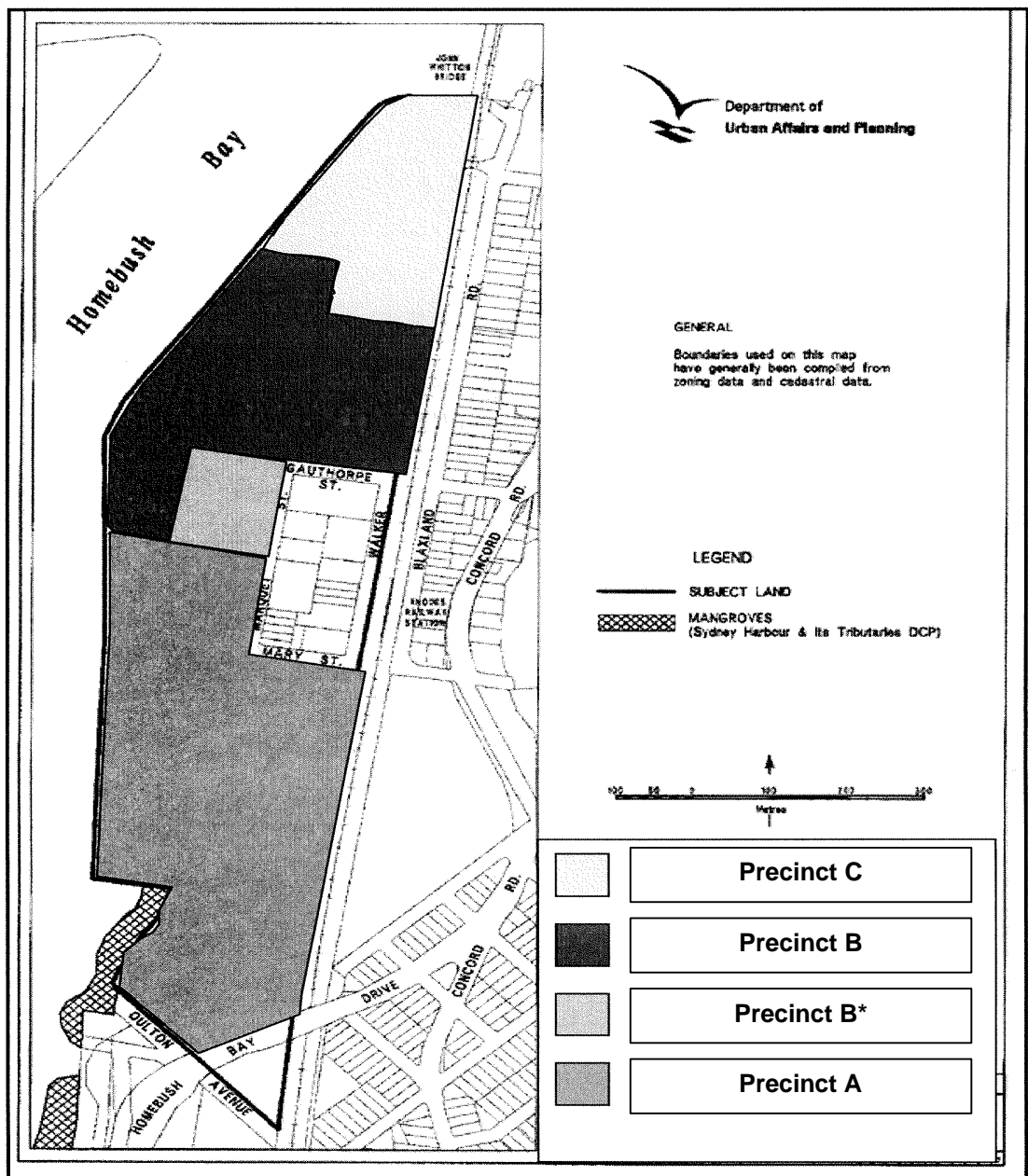
Chapter 2 History of the Rhodes Peninsula Site

The terms of reference to this inquiry require the committee to examine the extent of land and water contamination on the Rhodes peninsula and the adjoining waters of Homebush Bay. The history of industrial usage of the Rhodes peninsula provides a clear indication of the extent of contamination.

Location

2.1 The Rhodes peninsula is situated 14 kilometres west of the Sydney Central Business District, 8 kilometres east of Parramatta and 6 kilometres north-west of Burwood. The Rhodes peninsula site has a complex history of industrial use and land ownership. The three main sites are commonly referred to as Precinct A, B and C. The areas are depicted in the following map:

Figure 2.1
Rhodes peninsula boundaries



2.2 The three main development sites at the Rhodes peninsula are presently owned by Orica Australia (Precinct A), Waterways Authority (Precinct B)⁸ and Rhodes Peninsula Developments Ltd, a subsidiary of Meriton Apartments (Precinct C). The sites were formerly owned by ICI, Union Carbide and Allied Feeds respectively and are commonly referred to by those names.

Land use of the Rhodes sites

2.3 Solving the contamination problem on the Rhodes peninsula and in Homebush Bay is complex. Various factors contribute to this complexity including:

- changing uses and ownership of the sites, which have had a variety of impacts on the peninsula and
- changes to the applicable environmental and planning controls during the history of the sites, depending on the use at the time.

2.4 The history of the site fits into two overlapping stages. From the early 1900s to the early 1970s, concentrated industrial use resulting in toxics and hazardous waste compounds, followed by increasing planning and environmental regulation as alternative uses were considered for the site.

2.5 The uses of the sites have changed the peninsula in many ways, particularly the size of the land itself. In the 1930s, the appearance of the Rhodes peninsula was significantly different to the land profile in the 1970s as a result of land reclamation which involved backfilling industrial waste into the Bay. The following aerial photos clearly show the changing land profiles (Figures 2.2 – 2.4).

2.6 Figure 2.3 shows the changing land profile commencing with Precinct B and extending to precinct C in Figure 2.4.

⁸ The Lidis Group purchased a part of Precinct B marked with an asterisk (*) in Figure 2.1.

Figure 2.2 Rhodes peninsula 1930



Figure 2.3 Rhodes peninsula 1951



Figure 2.4 Rhodes peninsula 1970



Source:
<http://www.rhodesremediation.nsw.gov.au/areahistory.html>,
(accessed 18 March 2002)

History of Precinct A⁹

- 2.7** Precinct A consists of two sites formerly owned by CSR at Mary Street and Berger Paints at Alfred Street. Industrial activity began on the Mary Street site in 1913 with the establishment of a foundry. During the 1950s the site was developed by CSR into a chemical plant producing compounds such as plasticisers, acetates and industrial alcohol. Orica Australia, then known as ICI Specialty Chemicals (ICI), purchased the Rhodes site in 1986 from CSR and began reducing production capacity from 1992 until final closure in 1997.
- 2.8** Industrial development at the Alfred Street site began in 1919, with the establishment of the Berger Paint factory. Operations included paint milling, storage of raw materials such as solvents and monomers, lead carbonate, resin, varnish production and laboratory operations. Lead by-products have over time leached into the Bay. Dulux acquired Berger Paints in 1986 and immediately began to wind up operations. In 1988 ICI acquired the site from Dulux and closed down the remaining paint factory.
- 2.9** In 1997 ICI announced its intention to investigate the level of contamination in preparation for later remediation and redevelopment. In 2000 ICI, now trading as Orica Engineering, entered into a commercial arrangement with property developer, McRoss Developments, to develop a mixed land use of medium density residential housing, as well as some commercial and retail outlets. A remediation application was approved by Concord Council (now part of City of Canada Bay Council) in September 1998. The remediation was conducted and completed by Walker Civil Engineering.
- 2.10** On the former CSR part of the site hydrocarbon contaminated soil was pumped to the surface and treated off-site. The soil contamination was treated by land farming which is a method of mixing and aerating the soil to evaporate hydrocarbons and to initiate some biological action to break down some contaminants. On the former Berger part of the site which was contaminated with lead, on-site treatment initially used soil-washing techniques which were found to be ineffective. Orica then excavated and disposed of the material off-site in accordance with EPA guidelines at the time.¹⁰
- 2.11** Validation certificates for the completed works were issued in December 2001.

⁹ Primary sources for this section are Submission 5, Environment Protection Authority, and Submission 17, Orica Australia Pty Ltd

¹⁰ J Woodward, Assistant Director-General, Environment Protection Authority, Evidence, 7 February 2002, p38

History of Precinct B¹¹

- 2.12** Precinct B occupies an area of 10.16 hectares. It was first used for industrial purposes in 1928, when the original owners, Timbrol Ltd, started the production of timber preservatives and other chemical based commodities, utilising waste coal tar oils from the Australian Gaslight Company (AGL) operations at Mortlake.
- 2.13** In 1949 the Timbrol plant began producing various chlorinated herbicides including DDT, 2,4,5-T and 2,4-D which are both ingredients in Agent Orange. A significant by-product of the manufacture of 2,4,5-T was 2,3,7,8 tetrachlorodibenzo-p-dioxin (TCDD), the most toxic of dioxin compounds. Other substances causing contamination of the site are various congeners of dioxins, furans, organochlorines, phenols and several metals.
- 2.14** In 1957 Union Carbide Australia Ltd, a multinational chemical manufacturer, purchased the site. In 1969 international research identified the presence of trace quantities of dioxin in 2,4,5-T production¹², and the following year Union Carbide began storing dioxin waste in drums for off-site disposal. The production of 2,4,5-T was phased out from 1976.
- 2.15** A history of chemical manufacture on the site is summarised in the following table.

Table 2.1 History of chemical manufacture on Precinct B

Chemical	Period of manufacture
Coal tars (PAHs) (timber preservative)	1928-1936
Xanthate (timber preservative)	1933-1986
Aniline Nitrobenzene (explosive)	1940-1961
Synthetic Phenol	1943-1971
Chlorobenzene/Chlorophenol/DDT (dioxin precursors)	1948-1983
Electrolytic Chlorine Plant	1953-1976
2,4-D and 2,4,5-T Herbicides (dioxin precursors)	1949-1976
Bisphenol A (DPP)	1960-1976
Phenol Formaldehyde Resins	1964-1976

Source: Submission 7, Theiss Services p 4

- 2.16** Reclamation of Precinct B took place in four stages, identified as areas R1, R2, R3 and R4. The location of the reclamation areas and the type and thickness of the layers of fill contained in each are shown schematically in Appendix 1 (at p1). Areas R1 to R4 were reclaimed by placing fill behind sea walls formed in Homebush Bay. Areas R1 and R2 contain mainly mixed clean fill material (soil and rock) and demolition rubble overlaying

¹¹ Main sources for this section are Submission 27, Waterways Authority, Submission 5, Environment Protection Authority, Submission 7, Theiss Services

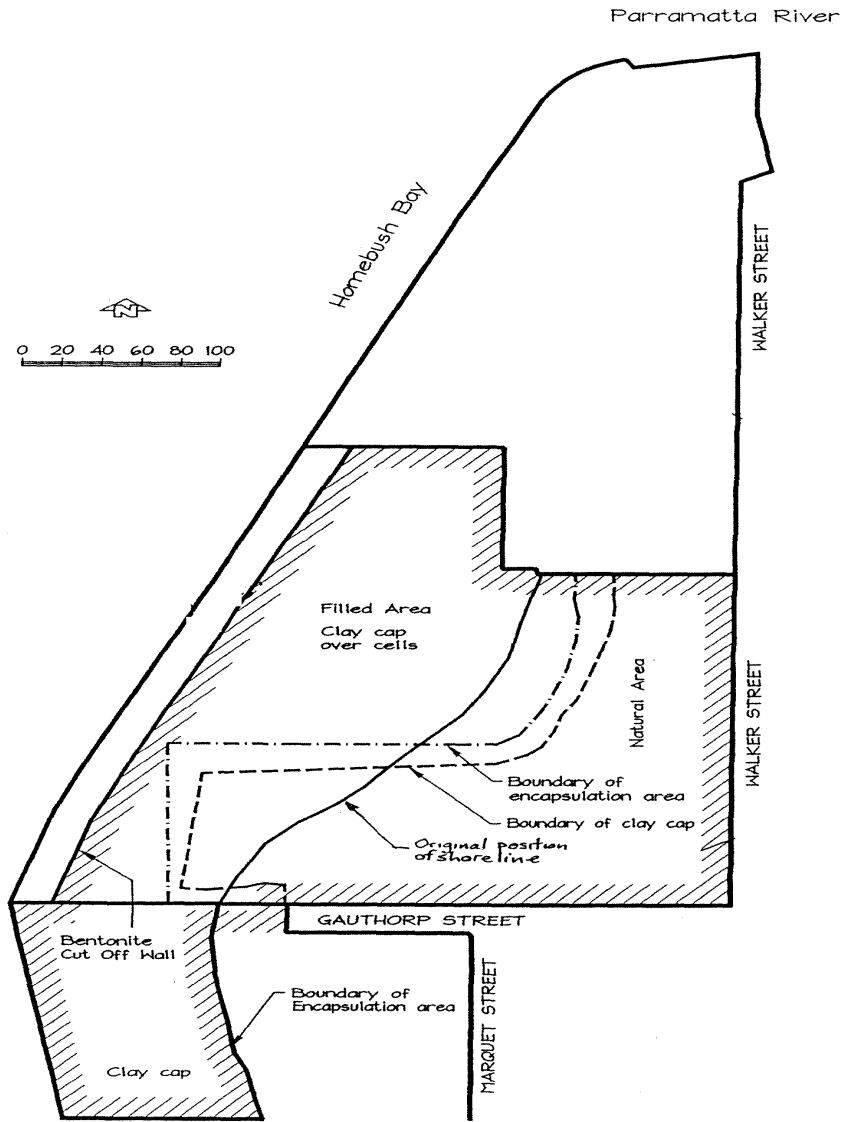
¹² Submission 5, Environment Protection Authority, p38

the original marine mud. The fill in reclamation areas R3 and R4 consists mainly of spent lime and ash, both being waste by-products of chemical manufacturing processes undertaken on the site.¹³

- 2.17** In 1986 Union Carbide closed its remaining chemicals manufacturing operations and began demolition of the above ground plant and buildings. In May 1987, the EPA's predecessor, the State Pollution Control Commission (SPCC), directed Union Carbide that regulatory approval was required before any further remediation took place. Union Carbide had ceased operations in Australia when it formed Lednez Pty Ltd, in October 1991 as a subsidiary whose asset was the contaminated site. The NSW Government acquired the site, and responsibility for it, in February 1999.
- 2.18** Partial remediation of the site was undertaken to a non-residential land use standard from the late 1980s to the early 1990s. At that time a large amount of contaminated oil was recovered from trenches excavated in fill-in reclamation areas R1 and R2. The contaminated oil was sent offshore for destruction by incineration.
- 2.19** During the remediation, contaminated fill on the east and south of the site was excavated to shale bedrock. This resulted in a large L shaped excavated area located on the eastern and southern sides of the site. Material from the excavation, plus demolition materials (crushed masonry) was placed in an encapsulation cell on the centre of the site. The encapsulation cell on R1-R2 and the remaining filled areas R3 and R4) were then capped with approximately 2 metres of clean clay.
- 2.20** At that time a bentonite clay cut-off wall was also installed along the western boundary of the site to reduce the migration in ground-water of chemicals from the site into Homebush Bay. The location of the cut-off wall is shown below in Figure 2.5. It extends across the R1, R2 and R4 reclamation areas, and is set back about 20 metres from the seawall. Significant contaminated fill remains between the cut-off wall and the seawall.

¹³ Submission 7, Thiess Services, p4

Figure 2.5 Encapsulation boundaries



Source: Submission 7, Theiss Services

2.21 A summary of average concentrations of the main contaminants present in various layers of fill materials in the encapsulation cell and reclamation areas R1 to R4 is given in Table 2.2 below.

Table 2.2 Average contamination levels in soil and fill on Precinct B

Area/ material type	Total TPHs (ppm)	Total PAHs (ppm)	Total OCPs (ppm)	Total Chloro- Phenols (ppm)	Total Chloro- benzenes (ppm)	Total dioxins & furans (TEQ ppb)
Encapsulation						
Clay cap	68	4	4	0.3	1	0.2
Cell fill	260	9	4	18	10	2.4
Areas R1 + R2						
Original hard fill	9347	1301	71	13	388	13
Ash fill	2525	122	6	16	54	10
Spent lime fill	5545	840	4	1	198	0.2
Sediments	119288	2253			165910	NT
Area R3						
Mixed hard fill	2451	57	3	16	43	16
Ash fill	1471	12	8	245	9	3
Spent lime	1172	29	21	34	6	53
Sediments	687	14	1	81	2	0.1
Area R4						
Clay cap	71	4	1	0.3	1	0.4
Mixed hard fill	1506	32	54	164	43	
Ash fill	10847	280	24	69	87	23
Spent lime	1104	22	108	229	219	128

TPHs = total petroleum hydrocarbons eg petrol, distillate and oil

PAHs = polycyclic aromatic hydrocarbons eg coal tars and road tars

OCPs = organochlorine pesticides eg DDT

Chlorobenzenes and chlorophenols chemical building block for dioxins

TEQ = Toxicity Equivalence, NT = not tested, ppm = parts per million or mg/kg, ppb = parts per billion or ug/kg

Source: Submission 7, Thiess Services, p5

2.22 Inspection of the data shows that the highest dioxin levels occur in spent lime fill in areas R3 and R4. However not all the lime fill on the site is contaminated. Most of the lime in areas R1 and R2 and some of the lime in area R3 contains only very low levels of dioxins.¹⁴

¹⁴ Submission 7, Thiess Services, p6

History of Precinct C¹⁵

- 2.23** Precinct C is the site at the northernmost point of the peninsula. The site has an area of 5.48 hectares and is bounded by Homebush Bay on the western side, the Parramatta River on the north, Walker Street and the main northern railway on the east and the former Union Carbide Factory on the southern side.
- 2.24** In 1919 a flour mill was built on the site, at 42 Walker Street, by John Darling. From this date it was progressively developed until Allied Feeds Mills took over the site for the same use. The main contamination concern lies on that part of the site built-up from reclaimed land created by backfilling into the bay with industrial waste from the Union Carbide factory. From the period 1958 until 1974 this reclamation resulted in the western part of the site being contaminated with a range of chemical wastes, including dioxin, chlorinated benzenes and phenols, herbicides and organochloride pesticides.
- 2.25** In 1991 the site was purchased by Pental Nominees Pty Ltd, which was shortly afterwards advised not to disturb the site without approval by the SPCC. The site was subsequently purchased by Bankers Trust Custodial Services (BT), with an announcement in 1997 that the NSW Government and BT had agreed in principle to concurrently remediate Homebush Bay and Precinct C. This did not progress, and in February 2001 a Meriton backed development company called Rhodes Peninsula Developments purchased the site from BT.

Homebush Bay¹⁶

- 2.26** Seepage from the reclaimed foreshore area of Precincts B and C, and tidal exchange has resulted in the sediments of the North Eastern portion of Homebush Bay becoming contaminated with a range of chemical wastes, including dioxin.
- 2.27** In 1997 the NSW Government announced that it was willing to contribute up to \$21 million to remediate Homebush Bay.¹⁷ During debate in the Legislative Assembly, the Hon Carl Scully MP, the Minister for Ports¹⁸, stated:

Homebush Bay is one of the State's most polluted waterways and is a blight on our environmental record. That will change as a result of the work undertaken by this Government. Homebush Bay will once again become a waterway of which we can all be proud, and it will reclaim its legitimate place as part of the best harbour in the world.¹⁹

¹⁵ Main sources are Submission 5, Environment Protection Authority, and Submission 11, Environmental Resources Management Australia.

¹⁶ Main sources for this section are Submission 5, EPA, and Submission 27, Waterways Authority

¹⁷ The Hon Carl Scully MP, Legislative Assembly, *Hansard*, 19 June 1997, p10744

¹⁸ Then Minister for Roads, Minister for Public Works and Services, Minister for Ports, Assistant Minister for Energy, and Assistant Minister for State and Regional Development.

¹⁹ The Hon Carl Scully MP, Legislative Assembly, *Hansard*, 19 June 1997, p10745

- 2.28** Following the announcement, the Department of Public Works and Services called for tenders for the remediation work. Delays and a change in ownership of Precinct C resulted in the final tendering process including only the Bay and Precinct B. The successful tenderer was Thiess Services Pty Ltd in partnership with Trafalgar Corporate Pty Ltd. The contractual arrangement between the Waterways Authority (Waterways) and Thiess Services provides for Precinct B and the Bay area adjacent to precincts B and C to be remediated to the required regulatory standard. Waterways will retain ownership of Precinct B while the remediation is in progress. After remediation works are completed, title to Precinct B will pass to Trafalgar Corporate.
- 2.29** Waterways is responsible for the management of the waters of Homebush Bay adjoining sites A, B and C. An important reason for Waterways assuming ownership and liability for Precinct B was that it was already liable for remediating the material in the Bay and access to a dry land site was a significant advantage.²⁰

²⁰ Mr Whittell-Webb, Waterways Authority, Evidence, 7 February 2002, p44

Chapter 3 Contaminants of concern

A broad range of contaminants are present within Homebush Bay and on the Rhodes peninsula. As explained in chapter 2, the presence of certain chemical contaminants pose a threat to the surrounding environment and human health. Over the years numerous risk assessments have been conducted on or near the Rhodes peninsula to identify those contaminants, their potential threats and the likelihood of adverse consequences. Several of these risk assessments have focussed on analysis of sediment in Homebush Bay. The Bay is exposed to contamination from ground seepage, tidal exchange and stormwater and consequently shows the presence of a broad range of contaminants.

Chemicals present in site sediment

3.1 A screening-level risk assessment (SLRA) is used to identify chemicals of potential concern (COPC) to aquatic life, wildlife or people, while eliminating from further consideration those that pose negligible risks. The results serve as the basis for conducting a detailed risk analysis before management decisions are made. An SLRA was conducted on Homebush Bay in 1996 by Parametrix and AWT Ensignt (Parametrix) on behalf of the Office of Marine Safety and Port Strategy (now the Waterways Authority). The SLRA tested for numerous chemicals in the Bay sediment as presented in the following table. Identified COPC are marked with an asterisk (*):

Table 3.1 Chemicals examined in Homebush Bay sediment

Polyaromatic compounds²¹	Monocyclic aromatic compounds	Organochlorine Pesticides	Metals
*Acenaphthene	*3-Methylphenol	*gamma-BHC (Lindane)	*Aluminium
*Acenaphthylene	2-Methylphenol	Heptachlor	*Arsenic
*Anthracene	4-Methylphenol	Heptachlor epoxide (fish only)	*Barium
*Benzo(a)anthracene	*1,3-Dichlorobenzene	*Chlordane, total	*Boron
Dibenzo(a,h)anthracene	*1,2-Dichlorobenzene	*Dieldrin	*Cadmium
Chrysene	*1,4-Dichlorobenzene	*Endrin	*Chromium
Coronene	1,3,5-Trichlorobenzene	*p,p -DDD	*Cobalt
*Fluorene	1,2,4-Trichlorobenzene	(dichlorodihenyldichloroethane	*Copper
*Fluoranthene	*1,2,3-Trichlorobenzene	*p,p -DDE	*Iron
Benzo(b)fluoranthene	*Tetrachlorobenzene	(dichlorodiphenyldichloroethyle	*Lead
Benzo(k)fluoranthene	*1,2,3,4-Tetrachlorobenzene	ne)	*Molybdenum
*Naphthalene	*Pentachlorobenzene	*p,p -DDT	*Nickel
Benzo(g,h,i)perylene	*Hexachlorobenzene	(dichlorodiphenyltrichloroethan	*Selenium
*Phenanthrene		e)	*Silver
*Pyrene	Dioxin and Furans	*Endosulphan (alpha, beta)	*Tin (inorganic)
Beazo(a)pyrene	17 Congeners	Aldrin (fish only)	*Vanadium
Benzo(e)pyrene			*Zinc
Indeno(1,2,3-cd)pyrene			
Perylene			
*Chloronaphthalene			
*2-Chloronaphthalene			

Source: Parametrix Inc and AWT Ensignt, *Homebush Bay Screening-Level Risk Assessment*, prepared for the Office of Marine Safety and Port Strategy, October 1996, p7

²¹ also known as polycyclic aromatic hydrocarbons or PAHs

- 3.2** A detailed human health and ecological risk assessment was later conducted by EVS Environment Consultants in 1998.²² The report on this assessment provided analysis of chemical concentrations from a number of sample grids in Homebush Bay. The samples collected revealed the presence of a range of organic chemicals and metals. These grids are illustrated in Appendix 1 (page 2).
- 3.3** A summary of results for significant organic chemicals and metals found is shown in the following table.

Table 3.2 Average contamination levels in sediment for sample grids in Homebush Bay

Chemical	Grids			Parramatta River
	NE-S	NE-B	NC	
Dioxins and furans (ppb)	4.54	0.94	0.34	0.16
1,2,3,4 Tetra-chlorobenzene (ppm)	75358	113	35.6	54.2
Total PAHs ²³ (ppm)	7114	3247	3073	1785
Total DDT (ppm)	34920	1826	1400	133
Copper (ppm)	4.8	6.7	13.1	5.9
Zinc (ppm)	420	407	386	450
Chromium (ppm)	89.5	96.9	83.6	117
Lead (ppm)	149	154	146	137

Source: Submission 7 p.6

- 3.4** The concentrations of these organic chemicals and metals are higher than would be expected in a clean natural environment. Several of the organic compounds do not exist or are rare in nature (dioxins, chlorobenzene, DDT), and represent contamination originating from activities on Precinct B as well as other less significant sources.²⁴
- 3.5** The distribution of dioxins in surface sediment in the Bay shows that concentrations, particularly of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) are highest adjacent to Precincts B and C with a general trend of decreasing concentrations moving west across the Bay. Organic chemical concentrations near Precinct C are highest at the surface and decrease with depth. By contrast, organic chemical concentrations near Precinct B tend to be lowest at the surface and increase with depth. The 45 metre wide strip of sediment along the seawall which represents about 10% of the surface of the Bay contains approximately 50% of the total accessible dioxin in the surface sediment of the Bay on an area weighted basis.²⁵

²² EVS Environment Consultants, *Detailed human health and ecological risk assessment of Homebush Bay sediments*, prepared for The Office of Marine Administration, September 1998.

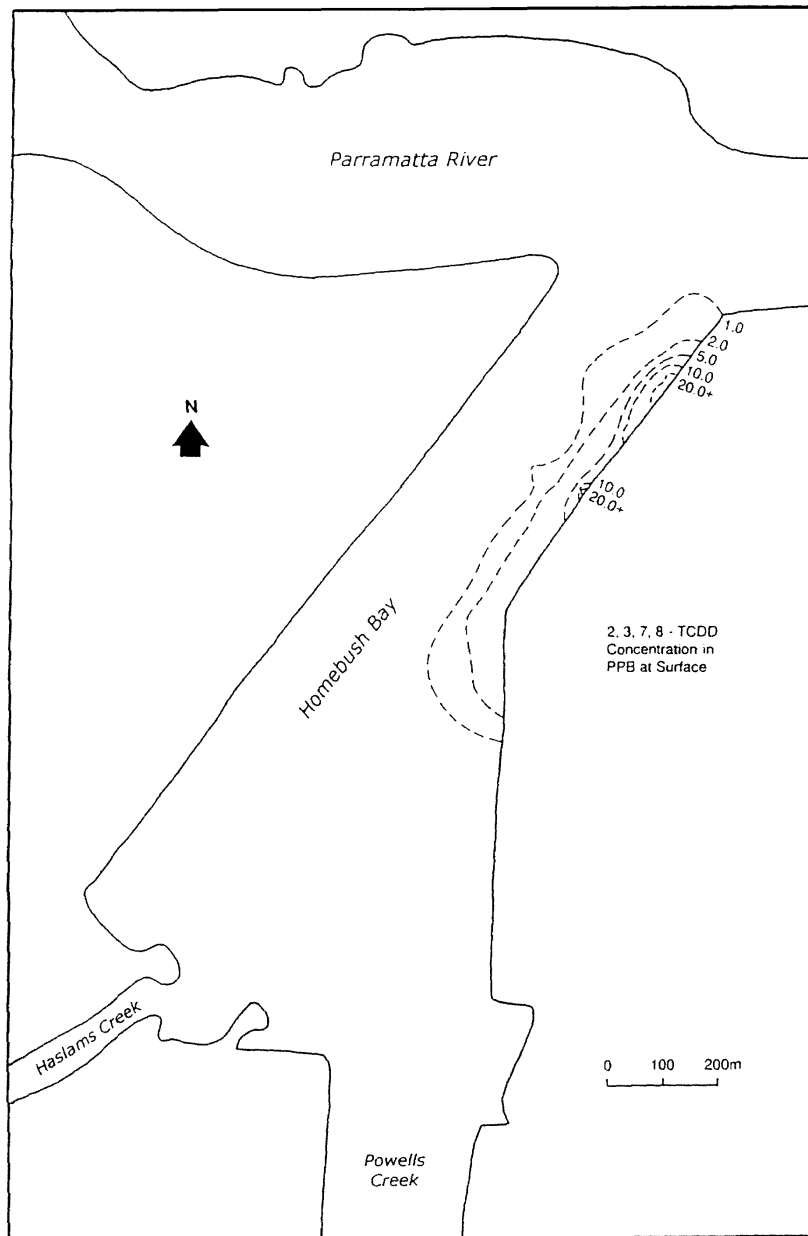
²³ polyaromatic hydrocarbons

²⁴ Submission 7, Thiess Services, p6

²⁵ Submission 7, Thiess Services, p7

3.6 The relative surface concentration of dioxin in sediment is illustrated in the following map.

Figure 3.1 Dioxin contamination in surface level sediments of Homebush Bay



Source: Dioxin Contamination in Sediments of Homebush Bay , *NSW Government Gazette No 169*, 4 December 1998, p9436, derived from Patterson Britton & Partners 1990

3.7 The distribution of other organic contaminants (PAHs, DDTs, chlorobenzenes) in the Bay follows that of the dioxins. The distribution of chemicals across the Bay at low levels is likely due to redistribution by:

- physical processes including tidal movement, storm events, wave action due to wind and boats and

- biological processes such as burrowing by animals and incorporation in living organisms.²⁶

3.8 The report found that there was no obvious relationship observed between metal concentrations in Bay sediments and the sites B and C. The distribution of metal contaminants does not follow the same pattern as for the organic contaminants. The metals tend to be more evenly distributed and are present everywhere in the Bay, Parramatta River and Port Jackson at some level.

Receptors of contaminants

3.9 Organisms that might be at risk from exposure to chemical contaminants, known as receptors, must be identified in conducting a risk assessment. In the present situation, the potential receptors include humans, aquatic organisms and wildlife.

3.10 Aquatic biota may be exposed to chemicals through a variety of pathways such as direct contact with water through gills, food ingestion, ingestion of sediments and sediment contact. The chemicals of concern in Homebush Bay are primarily associated with sediments, therefore, benthic organisms (such as crustaceans, molluscs, worms and fish) feeding within the benthic zone were of primary concern in the Parametrix risk assessment.²⁷

3.11 People who eat fish caught in Homebush Bay may be exposed to sediment-associated chemicals. The degree of exposure is dependent on a variety of factors, including chemical concentrations in fish and the amount and frequency of fish consumption.²⁸ Other people potentially exposed to sediment associated chemicals in Homebush Bay include those who use the Bay for recreational activities such as swimming, sailing or boating.²⁹ Mullet in particular were examined as a fish common in New South Wales waters and as an important commercial and minor recreational species consumed by humans. Mullet have a relatively high lipid level which can accumulate greater levels of lipid soluble contaminants than other fish.³⁰

3.12 Dominant wildlife within the Bay area includes seabirds such as pelicans, cormorants and herons, which can be exposed to sediment associated chemicals through the consumption of fish, crustaceans and other aquatic biota, as well as incidental ingestion of sediment and water. This ingestion usually results in low exposure to chemicals such as dioxin or DDT, that biomagnify relative to food consumption. For this reason the Parametrix risk assessment selected a fish-eating bird (the cormorant) to represent the most conservative exposure pathway for the wildlife of Homebush Bay.³¹ Cormorants typically prey on

²⁶ Submission 7, Thiess Services, p3

²⁷ Parametrix Inc and AWT Ensignt, *Homebush Bay Screening-Level Risk Assessment*, prepared for the Office of Marine Safety and Port Strategy, October 1996, p5

²⁸ *ibid.*, p5

²⁹ *ibid.*, p38

³⁰ *ibid.*, p13

³¹ *ibid.*, p5

gobies, a type of fish commonly consumed by several wildlife species in Homebush Bay.³² Chemical concentrations in gobies were analysed to estimate potential risks to wildlife.

3.13 Of the fish testing conducted, a number of organic chemicals were detected in both gobies and mullet tissue. The Parametrix report indicated that:

Mullet contained the highest chemical concentrations, likely due to their longer lifespan and higher lipid content, compared to gobies. 2,3,7,8-TCDD concentrations in mullet, however, were higher than those found during previous historical investigations. In gobies, however, historical 2,3,7,8-TCDD concentrations were higher than those found during the present study.³³

3.14 The Parametrix Report found that the potential chronic non-carcinogenic and carcinogenic risks to people consuming fish from the Bay could occur from dieldrin and 2,3,7,8-TCDD. Exposure of benthic organisms to DDT was predicted to result in the greatest risk. The potential risk to benthic organisms from exposure to 2,3,7,8-TCDD in sediment was predicted to be negligible.

