

Botany Bay Forum

University of NSW – Afternoon Session

Speakers

Chairperson: **Michael Johnson**

Speaker 1: **Peter Murphy**

Speaker 2: **David Waite**

Speaker 3: **John Black**

Speaker 4: **Stephen Samuels**

Speaker 5: **Sue Green**

Speaker 6: **Ian Tyrell**

Chairperson: **Michael Johnson**

My name's Michael Johnson from the School of Social Science and Policy and John Black has got me to chair the afternoon which I hope I will do quietly and unobtrusively from the rear of the podium. In the first session we already considered the impact and inter-relationship between the physical and biological environment and the human environment and this afternoon we're turning solidly towards the human environment and this recognises in the plans for the unit of the importance of including all of the dimensions of the human environment in consideration of Botany Bay, from the psychological to the social and economic and institutional factors that are all being so critical in the management and the decision making around Botany Bay. The first speaker this afternoon is going to be Professor Peter Murphy, who is the Dean of the Faculty of the Built Environment here at UNSW and has had a long history of working on urban planning and urban change issues and the first thing that he's going to consider is the role of demography and associated questions, which is, of course, a very critical one for Botany Bay, as Sydney is the fastest growing capital city in Australia. Without anymore ado, I'd like you to welcome Professor Peter Murphy. Thank you.

First Speaker: **Peter Murphy**

Good afternoon ladies and gentlemen,

I make no great claims, no real claims at all, to having a great deal of knowledge about what's happening in either Botany Bay or its hinterland. But, I did do quite a bit of work on changes in the central industrial area back in the late 1980's, and also, in fact, before that quite a large project on demand for recreational boating facilities in Sydney waterways. I've got a little bit of a background in that area. My comments are going to be very broad brush and general but hopefully there will be some observations in that it might stimulate some interesting discussion.

I've divided my remarks under two broad headings, some comments about some of the land based activities that may have implications for the bay and its associated waterways and then some comments about some bay based activities that might have some implications for land use, and undoubtedly I'll be overlapping issues that were discussed this morning which and will come up later this afternoon.

We will focus first of all on land based activities in the hinterland of the bay.

POPULATION GROWTH AND LAND-USE CHANGES

FOCUS: BOTANY BAY ← → CATCHMENT/HINTERLAND

AIM: IDENTIFY TYPE, SCALE AND SIGNIFICANCE OF

- 1 LAND-BASED ACTIVITIES THAT MAY IMPACT ON BAY
- 2 BAY-BASED ACTIVITIES THAT MAY IMPACT ON LAND

presented by

Professor Peter Murphy
Dean

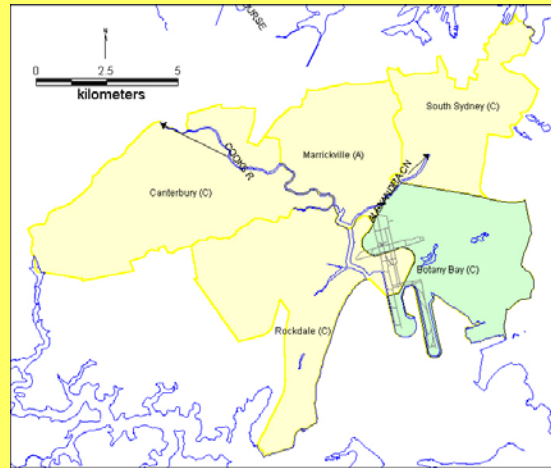
**BOTANY BAY: MOVING FORWARD 2004:
RESEARCH AND ACTION**

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I've divided my remarks under two headings, Residential Uses and Industrial Uses. Turning first to residential uses, I've distinguished between two periods, the period very approximately prior to about 1980 and the period very approximately since 1980. Before the 1980's, if you look at the residential scene, these are some of its main features - very broad brush. Population decline or stability in most of the catchment areas - this was typical of inner city population decline and middle ring population decline and very slow growth. The type of residential development in the hinterland was broadly low rise, low density type development. The area was largely built out by the late 1960's, it was predominantly populated by middle to low income households and of course there is a significant migrant presence in the inner west, with particularly Italian and Greek migrants in and around the Rockdale area and Canterbury area.

POPULATION GROWTH AND LAND-USE CHANGES



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Since the 1980's there's been some significant change from a demographic front right across Sydney, the inner city areas of course have been growing in population for the last 10 years or so, not radically, not nearly enough to take growth pressures significantly away from the metropolitan fringe, but growing nevertheless. These are just some numbers for 5 of the local government areas that are certainly within the bay catchment, although there are probably others that are relevant as well.

I read that population growth in very broad brush terms as resulting from a number of phenomena. Firstly I think there has been a significant spread of gentrification away from the harbourside suburbs and the beach areas which were its heartland. So as the prices in those areas have increased, you're getting a diffusion of demand away from the heartland areas and into areas such as the hinterland of the bay. We're getting obviously significant increases in population densities due to urban consolidation policies, but it's not the policies that are causing the density increases, its market pressures that are being enabled by the policies.