3.15 Low-level risks to wildlife were predicted for 2,3,7,8-TCDD, dieldrin and DDE. These potential risks were conservatively calculated by assuming that gobies from Homebush Bay were the only food source for the cormorants, and that the birds spent their entire life feeding within the Bay. The report notes that cormorants spend more than half their lives away from the Bay, and are unlikely to feed exclusively on gobies caught near the eastern sea wall in Homebush Bay.³⁴

3.16 The Parametrix screening-level risk assessment, highlighted that the dioxin 2,3,7,8-TCDD is a significant risk to human and environmental health.

What are dioxins?

3.17 Dioxins are a class of environmentally persistent chlorinated chemical compounds. Dioxins are a group with similar chemical structures and properties, and have similar biological characteristics, including toxicity. These compounds include polychlorinated dibenzodioxins (PCDDs), polychlorinated dibenzofurans (PCDFs), polybrominated dibenzodioxins (PBDDs), polybrominated dibenzofurans (PBDFs) and polychlorinated biphenyls (PCBs). The most toxic of this class of compounds is 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD).³⁵

3.18 Dibenzodioxins and dibenzofurans (more appropriately referred to as furans) are produced as unintended by-products released from sources such as combustion processes, including power generation, metal works, waste incineration, and synthesis of chemicals.

³² *ibid.*, p12

³³ *ibid.*, p53

³⁴ *ibid.*, p54

³⁵ Therapeutic Goods Administration, *Dioxins: Proposal For Setting An Australian Tolerable Intake*, Department of Health and Ageing, November 2001, p 4, available at <http://www.health.gov.au/tga/docs/pdf/dioxins.pdf> (accessed 11 February 2002)

They are also formed from certain naturally occurring events such as bushfires and volcanic activity. PCBs, a common dioxin, were manufactured for approximately 50 years as components of insulating fluids for use inside transformers and other electrical equipment.³⁶

- 3.19** These chemical contaminants have a high profile in the international environmental and ongoing debate regarding both their acute and cumulative toxic effects.

Exposure pathways for dioxins

- 3.20** Dioxins primarily enter the environment as emissions to air and are deposited on to soil, plant and water surfaces. It is estimated that over 90% of dioxins present in the environment have originated from air emissions.

- 3.21** Information from the Commonwealth agency, Environment Australia, indicates that overseas studies have shown that the principal route of exposure for the general human population is through ingestion of food that carries trace levels of dioxins. The United States Environmental Protection Agency (USEPA) recently completed a draft reassessment of dioxins and related compounds which concluded that over 90% of the exposure occurred via food ingestion, primarily from meat, dairy products and fish.³⁷

Effects of dioxin exposure

- 3.22** Dioxins are chemically stable, resist metabolism and are fat soluble. Following ingestion and absorption from the small intestine, they are readily distributed via the blood to all organs. As a result of their fat solubility, dioxins accumulate in fatty tissue. The release of stored dioxins from fatty tissue into the circulation is extremely slow, and limits the rate of metabolism by the liver and subsequent excretion. The time to excrete half of an ingested dose of dioxins (or half-life) is usually measured in years. Dioxins are compounds of various chemicals and every compound has a different half-life, from a minimum of 3.7 years to a maximum of 50 years for the most persistent type, with an average of approximately 7 years.³⁸

- 3.23** Experimental studies have reported a number of effects to occur in animals following exposure to dioxins. Among the most significant are: endometriosis,³⁹ effects on the nervous system, developmental and reproductive effects and impairment of the immune system.⁴⁰

- 3.24** A number of dioxin congeners have been suggested to be associated with adverse health effects in humans. The observed health effects are dependent on the level and duration of

³⁶ *ibid.*, p 4

³⁷ <http://www.ea.gov.au/industry/chemicals/dioxins/background.html> (accessed 13 February 2002)

³⁸ *op.cit.*, note 35, p 8

³⁹ Occurrence of uterus lining membrane in areas other than the uterus such as in ovaries.

⁴⁰ <http://www.ea.gov.au/industry/chemicals/dioxins/background.html> (accessed 13 February 2002)

exposure as well as the susceptibility of the individual. At levels in the environment, the USEPA found that:

there is currently no clear indication of increased disease in the general population attributable to dioxin-like compounds.⁴¹

- 3.25** Some specific exposures to these compounds have nevertheless been associated with effects on the cardiovascular system, diabetes, developmental effects in children, endometriosis and cancer. Exposure to high levels of dioxins can lead to chloracne, a severe acne-like skin condition. Both the USEPA and the World Health Organization (WHO) have classified TCDD as a known human carcinogen (cancer-causing agent).⁴²
- 3.26** The USEPA draft reassessment of dioxins and related compounds indicates that the amount of dioxins found in the tissues of the general human population in the US closely approaches the levels at which adverse effects might be expected to occur. Background levels of dioxins in the USA are estimated to lead to an average cancer risk of 5 in 10,000 or 1 in 2,000 persons over a 70-year lifetime, as a result of exposure to dioxins.⁴³

Measurement of dioxin exposure

Concentration values

- 3.27** Dioxin concentrations are expressed either on the basis of the individual congeners being measured, or by the concentration of a mixture of congeners expressed as toxic equivalents (TEQs) of 2,3,7,8-TCDD. The concept of toxic equivalents (TEQs) was developed to allow the toxicity of a complex mixture in the environment to be estimated and ranked relative to TCDD (the most toxic dioxin) and expressed as a single number. Toxic equivalency factors (TEFs) are used to convert concentrations of individual dioxins or furans to equivalent concentrations of 2,3,7,8-TCDD, for example a value of 1.0 is assigned for 2,3,7,8-TCDD being the most toxic and 0.1 assigned for 2,3,7,8-TCDF, a congener of far less toxicity. The concentration of each congener is multiplied by its TEF and the sum of these values produces the TEQ.⁴⁴

Exposure assessment - 1990

- 3.28** In 1990, the WHO conducted a human health risk assessment and determined an acceptable or Tolerable Daily Intake (TDI) value of dioxins to which a human can be exposed without apparent harm. The TDI recommended by the WHO is internationally recognised as a reference value for the level of acceptable dioxin exposure. Until 1998, a

⁴¹ NCEA Office of Research and Development, EPA, *EPA: Exposure and health assessment for 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) and related compounds*, Washington DC USA, 2000.

⁴² <http://www.epa.gov/industry/chemicals/dioxins/background.html> (accessed 13 February 2002)

⁴³ <http://www.epa.gov/industry/chemicals/dioxins/background.html> (accessed 13 February 2002)

⁴⁴ EVS Environment Consultants, *A Review of the WHO Revised TDI and Sediment Remediation Criteria and Standards for Dioxins, Addendum Report*, June 2000, p 3

value of 10 picograms per kilogram per day (pg/kg/day) of 2,3,7,8-TCDD was used to estimate the acceptable dioxin concentration that would not harm human health.⁴⁵

- 3.29** This TDI value was based on general toxicological effects. A no observed adverse effects level (NOAEL) of 1,000 pg/kg/day for reproductive effects and immunotoxicity was determined in various laboratory animal species. Various factors were used to equate this to a human dose of 100 pg/kg/day. An uncertainty factor of 10 was then applied to yield the TDI of 10 pg/kg/day. This TDI value was for exposure to 2,3,7,8-TCDD only, and did not take account of other chlorinated dioxins, furans or dioxin-like compounds.⁴⁶

Exposure assessment update - 1998

- 3.30** In 1998 the World Health Organisation European Centre for Environmental Health (WHO-ECEH) and the International Program on Chemical Safety (IPCS)⁴⁷ coordinated a program (consultation) aimed at evaluating the exposure and possible health risks of dioxins to the population, with the objective of prevention and control of environmental input. The consultation involved 40 technical experts from Australia, Belgium, Canada, Denmark, Finland, Germany, Italy, Japan, the Netherlands, New Zealand, Spain, Sweden, the United Kingdom and the USA.
- 3.31** New epidemiological data⁴⁸ on the effects of dioxins and furans at low levels of exposure and new evidence relating to some dioxin-like compounds resulted in the TDI being reduced from 10 pg/kg/day TCDD to a range of 1 to 4 pg/kg/day TEQ of dioxins, and dioxin-like compounds.⁴⁹
- 3.32** During 2001, the European Commission Scientific Committee on Food (EC-SCF) released an updated risk assessment of dioxins and dioxin-like PCBs. Based on reproductive toxicity in laboratory animals, the EC-SCF established a Tolerable Weekly Intake (TWI) of 14 pg WHO TEQs/kg bw for dioxins, furans and PCBs. The EC SCF assessment is used as a basis for European Community rules on consumer health and food safety, toxicology and hygiene in the food production chain.⁵⁰
- 3.33** In June 2001, the European Food and Agriculture Organisation (FAO) and WHO Joint Expert Committee on Food Additives (JECFA) evaluated certain food contaminants and additives, including other dioxin and dioxin-like compounds (such as those mentioned at 3.18). JECFA evaluated the concentrations of these contaminants in food and national food consumption data. It estimated that in various developed countries:

⁴⁵ Therapeutic Goods Administration, Department of Health and Ageing, *Dioxins: Proposal For Setting An Australian Tolerable Intake*, November 2001, p 6

⁴⁶ *op.cit.*, note 44, p 3

⁴⁷ The IPCS is a program jointly run by the World Health Organisation, International Labour Organisation and United Nations Environment Program

⁴⁸ Data from studies in human populations relating to the origins, characteristics and control of diseases

⁴⁹ <http://www.ea.gov.au/industry/chemicals/dioxins/background.html> (accessed 13 February 2002)

⁵⁰ <http://www.ea.gov.au/industry/chemicals/dioxins/background.html> (accessed 13 February 2002)

median long term intakes of PCDDs and PCDFs are 33-42 pg TEQ/kg bw/month for an adult living in the USA or Western Europe. Estimates for New Zealand and Japan derived from measured concentration and food supply data were significantly lower, at 18 and 7 pg TEQ/kg bw/mo, respectively. (The NZ and Japanese estimates may be higher than the true intake, as food supply exceeds food consumption by at least 15%). If dioxin-like PCBs are also included, the daily total TEQ intake increases by about 25% in the USA and is approximately doubled in other regions. Recent studies from countries which started to implement measures to reduce dioxin emissions in the late 1980s clearly show decreasing dioxin levels in food and consequently a lower dietary intake of these compounds by almost a factor of 2 within the past 7 yr.

Compared to adults, the daily intake of dioxins for breast fed babies is 1-2 orders of magnitude higher. The latest WHO field study⁵¹ showed that mean levels of PCDD/PCDF and PCB in human milk in industrialised areas (10-35 pg I-TEQ/g milk fat) were higher than in developing countries (< 10 pg I-TEQ/g milk fat). However, there is clear evidence of a decrease in PCDD/PCDF levels in human milk between 1988 and 1993, with the highest rates of decrease in areas with the highest initial concentrations.⁵²

- 3.34** JECFA concluded that, in view of the long half-lives of dioxins, only after consideration of their total or average intake over months can their long or short-term risk to health be assessed, and that the tolerable intake should therefore be assessed over one month or longer. JECFA decided to express the tolerable intake as a monthly value in the form of a provisional tolerable monthly intake (PTMI) and recommended a PTMI of 70 pg/kg body weight.⁵³
- 3.35** The three international evaluations established that hormonal, reproductive or developmental effects are the most sensitive indicators of dioxin-related toxicity in experimental animals. There are variations in the studies as well as the methodology used in data analysis, however the WHO, EC SCF and JECFA reached similar conclusions. The standards proposed in each of the evaluations are shown in the table below with conversions to a daily, weekly or monthly basis.

Table 3.3 International standards for human intake of dioxins, furans and dioxin-like PCBs

Exposure standard	pg/kg bw/day	Pg/kg bw/week	pg/kg bw/month
WHO (1998)	1 4	7 28	30 120
EC-SCF (2001)	2	14	60
JECFA (2001)	2.3	16.3	70

Source: *Dioxins: Proposal For Setting An Australian Tolerable Intake*, Therapeutic Goods Administration, Department of Health and Ageing, November 2001, p 12

⁵¹ WHO, *WHO coordinated exposure study: Levels of PCBs, PCDDs and PCDFs in human milk; Environmental health in Europe*, No 3, 1996

⁵² *op.cit.*, note 35, p 7

⁵³ <http://www.epa.gov.au/industry/chemicals/dioxins/background.html> (accessed 13 February 2002), US Environmental Protection Agency, Risk Assessment Forum, *EPA: Interim procedures for estimating risks associated with exposures to mixtures of chlorinated-dibenzo-p-dioxins and -dibenzo-furans (CDDs and CDFs)* and 1989 update. Washington, DC USA, 1989, EPA/625/3-89/016.

A review of dioxin standards by environment consultants

3.36 In June 2000, EVS Environment Consultants conducted a review of the revised WHO dioxin TDI standards for the Waterways Authority.⁵⁴

3.37 The review was commissioned to achieve several outcomes:

- to identify how the 1998 WHO TDI standard differs from the previous 1990 TDI
- to conduct a worldwide survey to determine what TDI values for dioxin are presently in use by various countries around the world, including identifying which countries were using the 1998 revised WHO dioxin TDI, and
- to conduct a worldwide survey to determine what standards or criteria are presently being used for remediation of dioxin-contaminated sediments.⁵⁵

Differences in 1990 and 1998 TDI calculations

3.38 The review found that although the WHO consultation resulted in a re-evaluation and a lowering of the TDI, significant changes were incorporated into the calculation of this revised TDI including:

- the approach used to report effects levels, expressed in terms of body burden rather than dosage levels, and
- the inclusion of other dioxin and dioxin-like compounds in addition to 2,3,7,8-TCDD, that is toxic equivalents (TEQ).⁵⁶

3.39 The different data analysis methods used to calculate the 1990 and 1998 TDIs make it difficult to compare the two values were the same derivation method applied to both data sets. The 1990 TDI used a no observed adverse effects level (NOAEL) for an animal study, expressed in terms of dosage and applying safety or uncertainty factors to account for animal-to-human and other differences. On the other hand, the 1998 TDI started with a lowest observed adverse effects level (LOAEL) from animal studies, then used corresponding maternal body burdens (which eliminated the need for a safety factor to account for animal-human differences) to estimate human daily intakes, and then applied an uncertainty factor.⁵⁷

Varying approaches to the application and calculation of TDI values

3.40 There is a significant inconsistency in the calculation of TDI values between countries and even within certain countries. The review identified that a number of countries have

⁵⁴ *op.cit.*, note 44

⁵⁵ *op.cit.*, note 44, Executive Summary p 1

⁵⁶ *op.cit.*, note 44, Executive Summary p 4

⁵⁷ *op.cit.*, note 44, p 16

applied TDI values within the range of 1-10 pg/kg/day either as 2,3,7,8-TCDD alone or as TEQs. In the United States of America for example, two agencies, the Agency for Toxic Substances and Disease Registry (ATSDR) and the USEPA have taken different approaches to the calculation of TDIs, with the USEPA having a much lower estimate of acceptable daily intake. Canada and the United Kingdom (UK) have not adopted the revised WHO TDI. Korea and Japan adopted the WHO TDI in 1999.⁵⁸ Current or proposed TDIs range from 1 pg/kg/day TCDD (in the Netherlands and Germany) through 4 pg/kg/day (Japan), 5 pg TCDD/kg/day (Sweden, Norway, Finland and Denmark), and up to 10 pg/kg/day for TCDD and TEQs (UK, New Zealand and Canada)⁵⁹.

Proposed Australian dioxin limits

3.41 In November 2001, the Therapeutic Goods Administration of the Commonwealth Department of Health and Ageing released a proposal for setting an Australian TDI for dioxins. The proposal for a tolerable intake is based on the deliberations of the international evaluations outlined previously. The document observed that:

when expressed in terms of daily dose, the human intake standards proposed by the EC SCF and JECFA lie close to the mid-point of the WHO TDI range of 1 - 4 pg TEQs/kg bw/d⁶⁰

3.42 In conclusion the document states:

The Department of Health and Ageing cannot find any reason to discount any of the three exposure standards, but is satisfied that, based on the prolonged residence of dioxin-like compounds within tissues, it is most appropriate to set an exposure standard that extends over a monthly interval. The Department therefore favours adoption of the 70 pg/kg bw/mo limit proposed by the JECFA.⁶¹

3.43 The proposal was released for public comment by the National Health and Medical Research Council in late January 2002.⁶²

⁵⁸ *op.cit.*, note 44, Executive Summary p 2

⁵⁹ Larsen J *et al*: Current risk assessment approaches in different countries. Draft working paper for the WHO-ECEH/IPCS consultation on assessment of the health risk of dioxins; re-evaluation of the tolerable daily intake. , *Food Additives and Contaminants* 2000, 17 (4), 359, referred to in Dioxins: Proposal For Setting An Australian Tolerable Intake, Therapeutic Goods Administration, Department of Health and Ageing, November 2001, p 5

⁶⁰ *op.cit.*, note 35, p 12

⁶¹ *op.cit.*, note 35, p 12

⁶² the final report will be accessible through the NHMRC homepage at <http://www.nhmrc.gov.au>

Conclusion

3.44 Caution must be applied when comparing TDIs across jurisdictions. From a practical perspective, the background level of TDI must be ascertained to ensure that required remediation standards are set at an appropriate level. A balance must be achieved between ensuring the highest level of public safety and setting remediation standards at a level which is impractical or impossible to achieve. The 1998 EVS risk assessment report pointed to this issue where it stated:

From a practical remediation perspective, a TDI below background will always result in a conclusion of unacceptable dioxin risk, irrespective of any amount of remediation of Homebush Bay sediment. A risk management decision was made to consider a TDI that is generally protective of human health but that it is also practically achievable.⁶³

3.45 The committee understands that appropriate remediation standards will be determined by the EPA during assessment of the remediation proposals (see discussion in following chapter). The committee wishes to ensure that the standards not only are protective of human health, but that the community also has confidence in the standards adopted.

Recommendation 1

That the NSW Environment Protection Authority (EPA) publish the rationale and justifications for remediation standards applied to Precincts B and C.

⁶³ EVS Environment Consultants, *Detailed Human health and Ecological Risk Assessment of Homebush Bay Sediments*, prepared for The Office of Marine Administration, September 1998, p 4-3

Chapter 4 Environmental regulation

Where land or water is identified as contaminated it is necessary to distinguish whether or not regulation is required to protect human health and the environment. Several legislative mechanisms may apply to the regulation and management of contaminated land. The management of contaminated land in NSW is shared by the Environment Protection Authority (EPA), Planning NSW and local councils.

This chapter sets out the current environmental legislative framework which governs remediation and the consent processes involved. Although environmental regulation has changed significantly in the last two decades, this section does not attempt to cover this history but rather highlights the main processes which impact on the current status of the development sites.

The legislative framework

4.1 The key instruments for the regulation and management of contaminated land in NSW are the:⁶⁴

- *Contaminated Land Management Act 1997*
- *State Environmental Planning Policy No 55: Remediation of Land 1998*

4.2 Other instruments which are integral to management of remediation and redevelopment activities on contaminated land include the:

- *Environmental Planning and Assessment Act 1979*
- *Protection of the Environment Operations Act 1997*
- *Environmentally Hazardous Chemicals Act 1985*

Contaminated Land Management Act

4.3 The *Contaminated Land Management Act 1997* (CLM Act) empowers the EPA in the management of contaminated sites that pose a significant risk of harm to human health or the environment or both. Other contaminated sites that do not pose a significant risk of harm to human health or the environment, and are suitable for the current or approved use, are managed by local councils through the land use planning processes.

4.4 Prior to the enactment of the CLM Act, the *Environmentally Hazardous Chemicals Act 1985* (EHC Act) was used to impose control over contaminated sites. The CLM Act repealed parts of the EHC Act which referred to contamination of premises, including section 35 Notices. As the CLM Act only regulates sites that are contaminated to the extent that they pose a significant risk of harm or may reasonably considered to be such a risk, a site being

⁶⁴ Submission 5, Environment Protection Authority, p 4

the subject of a section 35 Notice must be assessed as posing a significant risk of harm before the EPA regulation of site occurs.

- 4.5** The CLM Act applies the polluter pays principle and sets out the role of the EPA and the rights and responsibilities of parties it might direct to investigate or remediate land contamination posing a significant risk of harm to human health or the environment. For example, a person who becomes aware that land has been contaminated and is possibly posing a significant risk of harm must, as soon as practicable after becoming aware, notify the EPA that the land is contaminated.
- 4.6** Under Part 4 of the CLM Act, the EPA is empowered to accredit site auditors and to establish regulations and guidelines for site auditors reviewing the assessment and remediation work of contaminated land consultants.
- 4.7** Contaminated sites need to be remediated to an appropriate level for their intended use. For instance, sites being rezoned for housing require a higher level of clean-up than do areas that will be used as open spaces such as parks or factories. If the site is potentially contaminated or has been remediated the site owner, or proponent, can engage (or the consent authority may require) an accredited independent site auditor to provide a site audit statement for the site. At the conclusion of the review process, site auditors will issue a site audit statement to confirm the suitability of the use of the site.

State Environmental Planning Policy No 55: Remediation of Land

- 4.8** *State Environmental Planning Policy No 55: Remediation of Land 1998* (SEPP 55) requires that a consent authority must not consent to carrying out of any development on land unless it has considered:
- whether the land is contaminated and, if so, whether it requires remediation to be made suitable for the purpose for which the development on the land is to be carried out, and
 - that the land will be remediated to that standard - a common requirement being that the applicant arrange an independent site audit by an auditor accredited by the EPA.
- 4.9** Clause 12 of the SEPP 55 enables the Planning Minister to refuse development consent for remediation proposals, such as those at Rhodes, where he or she is satisfied that there would be a more significant risk of harm to human health or some other aspect of the environment from carrying out of the work than there would be from use of the land concerned in the absence of the work. Planning NSW requires a Human Health and Ecological Risk Assessment to be submitted with an Environmental Impact Statement (EIS) before evaluating those risks.⁶⁵
- 4.10** As the EPA has power to require remediation of sites under the CLM Act, this agency plays a key role in advising Planning NSW on the remediation standards required.

⁶⁵ Submission 12, Planning NSW, p 2

Environmental Planning and Assessment Act⁶⁶

- 4.11** In assessing proposed remediation activities, the integrated development approval process under the *Environmental Planning and Assessment Act 1979* (EPA Act) provides a link between the EPA's licensing system and the development consent process in the planning system, so that the assessment and decision making process for each system informs the other.
- 4.12** The schedule of licensed activities under the *Protection of the Environment Operations Act 1997* (POEO Act) is closely aligned with the schedule of designated developments under the *Environmental Planning and Assessment Regulation 1994*. The majority of developments where the EPA has a licensing role will require an EIS.
- 4.13** A key feature of the integrated development process is the EPA's ability to have access to the essential information it requires to assess a proposal. The integrated development provisions meet this requirement in two ways:
- by requiring Planning NSW to consult with the EPA in the preparation of the Director's requirements for an EIS associated with a new proposal, and
 - the opportunity to request additional information if the EPA finds that the development application or EIS has insufficient information for it to make its determination and prepare its general terms of approval.
- 4.14** Integration of EPA licensing with the development approval procedures under the EPA Act provides public participation in the environmental assessment of activities that may be licensed by the EPA. The EPA licensing process also requires consideration of the outcomes of the planning process, including consideration of public submissions on development applications and EISs.

Protection of the Environment Operations Act

- 4.15** The POEO Act includes a licensing regime consisting of a single integrated licence called an environment protection licence. Environment protection licences enable the EPA to regulate activities in an integrated way by tailoring a licence to each activity to meet a specific mix of impacts across one or more media, including air, noise, water and waste. The environment protection licensing system ensures that the total environmental impact of an activity (on any environmental media in both the construction and operating phases) is considered when making licensing decisions.
- 4.16** An environment protection licence is an instrument for defining specific environmental performance standards or requirements for the licensed activity or activities specified in the schedule to the Act, such as:
- contaminated soil treatment works, and
 - transporting of waste.

⁶⁶ extracted from Submission 5, Environment Protection Authority, p 20

- 4.17 Appropriate conditions are generally negotiated with the licensee taking into account the surrounding environmental conditions, type of activity, and available technology. The licence conditions provide a mechanism for implementing regulations and best management practices.
- 4.18 The POEO Act includes many of the provisions previously covered by the *Clean Waters Act 1970* to regulate activities on Rhodes peninsula.

Environmentally Hazardous Chemicals Act⁶⁷

- 4.19 The EHC Act sets a legislative framework for chemicals policy and provides the EPA with powers to assess and control chemicals posing a serious hazard to the environment. These broad powers can prohibit or set controls at all points in a chemical's lifecycle and accordingly, support other legislation that deals with the environmental effects of chemicals and wastes through pollution prevention and waste avoidance and management.
- 4.20 If planning legislation is not triggered in relation to a proposal to implement new technology for the destruction of chemical wastes regulated under this Act, care is taken to ensure that community consultation is carried out during the technology assessment review process.
- 4.21 Chemicals contaminating parts of Rhodes peninsula and Homebush Bay such as DDT and dioxin are regulated under the EHC Act. Some of the provisions of this Act were repealed by the CLM Act which now contains those provisions.

Regulation of remediation activities issues addressed by the EPA

- 4.22 Within the legislative framework, the EPA considers many factors in determining the most appropriate regulatory response for projects such as those proposed for Rhodes peninsula and Homebush Bay. The Rhodes Peninsula Group raised various concerns in relation to site management issues including:
- water quality management
 - air quality protection
 - soil and sediment contaminants and
 - contaminant treatment.
- 4.23 To explain how these matters are addressed, in its submission to the inquiry, the EPA described the types of issues that the EPA examines and how environment protection requirements are developed for these types of sites. The Committee has reproduced this information below to facilitate community understanding information of the processes involved.

⁶⁷ extracted from Submission 5, Environment Protection Authority, p 21

Water

Issues of Concern

The potential water quality issues arising from the current proposals for remediation of contaminated land and adjacent Bay sediments that the EPA would expect to be addressed in the proposals and managed using the framework described above are:

- minimising the disturbance of contaminated Homebush Bay sediments and movement during dredging remediation;
- managing the presence of bioaccumulative substances such as dioxins and PCBs in wastewater from remediated sediments;
- managing operation wastewaters;
- managing runoff from sites during remediation (including stockpiled material);
- managing groundwater flows through the site during and following remediations; and
- managing removal of sediment containment structures in the Bay following remediation.

Development of Environment Protection Requirements

The information that the EPA takes into account when developing licence conditions is:

- the desired use of the water body;
- the pollution likely to be caused;
- the likely impact of that pollution; and
- the practical measures that can be taken to prevent or control the pollution.

The EPA's first step when assessing any remediation proposals for Homebush Bay (through the EIS) will be to ensure that all options to avoid a discharge to the Bay have been considered and implemented where practical. Where a discharge to waters as part of the remediation works is unavoidable, the EPA will develop licence conditions to ensure that the impact of the discharge is minimised. If the discharge has acute impacts it will not be acceptable.

When determining the likely impact of a discharge on Homebush Bay, the EPA will refer to the Australian and New Zealand Environment and Conservation Council (ANZECC) & Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. The 2000 Guidelines for Fresh and Marine Water Quality provides:

- the management framework for applying the water quality guidelines to the natural and semi-natural marine and fresh water resources in Australia and New Zealand;
- a summary of the water quality guidelines (numerical criteria and narrative guidance) proposed to protect and manage the desired uses for water resources; and
- advice on designing and implementing water quality monitoring and assessment programs.

The Guidelines set out the relevant ambient water quality goal for Australia. The EPA will compare the predicted concentration of pollutants in the waters of the

Bay immediately around any proposed discharge point, that is just after any discharge has mixed into the water, with the criteria set out in the Guidelines. Licence conditions will then be developed to protect water quality and ensure the desired uses of water in the Bay will be achievable. Other factors such as available technology, costs and operational issues are also taken into account when developing licence conditions. Licence conditions can include limits on the concentration of pollutants that are discharged or operational requirements or a combination of both. Licence conditions generally require the regular monitoring of any discharges and reporting to the EPA.

The Guidelines are not used as mandatory standards and have no formal legal status. Rather, the Guidelines provide recommended numerical criteria and narrative guidance for water quality parameters that when met, should ensure that the desired use of the water can be undertaken.

The Guidelines also provide a method for tailoring the numerical criteria to site specific conditions. This can be carried out to ensure that the criteria take into account any natural differences in the local environment at a particular location.

Air

Issues of Concern

The potential air quality issues arising from the current proposals for remediation of contaminated land and adjacent Bay sediments that are considered by the EPA are:

- Gaseous and particulate (including odorous) emissions from point and fugitive sources; and
- Accidental sources of air emissions during the construction and operation of the proposed plant.

Development of Environment Protection Requirements

The effects of air quality are generally gauged in terms of the affected human population or vegetation, therefore Licence conditions and environmental outcomes are often based on the protection of human health or sensitive plant species. Licence conditions may include emission limits for point sources, or operational management measures for fugitive sources.

The EIS will require the proponent to undertake an air quality impact assessment which should be carried out in accordance with:

- *EPA, 2001, Approved Methods for the Sampling and Analysis of Air Pollutants in NSW.*

This document lists the methods to be used for the sampling and analysis of air pollutant emissions, ambient air and meteorological parameters for statutory purposes.

- *EPA, 2001, Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW.*

This document lists the methods to be used and provides guidance for the modelling and assessment of air pollutants from stationary sources for statutory purposes. The EPA's impact assessment criteria for criteria pollutants, hydrogen

fluoride, individual odorous and toxic air pollutants, complex mixtures of odour, deposited dust and total suspended particulate matter are listed in this document.

- EPA, 2001, *Draft Policy: Assessment and Management of Odour from Stationary Sources in NSW*.
- EPA, 2001, *Technical Notes, Draft Policy: Assessment and Management of Odour from Stationary Sources in NSW*.

This document outlines the legislation that applies to odour assessment and management and recommends a policy framework for dealing with odour issues.

The major air pollutants of concern from a proposed activity need to be identified and quantified so that the likely ground level concentrations in ambient air can be predicted using an air dispersion model. The predicted ground level concentrations are then compared with the EPA's impact assessment criteria. The air quality impact assessment should be systematic to ensure that:

- all feasible alternatives that would meet the basic purpose of and need for the proposal are considered and compared; and
- all measures that could protect those resources are given full consideration in the planning process.

The EPA's minimum requirement for any proposal is to meet the emission limits in the *Clean Air (Plant and Equipment) Regulation 1997*. The *Regulation* specifies minimum standards of performance that generally represent reasonably available control technology. To ensure that a proposal can comply with the EPA's impact assessment criteria, the emission limits in the Licence are often more stringent than the *Regulation*.

For those activities that may generate pollutants not listed in the *Regulation*, emission limits are set at a level in the Licence which will meet the EPA's impact assessment criteria. If the pollutant bio-accumulates or has no safe threshold for exposure, or the source is the primary contributor to cumulative impacts, the emission limit in the Licence is based on best available control technology.

The EPA will also establish controls to minimise the impact of dust associated with the remediation process.

Noise and Vibration

Issues of Concern

The potential noise and vibration issues arising from the current proposals for remediation of contaminated land and adjacent Bay sediments that are considered by the EPA include:

- impacts due to noise from activities carried out on the site; and
- noise from vehicle movements off site generated by the remediation activities.

Development of Environment Protection Requirements

Licence conditions will be designed to protect the community from excessive intrusive noise and preserve amenity for specific land uses. Conditions may include noise emission limits for the site, or noise management measures such as times of operation that works will be restricted on particular days.

The EIS will require the proponent to undertake an assessment of potential noise impacts carried out by an accredited acoustical consultant. For remediation projects that extend over a significant period of time, the noise assessment should be carried out in accordance with the *NSW Industrial Noise Policy*. The *NSW Industrial Noise Policy* provides a guideline for the assessment of noise associated with major industries. This policy provides a comprehensive whole of government approach to managing noise.

The *NSW Industrial Noise Policy* seeks to promote environmental well being for NSW through preventing and minimising noise. It provides the framework and process for deriving noise limit conditions for consents and licences that will enable the EPA to regulate premises that are scheduled under the POEO Act.

The policy:

- establishes noise criteria that would protect the community from excessive intrusive noise and preserve amenity for specific land uses;
- uses the criteria as the basis for deriving project specific noise levels;
- promotes uniform methods to estimate and measure noise impacts;
- outlines a range of mitigation measures that could be used to minimise noise impacts.

The noise criteria used in the *NSW Industrial Noise Policy* to assess noise impacts consists of two components:

- that the contributed intrusive $L_{Aeq(15\text{minute})}$ noise levels emitted by the development must not exceed the existing background noise levels for the area by more than 5dB; and
- the noise contributed by the new proposal must not lead to any overall increase in the existing level of noise from industrial activities in the area above the recommended noise level for that land-use.

The noise criteria are not statutory noise limits but are used as a basis for deriving statutory noise limit conditions on development approvals and licences.

To assess potential noise impacts both components of the criteria are applied and the level of noise control is normally set by whichever component of the noise criteria is the more stringent. Where this more stringent level, known in the *NSW Industrial Noise Policy* as the project-specific noise levels, cannot be met the *NSW Industrial Noise Policy* provides for a negotiated noise limit. This negotiated noise limit can only be used if the EPA or the consent authority is satisfied that all feasible and reasonable means to mitigate the noise impacts have been applied and it is judged that the social and economic benefits out-weigh the noise impacts.

Potential road traffic noise impacts as a result of the remediation activities will need to be assessed in accordance with the NSW Government's *Environmental Criteria for Road Traffic Noise*.

Waste and Chemicals

Issues of Concern

Under the *Environmentally Hazardous Chemicals Act 1985* the proposed remediations for both Precincts B and C are subject to a technology review. This requirement is triggered as both proposals would involve treating materials contaminated with

scheduled chemical wastes and dioxin which are subject to regulation under this Act.

The major contaminants in the soil and sediments at the northern end of Rhodes peninsula and the north eastern portion of Homebush Bay have been identified as dioxins (toxic chemicals known to cause cancer) and a group of banned chlorinated pesticides (including DDT). These chemicals are known to have toxic effects, to persist in the environment and to accumulate in the food chain. The banned pesticides are generally referred to as scheduled chemical wastes. Both proponents must demonstrate that the technology they propose to use for the remediation can treat the scheduled chemical wastes and dioxins in a manner, that is during and after treatment, [sic] that will protect human health and the environment.

Development of Environment Protection Requirements

In NSW the treatment of dioxins and scheduled chemical wastes is controlled through the *Environmentally Hazardous Chemicals Act 1985* (EHC Act). The EHC Act provides a focused regulation of chemicals which can pose serious hazards to the environment and human health if they are not carefully managed. Using the provisions of the EHC Act, Chemical Control Orders can be made for certain chemicals and chemical groups. The Chemical Control Order contains conditions that must be met in treating the particular chemical or group of chemicals and also controls their treatment, storage, transport and disposal.

The two Chemical Control Orders that apply to contamination at the Rhodes peninsula sites include the *Chemical Control Order In Relation to Dioxin Contaminated Waste Materials (1986)* and the *Scheduled Chemical Wastes Chemical Control Order 1994* which were developed (and are updated on an ongoing basis) following broad ranging consultations with key stakeholders.

The EHC Act also provides for the EPA to issue a licence for activities at the specific site or for a specific technology in the case of mobile treatment plants. The EHC Act licence contains conditions that are specific to the technology proposed for treatment and the particular site conditions where the remediation treatment will take place.

In order to obtain the necessary EHC Act licence to treat dioxin or scheduled chemical wastes the proponent must provide the EPA with a comprehensive treatment proposal. The proposal needs to provide details of:

- the chemical or chemicals to be treated;
- information on why it is to be treated (for example, land is to be developed for residential use);
- the location of the treatment process or facility;
- the level of treatment that can be achieved; and
- the type of technology to be used.

Technology Assessment

In addition to using the Chemical Control Orders listed above, the EPA also uses established National Protocols to guide it in assessing technology proposals for the treatment of scheduled chemical wastes.

The National Protocols were developed by the Commonwealth through consultation with Government stakeholders on the Scheduled Waste Management Group and the external stakeholders represented on the National Advisory Body (which includes representatives from peak non-Government environment groups, industry associations and unions).

The National Protocols provide a nationally agreed, consistent and credible set of principles and practices for use by all States and Territories of Australia in assessing and approving trials and commercial applications of scheduled waste treatment technologies. The protocols also emphasise the role of community consultation in these processes.

The National Protocols were developed for Schedule X Wastes, a group of chemicals which includes scheduled chemical wastes but not dioxins. However, as the Protocols provide a consistent and objective framework, the EPA uses them as guidance documents in assessing proposed treatments for all the chemicals regulated under the *Environmentally Hazardous Chemicals Act 1985* including dioxin.

In the assessment of treatment technologies proposed for scheduled chemical waste contaminated materials at Rhodes peninsula and Homebush Bay, the following National Protocols would be relevant:

- *Approval/Licensing of Trials of Technologies for the Treatment/Disposal of Schedule X Wastes; and*
- *Approval/Licensing of Commercial-Scale Facilities for the Treatment/Disposal of Schedule X Wastes.*

The first protocol is generally used to assess treatment technologies in a limited, small-scale project in order to demonstrate that the technology is capable of treating the chemical in question to the standards required. These trials are required only for new and unproven treatment technologies that would not be considered for licensing as commercial treatment facilities. The second protocol is used to assess treatment technologies that have been proven either in Australia or overseas as viable treatment technologies for commercial scale operations.

Soil and Sediment Contamination

Issues of Concern

The EPA's concerns about the sites adjacent to Homebush Bay and the Bay sediments are:

- whether any of the sites or sediments pose a significant risk of harm to human health or the environment; and
- the suitability of the sites for their proposed use.

Under the *Contaminated Land Management Act 1997* (CLM Act) the EPA assesses whether land is contaminated with one or more substances in such a way as to present a significant risk of harm, having regard to the following matters:

- whether the contamination of the land has already caused harm (for example in the form of toxic effects on plant or animal life),
- whether the substances are toxic, persistent or bioaccumulative or are present in large quantities or high concentrations or occur in combinations,

- whether there are exposure pathways available to the substances (that is, the routes whereby the substances may proceed from the source of the contamination to human beings or other aspects of the environment),
- whether the uses to which the land and land adjoining it are currently being put are such as to increase the risk of harm (as for example, use for child care, dwellings or domestic food production),
- whether the approved uses of the land and land adjoining it are such as to increase the risk of harm,
- whether the substances have migrated or are likely to migrate from the land (whether because of the nature of the substances or because of the nature of the land),
- any guidelines made or approved by the EPA on contamination and remediation.

The CLM Act supports the *National Environment Protection (Assessment of Site Contamination) Measure 1999* developed by the National Environment Protection Council. This measure provides a consistent approach to the assessment of potentially contaminated sites throughout Australia. It provides guidance on sampling, risk analysis, risk assessment, community consultation, site auditor consultation, site auditor competency as well as investigation levels and provides a basis for guidance material and regulation in NSW. The measure also includes a policy framework for the assessment of site contamination.

National policy is also provided by the Australian and New Zealand Environment and Conservation Council (ANZECC) and National Health and Medical Research Council in the *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites 1992*.

If a site poses a significant risk of harm, the EPA ensures appropriate management either under the CLM Act or if the site is subject to active redevelopment, to a different land use management of the contamination will be achieved through the planning process. If the site does not present a significant risk of harm any contamination that is present is managed through land information strategies and through development, control and approval processes.

Identifying Contaminated Sites

The EPA will typically become aware of sites through site inspections, complaints or land rezoning or redevelopment processes where SEPP 55 applies. SEPP 55 is an environmental planning instrument that sets out matters that must be considered by local councils and other planning agencies when preparing local environmental plans or development control plans, or when determining development applications. Planning agencies must carry out an initial evaluation of available historical and other information to determine whether any potential contaminating activities have or may have been conducted on the site.

Owners and/or occupiers of sites also have an obligation to notify the EPA if they believe a site may pose a significant risk of harm.

Managing contaminated lands through the planning processes

If an evaluation indicates that a potentially contaminating activity has or may have been conducted on the site, the planning agency must consider the findings of a

preliminary investigation . The preliminary investigation will normally provide a preliminary assessment of site contamination and assess the need for further detailed site investigations.

A detailed site investigation should provide comprehensive information on the type, extent and level of contamination and assess contaminant dispersal and the potential effects of contaminants on public health and the environment. If the results of the detailed site investigation indicate that the site poses unacceptable risks to human health or the environment (on-site or off-site) under either the present or the proposed land use then a remedial action plan (RAP) needs to be prepared and implemented.⁶⁸

4.24 A remedial action plan (RAP) is used to ensure that clean-up of a site is managed according to planning or environment protection statutes. A RAP should:

- set remediation goals that ensure the site will be suitable for the proposed use and will pose no acceptable risk to human health or to the environment
- document in detail the actions that will be taken to address the risks and to ensure that the site is suitable for the proposed site use, and
- establish the environmental safeguards required to complete the remediation in an environmentally acceptable manner.⁶⁹

Environmental regulation at Rhodes⁷⁰

4.25 The regulatory responses to activities at the various Precinct areas is discussed in the following section.

Precinct A

4.26 Odour caused by activities on this Precinct was a key environmental concern during the 1980s. This culminated in the State Pollution Control Commission (SPCC) amending ICI's licence in order to require installation of odour control equipment. Subsequently, in July 1992, the EPA attached pollution reduction programs to the licence to further reduce odour. In August 1992, ICI announced that it would close six of the eight plants on the site.

4.27 Shortly before ICI's announcement that it would close down its industrial operations in 1997, the EPA indicated that, if ICI considered changing either land use or zoning, it needed to enter discussions with the EPA regarding the contamination of the land. In September 1997 ICI submitted an EIS for site contamination investigation and RAP, following which Concord Council (now part of City of Canada Bay Council) granted development consent for the remediation.

⁶⁸ Submission 5, Environment Protection Authority, pp 23-29

⁶⁹ Submission 5, Environment Protection Authority, p 6

⁷⁰ This section is based upon Submission 5, EPA, pp 8-13, Watson and Woodward, EPA, Evidence 7 February 2002.

- 4.28** In 1998 the EPA issued a notice under section 27A of the *Clean Waters Act 1970* directing ICI to provide a remedial action plan (RAP) for the reduction of phthalates and hydrocarbons in contaminated groundwater from the site and subsequently to implement the works described by the RAP. These works concluded in September 1998, including the installation of a high density polyethylene liner against the seawall and a monitoring program.
- 4.29** Precinct A was recently remediated by Orica, which voluntarily undertook remediation of the site in accordance with national and New South Wales guidelines. An independent contaminated site auditor recently reviewed and signed off on the consultant's reports following the remediation of the land. The representatives of the EPA at the committee's hearing on 7 February 2002 confirmed that the remediation had satisfied the EPA's requirements for the development purposes proposed by Orica.⁷¹
- 4.30** The remaining remediation issue for Precinct A is the level of contamination in the sediments of the adjoining section of the Bay, and the extent to which these were the result of stormwater runoff from the former use of the site. The EPA is currently assessing a consultant's report to determine whether the contamination of the Bay sediments adjacent to the site is posing a significant risk of harm.

Precinct B

- 4.31** When Union Carbide closed its plant in 1986, the former SPCC (now the EPA), issued notices for the investigation, assessment and remediation of the site for the purposes of industrial use or open space (not for residential use).
- 4.32** The contaminated material was collected and put in an area of the land which was then capped with impervious clay. This occupies approximately half the site, and at present is not permitted to be used for any purpose other than open land (the rest of the site is able to be used for some industrial and commercial purposes).
- 4.33** In 1994, the EPA issued a notice under section 35 of the EHC Act directing the then owners to prepare a long term monitoring plan of the remediation works. Subsequently the EPA issued a new notice under section 28 of the newly commenced CLM Act, directing the owners to continue long term monitoring to ensure the remediation works continue to provide effective containment. In November 1998, the EPA's assessment of a monitoring report⁷² indicated the continued migration of contamination from the site into the Bay. The EPA determined that contamination in this part of the Bay poses a significant risk of harm to human health and to the environment.
- 4.34** Following acquisition of Precinct B by the Waterways Authority (Waterways), the new owner advised the EPA that it intended to remediate the site further to make it suitable for residential use. Accordingly, it accepted liability for the cost of remediation. In October

⁷¹ Woodward *ibid.*, p34. He indicated that, if variations of the development proposal were made, the EPA would then have to re-examine whether the remediation was sufficient for the new uses

⁷² JET consultants, Groundwater Monitoring Results and Inspection Report for the Landscape and Car Parking Area of the Former Union Carbide Chemicals Factory site: March 1998-June 1998, Report No JET0314-074

2001 the EPA supplied Planning NSW and Waterways with its requirements for the preparation of an EIS in regard to the proposed remediation. These requirements included a comprehensive RAP to be reviewed by a site auditor, an environment protection licence under the POEO Act and a licence under the EHC Act.

- 4.35** The part of Precinct B owned by the Lidis Group has a small area at its westernmost point which the EPA believes to be contaminated with dioxins, benzenes and organochlorides. The owners are currently Statewide Developments Pty Ltd (see B* at Figure 2.1). The EPA has advised that, if no contamination studies have been done on this part of Precinct B, then a study may be required in future.⁷³

Precinct C

- 4.36** The western area of Precinct C is contaminated as a result of land reclamation discussed in chapter 2. The former SPCC issued a notice under section 35 of the EHC Act in May 1987 directing that:

- no disturbance of the site was to occur without SPCC prior approval, and
- that the contamination of the site and adjacent sediments be assessed. Subsequent to this investigation, the EPA issued a number of notices in 1992 directing that a remedial action plan be formulated and implemented, resulting in further investigations of contamination on the site.

- 4.37** A further series of notices were issued by the EPA under section 35 of the EHC Act in 1994, directing that no disturbance of certain contaminated zones of the site was to occur without EPA prior approval. During the late 1990s the previous site owner indicated an interest in remediating the site together with the proposed Precinct B and Homebush Bay remediation. Site ownership changed in late 2000 and the new site owner has, according to the EPA's submission, indicated that it wishes to remediate the site independently so as to make the site suitable for residential use.

- 4.38** In March 2001 the EPA conducted an assessment under the CLM Act and determined that the site posed a significant risk of harm to human health and the environment. As the owner has indicated its intention to remediate, they provided input into requirements for the EIS for the remediation. This is likely to include a comprehensive RAP reviewed by an accredited NSW site auditor; an environment protection licence under the POEO Act and a licence under the EHC Act. Planning NSW recently issued the Director's requirements for the EIS.⁷⁴

Homebush Bay

- 4.39** Sediments in the Homebush Bay adjacent to Precincts A, B and C contain contaminants that have emanated from those sites. Numerous investigative studies have been conducted opposite Precinct B and C in order to determine the extent of contamination of the sediments. Precinct A has recently been assessed to determine contaminant levels.

⁷³ Submission 5, Environment Protection Authority, p 11

⁷⁴ G Prattley, Planning NSW, Evidence, 7 February 2002, p 25

- 4.40** In April 1995 the EPA issued a notice directing the then Maritime Services Board, as owner of Homebush Bay on behalf of the NSW Government, to ascertain the nature and extent of dioxin contamination in the Bay sediments and to submit a RAP to the EPA.
- 4.41** In 1998, the EPA conducted an assessment under the CLM Act and determined that, on the basis of the available information, contamination in parts of the bay posed a significant risk of harm to human health and the environment. Accordingly, under section 21 of the Act, the EPA issued a declaration to remediate the bed of Homebush Bay adjacent to the Rhodes peninsula as outlined in Appendix 1 (page 3).
- 4.42** The Marine Ministerial Holding Corporation, which owned Precinct B on behalf of the NSW Government before passing it to Waterways, agreed under section 26 of the CLM Act to remediate the area voluntarily with the consent of the EPA. No remediation notice is therefore required under section 23 of the Act.⁷⁵

Status of current liability

- 4.43** The CLM Act clearly establishes a hierarchy of liability from the polluter to the owner and notional owner. The Nature Conservation Council of NSW suggested that liability for the cost of remediation of Homebush Bay should be placed on past polluters that are likely to have affected the levels of pollution in the Bay, in accordance with the polluter pays principle.⁷⁶
- 4.44** The CLM Act permits both acceptance of liability through voluntary remediation agreements as well as providing the EPA with powers to direct a site owner to remediate a site and to direct the recovery of costs from a polluter. While pursuing the actual polluters under the polluter pays principle may be desirable from an equity perspective, in some instances the polluter may be difficult to pursue. In the present situation, Union Carbide ceased business activities in Australia and legal recourse was not considered practical.⁷⁷
- 4.45** In the present situation, where sites on the Rhodes peninsula are known to be contaminated, all owners of those sites have voluntarily agreed to remediate their sites in cooperation with the relevant government agencies.⁷⁸

⁷⁵ Submission 27, Waterways Authority, p 5

⁷⁶ Submission 22, NSW Nature Conservation Council, p 8

⁷⁷ Submission 3, Confidential

⁷⁸ Submission 5, Environment Protection Authority, p 16

Chapter 5 Present risks from contaminants

The necessity to remediate contaminated land and water at the Rhodes peninsula arises from:

- a statutory requirement where there is a significant risk of harm to human health or the environment,
- community and environmental safety and amenity.

The risks to human health or the environment from existing conditions at the Rhodes peninsula will vary dependent on whether the various areas remain in their present state or whether the site uses change. The risks posed by the site areas are outlined below.

Risk status of Precinct A

- 5.1 Precinct A was recently remediated voluntarily by Orica Australia in accordance with required standards under national and New South Wales guidelines.
- 5.2 An independent contaminated site auditor has signed off on the completed remediation work. The sign-off verifies that the remediation has been done and that the site is suitable for certain uses, including recreation open space and playing fields, and part also for some residential townhouse-type development. Validation certificates were obtained from accredited environmental auditors in December 2001 and forwarded to the EPA for final assessment.⁷⁹
- 5.3 The buffer zone at the land-water interface with Homebush Bay was not remediated and may still present a risk (discussed further under Risk status of Homebush Bay below).

Risk status of Precinct B

- 5.4 Precinct B is substantially contaminated. Previous remedial actions, including burial and capping of the most contaminated soil were deemed to provide an acceptable level of protection to human health and the environment where the land use is restricted to industrial or commercial land use. The committee is advised that the surface of the site (unlike the buried fill content) does not currently represent a risk to human health (given restricted access) or a risk to the environment in terms of exposure to surface soil, or related dust and sediment.⁸⁰ The site is unsuitable for residential use.
- 5.5 Risks to human health and the environment from Precinct B and Homebush Bay have been evaluated through a detailed human health risk assessment conducted for Thiess Services by Egis Consulting. Thiess Services advised the committee that the assessment considered ecological as well as human health risks and was conducted in two phases a

⁷⁹ J Woodward, Environment Protection Authority, Evidence, 7 February 2002, pp 38-39

⁸⁰ Submission 7, Thiess Services, p 9

screening level (Tier 1) and a detailed level (Tier 2). The scope of the assessment with respect to human health is outlined as follows:

The risk assessment was undertaken on the basis of medium to high density residential redevelopment of the site with recreational landuse in areas of open space. The target populations (receptors) for the risk assessment were site residents, recreational users, ground maintenance workers (eg gardeners) and intrusive maintenance workers (eg contractors digging service trenches).

The Tier 1 risk assessment found that dioxins are likely to be of most significance for human health and ethylbenzene is likely to be of most significance for odour impact.

The Tier 2 risk assessment developed depth related soil criteria for several chemicals including dioxins to protect human health for the above groups. The risk assessment used the WHO 1998 range of 1-4 pg/kg-day to develop soil clean up criteria.

The residual levels of dioxins proposed in surface soils for the site are probably less than in surface soils from suburban Sydney in general.⁸¹

- 5.6** The target environmental receptor for the risk assessment was the marine ecosystem in Homebush Bay. The Tier 1 risk assessment found that chlorinated phenols and chlorinated benzenes are likely to be of most significance with respect to migration in groundwater and impact on aquatic ecosystems. Also of significance were organochlorine pesticides and PAHs.
- 5.7** The Tier 2 risk assessment developed soil remediation criteria to protect groundwater based on leaching tests and empirical relationships for the various soil and fill types on the site. Aquatic water quality criteria were taken from the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000* and the *National Environment Protection (Assessment of Site Contamination) Measure 1999*. A more detailed evaluation of the effects of the potential chemicals of concern is proposed during the preparation of the RAP.⁸²
- 5.8** An independent contaminated land auditor is currently reviewing the draft risk assessment.

Risk status of Precinct C

- 5.9** At present, a significant portion of Precinct C and the portion of Homebush Bay adjacent to sites B and C have been assessed by the EPA as posing a significant risk of harm to either human health or the environment as dioxin in sediment has caused high levels of dioxins in fish caught in the Bay.⁸³

⁸¹ Submission 7, Thiess Services, pp 17-18

⁸² Submission 7, Thiess Services, p 20

⁸³ Submission 5, Environment Protection Authority, p 15

Risk status of Homebush Bay - adjacent to Precinct A

- 5.10** A consent condition for the remediation of Precinct A, stipulated by the then Concord Council required Orica to conduct a Health and Environmental Risk Assessment in the south-east section of Homebush Bay immediately adjacent to the Company's site.
- 5.11** In August 2001, Orica received the results of a \$450,000 health and environmental risk assessment study, which it commissioned with the approval of NSW EPA and the Waterways Authority. The study, entitled *Human Health and Environmental Risk Assessment of Sediments in Southeast Homebush Bay*, identified that there were contaminants such as lead and phthalates in sediments potentially arising from operations on the sites now owned by Orica. The study concluded that contaminants present negligible risk to human health and minimal ecological impact on the southeast section of Homebush Bay. It was considered that further, intervention would not produce sustainable benefit and could increase the risk of mortality for existing aquatic species.⁸⁴
- 5.12** Mr Paul Hanly, a representative from the Rhodes Peninsula Group, indicated that this report has not been made publicly available.⁸⁵ The EPA informed the committee that it made the Executive Summary of this document available to the local community through the City of Canada Bay Council.⁸⁶ Canada Bay Council advised that it has not made the document publicly available.⁸⁷ In the interests of facilitating good community relations, the EPA and the City of Canada Bay Council should make the document available to the local community at the earliest possible opportunity.

Recommendation 2

That the human health study conducted by URS Australia entitled, *Human Health and Environmental Risk Assessment of Sediments in Southeast Homebush Bay*, be made publicly available by the EPA and City of Canada Bay Council.

- 5.13** The report on the health and environmental risk assessment study was submitted to the EPA for assessment. The EPA advise that they are consulting with NSW Health on the issue of potential access by children and people to the mud flats around the mangroves and that there has not been a final determination by the Government on the conclusions drawn by the consultants.⁸⁸

⁸⁴ Submission 17, Orica Engineering, p 3

⁸⁵ P Hanly, Evidence, 8 February 2002, p 62

⁸⁶ Correspondence from Joe Woodward, Assistant Director General, EPA to Director, dated 4 March 2002, p 1

⁸⁷ Telephone conversation between D Westman, Manager, Environment and Recreation, City of Canada Bay Council and Director, 1 May 2002

⁸⁸ J Woodward, Evidence, 7 February 2002, p 40

- 5.14 The prepared investigation report is being considered by the EPA, which will determine whether there is a significant risk of harm to health or the environment.⁸⁹ Mr Joe Woodward, Assistant Director-General, EPA, stated that if the EPA determines that the lead and phthalate sediment in the Bay area adjacent to Precinct A is not okay, the EPA may require remediation for which Orica would be responsible.⁹⁰

Risk status of Homebush Bay - adjacent to Precincts B and C

- 5.15 The area of Homebush Bay adjacent to Precincts B and C presents a clearly established human health and environment risk.

Human health

- 5.16 As indicated in Chapter 3, studies have shown that the main human exposure route to dioxin is through ingestion of food. In support of this, NSW Health informed the committee that:

Although high exposures may occur in some workplaces, the most significant dioxin exposure in humans is through diet. Studies in industrialised countries indicate a daily average dietary intake of dioxins of 1-3 pg TEQ/kg bw/day for adults. If all dioxin-like compounds are included, this level could be 2-3 times higher.⁹¹

- 5.17 The Parametrix SLRA report identified that people potentially exposed to sediment associated chemicals in Homebush Bay include those who:

- use the Bay for recreational activities such as swimming or boating, and
- catch and consume fish and shellfish from the Bay.

- 5.18 The report stated that limited recreational activities occur in Homebush Bay and people do not generally swim in Homebush Bay or the associated reaches of the Parramatta River. Boating and sailing occurs in the Parramatta River, but is limited within Homebush Bay because of shallow water and small size of the Bay. Secondary use activities, such as waterskiing, do not occur at Homebush Bay.⁹²

- 5.19 The report outlined that human health exposure pathways were evaluation based on their relative expected levels of exposure. It explained that:

while it was acknowledged that incidental ingestion and dermal contact with Homebush Bay sediments while swimming, boating, or sailing, might occur, these pathways were not quantitatively evaluated because they are expected to result in lower exposures than from consumption of fish caught in the Bay. The reasons

⁸⁹ Correspondence from Mathew Taylor, Chief Executive, Waterways Authority to Director, dated 19 February 2002, p 3

⁹⁰ J Woodward, Evidence, 7 February 2002, p 42

⁹¹ Submission 23, NSW Health, p 7

⁹² *op.cit.*, note 27, pp 38-39

are two fold: first, exposures are expected to occur less frequently for incidental exposure and dermal contact, and second, the chemicals believed to contribute most to potential risk to human health are those that bioaccumulate.⁹³

5.20 The detailed risk assessment for human health later conducted by EVS Environment Consultants found that the level of dioxin in fish in the Bay was high and represented an unacceptable risk to human health. The report recommended remediation of an area of sediment along the Precinct B and C seawall to reduce dioxin levels in fish to a safe level for human consumption.⁹⁴ Thiess Services advised that their involvement in the remediation project is designed to remove a risk to human health that is currently being managed by a ban on fishing.⁹⁵

Environment

5.21 The levels of contamination on sites B and C have the potential to negatively impact the environment by migration of chemicals in groundwater. Although this leakage is mitigated to some extent by the existing cut-off wall, contaminated fill is present between the cut-off wall and sea wall (Appendix 1). As indicated, the dioxin contamination in Homebush Bay is a significant risk of harm to fish and other aquatic organisms. Accordingly a ban on fin fishing in the Bay imposed by NSW Fisheries reflects this risk.

5.22 The risk assessments conducted on Homebush Bay have considered current risks and assessed that remediation levels for various chemicals in sediment and soil should make levels of contaminants in groundwater leaving Precinct B acceptable for the aquatic ecosystem and make the Bay safe for fish eating birds.⁹⁶

5.23 The following chemicals were identified as of main concern to the environment:

Table 5.1 Chemicals of main concern to the environment

Aquatic biota	Wildlife
Polycyclic aromatic compounds (PAHs)	Dioxins
Organochlorine pesticides (OCPs) eg DDT	Organochlorine pesticides (OCPs)
Chlorobenzenes (dioxin precursors)	
Heavy metals eg lead	

5.24 The eating of contaminated fish was the primary exposure pathway for birds. The EVS risk assessment found that:

- the level of dioxin in fish in the Bay was high and was a risk to fish eating birds

⁹³ *op.cit.*, note 27, pp 38-39

⁹⁴ Submission 7, Thiess Services, p 18

⁹⁵ *ibid.*

⁹⁶ Submission 7, Thiess Services, p 19

- levels of metals in sediment pose some risk to benthic invertebrates over broad areas of the Bay and
- levels of chlordane, DDT and dieldrin (OCPs) and lead and zinc were high for aquatic invertebrates in parts of the Bay near sites B and C.⁹⁷

5.25

The chemicals of concern directly related to sites B and C are dioxins, DDT, dieldrin and PAHs. The other chemicals are generally consistent with elevated levels over the Parramatta River and Port Jackson areas.⁹⁸ The EVS report recommended that remediation of sediment for the latter chemicals does not occur as the presence of these over large areas would subsequently recontaminate the target area.⁹⁹

⁹⁷ Submission 7, Thiess Services, p21

⁹⁸ *ibid.*

⁹⁹ *ibid.*

Chapter 6 Proposed remediation standards and technology

Remediation of contaminated land should provide three main community benefits:

- residential occupation of land previously used for industrial purposes
- public access to the foreshore for recreational use and
- improvement of visual amenity compared with current site appearance

More specifically, the Waterways Authority (Waterways) stated that the objectives of the Homebush Bay Remediation Project are to:

- remediate Homebush Bay to enable the fin fishing ban to be removed
- reduce to an acceptable level the ongoing risk from sources of dioxin to human, aquatic and bird life that use the Bay and
- ensure that Precinct B is remediated to facilitate its redevelopment as envisaged by the Rhodes Peninsula Development Control Plan.¹⁰⁰

Achievement of these objectives will require remediation activities to achieve a sufficient standard through implementation of appropriate technology. This chapter addresses these two remediation factors.

Required remediation standards

6.1 To assess whether land is contaminated in a way that will present a significant risk of harm, the EPA must consider a range of matters including the uses of the land:

whether the uses to which the land and land adjoining it are currently being put are such as to increase the risk of harm (as for example, use for child care, dwellings or domestic food production).¹⁰¹

6.2 The objective of site remediation is to clean-up the site for a specific use. Clean-up criteria are developed by either comparison to soil investigation levels which are established by the National Environmental Health Forum or a site specific assessment of the risks that the chemical may be posing. Soil investigation levels are available for contaminants such as lead and DDT but not dioxin, therefore a site-specific risk assessment must be conducted.

6.3 Where the act or activity of a person changes the approved use of the land and a consequent risk of harm arises, the person is responsible for those risks even if the contamination itself did not change.¹⁰² The standard of remediation therefore relates to the acceptable standard for the proposed development. A standard suitable for residential use

¹⁰⁰ Submission 27, Waterways Authority, p 1

¹⁰¹ Section 9(d) *Contaminated Land Management Act 1997*

¹⁰² Section 13(c) *Contaminated Land Management Act 1997*

would be the lowest standard acceptable for redevelopment for the purpose of residential occupation.

6.4 Mr Joe Woodward, Assistant Director-General, EPA, explained the rationale for these requirements:

It is has to do with not only the toxicity of the actual pollutant that you are dealing with, but one of the assessments that has to be taken into account is the exposure pathway: how likely it is that people will come in contact with the pollutant. For example, a preschool is likely to have a high likelihood that children might be out there and eating soil and so on. If you have a commercial development that is not such a high likelihood so you have slightly higher levels of requirements, or more stringent requirements as you move through a hierarchy going from industrial, open space, commercial, townhouse-type development with tennis courts and that sort of thing down to residential development with people growing vegetables and so on in their backyards. So they become more and more stringent for each of those purposes.¹⁰³

6.5 For example, the standard of remediation for Precinct A requires the site be suitable for certain uses, including recreation open space and playing fields and part also for some residential townhouse-type development.¹⁰⁴ The standard to be adopted for remediation of sites B and C will be determined once the risk assessment and Environmental Impact Statement have been completed and approved.

An appropriate remediation standard tolerable daily intake

6.6 Remediation standards are often expressed in terms of tolerable daily intake (TDI) that can be achieved by a remediation process. During the inquiry, a number of submissions raised concerns that a sufficient remediation standard may not be achieved where:

- the dioxin TDI is set too low and does not meet World Health Organisation recommended limits¹⁰⁵ and
- technology will not achieve the WHO recommended TDI dioxin target of 1-4 picograms per kilogram bodyweight (pg/kg bw/day).¹⁰⁶

6.7 NSW Health have advised that the provisional TDI of 1-4 picograms per kilogram of bodyweight for dioxin or total equivalent whilst not officially promulgated, can be used as a guideline for the purposes of planning and assessing remediation at Rhodes.¹⁰⁷

6.8 The Waterways Authority (Waterways) advised the Committee that for the purposes of the Homebush Bay Remediation Project, a recommended TDI will be set through the

¹⁰³ J Woodward, Evidence, 7 February 2002, p 39

¹⁰⁴ J Woodward, Evidence, 7 February 2002, p 39

¹⁰⁵ Submission 10, confidential

¹⁰⁶ For example, Submission 1, Rhodes Residents Group, p 12; Submission 22, NSW Nature Conservation Council, p 6

¹⁰⁷ Submission 23, NSW Health, p 5

Integrated Development Approval process under the *Environmental Planning and Assessment Act 1979*.¹⁰⁸ Thiess Services indicated that it was expected the remediation standard will refer to the recommended dioxin TDI of 1 to 4 picograms per kilogram of bodyweight.¹⁰⁹

6.9 The committee is advised that the EIS for Precinct C is currently in progress.¹¹⁰

6.10 The committee proceeded to consider and evaluate the proposed remediation technologies.

Remediation methods

6.11 Remediation of contaminated land requires one of the following options in order of increasing cost:

- On-site containment
- Off-site disposal
- On-site stabilisation
- On-site treatment

6.12 On 19 June 1997, the NSW Government announced that it had rejected the first three options for site remediation.¹¹¹ The Waterways tender specification for remediation of Precinct B and Homebush Bay accordingly excluded the first two options and required destruction of contaminants where possible which also precluded use of the third option. The Thiess proposal (the successful tender) advanced the option to:

- destroy contaminants where contaminated material is unsuitable for reuse on residential land and
- reuse on-site of treated and untreated material that met residential reuse criteria.

6.13 Waterways indicated that on-site treatment is the most acceptable option for remediation of Precincts B and C. The proposed remediation methods involve one of two processes:

- Directly heated thermal desorption (DTD)
- Indirectly heated thermal desorption (ITD)

6.14 Thiess Services (for Precinct B and Homebush Bay)¹¹² and Earthtech (for Precinct C)¹¹³ have expressed a clear preference for DTD. Thiess Services have acknowledged that they are willing to accept ITD if required by the EPA.

¹⁰⁸ Submission 27, Waterways Authority, p 6

¹⁰⁹ Submission 3, confidential

¹¹⁰ Submission 7, Thiess Services, p 13

¹¹¹ The Hon Carl Scully MP, Legislative Assembly, *Hansard*, 19 June 1997, p 10745

¹¹² John Hunt, Thiess Services, Evidence, 8 February 2002, p 39

¹¹³ From literature obtained during Rhodes peninsula site visit

Directly heated thermal desorption

- 6.15** DTD is a physical separation process that uses direct energy transfer to heat a bed of material such as soil until it is volatilised and organic contaminants can be separated from the soil.
- 6.16** The contaminated soil is typically heated to a temperature between 150°C and 650°C. The temperature required to achieve the performance standard depends on several variables including, the type of contaminant, the cleanup criteria, the length of time that the soil spends in the thermal vaporiser and the nature of the soil (such as clay, sand or silt).
- 6.17** The gas generated during the heating of the soil is collected and transferred to an emission control system designed to eliminate any particulates, metals, organic contaminants and thermal treatment by-products resulting from the desorption process. The emission control systems include filters designed to remove larger particulates before entering the high temperature filter bags for the finer particles. Any entrained particulates are recirculated to a kiln conveyor system for retreatment.
- 6.18** The other part of the emission control system is the thermal oxidiser, which heats the air entering the chamber to approximately 1000°C for up to 3 seconds to destroy any residual vaporised contaminants. The treated air is then discharged as water vapour, with all harmful contaminants destroyed and removed.¹¹⁴ Dioxin formation in combustion processes is eliminated by fast quench systems fitted to desorbers which instantaneously cool the off gas, eliminating formation of dioxins.¹¹⁵
- 6.19** The committee was informed that the advantages of DTD in treatment of organochlorine (dioxin, pesticides etc) contaminated waste include:
- the approach meets all of the anticipated regulatory requirements associated with emissions and destruction capabilities
 - the approach represents proven technology which has been used extensively and successfully on sites with similar contaminants and contaminant concentrations overseas. DTD technology has been utilised for treatment of hazardous wastes in approximately 90 projects in the last 10 years in the United States of America (USA)
 - it provides a closed loop on-site process that does not require a second stage destruction of concentrated waste waters, condensates or oils
 - there is no requirement for transportation of concentrated wastes to alternative treatment facilities
 - it enables all potential exposure pathways to be managed in accordance with relevant EPA and regulatory authority requirements
 - it takes less time than the ITD process, for example, DTD units typically process 40 tonnes per hour compared with 15 tonnes per hour for ITD units and

¹¹⁴ Submission 6, confidential

¹¹⁵ Submission 7, Thiess Services, p33

- DTD typically costs less per tonne to treat than ITD.¹¹⁶

One witness to the inquiry, however, stated that the DTD process could in fact produce dioxins and questioned the effectiveness of attempts using the direct method.¹¹⁷

Indirectly heated thermal desorption

- 6.20** The ITD process involves separating contaminants from soil by heating the soil in a closed system so that the contaminants vaporise, are cooled, condensed and captured, leaving clean soil, that is, free of organochlorine contaminants. The offgas produced contains methane and other combustible non-condensable gases and is typically fed into the boiler which heated the soil in the first place.
- 6.21** The contaminant by-product of the thermal desorption process is then treated by a Base Catalysed Decomposition (BCD) process which is expected to destroy the contaminants with salt, water and oil as by-products which can then be recycled on-site. In the BCD process, the contaminant is added to a carrier oil in a ratio of about 1 to 9, along with excess sodium hydroxide and heated to around 350°C. At this temperature the chlorine is stripped from the contaminants to form sodium hydroxide or common salt.¹¹⁸
- 6.22** If indirect thermal desorption is used to treat contaminated material on the site, the plant will generate about 7 kg of contaminated oil for each tonne of soil treated. This will equate to about 2.5 tonnes of oil per day or 17.5 tonnes per week for the predicted rate of soil treatment. For cost reasons, Thiess proposes to transport this material under licence to an existing BCD facility in Brisbane for treatment, rather than bring the treatment plant to Sydney. The oil could be transported by rail or road. This would result in 1 to 2 truck or rail movements per week for a year depending on the size of tank or tanker used. The total number of truck movements for the project for this operation is expected to be between 60 and 80 over the life of the project.¹¹⁹
- 6.23** Thiess Services has indicated that ITD technology is well established for remediating contaminated sites in the USA and that about 80 projects have been carried out there in the last decade. Thiess undertook bench scale trials using the ITD process and contaminated materials from Precinct B and Homebush Bay during preparation of the Homebush Bay tender, to demonstrate that the technology could be successfully applied to the project.¹²⁰
- 6.24** Thiess Service advised the Committee that BCD Technologies (an organisation that Thiess proposes to contract for the BCD process) recently conducted trial on dioxin contaminated concentrates from the Homebush site, to demonstrate their capability. The trials reduced concentrations of contaminants below required limits for treatment. Thiess acknowledges that, although the BCD Technologies facility included the results of successful dioxin trials

¹¹⁶ Submission 7, Thiess Services, p 33; Submission 6, confidential

¹¹⁷ M McNamara, Evidence, Friday 8 February, p 25

¹¹⁸ Submission 3, confidential

¹¹⁹ Submission 17, Orica Engineering, p 24

¹²⁰ Submission 7, Thiess Services, p 30

in its licence application a decade ago, the Queensland Government has advised that it would need to make a separate licence application to receive and treat dioxin contaminated wastes from the Homebush site.¹²¹

Preferred treatment technology

- 6.25** The environmental assessment process conducted by the EPA will be used as the key criteria in selecting the ultimate remediation process and technology, so as to avoid any unacceptable environmental impact.¹²² The EIS for Precinct B is expected to contain an assessment of alternative strategic remediation options. Correspondence provided to the Committee indicates that:

This will include for example, an assessment of alternative remediation options such as on or off site treatment, treatment of the contaminated materials versus encapsulation on site, and the alternative arrangements for best removing contaminated sediments from Homebush Bay, such as the establishment of the coffer dam versus dredging.

With respect to treatment technologies, the EIS will examine the range of available technologies as far as details are available. The EIS will also assess for instance on-site alternatives of indirect thermal desorption (ITD) and direct thermal desorption (DTD) and will nominate available on and off-site alternatives to process any residuals generated by the thermal processes. This is likely to include the possibility that base catalysed dechlorination (BCD) may be required on-site.¹²³

Technology capability

- 6.26** During the inquiry, Mr Mark McNamara raised questions over the capability of the current technical proposals for thermal desorption processes to effectively destroy contaminants to an acceptable standard. In particular, Mr McNamara was concerned that the BCD treatment process would not achieve the desired outcome. Mr McNamara cited various comments from historical reference material, predominantly from the USEPA in support of his statements.¹²⁴
- 6.27** The Committee asked Mr John Hunt of Thiess Services whether or not remediation of dioxins has been attempted for residential landuse in the USA. Mr Hunt stated that there is no direct analogy for this project. He stated that:

Most of the sites cleaned up there have been industrial areas returning to industrial use. Our sites are industrial areas going to residential use.

¹²¹ Submission 7, Thiess Services, p 32

¹²² Submission 27, Waterways Authority, p 6

¹²³ Correspondence from Jo Robertson, Project Manager, PPK E&I, to Mark McNamara, dated 6 December 2001

¹²⁴ Correspondence from Mark McNamara, to Director, dated 20 February 2002

There is no direct experience for residential land use with dioxins, but there is experience with other chemicals with similar boiling points and similar properties for residential land use. Dioxins from the point or thermal treatment technology are not particularly special, in that they have a boiling point, and the boiling point is similar to the boiling point of other chemicals which are removed by thermal desorption. In that sense there is plenty of proof that the process has worked.¹²⁵

6.28 Mr Hunt informed the Committee that Thiess has retained expert advice on thermal treatment technologies from the company Focus Environmental from the USA. Focus Environmental has been involved in about one-third of the approximately 171 projects in the last decade in the USA using thermal desorption to treat hazardous waste. It has been involved either for technology providers, regulators developing the conditions under which the plants are run, or for the owners of the sites monitoring those projects. Thiess advises that about half of those projects used indirect thermal desorption and about half used direct thermal desorption.¹²⁶

6.29 Mr Hunt provided a detailed explanation of the relevant proposed direct and indirect thermal desorption technologies. He explained that both indirect and direct methods produce approximately the same level of dioxin in the course of treating dioxin contamination or other organochlorines. Mr Doug Moss, Manager, Operations and Development NSW, stated, to put these plants in context, they would be about as dirty as a diesel truck.¹²⁷ Mr Moss also stated that:

the real concern on a site of this nature is not emissions from the stack but dust control measures for the balance of the works – the excavations and haulage, and all of the works that go on to support one of these plants. The vast bulk of emissions will come from those processes, and not from the thermal plant.¹²⁸

6.30 With respect to the potential success of the BCD process, the Department of Public Works and Services provided a copy of a report by Egis Consulting on bench-scale trial conducted in July 2001 at BCD Technologies, Brisbane. The aim of the trial was to demonstrate whether or not the contaminated soil on Precinct B and Homebush Bay can be successfully remediated by the proposed ITD plant and that the BCD process can destroy the contaminants contained with the ITD extract. The report concluded that the BCD process can achieve a high level of destruction of contaminants which are present in condensate. Further, the report states:

The trials have shown that the ITD process has the potential to achieve a high level of reduction of contaminants in the soil at the Lednez site.

6.31 The report did however qualify the effectiveness on the basis that this was a batch treatment and not a full scale system.¹²⁹

¹²⁵ J Hunt, Thiess Services, Evidence, 8 February 2002, p 43

¹²⁶ *ibid.*

¹²⁷ J Hunt, Thiess Services, Evidence, 8 February 2002, pp 43-44

¹²⁸ D Moss, Thiess Services, Evidence, 8 February 2002, p 45

¹²⁹ Egis Consulting Australia, *Homebush Bay Remediation Project Final Draft Report on Bench-Scale Trial at BCD Technologies*, July 2001, 22 February 2002, pp 17-18

6.32 The Committee was also advised by the EPA that the North Newington site was successfully treated using ITD technology. The EPA indicated that the process confirmed that:

The technology can significantly reduce the concentration of persistent chlorinated organic compounds (including dioxins) in contaminated soil without increased risks to local residents, nearby workers and the environment.¹³⁰

6.33 Mr Joe Woodward from the EPA advised that application of DTD was less clear and as a result, before he could approve any proposal for the direct thermal desorption method, the EPA will:

need a lot more information to be convinced that all the national and international protocols for dioxin and other organic chemicals can be treated to acceptable levels before we would approve it.¹³¹

6.34 The Committee has received expert technical information which both supports and questions the appropriateness of proposed remediation processes. The Committee has attempted to assess the value and context of the information provided. It would be appropriate to state that, in the past, some applications of thermal desorption and base catalysed dechlorination technology have not achieved relevant treatment criteria.

6.35 In the present circumstances, it is anticipated that the EPA will place stringent requirements on both emissions from the preferred remediation process as well as acceptable contaminant levels on treated material. Accordingly, the Committee suggests that not only effective monitoring be in place but that exceedences from established tolerance levels should be urgently reported to the EPA.

Recommendation 3

That the EPA should only approve a proposal for treatment using the direct thermal desorption (DTD) method if it is convinced that the treatment complies with all the relevant protocols regulating the treatment of dioxin and other organic chemicals.

Recommendation 4

That in the event of reports that emissions from treatment processes exceed established tolerance levels, the EPA develop an emergency communication plan to provide an effective and prompt response to meet safety concerns, including notification to all affected residents.

¹³⁰ Correspondence from Joe Woodward, EPA to Director, dated 4 March 2002, p 2

¹³¹ J Woodward, EPA, Evidence, 7 February 2002, p47

Financial cost and appropriate remediation standards

6.36 The financial cost to remediate the Rhodes peninsula is dependent on both the process used for remediation as well as the standard of remediation achieved. Site specific factors such as location and depth, groundwater profile and underlying substrate will influence selection of the most appropriate remediation process.

Precinct A

6.37 The remediation of land on Precinct A cost Orica Engineering \$24 million. This has involved:

- clearing the site of redundant, contaminated plant and factories
- the removal of metals contaminated waste to a licensed waste disposal facility and
- the remediation and reuse (on the site as clean fill) of organic contaminated materials.¹³²

Precinct B and Homebush Bay

6.38 The Committee was advised that there was concern within the Community Liaison Group that the scope of remediation will be determined by the funds available rather than the capacity of available technologies. The further concern is that remediation is cost-driven, not health-driven.¹³³

6.39 The extent of dioxin and other chemical contamination will influence the financial cost to achieve a suitable standard of remediation. The extent of contamination is known with a high degree of certainty.¹³⁴ The Committee is in no doubt that, the more funding provided for remediation of Homebush Bay, the higher the quality of clean up that could be achieved.

6.40 The remediation quality goal is qualified, as expressed by Dr Kate Hughes of Econeco,

this must be considered within the wider issue of dioxin pollution and clean-up standards.¹³⁵

6.41 Mr John Hunt of Thiess Services explained that the main difference between ITD and DTD was duration and cost. Although equipment costs will be similar, ITD will take twice as long to process, all other things being equal, so operational costs will be twice as much as labour will be required for twice as long:

¹³² Submission 17, Orica Engineering, p 2

¹³³ Submission 20, Econeco, p 2

¹³⁴ Submission 7, Thiess Services, p 11

¹³⁵ Submission 20, Econeco, p 2

You will be paying the men for two years instead of one year to treat the same amount of soil. The direct one is much more efficient on gas usage, so with the indirect process the gas costs will be higher.¹³⁶

- 6.42** In light of similar emissions and energy usage for both processes, the Committee questioned why ITD was considered as an option. Mr Doug Moss of Thiess Services responded:

I understand that in the United States of America, and I guess elsewhere too, it has been easier to license and permit the indirect thermal desorption system because, from a perception point of view, the flame does not contact the soil and therefore the question of incineration is not a question per se. So licensing it has proven to be easier compared to licensing the direct thermal desorption system. The indirect thermal absorption system, I guess as a matter of chance, in practice has been used a lot more on smaller projects, such as at North Newington for 400 tonnes. Some of the larger jobs in the United States, conversely, have been done by DTD simply because of the economics making it worthwhile to go to the extra effort required in the approvals and licensing processes, consultation with the community and all those things.¹³⁷

- 6.43** Mr Moss expressed a clear preference for DTD on the basis that it provides greater flexibility in terms of the outcome and financial position:

There is no difference in the outcome on site in terms of the soil concentration, how much material, where it is, et cetera. They must be the same because that is approved by the EPA and by the auditor, without regard for, basically, how we get there. I think direct fired gives us greater flexibility to deal with uncertainties and to deal with licensing issues which may arise with the regulators. Indirect thermal pushes us closer to the absolute value of this property and the \$20 million.¹³⁸

- 6.44** In relation to liability for the adequacy of the remediation process, Mr Doug Moss explained that during the course of the works, Thiess is responsible for risks associated with the remediation process and is insured for these activities. Thiess liability ends with the performance of its work after it is signed off by a site auditor. Thiess advised that the site auditor would also be covered by insurance if the sign-off was later found to be deficient.¹³⁹

- 6.45** The NSW Government (on behalf of the Waterways Authority) has committed \$21 million as a contribution to the remediation of the Bay.¹⁴⁰ Trafalgar Corporate anticipates that remediation for residential development and remediation of Homebush Bay to remove the fin-fishing ban is approximately \$75 to \$90 million if the indirect thermal desorption process along with the base catalysed decomposition process is utilised. It is estimated that

¹³⁶ J Hunt, Thiess Services, Evidence, 8 February 2002, p 45

¹³⁷ D Moss, Thiess Services, Evidence, 8 February 2002, p 46

¹³⁸ D Moss, Thiess Services, Evidence, 8 February 2002, p 53

¹³⁹ *ibid.*

¹⁴⁰ Submission 27, Waterways Authority, p 6

400,000 cubic metres of material will need to be excavated and reinstated, with 300,000 cubic metres of this requiring treatment.¹⁴¹

- 6.46** The Committee noted during evidence provided by Mr Moss that the cost to remediate Homebush Bay may exceed the Government's committed \$20 million:

What has put pressure on the Government's \$20 million is that only in the last couple of years the criteria for dioxin in terms of the tolerable daily intake – for example, the World Health Organisation has gone from 10 to one to four. We are at a point where, if we do more than the 45-metre strip, as we propose and as we think is justified, the job is in question.¹⁴²

- 6.47** The Committee recognises that, a funding shortfall may occur if the \$20 million committed by the NSW Government was based on a remediation standard which is considerably less than that recently adopted internationally. This amount may be put under further pressure if ITD treatment is required by the EPA which will also ultimately determine the remediation standard. The Committee does not wish essential remediation activities to be jeopardised or delayed by a funding deficiency resulting from changes to the regulatory environment.

Recommendation 5

That if indirect thermal desorption (ITD) is identified by the EPA as the preferred treatment technology, the NSW Government should negotiate with Thiess Services to provide supplementary strategies over and above the \$20 million originally committed to remediate the proposed areas of Homebush Bay.

Precinct C

- 6.48** Neither of the project proponents Meriton Apartments or Earth Tech Engineering provided publicly available cost information.
- 6.49** Due to the similarity of the land based problem for Thiess Services, the relative issues and costs would apply to Precinct C by analogy.

¹⁴¹ Submission 3, confidential

¹⁴² D Moss, Thiess Services, Evidence, 8 February 2002, pp 51-52

Dioxin based remediation objectives

6.50 There was some concern that the remediation objective is dioxin based and does not cover all pollutants present on the sites including DDT, phthalates and heavy metals.¹⁴³ The submission from the Nature Conservation Council of NSW expressed concern that more comprehensive sampling of areas around Homebush Bay were not conducted to ascertain the full extent of contamination.¹⁴⁴

6.51 In response to concerns that risk assessments are focussed more on dioxin to the exclusion of other contaminants, Mr Joe Woodward from the EPA responded that the EPA has made it clear that a range of chemicals must be investigated through the director's requirements:

In fact, we have 30 pages of director's requirements that go through a vast range of chemicals. Dioxin, I think, is going to be the primary one, and that is where there has been a major focus. For many of the pollutants there are national guidelines for what is called investigation levels for pollutants. The goal during the EIS process is for the proponents to remediate the sediments or the land to meet those investigation levels.

In the case of some chemicals, like dioxin, there are no investigation levels that have been set.¹⁴⁵

6.52 Waterways provided scientific evidence from a study that indicated that sediment in the affected areas of Homebush Bay do not shift and in particular, dioxin contaminants do not shift.¹⁴⁶ The report presents information from historic hydraulic survey data from 1978 to 1996 illustrating that there has been a steady deposition of sediment into Homebush Bay of about 2 centimetres per year. Waterways state that:

This means that sediments in the Bay, including contaminated sediments, will gradually be buried and thus held in place by natural processes.¹⁴⁷

6.53 Mr John Hunt, Thiess Services, explained that thermal desorption will also destroy organic compounds other than dioxin:

The process captures all organic compounds that will boil within the temperature range at which we are working. Dioxins have a very high boiling point, and they are the chemical of concern. But all the other organics come out as well.¹⁴⁸

¹⁴³ Submission 20, Econeco, p 2

¹⁴⁴ Submission 22, NSW Nature Conservation Council, p 4

¹⁴⁵ J Woodward, Environment Protection Authority, Evidence, 7 February 2002, p 42

¹⁴⁶ Correspondence from Mathew Taylor, Chief Executive, Waterways Authority to Director, dated 19 February 2002, attaching Report No 96/01 Homebush Bay Hydrodynamics and Sediment Transport Preliminary Model Studies, Sydney Ports Corporation, January 1996.

¹⁴⁷ Correspondence from Mathew Taylor, Chief Executive, Waterways Authority to Director, dated 19 February 2002, p 2

¹⁴⁸ J Hunt, Thiess Services, Evidence 8 February 2002, p 48

Chapter 7 Remediation related risks

The resolution establishing the terms of reference reflects uncertainty in the community regarding not only the standard to which the sites will be remediated, but also the resultant impacts of remediation on human health and the environment.

Dr Kate Hughes, from Econeco, an independent consultant to the Community Liaison Group established under the Environmental Impact Statement for Precinct B and Homebush Bay remediation, encapsulated community concerns regarding remediation of the Rhodes peninsula:

it is not about people opposing remediation although some do because they believe the land should just lie there; (that is a valid and reasonable position) Rather the situation is about having confidence that the people undertaking the process will do it right.¹⁴⁹

Risks to human health during remediation

- 7.1 The prevention of hazardous chemical exposure through the environment is critical to the protection of the health of humans during remediation. The main groups which may be subject to risks during remediation activities include:
- the site workforce,
 - existing local residents and workforce (including those across the river), and
 - future site residents if development and remediation overlap.
- 7.2 Before any remediation process can commence, the responsible party must obtain an environmental protection licence under the Protection of the *Environment Operations Act 1997* and a licence under the *Environmentally Hazardous Chemicals Act 1985*. The licences allow the Environment Protection Authority (EPA) to regulate activities which may create dust, water, noise, vibration, waste, chemicals, soil and sediment problems. The EPA has indicated that licence conditions will be imposed to require that these activities do not pose an unacceptable risk to the community.¹⁵⁰
- 7.3 The remediators must monitor and record all activities on site which must be available for audit any time by the EPA and WorkCover. The records and the recording process must be maintained in accordance with the RAP. Waterways have advised that the EPA will investigate any adverse reports by members of the public.¹⁵¹

¹⁴⁹ K Hughes, Econeco, Evidence, 7 February 2002, p 60

¹⁵⁰ Submission 5, Environment Protection Authority, p 16

¹⁵¹ Submission 27, Waterways Authority, p 7

Recommendation 6

That the EPA frequently monitor records of site activities and report to the community liaison groups in order to maintain community confidence in responsible remediation activities.

Recommendation 7

That the EPA provide a rapid investigation response to adverse reports by the public during remediation activities.

Worker Safety

- 7.4** A number of submissions received by the committee expressed the importance of protecting the health of workers on remediation sites.¹⁵² During the inquiry, the Committee received evidence from Mr Luis Almario, who worked as a cleaner on Precinct B during demolition activities between 1988 and 1992. Mr Almario suffers from a variety of health problems which he attributes to his employment in a contaminated industrial area during earthmoving activities. Mr Almario's case is presently subject of legal proceedings and according to convention the Committee will not present discussion regarding his situation. The Committee does however wish to highlight the need for future remediation activities to adopt strict occupational health and safety procedures to protect the health of workers at Rhodes.
- 7.5** Sydney Water advises that any redevelopment activity in the areas will require extensive assessment and management of all contaminants identified in the soil and groundwater to ensure that Sydney Water meets occupational health and safety obligations. Accordingly water and sewerage pumping stations and pipeline infrastructure must not pass through contaminated ground.¹⁵³ Any existing pipeline infrastructure that may be found to lie within contaminated ground will need to be excavated, remediated and re-laid in a corridor of clean soil. The measures are necessary to ensure that:
- future employees involved in maintenance of infrastructure are not exposed to harmful chemicals and
 - public health is not affected by contaminants entering the infrastructure.¹⁵⁴
- 7.6** Thiess Services advised the Committee that, in an effort to protect human health, and in particular the health of site workers, it will prepare a comprehensive and conservative occupational health and safety (OH&S) plan for the remediation works. It is proposed that the plan consider issues such as:
- control of and responsibilities for the OH&S Plan

¹⁵² For example, Submission 4, Rhodes Peninsula Group, pp8-9

¹⁵³ Submission 13, partially confidential

¹⁵⁴ Submission 13, partially confidential

- chemical hazards that pose a risk to human health and potential exposure pathways
- physical hazards on the site
- safe work practices including inductions, inspections, communications and operating procedures and medical surveillance
- monitoring for chemicals, dust and noise at the site boundaries and in work areas and
- trigger levels (a level below a safe level) for action, actions to be taken and responsibility for actions related to the monitoring program.

7.7 Medical surveillance is expected to include conducting tests on the site workforce before and after the works for the chemicals of concern on the site and to document the level of protection achieved during the works.¹⁵⁵

7.8 It is proposed that the Thiess Services OH&S plan will be independently reviewed by Dr Garry Smith, who has extensive expertise in the area of risk assessment, toxic chemicals, worker health and remediation management. Dr Smith was retained by the State government and the Construction, Forestry, Mining and Energy Union (CFMEU) to monitor and audit all OH&S plans and practices during the Olympic site remediation and redevelopment. He has been retained by Thiess to provide the same service for the Rhodes remediation.¹⁵⁶

7.9 Thiess submits that the above process:

will provide a robust, flexible and responsive mechanism to ensure that worker health is protected during the remediation works.

In general, if the workers on the site are protected, including those not subject to special PPE¹⁵⁷ requirements (eg administrative staff in the site offices), then existing and new residents will have an even greater level of protection, since risk decreases with distance from the site or source of the contaminants.

To ensure that the subsequent development workforce is protected, the remediation works will include reinstatement of the site to ground levels required for the development including excavation of basements.¹⁵⁸

Safety of workers - experiences of the Sydney Olympic Park Authority

7.10 The Sydney Olympic Park Authority (SOPA) provided the committee with a valuable retrospective insight into its own remediation and development experiences. SOPA explained that the implementation of a strategic risk management approach to OH&S and

¹⁵⁵ Submission 7, Thiess Services, p 28

¹⁵⁶ *ibid.*

¹⁵⁷ personal protective equipment

¹⁵⁸ Submission 7, Thiess Services, p 28

extensive monitoring and reporting by the Olympic Coordination Authority (SOPA's predecessor) played a significant role in the overall success of the remediation process in the Sydney Olympic Park Area.¹⁵⁹ SOPA outlined various elements of the remediation process:

The OH&S plans were signed off by the Health Risk Awareness Working Party (HRAWP). Representatives of this forum included; Union representative, Project Management representative, Expert assisting the Unions, independent OH&S Monitoring contractor, Contractors Representative.

OH&S plans were specific to the areas and contaminants, relevant to each contract. The working party met regularly to review the results of the monitoring and as necessary, to adjust the OH&S plan. US criteria were used as they are more stringent than Australia criteria and often safety factors were applied to give greater safety. An OH&S monitoring process was set up by an independent individual contract.

All personnel on site were given a full induction on risks and procedures and the results of the monitoring were made available to all parties involved in the processes. At a later date, neighbours who responded to invitation were also inducted and supplied with copies of monitoring results.

Monitoring of the site began 1 hour before the start of work and continued until 1 hour after the finish of work. At the State Sports Centre where public use of the site continued and lasted from 7am to 11pm for 361 days per year, the monitoring covered the period from 4am to midnight.

When possible, results of the monitoring were distributed to the work force before start of work the following day. If exceptions were recorded, the information was distributed as soon as it became available to enable corrective action to be taken.

In addition to OH&S induction and monitoring, medical screening was undertaken of site personnel. This testing was carried out by WorkCover and was most extensive. The timeframe for the screening process reflected that for the completion of the works. The general test interval was 12 months although project management staff were screened on the basis of results of the screening, full medical history and age with the re-screening period varying from 6 to 24 months.

7.11 SOPA explained that an effective reporting and monitoring process provided a number of benefits to the remediation:

The monitoring processes took into account neighbours and the use of the site by the public during the works. The OH&S monitoring and reporting process together with the construction controls to ensure site safety reduced costs both by giving workers a level of confidence and allowing bulk handling processes. Throughout the works, the cost per cubic metre of moving waste was reduced by an estimated 70% reflecting confidence in the processes and controls.¹⁶⁰

¹⁵⁹ Submission 9, Sydney Olympic Park Authority, p3

¹⁶⁰ *ibid.*

7.12 Dr Kate Hughes advised the Committee that:

The value of a strong focus on occupational health and safety was well understood at the Homebush Bay remediation project where the first line of defence against chemical injury was enhanced work-place health and safety procedures.¹⁶¹

Recommendation 8

That WorkCover ensures that the occupational health and safety strategy in the Remedial Action Plans for Precincts B and C and Homebush Bay incorporate strict requirements modelled on the Homebush Bay Olympic site remediation project.

Recommendation 9

That WorkCover regularly audit remediation activities for adherence to occupational health and safety guidelines.

Dust and odour issues

7.13 The primary sources of impact to air quality at the Rhodes peninsula will be the potential generation of dust from earth moving activities, odours generated from contaminated material and from stack emissions from treatment equipment. The majority of concerns raised were in respect of dust due to experiences with the nearby remediation at the former AGL site in Mortlake and that Thiess Services had a role on that site.¹⁶²

7.14 Concern was expressed by Mr Paul Hanly from the Rhodes Peninsula Group that:

Experience of residents at Cabarita/Mortlake of the AGL remediation has shown that the residents are greatly disturbed by the continual problems with dust and the efforts necessary to have the problem addressed. Dust is one of the main concerns raised by the local community and the record of dust problems at North Newington experienced by residents of Melrose Park and at AGL experienced by residents of Cabarita Mortlake show clearly the need for more stringent standards, measuring, auditing and enforcement.¹⁶³

7.15 The King Street (Area) Residents Group also expressed serious concerns that contaminated airborne dust from soil remediation may impact the community.¹⁶⁴

7.16 In evidence before the committee, Mr Hanly called for a high standard of dust control measures:

The remediation here is being done within 400 metres of the Meadowbank medium-density area and the medium to high-density Liberty Grove

¹⁶¹ Submission 20, Econeco, p 5

¹⁶² For example, submission 4, Rhodes Peninsula Group, p 7

¹⁶³ Submission 1, Rhodes Residents Group, p 8

¹⁶⁴ Submission 19, King Street Area Residents Group, p 1

development. There are four eight-storey towers in the area of Liberty Grove closest to the Union Carbide remediation. Concord West Public School is located here and the closest residents are less than 50 metres from the proposed remediation. I believe the level of dust protection afforded to local residents should be significantly higher than the standard dust measures because of the proximity of residents in Blaxland Road and the number of residents potentially affected.¹⁶⁵

7.17 Thiess acknowledged that there were problems at the AGL site and indicated that it had learnt from that experience:

Thiess' role there [at the AGL site] is very much a contracting role and doing what we are told by the project management organisation and the client. There have been several interface issues there with the developers as well, in that parts of the site have been handed over. I think overall it has not worked particularly well. We have complete control of this site.¹⁶⁶

7.18 In response to dust related concerns arising from Thiess involvement with the AGL site remediation, Mr Doug Moss explained that part of the dust problem related to significant importation of soil onto the AGL site:

The biggest thing we have learnt from Mortlake and it is something that has been put to us by the community is that something in the order of half a million cubic metres of material has been brought to the site in road trucks to backfill the site. You could imagine half a million cubic metres coming in 14 cubic metre loads. You are talking about a couple of hundred trucks a day going to that site. We believe that probably more like 80 per cent of the dust that is generated on that site is from those importation activities.

We are designing this as a cut-fill balance, so there is no import or export of material, except for the thousand tonnes [of concentrate removed for the ITD process]¹⁶⁷

7.19 The Committee asked Mr Moss how Thiess proposes to manage the exposed surface area and resulting dust problem during remediation. Mr Moss responded that Thiess would turf remediated areas:

This has been a problem at Mortlake as well. For some reason, once the areas have been brought to finish level they are generating quite a lot of dust. They have not been managed well, in terms of grassing and that sort of soil stabilisation work. We made a promise to the community that when we completed each stage we would progressively turf the surface, so we would import turf and grass the top of the site, and we do that on a progressive basis as we complete each area.

We are able to grass the site as we go. Mortlake has been grassed, for example, but it has been spray-seeded, the take-up has not been great and there are those

¹⁶⁵ P Hanly, Rhodes Peninsula Group, Evidence, 7 February 2002, p 12

¹⁶⁶ D Moss, Thiess Services, Evidence, 8 February 2002, pp 49-50

¹⁶⁷ D Moss, Thiess Services, Evidence, 8 February 2002, p 49

sorts of practical issues. We think we can certainly fix those issues on this job, and that has been our promise to the community.¹⁶⁸

7.20 Mr Doug Moss explained that to limit dust creation, the feeding aspect of the treatment process would be conducted inside a ventilated shed :

The proposal is to shed the feeding side of the process. We do all the conditioning of the soil all the drying and all the dusty stuff inside a ventilated building and then stick the back end of the plant outside. So it will come out on a conveyor and go into a stockpile.¹⁶⁹

7.21 In its submission to the Committee, Thiess Services addressed any concern that may arise from emissions as a result of ITD. Thiess pointed to the North Newington project where a stack test on air emissions during treatment of contaminated soil showed an exceedance of the dioxin emission criterion by a factor of about 50% due to failure of a fire eye which controls burner performance.¹⁷⁰ A subsequent retrospective health risk analysis for the emission exceedance, carried out in response to the concerns of the local community, found that even if the entire project had been carried out with an emission level equal to that of the exceedance that:

- risks to workers on the site would still be within acceptable limits at the stack and
- risks to the health of offsite residents several hundred metres away were well below acceptable limits.¹⁷¹

7.22 Thiess Services considers the risk of dioxin exposure through air emissions to be of a lesser degree than dust as the main exposure pathway for the onsite work is ingestion of soil via dust. For the ITD plant in question the mass of dioxins emitted during 8 hours of standard operation, was calculated to be equivalent to the mass of dioxins emitted during one hour of operation of a 10 tonne diesel delivery truck in the city.¹⁷²

7.23 Remediation of Homebush Bay is not expected to generate dust concerns due to the intention to treat relatively moist sediment. Thiess proposes to sequentially isolate sections of the Bay with earthen coffer dams so that approximately 50,000 cubic metres of sediment (in total) can be excavated dry . No dredging is therefore involved which requires de-watering and treating liquid sludge onshore.¹⁷³

7.24 Waterways had advised the Committee that the EIS will assess the potential for dust and vapour escaping from the site when soil is disturbed, as well as the potential for health risk from contaminants carried on dust from remediation.¹⁷⁴

¹⁶⁸ D Moss, Thiess Services, Evidence, 8 February 2002, pp 49-50

¹⁶⁹ D Moss, Thiess Services, Evidence, 8 February 2002, p 47

¹⁷⁰ Submission 7, Thiess Services, p 31

¹⁷¹ Submission 7, Thiess Services, p 32

¹⁷² Submission 7, Thiess Services, pp 28, 32

¹⁷³ Submission 7, Thiess Services, pp 11-13, 28

¹⁷⁴ Submission 27, Waterways Authority, p 8

Recommendation 10

The committee recommends that the EPA ensure that air quality control measures implemented by site remediators include:

- limiting open excavation face to a minimum to reduce potential dust and odour emissions
 - covering all stockpile areas
 - operation of specific odour control measures and odour suppressants
 - inclusion of truck wash down areas to minimise dust disturbance from truck wheels
 - use of water sprinklers to suppress dust sources and
 - monitoring regimes and emergency triggers to be included in the operation of the treatment equipment if fugitive stack emissions occur.
-

Air quality monitoring

7.25 An air quality monitoring process will be essential to ensure any dust generation or vapour emissions are promptly identified and managed. The EPA advised that real time surrogate monitoring of air emissions is critical to supplement monitoring of those chemicals that have a long laboratory turn around time. For dioxin, it takes 7 days to receive laboratory results from sampling.¹⁷⁵

7.26 Mr John Hunt, Environmental Scientist, Thiess Services explained Thiess strategy with regard to off-site monitoring for airborne toxins in the local residential areas:

Basically there will be a fairly comprehensive monitoring plan put up as part of the EIS, that will be part of the remedial action plan. That plan will be developed by consultants who specialise in the area of OH&S monitoring. It will be reviewed by the EPA, and the Department of Health has indicated that they have a very strong interest in being involved in reviewing that plan because they have particular expertise.

At the moment we are collecting baseline data on the site and around the site. I think there has been a proposal to put stations in the Rhodes area, near the community hall and down at Melrose Park, to find out what is happening there at the moment. I am not aware of the details or how that will be taken forward, but it is an issue that we are well aware of. It is one of the main issues that has concerned the residents. From our point of view, it is a pretty important aspect.¹⁷⁶

¹⁷⁵ Correspondence from Joe Woodward, EPA to Director, dated 20 February 2001, p 2

¹⁷⁶ J Hunt, Thiess Services, Evidence, 8 February 2002, p 50

- 7.27** The importance of collecting baseline data and placing air quality data in context of the existing environment was highlighted in evidence by Dr Kate Hughes. She advised the Committee that the NSW EPA collects air quality data in the Sydney Basin including the incidence of dioxins and other air toxins in ambient air. Although this information is not publicly available, it may be useful in establishing a contamination baseline to measure against identified pollution events. For example, information about dioxin formation resulting from New Years Eve fireworks celebrations and the Christmas 2001 bushfires helps place dioxin pollution in context.¹⁷⁷ During hearings, Dr Hughes stated:
- I think it is important to put on the table whatever information the EPA or its consultants have generated in studying dioxins in the air shed – or anywhere else for that matter – even if they are incomplete. What usually happens is that the EPA or somebody else in government commissions a study, which is never peer reviewed or published. It is what we call "grey literature" and which just sits there – I know that there are some air quality studies of dioxins in the Sydney basin – we would expect that; it is a big industrial city – and that is very important information for comparison purposes. We must be able to get a baseline to understand what we are talking about.¹⁷⁸
- 7.28** The scale and significance of any pollution that occurs during remediation activities could then be determined.
- 7.29** The King Street (Area) Residents Group requested that air monitoring stations be installed in Concord Avenue between King Street and Liberty Grove at least during remediation and construction.¹⁷⁹
- 7.30** During remediation of the Sydney Olympic Games site, the Olympic Coordination Authority (now SOPA) provided results of air and dust monitoring on the Internet as well as explanations of the monitoring program.¹⁸⁰
- 7.31** Mr Joe Woodward, Assistant Director-General, EPA advised that the EPA does not anticipate a need for it to directly conduct any monitoring.¹⁸¹

Recommendation 11

That the EPA ensure the remediation proponents implement air monitoring measures both adjacent to precincts B and C as well locations further from the peninsula during remediation of those sites.

¹⁷⁷ Submission 20, Econeco p 5

¹⁷⁸ K Hughes, Econeco, Evidence, 7 February 2002, pp 58-59

¹⁷⁹ Submission 19, King Street Area Residents Group, p 2

¹⁸⁰ see <http://www.oca.nsw.gov.au/ecology/science-air.cfm> (accessed 22 April 2002)

¹⁸¹ Correspondence from Joe Woodward, EPA to Director, dated 20 February 2001, p 3

Recommendation 12

That results of air monitoring be made publicly available (including the website www.rhodesremediation.nsw.gov.au) as part of ongoing community communication and consultation programs.

Human health study

7.32 A number of submissions received by the committee indicated a desire in the community for a human health study to be conducted covering the community living near the proposed remediation works. The intention is to provide a method of measuring before and after health outcomes related to remediation activities.¹⁸²

7.33 Dr Kate Hughes of Econeco explained the difficulty in conducting such a study and explained the difficulty in achieving scientifically robust results from epidemiological investigations of entire communities. Dr Hughes cited the following comment from a publication entitled *Quick Poison*:

Wherever they live, most people are exposed to a complex mixture of pollutants, not just one or two specific chemicals say in the workplace or through their water supply. Besides, these days, virtually everyone starts life with a baseline residue of OC¹⁸³ compounds in their bodies, and over a lifetime, they accumulate even more. Attempts at rigorous comparison between exposed and non-exposed people are, therefore, not feasible, and a definition of exposed and control groups is difficult to establish.¹⁸⁴

7.34 Dr Hughes also outlined factors that confound interpretation of data associated with chemical load including, the complexity of the body's response to foreign substances, the relationship of exposure to permanent chemical injury and the delayed onset of disease from chemical exposure. Interpretation of raw data on human body load may be open to trivialisation and distortion.¹⁸⁵

7.35 Evidence from NSW Health confirmed the view of Dr Hughes on monitoring for health outcomes:

there are known problems with health studies in small areas and it is accepted that it is very difficult to prove any effect, even if it is present. The causal link between exposure and effect is often very difficult to establish due to variations in small populations and the exposure issue. Such a study would have to gather individual data so that variations in individual person data, such as smoking and occupational exposures, could be accounted for. A further disadvantage is that these kinds of effects are not detected until months or years after an exposure. For that reason we prefer a method of monitoring environmental exposures as a preventative

¹⁸² For example, Submission 20, Econeco

¹⁸³ organochlorine

¹⁸⁴ Submission 20, Econeco, p 3, citing K Short, *Quick Poison*, Envirobook, Sydney 1994, p 147

¹⁸⁵ Submission 20, Econeco, p 4

measure. I emphasise again that New South Wales Health has been discussing, and will continue to discuss, with residents the need and form of any health assessments.¹⁸⁶

- 7.36** As indicated in chapter 3, diet is estimated to account for over 90% of human exposure to dioxin, although exposure also occurs through background (environmental), accidental or occupational exposure. The 1998 WHO Consultation explained that the available information derived from numerous studies in industrialised countries indicates a daily intake of PCDDs and PCDFs in the order of 1-3 pg TEQ/kg/day, based on an adult body weight of 60 kg. If dioxin-like PCBs are included, then the daily TEQ intake factor can be 2-3 times higher.¹⁸⁷
- 7.37** Mr Paul Hanly wished to find out the health and life expectancy statistics for Rhodes as opposed to Concord LGA compared to the general population in Sydney.¹⁸⁸ NSW Health advised that in relation to cancer statistics, Concord did not have any differences in cancer incidence as whole, or in rates of any specific cancer, compared to the rest of NSW.¹⁸⁹
- 7.38** In an attempt to alleviate the community's concerns regarding their health during remediation activities, NSW Health advised the Committee that it has been proposed that a community liaison sub-committee be established and NSW Health has agreed to provide representation on that sub-committee.¹⁹⁰

Recommendation 13

That in the interest of public awareness, NSW Health provide leadership to any community liaison group created to examine health issues of concern.

Testing of roof dust

- 7.39** During the inquiry, some concern was raised that no testing of roof dust or topsoil for contamination has occurred in streets surrounding the Rhodes peninsula.¹⁹¹ More specifically, Mr Paul Hanly raised concern that during the remediation of the Dulux Paints properties at Cabarita, many houses had their roof dust removed although no roof dust

¹⁸⁶ G Stewart, NSW Health, Evidence, 8 February 2002, pp11-12

¹⁸⁷ <http://www.who.int/pes/docs/dioxin-exec-sum/exe-sum-final.html>: *Assessment of the health risk of dioxins: re-evaluation of the Tolerable Daily Intake*. WHO Consultation, May 25-29, 1998, Geneva, Switzerland. WHO European Centre for Environment and Health and International Programme on Chemical Safety, Executive Summary (accessed 28 March 2002); *A Review of the WHO Revised TDI and Sediment Remediation Criteria and Standards for Dioxins, Addendum Report*, EVS Environment Consultants, June 2000, Executive Summary p 2

¹⁸⁸ Submission 1, Rhodes Residents Group, p 9

¹⁸⁹ Submission 23, NSW Health, p 14, citing NSW Cancer Council. Cancer Maps for New South Wales: Variation by Local Government Area 1991 to 1995, March 1999.

¹⁹⁰ Submission 23, NSW Health, p 5

¹⁹¹ Submission 4, Rhodes Peninsula Group, p 7

tests have been conducted opposite the Berger Paints Plant.¹⁹² The King Street (Area) Residents Group requested that the roof dust of the houses in the area be tested before remediation commences and at intervals during remediation and construction.¹⁹³

7.40 Dr Kate Hughes explained that the argument for testing of roof dust and garden top soils of surrounding houses is intended to establish a degree of contamination prior to remediation works and allow for comparison of dust levels generated at periods of time during the project and completion. She acknowledged that this may provide an important reference point about some of the existing pollution risks in homes as a result of activities across the whole city as well as dust depositions made during the period of the remediation works.¹⁹⁴

7.41 Dr Hughes nevertheless questioned the merits of roof dust testing during remediation:

it would be a very challenging task to investigate the correlation between the contents of the most recent ceiling dust layer, (or garden topsoil layer), with dust from the remediation site.

Such an investigation would be confounded by the likely presence of dusts from other sources in the area, both point source and non-point source. Given the many factories located in the area, there could be several point sources of dioxin and other pollutants, as well as many tens of thousands of non-point sources, including, but not confined to, motor vehicle emissions.

This and other confounding factors ensure that any well-designed study of ceiling dust or garden topsoil in the area near the remediation works would be a massive and complex task, with no surety of meaningful results.¹⁹⁵

7.42 Dr Stephen Corbett from NSW Health supported this views and stated:

We are aware of the concerns that some residents have about contamination in roof spaces. Roof spaces are a settling chamber for dusts of all kinds in urban environments and we do know from our own testing that all of our roof spaces contain lead and polycyclic aromatic hydrocarbons and a range of compounds, often in quite high concentrations because they filter out the particles which are contaminated. We are also reasonably certain that in houses in which the fabric is intact they are not an important pathway of exposure.¹⁹⁶

7.43 Dr Corbett however warned that people should be scrupulous about the control of dust emanating from the roof when they renovate their houses.¹⁹⁷

¹⁹² Submission 1, Rhodes Residents Group, p 11

¹⁹³ Submission 19, King Street Area Residents Group, p 2

¹⁹⁴ Submission 20, Econeco, p 7; K Hughes, Econeco, Evidence, 7 February 2002, p 59

¹⁹⁵ Submission 20, Econeco, p 7

¹⁹⁶ S Corbett, NSW Health, Evidence, 8 February 2002, p 16

¹⁹⁷ *ibid.*

Risks to human health after remediation

7.44 The terms of reference to this inquiry require the committee to examine the risk to future residents of the Rhodes peninsula. The EPA is responsible for ensuring that the specified level of clean-up will protect known future users of the site and the environment.¹⁹⁸ When remediation activities are complete, an EPA accredited site auditor will be required to certify the suitability of the sites for residential development. The risk to future residents is an issue that is considered in the site audit statement issued by the independent auditor.

7.45 Clause 7 of *State Environmental Planning Policy No 55 Remediation of Land* (SEPP 55), requires that a consent authority (the Minister for Planning in this instance) not consent to the carrying out of any development on land unless the authority is satisfied that the land has been or will be remediated to a standard suitable for the land to be developed for that purpose. Planning NSW confirmed the EPA's role in ensuring that clean-up certification is obtained:

In order to be satisfied that the land will be remediated to a suitable standard, the consent authority may require the applicant to arrange an independent site auditor accredited by the Environment Protection Authority.¹⁹⁹

7.46 The Committee raised the issue of whether or not there was merit in some sort of indemnity bond that may be attached to a site audit statement to allow residents to have some feeling of security should audit statements be found to be incorrect.

7.47 Mr Joe Woodward explained that the *Contaminated Land Management Act 1997* deals with this issue reasonably well through assessment of a cleaned site against the goals set for remediation. Mr Woodward stated that, in terms of any site auditor's statements:

there is a requirement for financial indemnity to be covered in that. I am not quite sure of the exact amount, but it may be in the order of \$10 million or \$20 million. If there ends up still being contamination later on, then of course the Contaminated Land Management Act does provide all of the powers to require any further works or investigations in future as well. But the aim of the whole process is to ensure that that does not happen.²⁰⁰

Risks to the environment from remediation

7.48 Risks to the environment from remediation encompasses both the impacts of remediation as well as the adequacy of remediation to improve the environment. The Nature Conservation Council of NSW (NCC) indicated that there are ecological costs involved with the remediation of sediments, particularly in an area that supports extensive mangroves and wetland habitats.²⁰¹ Ms Racquel Carter, Coastal Project Officer with the NCC informed the committee that:

¹⁹⁸ Submission 5, Environment Protection Authority, p 6

¹⁹⁹ Submission 12, Planning NSW, p 2

²⁰⁰ J Woodward, Environment Protection Authority, Evidence, 7 February 2002, p 45

²⁰¹ Submission 22, NSW Nature Conservation Council, p 7

The wetland areas provide habitat values for a number of migratory and threatened species. Those species include the bar tailed godwit, common greenshank, Pacific golden plover, Lathams snipe, sharp tailed sandpiper and eastern curlew. I would like to remind the Committee and State agencies, and local government, that these birds are protected under international agreements the Chinese and Australia Migratory Bird Agreement [CAMBA] and the Japanese and Australia Migratory Bird Agreement [JAMBA].²⁰²

7.49 As indicated previously, under Clause 12 to SEPP 55, the Minister for Planning may refuse development consent for remediation where he or she is satisfied that there would be a more significant risk of harm to some aspect of the environment from the carrying out of the work than there would be from the use of the land concerned in the absence of the work.²⁰³

7.50 Thiess Services acknowledged that there will be some negative short term impacts from remediation:

Remediation work in the Bay will result in the short term in the death of all marine invertebrates and possibly some fish that live in the area that will be disturbed. However in the medium to long term the remediation will mitigate risks to marine invertebrates. The remediation will also involve a research project into the environmental performance of various types of backfill materials used to reinstate the dioxin footprint. The rate of re-colonisation of the clean backfill will provide information on optimal backfill materials for future projects.²⁰⁴

7.51 Thiess proposes that the material be treated and not returned to the Bay as treatment for dioxins will not remove heavy metals present in the sediment. Although not suitable for return to the Bay, the heavy metal in the sediment is expected to be below levels of concern for residential landuse.²⁰⁵ Mr John Hunt from Thiess Services further explained that the treated sediment from Homebush Bay will be safe to reuse on land from a human health point of view:

because humans are less susceptible to health problems from the particular metals involved at the concentrations involved.²⁰⁶

7.52 Mr Hunt later explained the proposal to reinstate sediment to Homebush Bay:

the proposal is to put it back to its original topography. What is on the table at the moment that is under discussion with Fisheries and the Waterways Authority is to actually use this project to investigate the actual properties and the benefits of various sorts of fill. They would be clean fill material such as crushed shale or crushed sandstone or clean sand to actually put back a range of different materials and to then monitor the recolonisation of those different sorts of materials by the actual benthic organisms. The thought is that it is a good opportunity to get some

²⁰² R Carter, Nature Conservation Council of NSW, Evidence, 8 February 2002, p 19

²⁰³ Submission 10, confidential

²⁰⁴ Submission 7, Thiess Services, p 19

²⁰⁵ Submission 7, Thiess Services, pp 11-13

²⁰⁶ J Hunt, Thiess Services, Evidence, 8 February 2002, p 38

first-hand information on that aspect because if any further work is done in marine environments, as it could be in Sydney Harbour, this is a hole in our knowledge: it is a data gap.²⁰⁷

Adequacy of Homebush Bay remediation

7.53 The effectiveness of the proposed Homebush Bay remediation was questioned by a number of submission and witnesses. In particular the concerns included:

- whether or not the ban on fin fishing be able to be lifted after the remediation is completed according to proposed standards²⁰⁸
- remediation activities will not adequately address lead and phthalate contaminated sediment opposite Precinct A which will remain close to mangrove areas and protected Bicentennial Park wetlands²⁰⁹ and
- that remediation does not cover the entire Bay and will leave areas with DDT hot-spots (small areas with a significant concentration).²¹⁰

7.54 Mr Ben Cole, Chemical Campaigner, Total Environment Centre (TEC) recommended that as dioxin is biocumulative, areas that have already been identified as hot-spots and having extremely high levels of dioxin, should be remediated using careful planning and *in situ* remediation of that land.²¹¹ The Committee recognises that dioxin hot spots in Homebush Bay may inhibit the ability to reduce dioxin contamination in fish and reduce the chances of lifting the ban on fishing.

7.55 Mr Paul Hanly also raised concerns that the cumulative effects on fish from other bays should also be considered in the risk assessments:

the fish are not only grazing in Homebush Bay but they are also grazing in these seven or eight other heavily contaminated embayments and the risk assessment done by EVS and the works done by Parametrix do not assume that there is any contamination of the fish from their grazing in those bays. They have only focussed on dioxin in Homebush Bay so when looking at DDT they have not looked at the cumulative effects from other bays. I do not know whether there would be one. They have not looked at the cumulative effects of metals from other bays. So the determination of the scope of the works has not taken a whole of harbour approach to the other contaminants.²¹²

²⁰⁷ J Hunt, Thiess Services, Evidence, 8 February 2002, p 39

²⁰⁸ Submission 1, Rhodes Residents Group, p 20; Submission 30, Friends of the Earth

²⁰⁹ Submission 4, Rhodes Peninsula Group, pp 5-6

²¹⁰ Submission 20, Econeco, p 2

²¹¹ B Cole, Total Environment Centre, Evidence, 8 February 2002, p 23

²¹² P Hanly, Rhodes Peninsula Group, Evidence, 8 February 2002, p 63

- 7.56** In his submission, Mr Hanly stated that the heavy metals, dioxins and other contaminants in the remainder of Homebush Bay will not necessarily reduce the risks of contaminated fish.²¹³
- 7.57** The NCC expressed the need to protect the diverse wildlife in the area:
- Considering the diversity of bird life that utilise the wetlands of Bicentennial Park and Newington, it is imperative that all potential risks of bioaccumulation are eliminated throughout all trophic levels.²¹⁴
- 7.58** The EVS report which examined site-specific toxicity and benthic community assessment of Homebush Bay marine sediments examined the distribution and risk from a wide range of chemicals in sampled areas of Homebush Bay. The report concluded that:
- additional remediation of Homebush Bay sediments beyond the proposed dioxin-based remediation for human health is not warranted at this time.²¹⁵
- 7.59** The EVS report did make a comment that some adverse effects are possible over a limited spatial range, a grid area next to a proposed remediation area adjacent to Precinct B (identified as NE-04B in Appendix 1 p 2). It was concluded that these effects may not actually occur in the field and are not expected to be severe.²¹⁶ Although sound methodological reasons are advanced for discounting concern regarding hotspot areas such as this, the potential bioaccumulative threat is nevertheless present.
- 7.60** The NCC and TEC advocate that the total fishing ban on the Rhodes peninsula should be maintained to aid in rehabilitation of the area.²¹⁷ In hearings before the Committee, Ms Racquel Carter of the NCC also recommended that the ban be retained until acceptable standards are achieved:
- Most of the fish that use these wetlands are estuary marine fish, which obviously travel to other areas probably east of the Parramatta River, Gladesville Bridge and further west of Rhodes peninsula, so there are concerns about just lifting the bans and not having extensive monitoring afterwards to ensure that the level of dioxin and other contaminants in these species have been reduced to acceptable standards. I really recommend that this ban be kept in place until these results are obtained, which probably will not be for a number of years.²¹⁸
- 7.61** The Committee considers that retention of the fishing ban will provide time for ecosystems to re-establish on the foreshore as well as provide a period of time in which to evaluate the

²¹³ Submission 4, Rhodes Peninsula Group, p 9

²¹⁴ Submission 22, NSW Nature Conservation Council, p 6

²¹⁵ EVS Environment Consultants, *Homebush Bay Marine Sediments: Site-Specific Toxicity and Benthic Community Assessment*, February 1999, p 27

²¹⁶ *Ibid*

²¹⁷ Submission 22, NSW Nature Conservation Council, p 16

²¹⁸ R Carter, NSW Nature Conservation Council, Evidence, 8 February 2002, p 23

safety to human health of fishing and eating fishing from Homebush Bay. NSW Health supports a continuation of the fishing ban until fish contaminant levels are acceptable.²¹⁹

7.62 The Committee was advised by NSW Health that the Fish Contaminant Committee was responsible for monitoring fish tissue concentrations with a view to lifting the ban. NSW Health, Fisheries and the EPA are represented on that group as a group of agencies with expertise in the various disciplines that are needed to make that deliberation.²²⁰

Recommendation 14

That the Waterways Authority, as the owner of the land under Homebush Bay, further investigate measures to remediate dioxin hotspots and other known contaminants.

Recommendation 15

That during remediation and for 12 months after completion of remediation of Homebush Bay:

- sampling of sediment and fish from remediated and non-remediated areas occurs on a quarterly basis and
- data collected from sampling be incorporated in a future human health and ecological risk assessment.

Recommendation 16

That upon completion of remediation of Precincts B and C:

- the total fishing ban remain for a period of at least 12 months
 - after 12 months, an independent detailed human health and ecological risk assessment be conducted sampling sediment and fish from remediated and non-remediated areas of Homebush Bay, and
 - the ban remain until it is demonstrated that contaminant levels in fish are reduced to acceptable levels.
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Conclusion

7.63 It is the view of the EPA that remediation of the Homebush Olympic venue demonstrates that remediation can occur without increased risks to local residents, nearby workers and

²¹⁹ Submission 23, NSW Health, p 10

²²⁰ S Corbett, NSW Health, Evidence, 8 February 2002, p 14

the environment if it is managed properly to control issues such as dusts, emissions from the treatment facility and stormwater run-off.²²¹

7.64 The EPA advised the committee that EISs for the proposed remediation areas will need to address a number of issues including those related to:

- water - including potential Bay water quality impacts during dredging operations and managing stormwater
- air emissions - from stacks and soil excavation and handling
- noise and vibration - from plant and vehicles
- waste management and
- investigations of the solid and sediment contamination.²²²

7.65 The committee agrees with the EPA's view that remediation can occur without subjecting human health and the environment to adverse risk. Although this may be technically possible, it is imperative the EPA ensure that this occurs in practice. The committee understands the EPA's role in assessing risks at the Rhodes peninsula is critical to the protection of human health and the environment. Consequently, the committee wishes to ensure that all human health and environmental matters are considered thoroughly.

Recommendation 17

The committee recommends that the EPA, in conjunction with the appropriate regulatory authorities, closely monitor environmental controls and on-site management of remediation works to ensure that the integrity of the environment and the health and safety of workers and the public is not compromised.

Environmental controls that should be monitored include:

- surface water, leachate and groundwater management and treatment controls
- erosion and sediment controls
- odour and dust controls and
- noise and traffic measurement and safety measures.

Recommendation 18

That the EPA encourage, where possible, the parties remediating Precincts B and C to coordinate remediation activities so that disruption to the community is minimised.

²²¹ Submission 5, Environment Protection Authority, p 5

²²² Submission 5, Environment Protection Authority, p 5

Recommendation 19

That the Rhodes Remediation website www.rhodesremediation.nsw.gov.au be updated and dedicated as a repository for all information of community interest concerning remediation in the area.

Recommendation 20

That the Waterways Authority link this Standing Committee on State Development report to the Rhodes remediation website.

Chapter 8 Planning and development requirements

Major Planning Instruments

- 8.1 Both the remediation and the subsequent development of the Rhodes peninsula sites are governed by planning as well as environmental requirements. The *Environmental Planning and Assessment Act 1979* (EPA Act) is the key legislation which governs environmental impact assessments of major development projects.
- 8.2 While local councils normally determine development applications, the Act provides that certain developments, such as the remediation of the Rhodes peninsula, may be declared to be State significant and require the consent of the Minister. The gazetting of Sydney Regional Environmental Plan No 29 (SREP 29) on 19 November 1999, appointed the Minister for Planning as the consent authority for development on Rhodes peninsula.
- 8.3 Several planning instruments are important in understanding the current redevelopment and remediation of the Rhodes peninsula. The key document is the SREP 29. To assist in interpretation of the SREP 29 are three other plans: the Development Control Plan (DCP), the Community Development Plan (CDP) and the Transport Management Plan (TMP). The *State Environmental Planning Policy No 55 Remediation of Land* (SEPP 55) is also important in specifying planning requirements for remediation of sites such as those at Rhodes.

History of Planning Requirements²²³

- 8.4 Planning NSW advised the committee that proposals for the redevelopment of Rhodes peninsula have not been developed or emerged in isolation but as part of the overall strategy for Sydney. As a result of fragmented ownership of the peninsula, many planning instruments, such as Environmental Impact Statements for remediation of particular sites, have been activated at differing times as various owners put forward proposals for use of their land. The density of development proposed on Rhodes peninsula is largely influenced by the broad Sydney strategy of producing a compact city.
- 8.5 In the early 1990s ICI (owner of Precinct A) approached the Department of Urban Affairs and Planning (DUAP), now Planning NSW, and the then Concord Council to ascertain redevelopment options for the peninsula. A study of the entire Rhodes corridor from Strathfield to the Parramatta River was commissioned by the Department and Concord Council. Among other things, this report recommended that residential uses on the Rhodes peninsula range in densities from 1.1:1 to 1.7:1.
- 8.6 This proposal was not adopted by the Council. Later in 1997, ICI again approached the then Minister for Planning and DUAP to identify options for Rhodes peninsula. ICI's proposal was to develop a regional shopping centre on Precinct A in the order of 80,000 to

²²³ Source for this chapter primarily comes from Submission 12, Mr R Black, Director, Urban Assessments, Planning NSW; and Messrs Prattley, Kirby and Twiney, Planning NSW, Evidence, 7 February 2002.

100,000 square metres in size. Although DUAP did not support the proposal, Concord Council and the then Minister for Planning agreed to establish a working party which was chaired by Professor Hans Westerman. The purpose of the working party was to identify a suitable redevelopment strategy for the Rhodes peninsula. The working party comprised representatives of a number of State Government departments, Concord Council and the major land owners in the study area. The working group presented a strategy to Minister at the time in March-April 1998.

- 8.7** The Strategy which was produced recommended a gross density of 1.2:1 and allowed around 35,000 square metres for essentially residential uses with a small amount of office development, and about 10,000 square metres of retail space. Office uses were proposed so as to create an active centre adjacent to the railway station, trying to integrate employment with residential development as far as possible. Residential density was set at about 75-95 dwellings per hectare.

Sydney Regional Environmental Plan No 29 Rhodes Peninsula

- 8.8** The 1998 Strategy was then exhibited as the draft Rhodes Regional Environmental Plan from 12 February 1999 to 12 March 1999, and public submissions were accepted until 19 April 1999. A public meeting on 23 March, hosted by the Hon John Murray MP, Member for Drummoynes, was attended by 60 people.

- 8.9** Following public consultation, the Department gazetted the Sydney Environmental Plan No 29 Rhodes Peninsula (SREP 29) on 19 November 1999. Under this instrument the Minister, rather than the Council, becomes the consent authority for planning decisions. The Plan established planning principles for the Rhodes peninsula relating to land use, buildings, public domain, access, movement and parking and ecological issues. The plan also:

- creates land use zones
- introduces floor space restrictions in each of the 4 Precincts and for specific uses
- limits building heights
- controls bulky goods retailing and
- requires the consent authority to be satisfied that adequate transport infrastructure and arrangements for embellishment and maintenance of public open space are in place before granting relevant development consents.²²⁴

- 8.10** SREP 29 is effectively a framework document for development, so that developers of the various sites need to ensure any of their individual proposals comply with the principles in this document.

- 8.11** During the development of the draft Plan the EPA provided advice from a strategic perspective to ensure that ecologically sustainable development objectives in the plan went beyond general statements of intent. This advice included specific planning and design criteria to encourage:

²²⁴ Submission 12, Planning NSW, p 3

- appropriate land use in context of site contamination and subsequent remediation and
- support for the State Government's Action for Air and Action for Transport 2010 policies, for example reduction of car usage.²²⁵

Development Control Plan and Community Development Plan

8.12 Following the gazettal of SREP 29, a Development Control Plan (DCP), a Community Development Plan (CDP) and Transport Management Plan (TMP), were prepared to provide support to SREP 29 and to assist the development of individual sites.

8.13 The purpose of the CDP is to encourage an integrated approach to planning for development including community services. It is intended to establish a management framework and a participatory planning approach to ensure that state government agencies, the local council, special interest groups and the local community work together to achieve identified community planning principles. It takes into account census data and other social indicators to plan for future needs of residents, including:

- accessibility issue for community services, particularly for those with disabilities or from a non-English speaking background
- health needs of the population, including consideration of the impact of greater numbers of older persons or young children
- education needs at both primary and secondary levels and
- opportunities for passive and active recreation.

8.14 The DCP establishes the street and public open space layout for the area and introduces guidelines for the design and arrangement of buildings. The DCP also contains planning controls for development which consider:

- land use encouraging local facilities in residential areas and developing a wide range of activities in the mixed use zone
- buildings guiding aspects of design such as height, building materials, privacy and natural ventilation
- interface with public areas shaping the character of streets through building setbacks and a clear separation between public and private space
- private open spaces encouraging well-designed front gardens, balconies, terraces and gardens that will sustain vegetation and help infiltrate stormwater and
- pedestrian access, parking and servicing ensuring that designs for public areas are accessible for people with limited mobility and minimise conflict between pedestrians and vehicles.²²⁶

²²⁵ Submission 5, Environment Protection Authority, p 17

²²⁶ Submission 6, confidential

- 8.15** The DCP and the CDP were prepared by consultants on behalf of DUAP and publicly exhibited. The CDP was aimed at establishing a consultation and community participation program for future planning and development. The CDP is intended to inform the local community about future issues affecting development on the peninsula through community newsletters, information meetings and other means.

Transport Management Plan

- 8.16** The TMP is a proactive plan which contains infrastructure requirements for the projected population and surrounds and seeks to influence travel behaviour. It aims to provide a comprehensive strategy for the management of traffic and transport and includes an implementation plan for transport infrastructure to support the development of the Rhodes peninsula.²²⁷
- 8.17** The TMP was prepared by traffic consultants Masson Wilson Twiney and exhibited to the public at the same time as the CDP and DCP. The TMP was endorsed by the Minister for Planning in November 2001 and came into effect on 3 December 2001.
- 8.18** The TMP is a response to the requirement in clause 13 of the SREP 29, which states that no consent is to be issued to development by the Minister unless the Minister is satisfied that:
- (a) railway and bus infrastructure that will provide an adequate public railway and public bus service for people who will reside or work on, or otherwise use, the land to which this plan applies, and
 - (b) roads and related infrastructure [will be] of a standard adequate to provide public and private vehicular transport access to, and egress from, the land to which this plan applies from and to other land within the region.²²⁸
- 8.19** To model transport effects the following development scenario at Rhodes was assumed in the TMP:
- Approximately 3,000 units
 - 50,000m² commercial office space
 - 25,000m² retail space
 - 15,000m² bulky goods space and
 - 12,000m² high tech industrial space.²²⁹
- 8.20** The TMP strategy includes a number of elements such as:
- maximising density near the railway station

²²⁷ Submission 12, Planning NSW, p 4

²²⁸ *ibid.*

²²⁹ Taken from p19 of Transport Management Plan as reproduced in *Submission 12*, p 6

- providing convenient pedestrian and cycle access to other areas (a recreational cycle route along the western foreshore of Rhodes, linking to Homebush Bay and John Whitton Bridge as well as a new pedestrian link to Concord West)
- restricting car parking for various new developments (as well as discouraging long-stay parking near shops)
- enhancing bus service provision
- upgrading the railway station and providing increased servicing of the area (the redevelopment will also provide bus shelters, stops and signage for existing bus services and allow for a future bus route on the western side of the railway line) and
- providing flexibility in northern and southern vehicular access points to reduce impacts on the Concord-Homebush Drive intersection (widening this intersection, and redirecting traffic from the site onto Homebush Bay Drive at Oulton Avenue, and onto Concord Road at Averill Street).

8.21 The TMP is a lengthy and detailed document that considers many facets of traffic and transport management. Chapter 6 of the TMP outlines the means of achieving traffic and transport management targets. This is attached at Appendix 2.

8.22 An important part of the TMP is an estimation of transport demand. The following estimates were made of trips when the development of the sites is complete:

Table 8.1 Estimated transport demand²³⁰

	AM Peak			PM Peak		
1. Person Trips/hours						
Residential		2420			2420	
Commercial employees		895			895	
Industrial employees		170			170	
Retail employees		436			436	
Shoppers					3200	
TOTAL		3920			7120	
2. Public Transport Trips	IN		OUT	IN		OUT
Train	360		580	724		504
Bus	147		240	320		227
Ferry	15		24	24		15
3. Vehicle Trips/Hour	IN	OUT	TOTAL	IN	OUT	TOTAL
Main site	700	810	1510	1040	930	1970
Southern site	140		140		140	140

²³⁰ Taken from p 20 of Transport Management Plan as reproduced in *Submission 12*, p 6

8.23 Planning NSW advises the Committee that the traffic generation has been assigned to the road network and the operation of the network intersections modelled for a series of scenarios to test the sensitivity of situations:

The operation of the road network has been modelled by means of the SCATES program using RTA standard lane capacities. The modelling has included allowances for generation from the Digital site and included a number of scenarios. Analysis was also undertaken with consideration of the proposed intersection improvements.²³¹

Public Consultation during the planning process

8.24 This section discusses the public consultation and participation initiated during the formal planning processes. The public perception of the adequacy of public consultation in the remediation and planning processes is discussed in chapter 9.

8.25 The legislative requirements placed on Planning NSW, as the consent authority through the Minister for Planning, are primarily contained in the *Environmental Planning and Assessment Act 1979* (EPA Act). One of the purposes of this Act, at section 5(c), is:

to provide an increased opportunity for public involvement and participation in environmental planning and assessment.

8.26 According to a recent report prepared for Planning NSW, for public involvement to be effective, participation should:

- not be so late in the life of an issue that it is tokenistic, or merely confirms decisions already made
- be selected in a way that is not open to manipulation, and should include a cross-section of the population as individuals and as groups
- allow consideration of the big picture, so people can really become engaged and
- make sure all participants have time to become well informed.²³²

8.27 Likewise DCPs and Environmental Impact Statements, such as that prepared for the Rhodes peninsula, are required to be publicly exhibited and opportunity provided for comment at the draft stage.

Consultation during SREP 29 development

8.28 In the preparation of a regional environmental plan such as SREP 29, requirements under sections 47-48 of the EPA Act are primarily to ensure the public is notified where the draft

²³¹ Submission 12, Planning NSW, p6

²³² DUAP, *Ideas for Community Consultation* by Carson and Gelber, 2001 p9, quoted in Audit Office of NSW, *Performance Audit Report: Department of Urban Affairs and Planning, Environmental Impact Assessment of Major Projects in NSW* 2001, p38.

of the plan is to be exhibited, and to allow the opportunity for submissions to be made from the public in response to the exhibited draft.

8.29 Planning NSW advised the Committee that the following events occurred in developing SREP 29:

In 1997 Minister Knowles with the Mayor of Concord Council, Clr. Peter Woods, established a working party to report on an appropriate redevelopment strategy for the Rhodes peninsula north of Homebush Bay Drive.

The working party comprised representatives of the landowners, Concord Council, the RTA, DoT, EPA and the former Ministry for Forests and Marine Administration. It also contained 2 community representatives.

A reference group was established in 1998 to contribute to the development of the REP. The reference group was chaired by a senior executive officer of the Department and comprised key stakeholders including: Concord Council, the Roads and Traffic Authority, Department of Transport, the former Office of Marine Administration, the Environment Protection Authority and the major land owners in the study area.

The reference group reviewed the March 1998 strategy prepared for the site and recommended some alterations relating to the extent of commercial and retail floor space allowable on the site. The overall density set for the site was marginally increased from a gross density of 1.2:1 to 1.3:1. The alterations were supported by retail, transport and urban design investigations.

The exhibition of the draft Rhodes Regional Environmental Plan exceeded the requirements laid down in the Environmental Planning and Assessment Act, 1979.

It was placed on public exhibition from 12 February 1999 to 12 March 1999 to allow for public comment. Submissions were received up until 19 April 1999.

The draft REP and supporting studies were exhibited at three locations: Concord Council, the Department's Pyrmont office and Information Centre.

Public notice was given on 10 February in 5 newspapers: Sydney Morning Herald, Auburn Review and Pictorial, Parramatta Advertiser, Glebe and Inner Western Weekly and Northern District Times.

All landowners affected by the REP were notified in writing.

The Department held a community meeting on 13 March 1999. Advertisements were placed in the Sydney Morning Herald (2 March) and the four local papers (3 March) listed above. Approximately 90 people attended. Representatives of the Department also met with local residents groups and attended a closed Council meeting to discuss the draft REP.

John Murray, MP invited the Department, the Roads and Traffic Authority and the Department of Transport to a public meeting on 23 March 1999. Approximately 60 people attended.

The REP was made by the then Minister for Urban Affairs and Planning on 9 November, 1999 and appeared in NSW Government Gazette No. 130 on 19 November, 1999.²³³

Consultation on TMP, DCP and CDP

8.30 An important element of the initial CDP was to establish a consultation and community participation program for the future planning and development at Rhodes peninsula. Activities in this program included:

- focus on informing target audiences about the project and on trying to get a focus on a vision for Rhodes. Also an education phase for involvement in design processes like a community brain storm
- establish a 1800 telephone number for the Rhodes Project
- one community newsletter (distributed to 2200 homes & businesses); a newspaper advertisement also placed to inform of consultation events
- two community walks (to meet people, allow the community to take a closer look at area, allow the community to understand different perspectives and issues)
- three community studios (5 June 2000 - Urban Design & Open Space; 6 June 2000 - Traffic & transport; 7 June 2000 - Community issues)
- five stakeholder focus groups (by invitation on 7, 15, 16, 19 June 2000)
- two Strategy testing workshops (26 & 27 June 2000) for stakeholders and community. Community newsletter distributed in Phase 2 outlined this workshop and advertisements also placed in newspapers to remind about workshops
- community Newsletter, distributed 1 December 2000 (by mail drop). Community Information Day (for draft DCP, TMP and CDP) 9 December 2000 and ²³⁴
- community Consultation Register (a copy of notes of consultation provided to the Department in early 2001).

8.31 During the preparation of the DCP documents DUAP established a DCP advisory group to provide independent advice and input. As well as a Department representative it included the Government Architect, representatives of professional associations, the Department of Transport and the Roads and Traffic Authority. The City of Canada Bay Council was invited to send a representative and in response they nominated Mr Paul Hanly, a community representative from the Rhodes Peninsula Group.²³⁵

8.32 The draft DCP, TMP and CDP were all publicly exhibited for 2 months from 9 December 2000 to 15 February 2001. The exhibition of these draft plans was advertised in the *Sydney*

²³³ Submission 12, Planning NSW, p8

²³⁴ The open day had limited attendance and the Department subsequently discovered that the private company hired to letterbox local residents had not completed this task Submission 12, Robert Black, Director Urban Assessments, Planning NSW, p10.

²³⁵ Submission 12, Planning NSW, p9

Morning Herald on 9 December 2001. The reports were placed on exhibition at the Department's offices at Governor Macquarie Tower and Pyrmont (where the Rhodes project team was located), the Concord offices of Canada Bay Council and at the local Anglican centre on Blaxland Road. A contact officer in the Department was available during business hours by phone and e-mail to field enquiries and receive comments.²³⁶

- 8.33** Following public comment and submissions, the CDP in particular was substantially revised to include more detailed analysis and information on social planning, demographics and the need for social infrastructure to respond to the development.²³⁷

²³⁶ Submission 12, Planning NSW, p10

²³⁷ *ibid.*

Chapter 9 Public consultation and participation

The terms of reference for this inquiry require consideration of whether there has been adequate public consultation in the planning process. Submissions and evidence to this inquiry have considered this in the widest sense, including public participation and consultation processes undertaken by the owners of the sites in developing proposals for remediation works as well as consultation by government agencies.²³⁸

The adequacy of community consultation regarding remediation and redevelopment of the Rhodes peninsula was a recurring theme during the progress of the inquiry. On behalf of the residents within the Ryde City Council area, the Council requested that there be an effective and ongoing consultation process which meets the needs of all stakeholders.²³⁹

Consultation by government agencies

Development of planning controls

9.1 A concern raised by the Rhodes Residents Group to be examined is the lack of involvement in the development of planning processes. In particular their submission expressed concern that:

Up until this point, we, as a community, feel that we have been shabbily treated by many government departments in this whole process, with no account of our very real concerns being acknowledged and addressed.²⁴⁰

9.2 The Rhodes Peninsula Group supported this view and expressed criticism of the consultation process due to:

the failure to regularly update residents and to include them in the planning process and have them as participants in planning workshops with government departments and landowners is a fundamental flaw.²⁴¹

9.3 The measures and processes implemented by government agencies to undertake public consultation was discussed in chapter 8.

9.4 Planning NSW considers that public participation in the process of the preparation of the planning controls for Rhodes peninsula has been more than adequate. The Department is also open to reasonable suggestions to improve the consultation process throughout the Rhodes redevelopment.²⁴² In evidence Mr Gary Prattley stated:

²³⁸ For instance Submission 27, Mr Matthew Taylor, Chief Executive, Waterways Authority; Submission 20, Dr Kate Hughes, Director, Econeco Pty Ltd

²³⁹ Submission 28, Ryde City Council

²⁴⁰ Submission 1, Rhodes Residents Group, p 2

²⁴¹ Submission 4, Rhodes Peninsula Group, p 2

²⁴² Submission 12, Planning NSW, p 11

I think we can always look at ways to improve consultation. Again, I was not involved in this process at the time, but having come into this job and having reviewed what has happened, in my view the consultation processes that have taken place are probably more extensive than I have seen in most similar circumstances in other States of Australia for this sort of development.²⁴³

- 9.5** Planning NSW informed the committee that efforts were being made to continue community involvement as a result of concerns raised by community representatives:

In response to a number of emails and letters to the Minister, Director-General, Executive Director and Director Urban Assessments and to comments about the TMP raised by the community representative at the DCP meeting, the Department agreed to provide a separate meeting for two of the Rhodes Peninsula Group (RPG) representatives. A meeting attended by Masson Wilson Twiney consultant Peter Twiney, and RTA representatives and the Department and Mr Paul Hanly and Mr Alan Jeffries was held to discuss issues related to the TMP.²⁴⁴

- 9.6** The committee notes that the NSW Premier's Department has established an interdepartmental group, the Rhodes Peninsula Reference Group, to share information and coordinate Government actions regarding the Rhodes peninsula.²⁴⁵

Remediation and redevelopment planning

- 9.7** The proposals to remediate Precincts B and C and Homebush Bay adjoining these areas will require the environmental impact statements (EISs) to be publicly exhibited. The exhibition allows any person to read them and write to Planning NSW, about their concerns before the Minister for Planning decides whether or not to allow development to proceed.²⁴⁶

- 9.8** With respect to development applications submitted for Precinct A, Planning NSW has indicated that it has complied with notification procedures for Development Applications (DAs) as per the EPA Act and SREP 29 by notifying the local community through advertisements in local papers as well as by extensive mail box drops. Initially the DAs were not on exhibition at the Council, however they have since been placed on informal exhibition.²⁴⁷

- 9.9** Planning NSW has indicated that all DAs and accompanying EISs for the Rhodes sites will be publicly exhibited for a minimum of 30 days and submissions invited from the public. The Director-General will also require that the community be consulted during the preparation of any EIS.²⁴⁸

²⁴³ G Prattley, Planning NSW, Evidence, 7 February 2002, p 28

²⁴⁴ Submission 12, Planning NSW, p 10

²⁴⁵ Correspondence from Sharon Boyd, NSW Premier's Department to Director, dated 30 January 2002

²⁴⁶ Submission 5, Environment Protection Authority, p 17

²⁴⁷ Submission 12, Planning NSW, p 10

²⁴⁸ Submission 12, Planning NSW, p 11

9.10 Mr Joe Woodward acknowledged that there was some frustration in the community about the absence of an independent report regarding proposed remediation activities. Mr Woodward stated that the reason for this is largely:

because at the moment we are in the middle of a process where there are proposals for urban development and remediation, but all the information is not out on the table. When people go through the EIS process, that process has to take into account all the requirements of the EPA and others and that will no doubt be a very thick and weighty document that will in fact draw it all together. I think that when the EIS's are out on public display that will achieve the goal of having all that information co-ordinated and out for public consumption. While all the bits and pieces are around at the moment, I think that will satisfy that desire.²⁴⁹

9.11 In a review of the EISs of Planning NSW (then DUAP), the NSW Audit Office stated that:

The process of exhibiting the EIS and seeking written comments does not of itself provide sufficient assurance of effective public involvement, since it:

- Comes relatively late in the process of project definition and assessment
- Requires the public to comprehend and address, within a relatively short space of time, the implications of a multi-volume (largely technical) document, usually shared amongst many people
- Does not facilitate the input of community members or groups who feel unable or unwilling to prepare written submissions.

9.12 The report also remarked that there is usually no detailed feedback to the public and community groups who have made the effort to prepare written submissions – only a form letter acknowledging receipt of the submission and a general reference to issues in the assessment report which is made public following the Minister's decision.²⁵⁰ The Audit Office recommended greater public participation in scoping major projects, including publishing Director-General's Requirements on the Internet for comment prior to the drawing up of draft planning instruments.²⁵¹

9.13 It is significant that public participation processes occur towards the end of a development assessment process. The Director General's Requirements are prepared with advice from the Department and agencies, and on this basis either the EIS or the draft planning documents are then prepared. The drafts are already prepared before any public input is sought (although this can be varied). Public input provided at this stage may lead to amendments but it does not shape the original draft and the issues covered in that draft.

9.14 The committee notes that with respect to the Rhodes peninsula, as proposed in the CDP and also in response to community requests for further participation, Planning NSW advises that it will provide a regular drop-in evening at Rhodes peninsula to inform residents about current development proposals. Current information on proposals will be brought and displayed for the community to view and ask questions. Representatives of

²⁴⁹ J Woodward, Evidence, 7 February 2002, p 44

²⁵⁰ Audit Office of NSW, *Performance Audit Report: Department of Urban Affairs and Planning, Environmental Impact Assessment of Major Projects in NSW* 2001 p 39

²⁵¹ *ibid.*, p 40

developers, Council, state agencies etc. may also be available to discuss issues and respond to questions and issues.²⁵²

- 9.15** While the committee commends Planning NSW for implementing this initiative, it should not be triggered as a result of public consternation. That the local community perceived the necessity to establish an organised representative group well before the formal requirement for such a body, expresses a loss in confidence in the ability for government agencies to protect the public interest.
- 9.16** The increased opportunity for public input is significant. There is no bigger project in New South Wales so far as environmental assessment is concerned, and public participation should not be limited to legislative requirements.
- 9.17** The committee considers that, although Planning NSW has fulfilled its statutory requirements in the present circumstances, the process of public consultation during the EIS formulation and exhibition must be reviewed with the objective of making public consultation a meaningful process rather than a formality.

Recommendation 21

That Planning NSW implement the recommendations of the NSW Audit Office report entitled *Performance Audit Report: Department of Urban Affairs and Planning, Environmental Impact Assessment of Major Projects in NSW* with a view to:

- comprehensively informing communities affected by a development to maintain public confidence in government processes and
 - including community participation in shaping draft planning documents.
-

Consultation by developers

Precinct B and Homebush Bay

- 9.18** The community consultation for Precinct B required by the EIS process is managed by PPK on behalf of Thiess Services. The process has involved the formation of a Community Liaison Group (CLG)²⁵³, the delivery of presentations on various critical aspects of the proposed remediation process and the appointment of two specialist independent advisers to community representatives. The extent and nature of the consultation process for Precinct B after the EIS completion is yet to be determined.²⁵⁴

²⁵² Submission 12, Planning NSW, p 11

²⁵³ A similar process has been established by Environmental Resource Management on behalf of EarthTech to prepare its EIS for Precinct C.

²⁵⁴ Submission 20, Econeco, p 7

- 9.19** Thiess Services informed the committee that it is currently engaged in a comprehensive public consultation process in connection with the remediation of Precinct B and Homebush Bay. It indicated that PPK Environment and Infrastructure has been retained to facilitate a community and stakeholder involvement program for the remediation of Homebush Bay and the former Union Carbide site. The aim of the program is to ascertain the values, issues and concerns of both public authorities and the community in relation to remediation activities.
- 9.20** Specifically the objectives of the community involvement activities are to:
- seek community knowledge and data that may assist in the investigation of potential impacts
 - assist in the identification of social and community impacts
 - seek to identify a range of options for the remediation of the land and the bay and
 - assist in understanding what potential mitigation techniques are acceptable to those who may be affected.²⁵⁵
- 9.21** The program includes the following elements:
- generation of community networks of information
 - establishment of a community liaison group
 - community workshops to discuss and evaluate project options
 - advertising in local newspapers
 - production of a series of household update newsletters
 - a project website
 - a 1800 telephone information line
 - community information evenings
 - EIS exhibition support activities and
 - meetings and sessions with special interest groups.²⁵⁶
- 9.22** As of January 2002 PPK and Thiess produced three community information newsletters and held five CLG meetings. The CLG meetings have worked through the major element of the remediation program including:
- the history of contamination of the former Union Carbide site and the Bay
 - the scope of the remediation proposals for the former Union Carbide site and the Bay
 - the land and bay risk assessments

²⁵⁵ Submission 7, Thiess Services, p26

²⁵⁶ Submission 7, Thiess Services, p26

- potential remediation technologies available and
- occupational health and safety management.²⁵⁷

9.23 Ms Carol Kendall, Secretary of the Rhodes Residents Group, also expressed satisfaction with the response by the remediators of Precincts B and C in establishing a committee with an independent chair and relevant technical experts.²⁵⁸ Ms Kendall stated:

The first one [Thiess] agreed to set up community liaison with us. We have an independent chairman and two expert witnesses. Residents who want to be involved can go along and have a listen. They seem to be presenting us with the facts as we believe they should be presented, and they are liaising with one another. When the second site came on board [Meriton] they decided they would take on the same committee, which was very good, and they are liaising with us as well.²⁵⁹

9.24 In its submission to the Committee, the City of Canada Bay Council drew attention to a recommendation in the CDP, that the community be consulted about issues affecting the Rhodes peninsula and actions to implement that recommendation. One of these actions included development of a consultation policy and formation of a reference group which the Council recommends be implemented as a matter of priority.²⁶⁰ The submission calls on the Government to:

implement the community consultation strategies identified in the Community Development Plan as a matter of priority, including the establishment of a broad based communication process, that may include a committee consisting of representatives of the community, Council, government agencies and developers of the Rhodes peninsula to maintain communication regarding the remediation and development process and develop appropriate strategies in this respect.²⁶¹

9.25 The committee notes that Mr Joe Woodward, Assistant Director-General, EPA provided an undertaking to the Committee that he will work with, and support, Canada Bay City Council in dealing with the concerns of residents.²⁶²

The Homebush Bay Environment Reference Group a consultation model

9.26 In its submission to the inquiry, the Sydney Olympic Park Authority (SOPA) noted the complexity of the Rhodes peninsula issues and the significant length of time that will be required to complete the remediation process. SOPA submitted that continuation of public participation and consultation should extend beyond the exhibition of the EIS and continue throughout the remediation and development projects at Rhodes peninsula using a model similar to that of the Homebush Bay Environmental Reference Group

²⁵⁷ Submission 17, Orica Engineering, p 26

²⁵⁸ C Kendall, Rhodes Residents Group, Evidence, 7 February 2002, p 2

²⁵⁹ C Kendall, Rhodes Residents Group, Evidence, 7 February 2002, p 3

²⁶⁰ Submission 8, City of Canada Bay Council, attachment p 47

²⁶¹ Submission 8, City of Canada Bay Council, p 1

²⁶² J Woodward, Environment Protection Authority, Evidence, 7 February 2002, p 44

(HBERG).²⁶³ The membership of HBERG was drawn from the community, professional environmental organisations, government agencies, academics and other specialists.²⁶⁴

9.27 SOPA indicated to the Committee that, based on its experiences, effective and ongoing public participation processes will be a critical factor in ensuring the overall success of remediation and development projects:

Public consultation on the remediation of land areas within Sydney Olympic Park was greatly facilitated via the Homebush Bay Environmental Reference Group, established in March 1998 by the Authority's predecessor, the Olympic Coordination Authority.

The Authority considers the Homebush Bay Environmental Reference Group to have been a highly successful model for regular communication to the public on the remediation activities occurring within Sydney Olympic Park.

This very effective forum met approximately every six weeks until the end of June 2001. The forum was independently chaired and included representatives from community, scientific and environment groups. Its primary role was to provide feedback on issues related to the development and monitoring of the remediated lands. The forum also ensured that community, scientific and environment groups had a voice in the ongoing management of the remediated areas.²⁶⁵

9.28 Ms Carol Kendall from the Rhodes Residents Group, who was a community representative on HBERG, expressed satisfaction with that model as representative of good community consultation.²⁶⁶

9.29 Dr Kate Hughes, who was a representative on HBERG while Director of the Olympic Coordination Authority Ecology Programs, expressed that HBERG was valuable and successful consultation process:

One of the things that made HBERG different to other consultative forums that have been established, say, in the past decade with which I have had experience is that HBERG was not the usual standard of having to have all the agencies involved sitting around the table and a couple of brave individuals, usually the most dynamic people because they can wear the difficulties. It was on an as-needs basis. We really tried to get a good mix of people in the selection process and were not frightened to put really pokey people on it. We need people to ask the really hard questions. It is openness of information. I reckon about 95 per cent of the information I wanted to table from the Olympics was tabled. I got most of what I wanted tabled. It is hard because it is more expensive for democracy, it is more time-consuming and there are maybe more risks because you might find something like remnant drums.²⁶⁷

²⁶³ Submission 9, Sydney Olympic Park Authority, p 5

²⁶⁴ see <http://www.oca.nsw.gov.au/ecology/detail.cfm?ObjectID=74&SectionID=community> (accessed 24 May 2002) for further details on HBERG.

²⁶⁵ Submission 9, Sydney Olympic Park Authority, p 5

²⁶⁶ C Kendall, Rhodes Residents Group, Evidence, 7 February 2002, p 2

²⁶⁷ K Hughes, Econeco, Evidence, 7 February 2002, p 65

Recommendation 22

That the Waterways Authority and Environment Protection Authority coordinate and effectively resource the establishment of a reference group based on the Homebush Bay Environment Reference Group which includes membership drawn from developers, the community, environmental organisations, government agencies, academics and other specialists.

Disseminating information through the Internet

- 9.30** To circumvent self declared experts from publicly manipulating openness of information, Dr Hughes suggested that a website be used to put all information in context as occurred during remediation of Homebush Bay before the Sydney Olympic Games:

The best example I can give you is the web site that we developed as a Community Information System, which was putting dioxin in context. It is very important to put things in context and tell the history.

I believe that if you put it all on the table, 10 metres of books or something like that, it does not mean anything. It is information, but it is poorly delivered. The Olympics thing was beautiful, because we had the money. I was able to bring in writers and people to enhance the information. That was not to hide it but to bring out the right information that we felt people needed. That was through our HBERG process, the user needs assessment – what are they really interested in? For example, with the dust issue, you could go to the web site and look under "science" at the section on how we dealt with the dust.²⁶⁸

- 9.31** Dr Hughes pointed out that it is important to maintain transparency if people are to understand issues such as remediation, environmental management, clean up, sign off, and auditing.²⁶⁹

- 9.32** Waterways advised the committee that the current phase of the consultation process includes a website hosted by Waterways and an update bulletin on the Homebush Bay Remediation Project which is sent via e-mail to interested stakeholders. Waterways state that:

The website gives the community an opportunity to subscribe to the bulletin, offer comments and lodge questions. The site also contains answers to frequently asked questions and provides contact details if more information is needed.²⁷⁰

- 9.33** The committee has reviewed this website www.rhodesremediation.nsw.gov.au. While the information it provides is useful to the community, it requires far greater detail with respect to issues such as those raised in this inquiry. For example, explanations in the Frequently

²⁶⁸ K Hughes, Econeco, Evidence, 7 February 2002, p 66

²⁶⁹ *ibid.*

²⁷⁰ Submission 27, Waterways Authority, p 8

Asked Questions page are excessively brief and provide no links to further information sources. Conversely, the Rhodes Peninsula Group's website Rhodes Peninsula / Homebush Bay Re-development web site ²⁷¹ provides a significant volume of information as well as commentary concerning issues the Group considers important. It is imperative that the Waterways website provides significantly greater detail commencing with the EISs for Precincts B and C once publicly available.

9.34 Although the committee acknowledges that the entire community does not have the ability to access the Internet, this should not prevent the establishment of an instantaneous information source. The activities of a local reference group can include information distribution through other means similar to those established by Thiess Services as outlined in paragraph 9.21.

Recommendation 23

That the Waterways Authority significantly increase the content of the website www.rhodesremediation.nsw.gov.au to at least include the following information:

- the Environmental Impact Statements for the remediation of Precinct B, (including the adjacent area of Homebush Bay) and Precinct C when publicly available
- the Environmental Impact Statements for the development of Precincts A, B and C when publicly available
- functions and meetings of the Rhodes Peninsula Reference Group
- meetings of Community Liaison Groups and
- updates on remediation and redevelopment matters affecting the Rhodes peninsula.

²⁷¹ <http://freepages.houses.rootsweb.com/~pmh1/index.htm>

Chapter 10 Development based concerns

This chapter will focus on issues raised regarding the proposed density of future development, the effectiveness of transport plans as well as other issues arising concerning redevelopment of the Rhodes peninsula.

The difficulty faced by the committee with respect to planning issues in this inquiry is succinctly expressed by Mr Gary Prattley, Executive Director, Planning NSW:

planning is about balancing a whole range of competing interests, as is obvious from the issues before this inquiry, and achieving the outcomes for those things. The democratic processes we have in this country are never easy. You have to work through those issues. You have to debate the different merits of the different cases. There is inevitably a political process because you are dealing with people's values and competing objectives.²⁷²

Density of development and traffic implications

- 10.1** The majority of objections to the scale of development at Rhodes included the resulting generation of traffic as a significant concern from a planning and environmental perspective.

Planning of densities

- 10.2** A concern raised during the inquiry was that the density of the proposed development is based on the cost of remediation.²⁷³ The Rhodes Peninsula Group contends that SREP 29 provides for a gross overdevelopment of the area covered by the plan.²⁷⁴
- 10.3** Planning NSW advised that the proposed development densities at Rhodes are being driven by overall planning strategy. Mr Gary Prattley, Executive Director of Planning NSW stated:

I would like to emphasise that the prevailing policy has been that of the broad Sydney strategy of producing a compact city, and that factor has largely influenced the density of development proposed on Rhodes peninsula.

It is a very strategic site in the context of the city in terms of the transport links, its rail links and certainly we, in our more recent policies currently on exhibition, are trying to encourage increased densities around public transport modes wherever they can be achieved consistent with other objectives as part of reducing car dependency as part of the whole sustainability and air quality issues. It is not

²⁷² G Prattley, Planning NSW, Evidence, 7 February 2002, p 29

²⁷³ For example, C Kendall, Evidence, 7 February 2002, p 4

²⁷⁴ Submission 4, Rhodes Peninsula Group, p 1

confined to this site; it is obviously something we are pursuing wherever there is the opportunity around those modes to pursue that.²⁷⁵

- 10.4** Mr Prattley stated that housing approximately 7,000 people at Rhodes is part of a wider challenge Planning NSW faces in facilitating infill accommodation to 190,000 people in the metropolitan area over the next 15 years. He indicated that the majority of these developments would need to occur within existing areas:

Not new greenfield lands but redevelopment or development like South Sydney, Ultimo, Pyrmont, any opportunity we can get. That is where the demand and the market is being driven. We are accommodating 70 per cent of all of our new households in the metropolitan area in infill development of one form or another. That is a very high level by Australian standards and even by international standards.²⁷⁶

- 10.5** It is estimated that full development of Rhodes would generate approximately 3,900 and 7,100 person-trips per hour in the morning and afternoon peak periods respectively.²⁷⁷

- 10.6** Trafalgar Corporate, the developer for Precinct B, states in its submission that the development of the Rhodes peninsula results in significant benefits for existing residents as well as future residents. It stated:

The combined developers will spend more than \$30 million upgrading local roads and traffic intersections, upgrading Rhodes railway station, establishing community facilities and creating public parklands, bicycle paths and walkways along Homebush bay. This would not be possible unless Rhodes peninsula is remediated, or unless the Government contributes this money to the community.²⁷⁸

- 10.7** The committee recognises the NSW Government's strategy for compact cities. Proposed future development for the Rhodes peninsula is in accordance with this strategy of providing medium to high density accommodation designed around former industrial use areas and existing transport infrastructure.

Existing traffic issues

- 10.8** The submission from the King Street (Area) Residents Group expressed concern that:

Over the last 8 years we have experienced over-development in our area with many serious consequences for the residents and the environment. The much higher density planned for the Rhodes Development and the more restricting road system, in particular, has gravely concerned many residents in this area.²⁷⁹

²⁷⁵ G Prattley, Evidence, 7 February 2002, p 25

²⁷⁶ G Prattley, Evidence, 7 February 2002, p 34

²⁷⁷ *Transport Management Plan*, Masson Wilson Twiney, p 36

²⁷⁸ Submission 3, confidential

²⁷⁹ Submission 19, King Street Area Residents Group, p 1

10.9 The submission also stated that further development in the area would exacerbate already seriously congested roads.²⁸⁰ Mr Paul Hanly of the Rhodes Peninsula Group expressed that a major concern for the Group was the traffic is already congested at peak times, for example, delays are already experienced at the Homebush Bay Drive and Concord Road intersections.²⁸¹

10.10 Mr D G Jones and Ms R A Vickers of Concord West submitted that as residents living beside Concord Road, they have observed and experienced increased traffic on Concord Road over the last 16 years and²⁸² Mr Rod Mould of Liberty Grove has also reported excessive existing road noise.²⁸³

Road congestion issues

10.11 A number of concerns were raised by Mr Paul Hanly of the Rhodes Peninsula Group regarding traffic problems expected from further development at Rhodes including:

- understated traffic forecasts
- worsening of congestion and delays at key intersections such as Homebush Bay Drive and Concord Road during peak times²⁸⁴
- traffic flows from proposed developments such as Meadow Bank Employment Area and Top Ryde Village may not have been considered in the Transport Management Plan (TMP) and may exacerbate the existing peak hour choke point at the Devlin Street Blaxland Road intersection (at Ryde).²⁸⁵

10.12 Ms Carol Kendall, Secretary of the Rhodes Residents Group requested a lowering of density:

When you take into account the Olympic Park redevelopment, people going in there and commercial residents, all these industrial sites that are being redeveloped will produce more vehicles on the road. The people who buy in these developments will have two cars, sometimes three cars, and they intend to use them. They will not leave them in the garage and catch the train for everything they want to do. There will be more people coming in and out. If the road is blocked up now, it will be even more blocked up.²⁸⁶

The committee shares the astonishment of the community that there are no longer term plans being considered to upgrade Concord Road to improve traffic flow.

²⁸⁰ Submission 19, King Street Area Residents Group, p 2

²⁸¹ Submission 1, Rhodes Residents Group, p 3

²⁸² Submission 14, D G Jones, p 1

²⁸³ Submission 25, R Mould, p 1

²⁸⁴ Submission 1, Rhodes Residents Group, p 3

²⁸⁵ Submission 1, Rhodes Residents Group, pp 2-4

²⁸⁶ C Kendall, Rhodes Residents Group, Evidence, 7 February 2002, p6, 8

- 10.13** The TMP reveals that there has been a 20% growth in average annual daily traffic flows over Ryde Bridge between 1996 and 2000.²⁸⁷

Accommodation of extra traffic

- 10.14** The committee acknowledges community concern regarding traffic congestion and recognises that it is an issue which must be addressed by Planning NSW and the Roads and Traffic Authority. The committee was interested to examine proposals to mitigate impending pressure on road infrastructure.

- 10.15** Traffic modelling outlined in the TMP indicates that in the short term:

the proposed intersection improvements can produce sufficient additional traffic capacity to serve the additional traffic generated by the proposal with similar levels of intersection operation to the existing situation.²⁸⁸

- 10.16** Mr Peter Twiney, Transport Planning Consultant to Planning NSW explained some of the strategy behind the access arrangements at Rhodes to accommodate extra traffic the developments will generate:

The critical intersection on that stretch of arterial road is the Homebush Bay Drive-Concord Road intersection. That is the one that is closest to capacity during peak periods at the moment. The strategy for vehicular access to the site is that there are two access points: one to the north, which is just to the south of Ryde bridge; and one to the south at Oulton Avenue. Those two access points mean that you do not necessarily have to go through the Concord Road-Homebush Bay Drive intersection in order to access the site. You can go from any part of the site to the south via Oulton Avenue or to the north via Averill Street. You do not necessarily have to go through a potentially congested intersection. That is the basic access strategy.

We have identified a series of roadworks that add additional capacity to the key intersections, including the Concord Road-Homebush Bay Drive intersection. Our modelling shows that we can create roughly about the capacity of the extra demand for traffic generated by this development.²⁸⁹

- 10.17** Mr Peter Twiney explained that the RTA can also adjust traffic signal timing to ease traffic congestion at intersections:

What happens in practice is that the RTA looks at key intersections such as this and adjusts the signal timing. Therefore, if delays on the side roads are getting too excessive, it changes the timing through the emergency control centre at the ATP to give more time on the side roads to prevent delays from becoming too great. Part of the outputs to the transport management plan are to put a camera on that intersection so that the emergency centre will know what is going on.²⁹⁰

²⁸⁷ G Prattley, Evidence, 7 February 2002, p17

²⁸⁸ *ibid*, p36

²⁸⁹ P Twiney, Masson Wilson Twiney, Evidence, 7 February 2002, p 35

²⁹⁰ P Twiney, Masson Wilson Twiney, Evidence, 7 February 2002, p 36

Influencing travel patterns

10.18 The TMP proposes that the redevelopment of the Rhodes peninsula provides an opportunity to influence travel patterns and promote fewer car based trips. It aims to reduce the ratio of car usage to other transport means from approximately 70%, down to 55% for work journeys and 61% for non-work journeys through increasing travel by walking, cycling, train and bus and by maximising use of existing infrastructure while identifying opportunities for future infrastructure.²⁹¹

10.19 The TMP considers these targets as realistic although acknowledges that the targets will be reliant on:

- implementation of restrictive parking policy for Rhodes development
- the augmentation of rail and bus services
- the facilitation of pedestrian/cycle routes to shopping/schools and to the railway station and surrounding areas
- provision of a diverse mixture of services/shopping/recreational and residential uses and
- measures to influence travel behaviour of new residents/employees.²⁹²

10.20 In an effort to reduce reliance on cars, Planning NSW is attempting to encourage public transport use through setting lower car parking levels within the developments.²⁹³ He stated:

If we are to accommodate the population of this city, we must find means of reducing the continuing impact of cars. If we continue to provide car spaces where they are not necessary, we will not get changes of behaviour. Yes, when we have the opportunity, close access to public transport and major upgrading of public infrastructure as proposed in this case we take a fairly strong view about trying to maximise the shift in behaviour by not stopping cars altogether but limiting the provision of car parking spaces.²⁹⁴

Public transport

10.21 City of Canada Bay Council called on Government to:

give high priority to improvement of public transport, and that the Minister for Transport inform Council what plans there are to improve public transport to the Rhodes area in light of the proposed developments at Rhodes.²⁹⁵

²⁹¹ G Prattley, Evidence, 7 February 2002, p 25

²⁹² *ibid.*, p 12

²⁹³ *ibid.*, p 34

²⁹⁴ *ibid.*, p 35

²⁹⁵ Submission 8, City of Canada Bay Council, p 2

10.22 The Council wished to know what plans were in place to improve public transport and a mixture of development to encourage people to use the bicycle or walk to work to reduce the use of cars.²⁹⁶

10.23 Planning NSW advised the Committee that, in preparing the TMP, the current and future transport and traffic needs have been assessed in relation to Rhodes peninsula and the surrounding transport networks. The TMP was prepared with consultation and input from various transport agencies as well as, City of Canada Bay Council and the local community. Planning NSW considered that:

the TMP includes an effective analysis of the current context both locally and regionally, in order to ascertain the circumstances which influence this area and which will be influenced by the development.²⁹⁷

10.24 During formulation of the draft development control plan (DCP) and TMP, the EPA proposed, among other things, the following measures be included:

- promotion of sustainable transport options in pre-purchasing marketing and promotion
- encouraging northbound heavy vehicle traffic departing the commercial and mixed use areas to use southern access to Homebush Drive
- residential parking spaces to be offered as a fully priced optional extra, designed for conversion to other uses with a proportion to be allocated on a casual pay for use basis and ratios being lower around the railway station
- on-street parking controls east of the railway
- propose cycle storage ratios for a redeveloped Rhodes Railway Station and
- upgrade the Meadowbank ferry wharf cycle lockers and lighting along the railway bridge cycle and pedestrian path.²⁹⁸

10.25 SOPA informed the committee that the Rhodes peninsula falls within the Sydney Olympic Park Development Area and that it supports close liaison with the developers and Planning NSW for the works on Rhodes peninsula. SOPA anticipates that it will work closely and cooperatively with Planning NSW, and various developers of the Rhodes peninsula to ensure that:

transport management within the area is fully integrated, supports both private and public transport (i.e.; bus, ferry, rail, pedestrian, cycling) options and considers holistically, the impact of adjoining developments on the planned expansion of Sydney Olympic Park.²⁹⁹

²⁹⁶ Submission 8, City of Canada Bay Council, Attachment p 47

²⁹⁷ Submission 12, Planning NSW, p 5

²⁹⁸ Submission 5, Environment Protection Authority, p 17

²⁹⁹ Submission 9, Sydney Olympic Park Authority, p 4

- 10.26** The committee considers that the measures proposed to influence public transport in the TMP should be successful if implemented effectively. Ultimately this will rely on the provision of adequate public transport infrastructure.

Provision of transport infrastructure

- 10.27** While there are clearly stated intentions by Planning NSW to encourage use of public transport alternatives to car usage, there is a lack of community confidence in the likelihood of effective implementation of the TMP. Some concerns include:
- there is a lack of commitment to upgrade rail and bus systems to cope with this type of development
 - there is a need to upgrade rail services to Rhodes station
 - it will be difficult to increase rail services considering congestion on the lines entering the City from the West and
 - the absence of a bus lane in the TMP will make it difficult to meet timetable targets through already congested routes and intersections.

Rail

- 10.28** The TMP indicates that Rhodes Station is servicing between 700 and 800 passengers per day and serves a low level of patronage compared to other metropolitan railway stations. Train loading surveys at Burwood indicate that during morning peak periods, trains running into the CBD are running at or near capacity. The TMP indicates that passenger loads could be accommodated if the following measures are implemented:
- increasing 6 car services during peak hours to 8 cars
 - quadruplication of rail tracks to link Epping to the western line at Strathfield and
 - construction of the Parramatta Rail Link to Chatswood.³⁰⁰
- 10.29** The TMP recommends that the rail station be upgraded to provide adequate facilities, including disabled access, for the increased demand at Rhodes as well as to encourage train use.³⁰¹
- 10.30** Information obtained from the Roads and Traffic Authority indicates that:
- The success of the development proposals is dependent on the timely implementation of both rail/road based public transport improvements and other demand management proposals indicated in Chapter 7 of the TMP. Timing of the quadruplication of rail tracks, provision of a new attractive rail station and other

³⁰⁰ G Prattley, Evidence, 7 February 2002, pp13-14

³⁰¹ *ibid.*, pp 20-21

improvements indicated in pages 25-28, require commitments by the relevant government agencies.³⁰²

10.31 The Committee understands that the Chatswood-Epping section of the Parramatta Chatswood rail link is due for completion by 2008³⁰³ with completion of the Parramatta to Epping section proposed for completion by 2010.³⁰⁴

10.32 At this stage, there does not appear to be commitment to the quadruplication of the Main Northern rail line. Correspondence from the Hon Carl Scully MP, Minister for Transport, and Minister for Roads, to Mr Paul Hanly explained that:

The State Rail Authority (SRA) has advised that timing options are still being considered for this work. The Government therefore is not in a position to announce any quadruplication plans at this stage. It should be noted that the success of the Rhodes peninsula redevelopment project does not depend on quadruplication of the Main Northern Line.³⁰⁵

Bus

10.33 The existing bus route (Route 458) operates between Top Ryde and Burwood and services Rhodes railway station. The TMP indicates that existing bus services are not heavily patronised. Under the Better Buses strategy, the State Transit Authority have proposed to extend the existing route from the Ryde area to Parramatta to enhance bus service accessibility.³⁰⁶

10.34 The TMP estimates that if a service from Macquarie University to Homebush Bay is implemented on a scheduled basis, estimated demand would justify 6 or 7 additional bus services per hour each way.³⁰⁷ The TMP considers that:

a variety of transport management initiatives are necessary to meet the special circumstances at Rhodes as there is no simple or single solution to the transport requirements of the proposed development.³⁰⁸

³⁰² Correspondence from Adriana Gavazzi, Roads and Traffic Authority, to Robert Black, Department of Urban Affairs and Planning, 9 February 2001.

³⁰³ *Release of Preferred Route for the Proposed Rail Link for Sydney's North West*, Media Release, The Hon Carl Scully MP, Minister for Transport, Minister for Roads, 10 March 2002.

³⁰⁴ *Planning Approval Sought for Parramatta-Chatswood Rail Link*, Media Release, The Hon Carl Scully MP, Minister for Transport, Minister for Roads, 23 August 2001.

³⁰⁵ Correspondence from The Hon Carl Scully MP, Minister for Transport, Minister for Roads, to Mr Paul Hanly, Rhodes Peninsula Group, 13 February 2002.

³⁰⁶ G Prattley, Evidence, 7 February 2002, pp 14-15

³⁰⁷ *ibid.*, p 21

³⁰⁸ *ibid.*, p 25

Conclusion

- 10.35** The committee notes recent media reports regarding limitations of the Cityrail network.³⁰⁹ Ageing infrastructure, outdated signalling systems, insufficient and unreliable rolling stock, poor timetable reliability, overcrowded trains, insufficient driver numbers and congested saturated rail lines at peak times may negatively impact on the ability to provide the necessary rail cars to peak hour services.
- 10.36** The committee is concerned that only the first of the three stated rail passenger load assumptions are likely to be fulfilled before completion of development at the Rhodes peninsula. If no commitment is made to the assumptions presented in the TMP, the target of achieving fewer road based trips by cars may be compromised. Further, an expansion in major sporting events hosted within the Sydney Olympic Park area will place increasing pressure on local road infrastructure over greater periods of time.
- 10.37** The TMP document recommends that the Plan itself be reviewed and targets reassessed in 5 years time.³¹⁰ Due to population expansion and development in other areas of the Sydney Basin which will impact on the overall road network, the committee considers this to be an appropriate timeframe.

Recommendation 24

That Transport NSW urgently review the assumptions made in the Transport Management Plan, to clarify whether or not estimated rail passenger loads can be adequately accommodated.

Recommendation 25

That the Transport Management Plan encompassing all forms of transport for the Rhodes peninsula be reviewed now and within 5 years time.

Recommendation 26

That Planning NSW, when considering large development projects, carefully consider transport planning in cooperation with Transport NSW, to ensure that:

- realistic assumptions are proposed in the Transport Management Plan and
- where public transport related infrastructure is required, that this can be provided before completion of the project.

³⁰⁹ D Goodsir, *Broken trains, broken pledges*, Sydney Morning Herald, 25 February 2002, p 6; J Kerr, *Some new carriages, but old stock will keep rolling on*, Sydney Morning Herald, 25 February 2002, p 6

³¹⁰ G Prattley, Evidence, 7 February 2002, p12

Schools

10.38 In his submission to the committee, Mr Paul Hanly expressed concern that existing primary and high schools are at capacity and there is a need to evaluate arrangements resulting from a large increase in population in the area.³¹¹ In referring to the Community Development Plan, Mr Hanly stated:

the local high school is five kilometres away. There is no high school within three kilometres. That means that according to the criteria used by the Minister for Education and Training in the closure of the Hunters Hill High School, there is no local high school for 7,300 people of whom approximately 600 are of high school age in this new development.³¹²

Recommendation 27

That the Department of Education and Training conduct an independent review of future public education demand from Rhodes, Liberty Grove and Concord areas.

Amenity impacts on surrounding areas

10.39 The Committee received a number of submissions expressing concern about impacts the remediation and development on Precincts A, B and C will have on residents of Liberty Grove and other nearby residential areas.

10.40 Mr Dietrich Willing from Friends of the Earth, expressed concern that the development on Precinct A may be occupied by residents and commercial activities taking place while remediation is still being conducted on the adjacent sites.³¹³ Precinct A may be affected by the time taken to remediate Precincts B and C as well as the volume and distribution of traffic generated between the northern and southern access locations from Rhodes.³¹⁴

10.41 Remediation and construction activity on Precincts B and C will need to be adequately coordinated to minimise amenity impacts on precinct A. Even distribution of traffic movements between the northern and southern access roads may assist to minimise overall traffic movements past Precinct A. The Waterways Authority have advised the Committee that negotiations are continuing with Meriton and Rhodes Peninsula Developments to ensure that remediation of Precincts B and C occurs simultaneously.³¹⁵

10.42 More specifically, an issue was raised regarding pollution, congestion and safety issues related to the proximity of the Oulton Avenue off-ramp near Liberty Grove homes.³¹⁶

³¹¹ Submission 1, Rhodes Residents Group, p 18

³¹² P Hanly, Rhodes Peninsula Group, Evidence, 7 February 2002, p 14

³¹³ Submission 30, Dietrich Willing, Friends of the Earth, p 2

³¹⁴ Submission 15, confidential

³¹⁵ Submission 27, Waterways Authority, p 5

³¹⁶ Submission 26, L Hanratty, p 4; Submission 29, L Quinsey, p 1

Another concern was that traffic from Oulton Avenue will cause a bank up of traffic spilling onto Homebush Bay Drive and cause traffic hazards.³¹⁷ Options were suggested for redesign of the off-ramp such as repositioning or angling the off-ramp to avoid direct approach to houses in Liberty Grove or designing alternative routes for the off-ramp.³¹⁸

- 10.43** Residents of Liberty Grove have requested that they be invited to community consultation meetings regarding redevelopment of the Rhodes peninsula. The Committee considers that communities immediately surrounding the Rhodes area be informed of future activities and included in discussions. The committee believes that a community representative should be included on the Rhodes community liaison groups with a view to providing a monitoring and feedback role regarding traffic impacts on neighbouring areas from activities at Rhodes.

Recommendation 28

That the Waterways Authority ensures that community liaison groups formed during the remediation and redevelopment of the Rhodes peninsula include at least one representative from the Liberty Grove community.

Environment considerations

- 10.44** The Nature Conservation Council of NSW (NCC) and Total Environment Centre (TEC) expressed concern that the proposed population load on the Rhodes peninsula would have significant impacts on sewage loads, stormwater run-off, water quality impacts on the Bay and noise and air pollution from resultant traffic loads. The NCC and TEC expressed concern that the density of development within close vicinity of the Newington and Bicentennial Park Wetlands will potentially degrade wetlands further and deter species from utilising areas for feeding and breeding.³¹⁹
- 10.45** The NCC and TEC proposed that no development and reclamation of Precinct B for residential development should occur. Their submission states:
- This site should be rehabilitated for biodiversity purposes and should not be developed for residential purposes, particularly high density urban development.³²⁰
- 10.46** The organisations advocated for Precinct B to be retained in ownership by the Government and be allocated for open space area or zoned for conservation and rehabilitated to provide for a riparian buffer zone.³²¹
- 10.47** In the event that development was to proceed, they recommend that:

³¹⁷ Submission 29, L Quinsey, p 1

³¹⁸ Submission 26, L Hanratty, p 6

³¹⁹ Submission 22, NSW Nature Conservation Council, pp 9, 11

³²⁰ *ibid.*, p 6

³²¹ *ibid.*, p 13

- the proposed housing density be decreased by 50% through a reduction in building height³²²
- there be water sensitive and energy efficient urban design using SEDA smart rating and housing design based on Sydney Olympic Parks Facilities and Newington and
- a 50 metre buffer strip be provided for the foreshore to promote habitats for fish and birds and other wetlands species.³²³

10.48 The committee acknowledges the concerns of the NCC and TEC with respect to environmental protection. It is nevertheless considered that it is the role of the Environment Protection Authority (EPA) to ensure sufficient human health and environment guidelines are imposed on a development.

Healthy Rivers Commission

10.49 During the inquiry, the issue of whether or not a Healthy Rivers Commission inquiry into Homebush Bay or Parramatta River area would provide an appropriate planning mechanism was raised.

10.50 Planning NSW has advised that the Cabinet determines the program for Healthy Rivers Commission inquiries. Planning NSW also advised that, in general, Healthy Rivers Commission inquiries focus on catchment wide issues rather than on specific areas such as Homebush Bay and therefore may not be the most appropriate mechanism for investigating issues within that locality.³²⁴

10.51 The EPA advised the Committee that the Catchment Management Board (CMB) established for Sydney Harbour and the Parramatta River provides a co-ordinated approach to looking at objectives and plans for the whole of the river system. Mr Joe Woodward, Assistant Director General, EPA indicated that the Board has representatives from councils, the community and government agencies including the EPA and that there are plans due to go out on public exhibition within the next few months.³²⁵ Mr Woodward further stated that:

The Healthy Rivers Commission would be just adding another layer of organisation on this, and I am not sure that that would necessarily achieve a large amount at the moment. The Healthy Rivers Commission does have a set of priorities established by the Government in terms of looking at whole river systems across New South Wales, and it has its work program. I think there was a particular focus on Georges River and Botany Bay because there has not been as much attention and investigation on that. There has been, and is, quite a focus

³²² Submission 22, NSW Nature Conservation Council, p 9

³²³ Submission 22, NSW Nature Conservation Council, p 15

³²⁴ Correspondence from Gary Prattley, Planning NSW, to Director, dated 25 February 2002.

³²⁵ J Woodward, Environment Protection Authority, Evidence, 7 February 2002, p 44

and quite a lot of money spent on Sydney Harbour, so I think it was thought that there were more immediate priorities for the Healthy Rivers Commission.³²⁶

- 10.52** As the CMB is currently examining plans for the Sydney Harbour and Parramatta River system, a Healthy Rivers Commission inquiry may not be required at this stage. The committee wishes to ensure the CMB provides a strategy for future uses and health of the catchment. The activities of the CMB should be publicised and the community be given an opportunity to comment.

Recommendation 29

That the Sydney Harbour and Parramatta River Catchment Management Board broadly publicise its objectives and plans for the river system and provide a period of at least 8 weeks for public consultation and participation.

³²⁶ J Woodward, Environment Protection Authority, Evidence, 7 February 2002, p 44

Chapter 11 Concluding recommendations

The committee makes the following concluding recommendations for the purposes of reviewing the progress of remediation and redevelopment on the Rhodes peninsula.

Recommendation 30

That the committee:

- monitor the remediation and redevelopment activities at the Rhodes peninsula for a four year period (until 30 June 2006)
- consider issues arising from remediation and redevelopment
- table any additional report in the Legislative Council from time to time, and
- consider feedback from residents, local community groups, industry, unions, agencies and local government bodies.

Recommendation 31

That the Minister for Transport and Minister for Roads, as the Minister responsible for public transport planning, reports annually (up to and including 30 June 2006) to the committee to identify transport planning initiatives that will facilitate patronage of public transport to and from the Rhodes peninsula.

Recommendation 32

That the Minister for Transport and Minister for Roads, as the Minister responsible for the Waterways Authority, reports annually (up to and including 30 June 2006) to the committee on the progress of remediation of the bay area adjacent to the Rhodes peninsula.

Recommendation 33

That the Minister for the Environment provides to the committee, reviews annually documenting variations from environmental guidelines by remediation activities. The first review should commence from the year ended 30 June 2003. Reviews thereafter should be conducted annually up to and including 30 June 2006.

Statement of Dissent: Hon Ian Cohen MLC

1. Majority Report Flawed

The majority report takes for granted that governmental processes for land development and their implementation in this particular case of toxic land and sediments are acceptable to the community. The 162 questions asked by the local community in their general submission and their 43 page submission in relation to transport show the nature and level of concern within the local community. The majority report fails to address most of the concerns and requests for information and I will turn to these questions later in this report.

The questions referred to above and submission of the Rhodes Peninsula Group in relation to Transport forms an integral part of this minority report.

Recommendation A

The issues raised and the submission by the Rhodes Peninsula Group in relation to Transport should be investigated and responded to by the arm of government to which they are addressed and the responses included in this Report and made available in digital form on the Government web site.

2. Who Bears the Risk?

The community is well aware of the many conflicting interests the State Government has in redeveloping the Rhodes Peninsular as landowner, clean up regulator, planner, and appointer of a limited number of auditors. These obvious conflicts involving tens of millions of dollars require the most transparent of processes. The proposal to put about 5,000 residents on remediated toxic land where there is no international precedent is fraught with risk. Responsibility ultimately must be borne by the NSW government. In the present climate, would any insurer would be capable of financing or willing to take the risk, of the compensation necessary if adverse health effects are experienced? It is quite possible that developers will be requesting the government to guarantee to purchasers on their individual titles that the land and surrounding areas including the Bay and its produce are safe for human occupation and enjoyment. There are also concerns about the lack of a truly independent auditor as the independent site auditors are all dependent on one of the landowners for accreditation.

Recommendation B

A peak environmental body should be funded to audit the remediation including emissions to air, soil and other outputs and their disposal in parallel with the audit required under the current regulatory regime.

3. Community Concerns

The SREP 29 rezoning and remediation and development are taking place in an environment where an inclination to question the government, its regulatory arms and corporations is a reasonable position.

The failure of the majority report to respond adequately to the questions posed by the community in such an environment only heightens the concerns about the proposed remediation and development.

Concerns were further re-inforced when the Minister for Planning approved the Development Control Plan, Transport Management Plan and Community Development Plan after the Government had supported the establishment of this inquiry, but before it had reported its results.

4. Examination of Lower Cost Alternatives

The majority report does not address whether the Peninsular and Homebush Bay should be remediated, although many reputable environmental organisations have campaigned for the clean up of the Bay and its sediments in particular for many years.

One argument is that burial of the contaminated sediments by new sediments over time will reduce the problems in the bay without expense. Waterways and EPA seem to have adopted this approach for severely contaminated sediments near the AGL site at Mortlake, in Iron Cove and in a bay in Middle Harbour. The works of Dr Gavin Birch show, as he presented to the Sydney Harbour Catchment Management Board, including senior executives of Waterways and EPA, that these 3 areas are so heavily contaminated that there are significant breaches of ANZECC sediment guidelines and yet it is not clear that Waterways or EPA have responded in the manner required under the relevant Acts and regulations. There are significant doubts that this approach is valid.

Another position is that because of the time taken and the problems involved in the processing of only 400 cubic metres of dioxin contaminated soils at the Olympic site, (compared to say 400,000 cubic metres at Rhodes) the sediments in the heavily contaminated sediments in the bay should be excavated into the existing pit on the government owned former Union Carbide site and the bentonite wall on that site extended around the Meriton site as well to contain leachate from reaching the Bay. The sites could then either undergo some form of bioremediation (as was used at Wilson Park, Auburn and as is being tested on the Meriton site by EM Technology) or simply await improvements in technology. Given that in 1988 a Risk Assessment for NSW Dept of Planning recommended in the light of then existing technology that even the natural part of the Union Carbide site should never be used for residential development, it is clear from what has been achieved at the Olympic site that there is a real prospect that in another 10 to 15 years many of the issues with the proposed remediation will have been solved. This position is also supported by those who point to the major changes in the state of knowledge of dioxins and other hazardous waste over the last 10 years and argue that the dramatic improvement in the state of scientific knowledge in relation to contamination, remediation and health impacts is likely to render the current proposal either unnecessarily expensive or inadequate to protect human health and ecology.

A variation to the above proposal is contained in the submission by the Nature Conservation Council of NSW and Total Environment Centre which suggests that given the national significance of the Bicentennial Park and Newington Wetlands and the use of those areas and the Bay by protected and threatened species and migratory birds under JAMBA (Japan Australia Migratory Bird Agreement) and CAMBA (China Australia Migratory Bird Agreement), the sites should be returned to open space suitable for the use of such species, particularly in light of the problems of remediation, the uncertainty of the safety of human health the adverse impacts of the development proposed for the SREP 29 area and the major developments planned elsewhere around the Bay and within the Olympic precinct/Sydney Olympic park.

The approval of the Development Control Plan and development applications in respect of the re-development of the Orica site prior to the completion of the remediation of the strip of sediments and the former Union Carbide site and Meriton site have dramatically increased the number of people (construction workers, new residents and new employees in the area) exposed to the risks of the remediation.

These alternative options and the costs and benefit compared to the proposal for remediation and redevelopment under SREP 29 should be properly evaluated.

Recommendation C

Decontamination of Precincts B and C, the Government and Meriton owned sites, and development of the Orica site should not proceed until the risks of remediation (see below) are dramatically reduced. The most contaminated sediments should be excavated onto the government owned former Union Carbide sites. Adequate containment there with proper control of dust and odour to the satisfaction of nearby residents can take place until the risks of remediation are dramatically reduced and the state of knowledge of the impacts of dioxins are known with sufficient certainty.

5. EPA Inaction

Recommendations in the majority report concerning the Environment Protection Agency (EPA) do not extend far enough. Evidence about the EPA's inaction concerning the nearby AGL redevelopment site (where dust has been a major problem for the community) and the Lidcombe Liquid Waste Plant run by Waste Services NSW (where odour emissions continue to cause complaints after installation of filters) was provided to the committee. The EPA should be targeting those polluters who are continually being reported to them. Multi-million dollar projects such as that proposed for Rhodes should have developer funded EPA/Planning NSW officers on site full time. This has a greater imperative where the remediation of or construction on formerly contaminated land is proposed.

Recommendation D

That the EPA begin active surveillance of premises which are reported frequently by the public with the aim of gaining successful prosecution of those liable and Planning NSW (as consent authority) require, as a condition of approval of any development application in respect of contaminated or previously contaminated land where the

total project cost exceeds \$20 million, the developer fund the NSW EPA/Planning NSW to provide a full time on site officer with power to enforce all conditions of approval and EPA requirements.

6. **The Dangers of Dioxin**

Dioxin is best described as a Human Carcinogen. It also has other non carcinogenic health effects.

The dangers of dioxin are increasingly well known. One of the most comprehensive sources on dioxin is the US EPA Dioxin Reassessment. The Reassessment has been strongly opposed by some industry. While remaining under development since 1992, it has proceeded through peer review, has been regularly updated and provides a comprehensive scientific resource on dioxin. (US EPA website.)

7. **Remediation Technology**

Thiess won its preferred tenderer status from Waterways on the basis of Indirect Thermal Desorption with Base Catalysed De-Chlorination. I understand that Waterways specifically indicated that it did not want to employ thermal destruction techniques like Direct Thermal Desorption.

Thiess have now indicated that the draft EIS is based on Direct Thermal Desorption. This raises issues of the integrity of the tender process. Meriton have indicated that they are proposing Direct Thermal Desorption and do not propose to utilise a negative pressure shed. These proposals raise serious concerns.

Direct TD is basically incineration with some pollution controls.

The arguments against incinerative techniques are well established.

Most are contained in Greenpeace's publication: "Incineration and Human Health: State of Knowledge of the Impacts of Waste Incinerators on Human Health." Michelle Allsopp, Pat Costner and Paul Johnston. Greenpeace Research Laboratories, University of Exeter, UK. March 2001 ISBN:90-73361-69-9 and in the works of Dr. Paul Connett, 1998 Professor of Chemistry, St. Lawrence University Canton, New York.

All around the world incinerators have been closed because of problems of contaminated emissions to air, formation of dioxins (in many cases said to be of greater amounts than those destroyed during the high temperature combustion), volatilisation of metals, particularly in the presence of chlorine, toxicity of byproducts, and problems of products of incomplete combustions. The US EPA has several documents which refer to these problems including United States Environmental Protection Agency, Innovative Site Remediation Technology - Thermal Desorption, Volume 6, 1993.

On the other hand it appears that the risks to the local community of Indirect Thermal Desorption with Base Catalysed De-Chlorination are acceptable to peak environmental bodies provided that dust, odour, water and other outputs are adequately controlled and there is adequate monitoring. Thiess won its preferred tenderer status from Waterways on the basis of this technology. Thiess, recognising the problems at the AGL remediation and

the extreme toxic nature of the material they would be remediating, gave an undertaking to the local community to do all preprocessing works other than bulk excavation and drying in a negative pressure shed, to work in many smaller areas and to turf each area as it was finished as well as the usual undertakings regarding dust, odour and water control. Greenpeace have accepted this combination of technology at the Olympic site, albeit for a project dealing with about 1% of the volume of material. They have recommended similar technology in Hong Kong

The acceptance of IDT/BCD by Greenpeace does not indicate a belief that the remediation will have an acceptable outcome or that the proposed standards to be required for clean up, dust odour, run-off, and other wastes or emissions will be acceptable, just that the process is of little risk to nearby residents and, properly applied, has the capacity to substantially reduce the degree of contamination. I understand there are significant concerns as to the ability to reach even 1 ppb in soils and as to the time this will take, given the experience at the Olympic site where work is not yet complete after 3 years on a project 1% the size of Rhodes. There are also issues regarding appropriate soil clean-up standards in the light of the dramatically reduced Tolerable Daily Intakes for Dioxins

8. Clean Up Standards

The Australian Department of Health and Aging proposes the adoption of a TDI for dioxin equivalent to 2.3 pg/kg/bw/day. This should be the required standard for the clean up of Dioxin in the Bay sediments.

In 1988 OSWER in the US issued guidelines requiring a maximum 1ppb TEQ for dioxin in soil. This was at a time when the WHO TDI was 10 pg/kg/bw/day. There is a correlation between those two standards. With the reduction in TDI the correlation requires that the maximum Dioxin TEQ for soil be similarly reduced to 0.23 ppb. There are doubts that this can be achieved.

There are a whole range of other contaminants in the soils, including original sediments in the reclaimed areas, and throughout the Bay. The NSW EPA should provide an internationally benchmarked clean up standard for each of these chemicals and metals.

9. Health Risk Assessment and need for Healthy Rivers Commission Report incorporating works of Dr Birch

There are disturbing aspects of the Human Health Risk Assessments previously done for the Bay.

There is concern that they have not incorporated all chemicals and metals throughout the whole of the Bay. This has not been done because the testing of the Orica sediments and the sediments at the outflows of Haslams and Powells Creeks have not been tested and the results made public. A Human Health Risk Assessment based on incomplete or unpublished data is worthless.

The exhibition of an EIS supported by a Human Health Risk Assessment which does not remedy these obvious flaws is a waste of taxpayers time and money.

Also of concern is the lack of an approach which measures, even in an arbitrary way, the total toxicity of the contamination remaining in the whole of the bay after the remediation and assesses the potential cumulative Human and Ecological Health Impact.

There are also arguments that the contamination in the other most contaminated areas identified by Dr Birch in the Parramatta River at Mortlake and Iron Cove, both of which adjoin the City of Canada Bay, should be included in the calculations and assessment. The fish don't only live in Homebush Bay, and they aren't only caught in Homebush Bay.

The ecological assessment also needs to adopt a cumulative approach and to consider the impact of the other most contaminated areas at Mortlake and Iron Cove. All of the River bed is one parcel of land owned by one party.

In fact, the assessment of the potential human and ecological health aspects should be done after the completion of a Healthy Rivers Commission report on the Parramatta River. The report should incorporate the works of Dr Birch on sediments.

Similarly, the formation of Catchment Management Plans without the benefit of the publication of Dr Birch's work and a Healthy Rivers Commission Report, is a potential waste of taxpayer's money and could result in the pursuit of ill conceived strategies.

10. Other matters of concern

Community submissions have raised a number of other issues that cause concern. Most of these issues are compounded because of the large number of new medium to high density developments in the surrounding area, including Newington, the Olympic Precinct, the western side of Homebush Bay, Breakfast Point (AGL), Cape Cabarita, the Strathfield Triangle, Top Ryde Village, Meadowbank Employment Area and the Arnotts site. There appears to be no comprehensive assessment of the cumulative impact of these developments on roads, rail, bus services, traffic delays, education, hospitals, and facilities for organised active recreation. The concerns below need to be considered in the context of a planned increase in the population of the former Concord local government area of 16,000 or 67%, including the SREP 29 area which puts the equivalent of 25% of the existing population of 24,000 into 4% of the land area at a density double that of Singapore or Hong Kong.

Lack of a high school within 3km, the distance used by the then Minister for Education in determining whether enrolments are local, and the lack of surplus capacity in local high schools. This lack is compounded by the large number of surrounding medium to high density developments

The lack of capacity and current use of demountables at local primary schools, and the fear of a reduction in open space available to students as capacity is eventually increased

Lack of facilities for organised active recreation. For an increase of over seven thousand people there is no provision for any organised sporting facilities such as soccer, netball, little athletics, rugby, cricket, league, baseball/softball, basketball, swimming, sailing or rowing. There are no facilities for any of these organised active recreations within walking distance of the site. The closest facilities are already well utilised.

Lack of planning for disabilities. The Community Development Plan identifies that 25% of residents in the local area have disabilities, but without identifying the types of disabilities and the special needs likely to be encountered and the capacity of existing providers of those services to meet a significant increase in demand

Lack of planning for special needs of those with NESB. Demographics indicate a likelihood of a significant proportion of persons of Non English Speaking Background. The likely backgrounds are different to those predominating in the area. There is no evidence of planning for the special needs of this increased NESB population.

11. Transport

The 43 page Submission of the Rhodes Peninsula Group highlights numerous concerns in relation to the Transport Management Plan. Again, the lack of a comprehensive study in the light of other developments in the near vicinity which will use Ryde Bridge as the main North South route is a principal concern. Items of concern in the report include:

- The number of intersections forecast to be graded F at the time of likely completion of the developments
- The number of intersections with a degree of saturation greater than 1 at the time of likely completion of the development
- The forecast 12.7 minute delay at the Concord Road / Homebush Bay intersection, and lengthy delays forecast at other intersections. The delays already experienced at the intersection lend weight to the concerns expressed, in spite of some proposed works at the intersection, particularly with the newly approved developments on the Australand site which will compound the complexity of the intersection
- The lack of a financial cost benefit analysis such as that done for the Lane Cove Tunnel
- Aggressive modal choice targets for use of public transport that are not supported by relevant census district data
- Decreases in services forecast for this section of the main Northern line as a result of the Parramatta / Chatswood link diverting services
- Current shortages of carriages, capacity of the signalling system and bottlenecks on the line between Strathfield and Redfern which cast doubt on the capacity of the rail system. The reporting of the Christie Report which was not released during the consultation process has heightened these concerns
- Very modest assumptions for background growth compared to growth in flows over Ryde Bridge over recent years
- There are also concerns of residents at Liberty Grove regarding proposed on and off ramps near the Northern entrance to that development which is only accessible by car from Homebush Bay Drive

Recommendation E

It is recommended that the outcomes for traffic and transport and performance against the plan be monitored, evaluated in conjunction with the local community and reported upon each 5 years until the development has been fully occupied. A review after 5 years is inadequate as the development is unlikely to be fully occupied by that time.

12. EIS

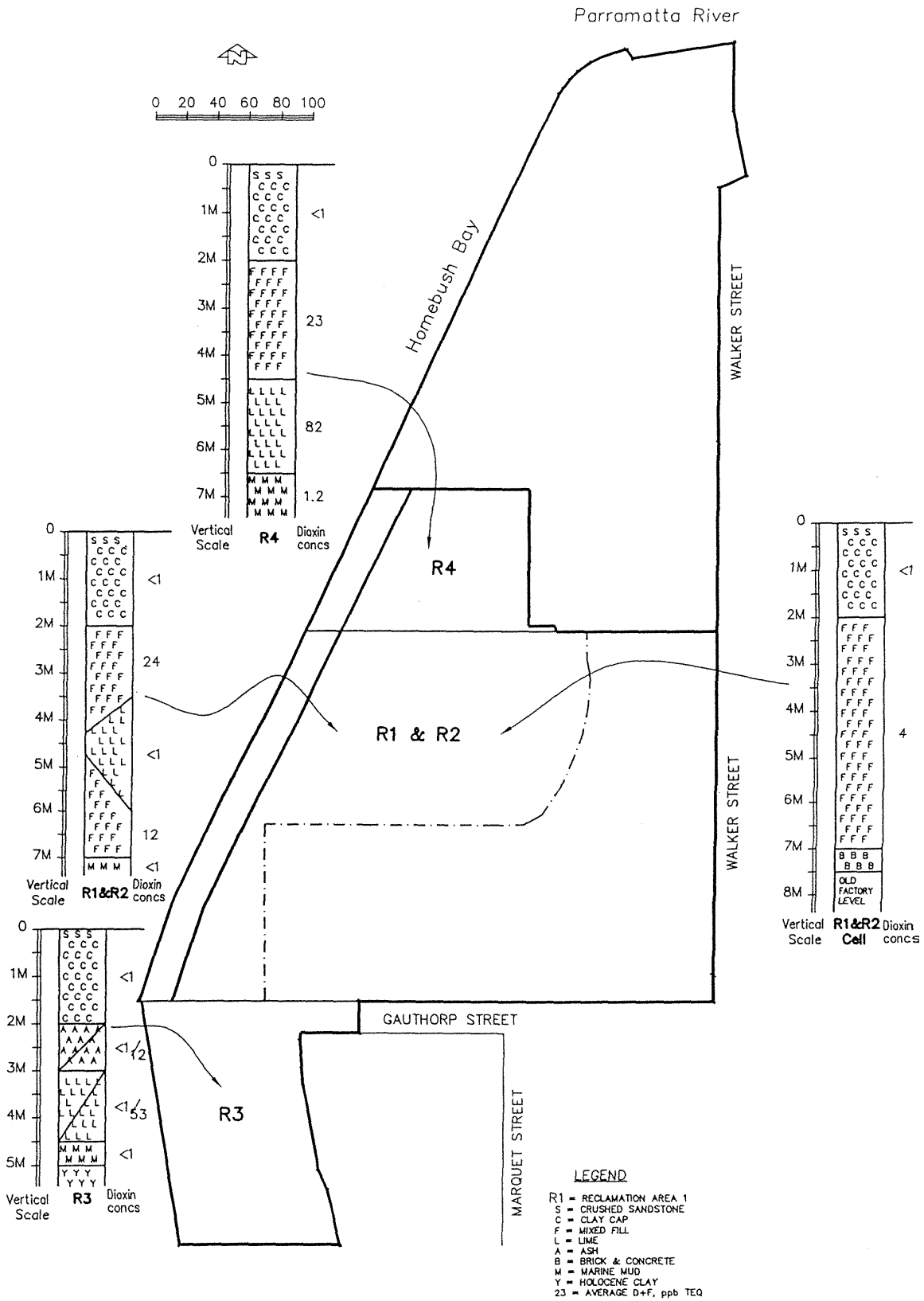
I understand that two Environmental Impact Studies in relation to remediation are expected to be released shortly. These will, with their appendices, be very large and complex documents and there will need to be ample time allowed for the review of such documents by interested parties. Some of the issues are expected to be scope of works in the bay, sediment clean up standards, soil clean up standards, stack emission standards, volatilisation of metals from soils and sediments and monitoring, including for fine particulate matter under the proposed PM2.5 standard, choice of remediation technology, use of continuous sampling for dioxin emissions and need to show compliance with the POP s treaty. There is also the possibility of the significant debate on the use of an incinerative process for treatment of toxic soils as this represents a change in what has previously been a well accepted consensus position that incinerative technologies would not be used.

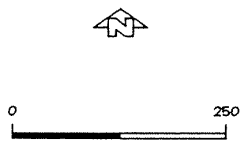
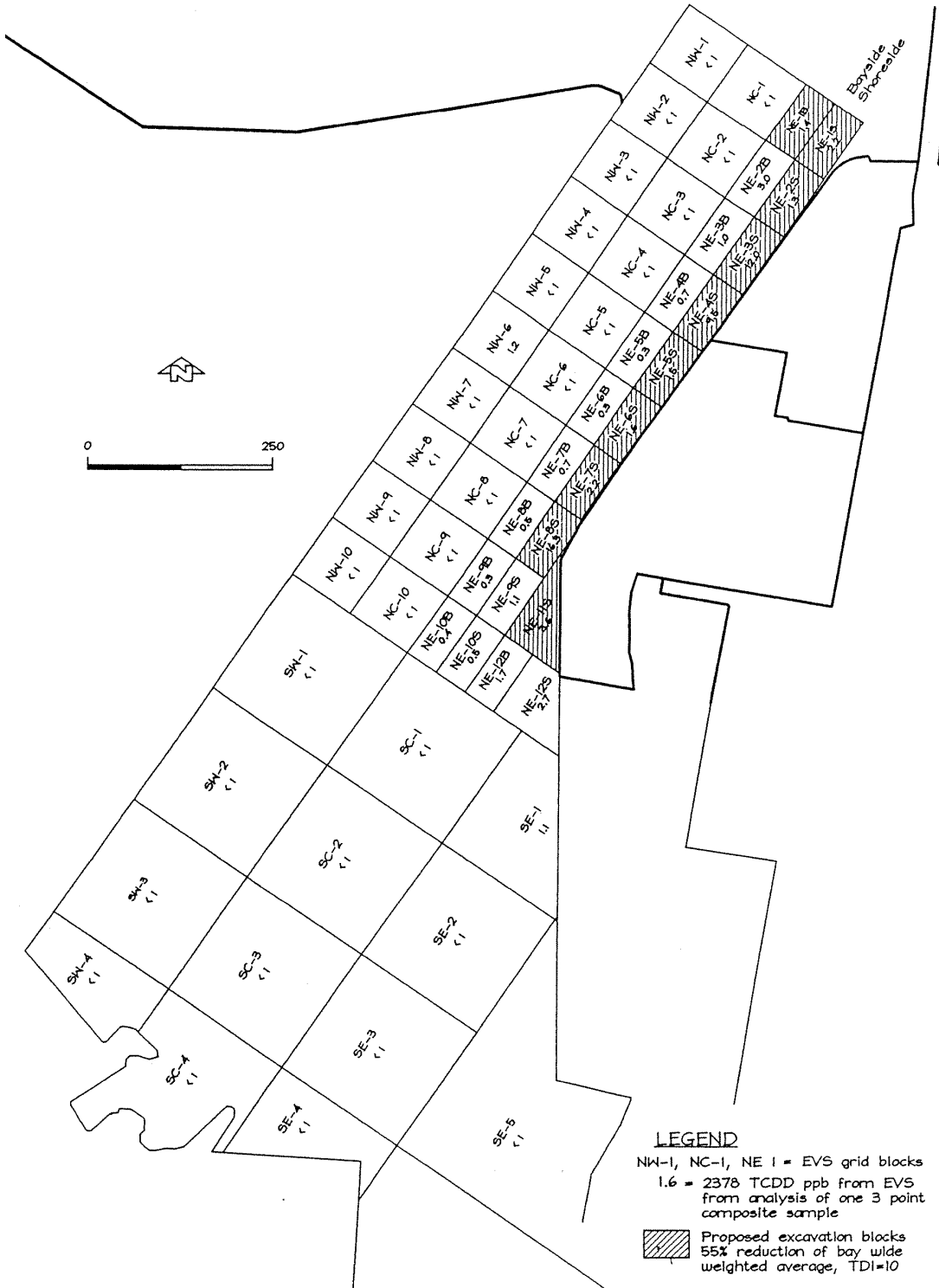
It would be unfortunate if there is no EIS required for the development itself in spite of its scale and the infrastructure needed to service it, such as roads and sewerage systems and the impact the development and its infrastructure will have on the surrounding environment.

Appendix 1

Reclamation areas

Source: Submission 7, Theiss Services





Appendix 2

Transport Management Plan

6. Transport Management Plan

Introduction

This chapter presents a transport management plan intended to influence the way people will travel. The plan is comprised of both infrastructure (roads/bridges) and policy/management components.

Context

Analysis of the traffic situation in the previous chapter indicates that although additional local capacity can be created, the longer term situation is likely to see congestion at key intersections. In these circumstances, it is important that viable public transport or non-car borne travel (ie cycle/walking), is possible to satisfy a range of trip purposes.

It is considered that a variety of transport management initiatives are necessary to meet the special circumstances at Rhodes as there is no simple or single solution to the transport requirements of the proposed development.

As circumstances change, and development proceeds, it is considered that the transport management plan will need to be updated in light of experience.

Achievement of Modal Split Targets

It is proposed to implement targets of 55% car use for journey to work trips and 61% car use for non work trips.

This section discusses the means for achieving the modal split targets proposed and the linkages between the proposed transport management measures and changing the way people travel.

Appendix C considers the potential to influence modal choice and presents an assessment of what could potentially be achieved in respect of new development at Rhodes Peninsula.

External Factors: the price and availability of car parking in commercial centres, increasing congestion on the arterial road network and likely enhancement to public transport service/accessibility provide a framework which will, in future, enhance public transport usage. Government needs to pursue metropolitan wide policies to control parking supply/price and continue to expand/enhance the public transport network, integrated with land use planning.

More locally the proposed mode choice targets are considered achievable with appropriate policies/measures. Key components of these are:-

Residents Trips-

- enlarging the effective catchment area of the railway station by the provision of attractive/safe/convenient pedestrian/cycle routes and facilities
- provision of an attractive/safe/accessible railway station
- provision of interchange facilities for kiss and ride, bus/rail etc.

- creation of a diverse mix of retailing/services/recreational facilities/employment within walking/cycling distance; and
- travel demand management

Employee Trips to Rhodes:-

- parking supply policy;
- enhanced public transport services and a convenient/attractive railway station;
- location and access of employment to public transport; and
- enhanced pedestrian/cycle connections

Visitors to Rhodes:-

- supply and charging control for car parking; and
- supply of residential visitor car parking

As external factors (such as public transport accessibility and the price of parking) are likely to help achieve the proposed mode choice targets, it is recommended that the transport management plan be reviewed and updated after 5 years to assess whether greater use of public transport/non-car borne travel is achievable.

Rail Access

For people travelling to and from the development area the most important feature of the site is the availability of the existing rail services which will improve in future when the following initiatives are implemented:-

- less crowding with additional 8 car sets in peak periods
- more frequent stopping services with quadruplication of tracks (long term)
- greater accessibility to destinations (eg Chatswood and Lower North Shore) with introduction of the Parramatta Rail Link.

The key elements of physical measures needed to reinforce these planned improvements in services are:-

- upgrading Rhodes railway station (to include disabled) access
- provision of residences/employment within convenient walking/cycling distance of the station
- control over parking supply for commercial office development
- provision of pleasant, direct and secure pedestrian routes to the station

Walking/Cycling

The mix of proposed uses within the development area, together with the mix of uses in the local area, means that there is an opportunity for a proportion of journey to work trips (and other purposes) to be made on foot/cycle.

Most important features of catering for walking/cycling trips for the journey to work are:-

- encouragement of a diverse mix of uses (differing employment/housing types)
- employment characteristics to generally match likely socio economic status of new/existing residents
- provision of safe/convenient/attractive walking/cycling routes – particularly breaking down the existing barriers to movement created by the railway and Homebush Bay Drive and creating a practical linkage to the ferry services at Meadowbank

- provision of pedestrian entrances to retail/leisure activity areas that have as much prominence for local residents and public transport patrons as those for car borne shoppers.

Buses

State Transit has proposals to extend bus services and is investigating the possibility of additional new services. Elements of infrastructure required to help bus use are considered to be:-

- safe, direct pedestrian links to bus stops on Concord Road
- provision of bus shelters/stops for existing bus services
- allowance in planning for a future bus route through the site on the western side of the line (this has been done through DCP controls)
- provision of additional services on each route incrementally prior to achievement of capacity

Non Work and Retail/Recreational Trips

The range of facilities available and the availability of safe and convenient pedestrian/cycle routes are the most important determinants to adjust modal choice for non work/retail/recreational trips. It is considered that the range of facilities permissible within the mixed use zone will allow this to occur.

Although the weekly household shopping is likely to be by car (to cater for the shopping bags) there is opportunity to satisfy discretionary shopping and spontaneous shopping by the location of shops on pedestrian/cycle routes and by locating shopping within convenient walking/cycling distance of residential catchments. This has been provided within the DCP for the site.

Influence on modal choice for retail/recreational modal choice is given by:-

- provision of convenient pedestrian/cycle linkages between residences and shops/facilities
- distribution and range of shopping and recreational facilities
- demand management

Demand Management

The development at Rhodes provides a unique opportunity to manage travel demand by influencing people's decision making processes before habits have been formed.

For example, a new resident in Rhodes may be accustomed to travelling to work by car. On relocating to Rhodes the person may well evaluate the differing car route alternatives available to his place of employ but is less likely to fully appreciate the costs/implications of public transport or walk/cycle plus public transport alternatives. Therefore supply of appropriate and relevant information at this decision making stage can provide good returns in managing and influencing travel demand.

Similarly, the close availability of rail services is likely to be a factor in new residents choosing the location based on existing travel habits or place of employment near the rail network.

In relation to retail and leisure activities an important part of demand management will be to schedule retail promotions and community activities to generate travel outside of normal morning and evening commuter peak periods.

Transport Management Plan Strategy (see Figure 12)

The strategy for transport management to guide development at Rhodes Peninsula (in pursuit of REP objectives) includes the following elements:-

- encourage a mix of employment, retail, residential and other uses
- maximise density of development near the railway station
- northern and southern vehicular access points to provide flexibility of approach and departure, reduce traffic use of the key Concord Road – Homebush Bay Drive intersection and to minimise traffic intrusion into existing residential areas
- provide convenient pedestrian/cycle routes within the development area and linkages to adjacent areas, especially across the railway line
- restrict development parking supply by specifying maximum parking numbers for different uses
- enhance bus service provision, facilities and information
- provide an attractive new railway station
- study and implement travel demand management

It is considered that each of these elements have or can be, achieved through both the type of development proposed and the implementation of the relevant planning documents including the TMP.

Although not necessary at this stage, there may be additional opportunities to enhance non-car borne access which are worthy of further study:-

- potential bus/pedestrian/cycle bridge linkage across Homebush Bay
- potential ferry wharf and private ferry service

Components of Transport Management Plan (see Figure 13)

Rail Services

- run 8 car sets during peak periods having regard to rolling stock availability
- provide an attractive rail station including disabled access and a pedestrian crossing of rail line (making provision for quadruplication of rail tracks) related to the phasing of the development and developer contributions
- provide real time train arrival information displays

Bus Services

- provide bus shelter information displays for existing/potential new bus routes which are incorporated into design for the new rail station, potentially including real time arrival information
- make provision for a potential future bus route through the development area west of the railway line.

Parking Policy

Appendix B discusses parking policy for different components of the development. To help persuade people to travel by non car borne means it is proposed to have a restrictive parking policy particularly for the commercial components of development within Rhodes.

Restrict parking supply by applying the following parking rates to different uses:-

- residential minimum 1 space per unit plus 1 visitor space per 10 units
 - maximum 0.6 spaces per studio unit
 - 1.0 space per 1 bedroom unit
 - 1.2 spaces per 2 bedroom unit
 - 1.5 spaces per 3+ bedroom unit
- visitor parking at 1 space per 10 units
- commercial office maximum parking supply rate of 1.75 spaces per 100m² GFA
- retail (maximum)
 - 4 spaces per 100m² leasable area
 - reduced provision allowed subject to adequate justification
 - employee parking to be charged in order to encourage public transport usage
- bulky retail
 - 2.5 spaces per 100m² leasable area
 - employee parking to be charged in order to encourage public transport usage

Retail parking should have a fee regime discouraging long stay parking.

There will be a need to monitor on-street parking in the vicinity of the site and progressive implementation of time limited parking and resident parking schemes.

Pedestrian/Cycle Linkages

- enhance access to the foreshore/ferry by provision of stairs/ramps at both ends of the existing cycle/pedestrian facility on John Whitton Bridge plus lighting on the bridge
- provide a recreational cycle route along the western foreshore of Rhodes linking to Homebush Bay and to the John Whitton Bridge route
- provide a pedestrian/cycle underpass under the railway (at the northern end of the existing platforms)
- provide a pedestrian overpass from the Digital site development into the new retail areas
- construct an overpass of the railway line to the reserve behind Killoola Street creating a pedestrian/cycle linkage to Concord West and the public school
- provide a commuter cycle route along Walker Street to link to Rhodes Station
- provide bicycle lockers/parking at Rhodes Station
- ensure commercial and retail developments make provision for cycle parking (in line with Council of City of Sydney rates).

Traffic Facilities

A series of road improvements have been identified as being required as a result of redevelopment at Rhodes:-

- Oulton Avenue
 - on and off ramps
 - signalisation
- Concord Road and Homebush Bay drive
 - new turn lanes
- Concord Road and Averill Street
 - new signals and road widening
- traffic calming to Blaxland Street and Cavell Avenue

More detail of these facilities is given in Chapter 7.

Travel Demand Management

The Rhodes development provides a unique opportunity to influence and manage travel demand as a new community is being created.

Early intervention and planning may allow people to develop travel habits which minimise car use and enhance the use of public transport and non-car borne modes. The time of day that people travel also affects levels of congestion on roads or crowding of trains and buses etc.

Various techniques are available to help manage travel demand and include:-

- flexibility in start/finish times for employment;
- facilitating walking/cycling for a range of trip purposes;
- encouraging car sharing through incentive/van pooling schemes;
- encouraging trips to be linked for multiple purposes;
- marketing and health programs;
- transport access guides for employees and visitors

For the Rhodes development, it is recommended that the key stakeholders (developers, transport operators, Council and DOT) jointly develop a staged behavioural change strategy, which includes:

- transport option information in “Welcome Kits” for new residents;
- Transport Access Guides for employees and major facility visitors;
- transport information seminars early in the life of the development; and
- possible implementation of individualised marketing techniques if required.

One demand management process is called ‘travel blending’¹. This encourages people to blend the modes they use rather than focussing heavily on the car, and at the same time continue their existing activities. This is done by:

- giving them a simple way of recording their travel behaviour;
- providing them with a set of ideas for changing their behaviour, customised for each individual person in the household; and
- giving them a simple system of monitoring any changes they make.

¹ Travel Blending – Steer Davis Gleave

Results have shown that it is a successful method for reducing car use. For example, a project carried out in Adelaide in 1997 indicated that participants reduced their car use by 21%-26% and that a follow up survey showed that changes in behaviour had 'stuck' with a further 8% reduction in car travel in the months following the study.

Another approach is called indimark (individualised marketing) developed in Europe in the 1990s. The key to this approach is by making small changes in people's mode choices which can in turn make a significant difference to the mode share in the overall population.

For the Rhodes development it is recommended that developers implement behavioural change techniques as different components of the scheme are completed. As noted earlier, however, early introduction of information/practical choices in people's decision making may allow avoidance of the creation of 'car borne only' travel habits and the need to modify them.

Other Possible Transport Management Opportunities

Homebush Bay Bridge

A bus/pedestrian/cycle bridge across Homebush Bay would have potential advantages in possibly creating more attractive and viable bus services as well as creating attractive pedestrian/cycle routes for Rhodes and Homebush Bay residents and visitors. It is recommended there be a separate study of costs/benefits/effects of such a bridge connection.

Ferry Wharf and Private Ferry Service

Sydney Ferries have indicated that existing Rivercat services are crowded in peak periods and that extension of services is unlikely. An opportunity may well exist to generate a ferry wharf and private ferry service which could provide a viable/attractive service for Rhodes. It is recommended this concept be given further study.

Monitoring and Update to Transport Management Plan

The transport management plan is aimed at reducing the quantity of car borne travel needed to satisfy people's trip purposes. As circumstances change and developments proceed, it is recommended that the transport arrangements and people's choice of mode of travel be monitored and the transport management plan updated accordingly. A period of 5 years after the commencement of construction may be appropriate as an initial check point to monitor progress.

5 Year Review

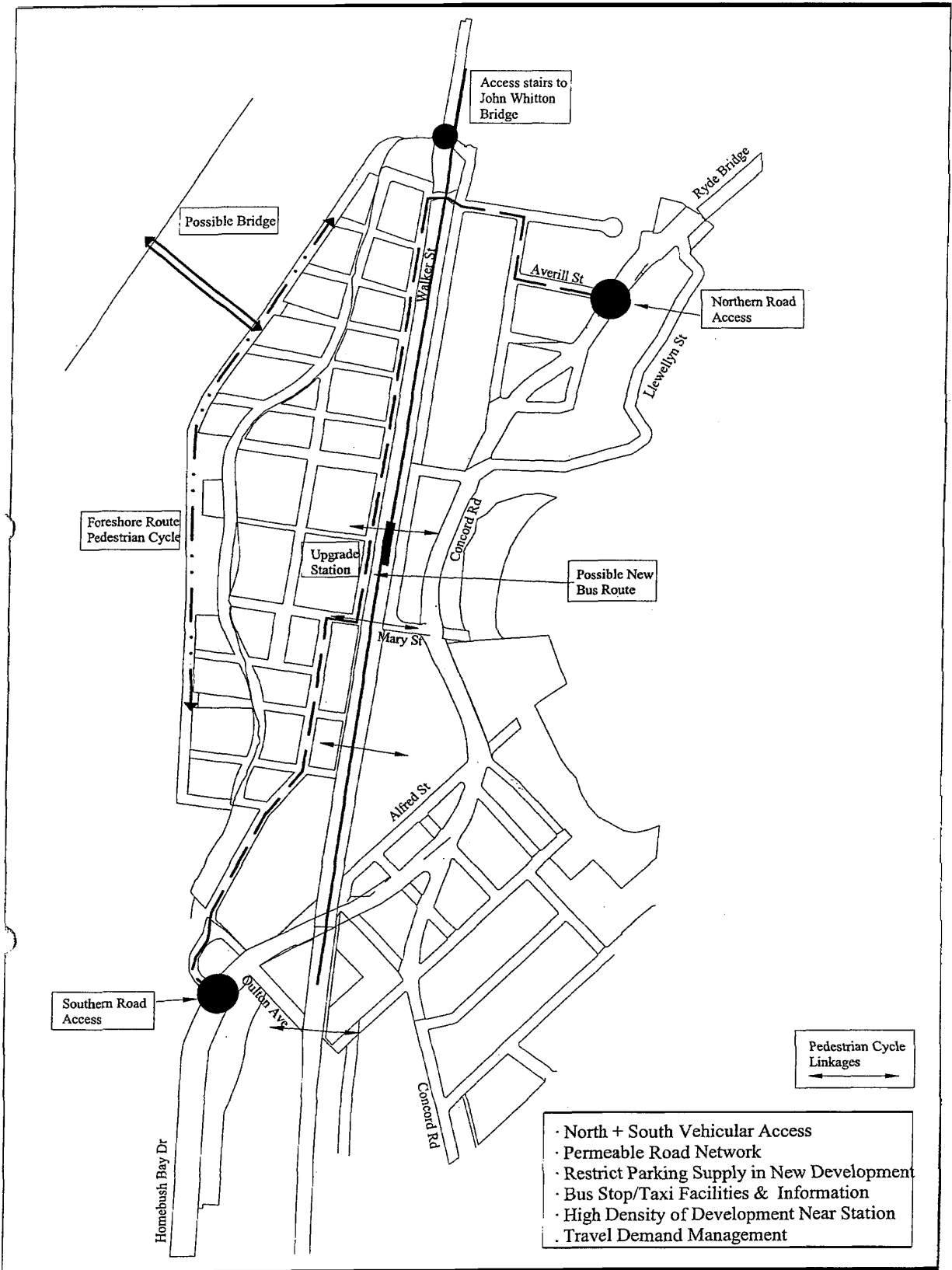
It is proposed that 5 years after commencement of construction may be an appropriate time to monitor progress. The Review will provide an opportunity to check on the phasing and modify the proposed implementation of the works if required. The following provides a broad overview of what the review and monitoring should at a minimum include.

- The TMP is based on the demand generated for road, rail and non vehicular transport modes as a result of the development proposed at Rhodes. Therefore, the development (type and quantity) and subsequent population growth should be checked during the

review. The assumptions, proposed growth and resultant demand are outlined in Section 5 (p.19-21).

- The proposed phasing will need to be checked in relation to whether development and growth has occurred as per the prediction. Following from this the phasing may need to be amended.
- The TMP proposes infrastructure improvements which, when implemented, are believed to meet the projected growth within Rhodes. There will need to be testing of whether the infrastructure is meeting this demand and if any unforeseen circumstances have arisen to alter the effectiveness of the infrastructure improvements.
- The initial analysis of demand generation and modal split may require some monitoring and surveying, eg at station, of residents, workers, visitors.

The Contributions Framework provides funds for some monitoring and review of this plan to be undertaken in the future. This work could be carried out independently or arrangements could be made with an appropriate body related to the development of the site (eg Council, RTA).



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 TRAFFIC AND TRANSPORT CONSULTANTS
 File: 001191d13 Date: 26/6/00

Figure 12 Transport Management Strategy Plan

Appendix 3

Submissions

Submissions

No	Author
1	Ms Carol Kendall, Rhodes Residents Group
2	Mr Paul Hanly, Rhodes Peninsula Group (including supplementary submissions)
3	Confidential
4	Mr John Pike, Rhodes Peninsula Group
5	Ms Lisa Corbyn, Environment Protection Authority
6	Confidential
7	Mr Doug Moss, Thiess Services Pty Ltd
8	Mr David Furlong, City of Canada Bay Council
9	Ms Diane Leeson, Sydney Olympic Park Authority
10	Confidential
11	Ms Judy McKittrick, Environmental Resources Management Australia
12	Mr Robert Black , Planning NSW
13	Partially confidential
14	Mr D G Jones
15	Confidential
16	Ms Laura Leonoff
17	Mr Peter Home, Orica Engineering
18	Mr Luis Almario
19	Mr Sundar Mahtani, King Street Area Residents Group
20	Dr Kathyne Hughes, Econeco Pty Ltd
21	Mr Roberto Meneses
22	Ms Kathryn Ridge, NSW Nature Conservation Council
23	Ms Vicky Sheppard, NSW Health
24	Pastor Guy Graham
25	Mr Rod Mould
26	Ms Lucy Hanratty
27	Mr Matthew Taylor, Waterways Authority
28	Ms Sue Weatherley, Ryde City Council
29	Mrs Lesley Quinsey
30	Mr Dietrich Willing, Friends of the Earth

Appendix 4

Witnesses

Witnesses

Mr Luis Almario

Ms Raquel Carter, NSW Nature Conservation Council

Mr Ben Cole, Total Environment Centre Inc

Dr Stephen Corbett, NSW Health

Mr Mark Davidson, Trafalgar Corporate Pty Ltd

Mr Geoff Fogarty, NSW Department of Public Works and Services

Mr David Furlong, City of Canada Bay Council

Mr Paul Hanly, Rhodes Peninsula Group

Dr Kathryn Hughes, Econeco Pty Ltd

Mr John Hunt, Thiess Services Pty Ltd

Ms Carol Kendall, Rhodes Residents Group

Mr Gordon Kirkby, Planning NSW

Mr Mark McNamara

Mr Doug Moss, Thiess Services Pty Ltd

Mr Gary Prattley, Planning NSW

Mr Greg Stewart, NSW Health

Mr Matthew Taylor, Waterways Authority

Mr Peter Twiney, Masson Wilson Twiney

Mr Ashley Watson, Environment Protection Authority

Mr Graham Watt, NSW Department of Public Works and Services

Mr Roly Webb, Waterways Authority

Mr Darryn Westman, City of Canada Bay Council

Mr Joe Woodward, Environment Protection Authority

Appendix 5

Previous Publications

Previous Publications

Item	Title	Date
Discussion Paper 1	Public Sector Tendering & Contracting in New South Wales: A Survey	May 1989
Report 1	Public Sector Tendering & Contracting in New South Wales: Supply of Goods and Services	August 1989
Report 2	Public Sector Tendering & Contracting in New South Wales: Local Government Tendering & Contracting	October 1989
Discussion Paper 2	Coastal Development in New South Wales: Public Concerns & Government Processes	November 1989
Discussion Paper 3	Public Sector Tendering & Contracting in New South Wales: Capital Works Tendering & Contracting: Management Options	June 1990
Report 3	Public Sector Tendering & Contracting in New South Wales: Capital Works Tendering & Contracting. Volume A	April 1991
Report 4	Coastal Planning & Management in New South Wales: A Framework for the Future. Volume 1	September 1991
Supplement to 4	An Alternative Dispute Resolution Primer	September 1991
Report 5	Public Sector Tendering & Contracting in New South Wales: Capital Works Tendering & Contracting. Volume B	December 1991
Report 6	Payroll Tax Concessions for Country Industries. Volume I	December 1991
Report 7	Public Sector Tendering & Contracting in New South Wales: Supply of Goods and Services: Follow Up Report	June 1992
Report 8	Coastal Planning & Management in New South Wales: The Process for the Future. Volume II	October 1992
Report 9	Public Sector Tendering & Contracting in New South Wales: Local Government Tendering & Contracting: Follow Up Report	April 1993
Discussion Paper 4	Regional Business Development in New South Wales: Trends, Policies and Issues.	August 1993
Report 10	Regional Business Development in New South Wales: Achieving Sustainable Growth: Principles for Setting Policy. Volume I	May 1994
Report 11	Regional Business Development in New South Wales: Achieving Sustainable Growth: Initiatives for Setting Policy. Volume II	November 1994
Report 12	Rationales for Closing the Veterinary Laboratories At Armidale and Wagga Wagga and the Rydalmere Biological and Chemical Research Institute	August 1996
Report 13	Factors Influencing the Relocation of Regional Headquarters of Australian and Overseas Corporations to New South Wales	October 1996
Report 14	Interim Report on the Fisheries Management Amendment (Advisory Bodies) Act 1996	April 1997
Report 15	Waste Minimisation and Management	April 1997
Report 16	The Fisheries Management Amendment (Advisory Bodies) Act 1996	July 1997

Discussion Paper 5	Future Employment and Business Opportunities in the Hunter Region	October 1997
Report 17	Fisheries Management and Resource Allocation in New South Wales	November 1997
Report 18	Operations of the Sydney Market Authority (Dissolution) Bill from Commencement until 31 December 1997	March 1998
Discussion Paper 6	International Competitiveness of Agriculture in New South Wales	May 1998
Report 19	Future Employment and Business Opportunities in the Hunter Region; and The Downsizing of the Rack Rite Investment Proposal	July 1998
Report 20	Interim Report on the Provision and Operation of Rural and Regional Air Services in New South Wales	September 1998
Report 21A	The Use and Management of Pesticides in New South Wales Vol 1	September 1999
Report 21B	The Use and Management of Pesticides in New South Wales Vol 2: Transcripts of Evidence	September 1999
Report 22	Inquiry into Road Maintenance and Competitive Road Maintenance Tendering	November 2000
Report 23	Merger of country energy distributors	May 2001
Report 24	Genetically Modified Foods: Interim Report	October 2001