POPULATION GROWTH AND LAND-USE CHANGES

TABLE 1: Dwelling structures available as a percentage of total occupied private dwellings (2001)

Source: Australian Bureau of Statistics 2001

Local Government Area	Separate Houses	Semi-Detached/Terrace/Town Houses	Flats/Units/Apartments
Botany Bay – C	42.6%	15.4%	40.4%
Canterbury – C	54.4%	7.0%	36.8%
Marrickville – A	33.6%	27.2%	35.9%
Rockdale – C	52.7%	12.1%	33.5%
South Sydney – C	3.6%	28.9%	64.7%

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You can see this especially in the South Sydney area where population growth has been quite high at around 18% over that 10 year period. I don't know if I can make this thing work backwards, but the previous table had some data on the proportion of flats as a percentage of the housing stock in each of these areas and the effect of high rise development in South Sydney is very marked. There have also been new rounds of immigrant settlement in the inner city, low income type settlement in places like Marrickville with Vietnamese and Pacific Islander settlement. The Canterbury area - obviously a lot of settlement from Middle Eastern countries and probably middle to upper income Chinese type settlement in the high rise developments around Hurstville. Broadly speaking, it's been a very significant increase in the general minuting of the catchment of the bay for obvious reasons, the very marked attraction of the manufacturing industry, road improvements, water quality improvements, waterways, landscaping and things like that.

POPULATION GROWTH AND LAND-USE CHANGES

TABLE 2: Population Change (1991-2001)
Source: Australian Bureau of Statistics 2001

Local Government Area	1991	1996	2001	Population Change (1991-2001)
Botany Bay – C	34435	34702	35897	4.2%
Canterbury – C	129232	132360	130947	1.3%
Marrickville – A	78023	76017	73431	-5.9%
Rockdale – C	84074	84847	88523	5.3%
South Sydney – C	77818	82960	92249	18.5%

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The implication for the Bay and the Cooks River - you can't make very specific statements, but the general implications are things like these all fairly obvious: increased demand for recreational access to waterside land and waterways; also an increased capacity with probably generally a higher income, better educated population, to demand improved environmental amenity and demand improved accessibility to waterside activities and to waterways themselves; and also an increase in capacity both numerically in terms of capability and intent to resist unwanted industrial activities and airport expansion. High residential densities, I assume, also correlate with increased storm water run off and that will feed through into water quality questions.

I turn quickly to industrial activities. The story of the industrial activities in the catchment of the bay, particularly around the central industrial area, will be familiar with many of you. Essentially what we saw from the early mid 1970's was a very sharp reduction in the number of manufacturing jobs located in central Sydney and a corresponding sharp contraction in the number of manufacturing firms. The reasons for that were twofold, its a combination of a longer term process of jobs being relocated to the outer areas of population growth where most of the blue collar workers were located, but also the impact of economic deregulation which led to the loss of around a quarter of a million of Australian manufacturing jobs between 1975 and about 1985. A lot of those industrial uses, they were replaced, of course, by freight forwarding and freight handling type activities, and a lot of associated office type development in the industrial areas, so there's been basically a greening and a quietening of those areas, and I think that's one of the factors why it's been possible to have so much residential development, both the availability of the sites - the disused industrial sites - but also the increase in amenity, if you like, associated with residual industrial activities. The implications of that sort of stuff for the Bay and Cooks River - I think that increased amenity of the industrial areas themselves and the contraction of industrial activity obviously has been a significant factor in the growth and expansion and gentrification and therefore flows through directly and indirectly into population growth.

The airport itself - somebody else, I know, is talking about that later. I'll make just a couple of very quick remarks. We know that there's not going to be a second airport for a very long time. We know that means there's going to be a very sharp increase over the next X years of air traffic. We know that that's going to mean continued community agitation and that can only be

accentuated by population growth and gentrification. One of the sidelights to airport growth - and this also applies to the expansion of Port Botany - is that there's going to be increased demand for industrial sites adjacent to those facilities.

POPULATION GROWTH AND LAND-USE CHANGES



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One of the features when Port Botany was established in the late 1960's is there was no land based assessment at all of the Port's impacts. I've just noticed this large collection here and I assume there must be a lot of stuff on that topic in an EIS that's done to validate a year round expansion. That's going to be interesting because it might create some conflicts. The Planning Department was very keen not to allow industrial land to be converted to non industrial uses right through the 1980's and into the 90's. That policy seems to have been completely eroded now, but it's going to be interesting to see what sort of conflicts and what sorts of pressures there are going to be between inner city high rise development, the demand for industrial land and support for airport and port activities. The M5 east has obviously sharply increased accessibility to south west Sydney and not only encouraged fringe population growth but, of course, goes against what governments are trying to do with urban consolidation. It must have, I assume, very sharply increased the economic viability of the industrial areas and, of course, also the Port and Airport themselves.

I'll finish with just 2 or 3 very quick remarks about the implications of activities on the bay for land use and population in the hinterland and the remarks are all around the potential for Port Botany's expansion to create some interesting conflicts. Traffic is an obvious one. I know we've got the M5 now but you'll all be very well aware of the massive problem caused by truck transport of containers and the total absence of planning to enable that to happen with the first stage of Port Botany. I'm not a transport planner, I haven't looked at the detail, maybe it's all fine now, I don't know.....but an expansion of Port Botany would seem to be a ridiculous thing to be doing if it's going to be generating a lot more freight handling activities on the roads. There is going to be increased competition with recreational uses, I imagine, port expansion, more ships, more potential conflict with recreational uses, and, I suppose, commercial fisheries. There is going to be increased competition, as I mentioned a moment ago, with other users of industrial lands. Demand for land associated with Port expansion industrial area combined with demand for industrial land created from the airport expansion combined with residential demand, is going to cause a lot of price inflation and potentially a lot more micro scale conflicts than we have seen in the past.

Finally I know from the dim distant past that one of the issues around Port Botany stage 1 was the question of not just the port but also the petrochemical complexes on either side of the bay and the implications of having hazardous materials storage, processing and movement in the vicinity of the bay. I assume, although I haven't looked into it in recent times, that our capacity to identify the risks associated with those sorts of activities is very state of the art and we probably don't have too many problems, but I think that may also not be the case.
Thank you.

Chairperson: **Michael Johnson**

The next speaker is Professor David Waite from our School of Civil and Environmental Engineering at the University of NSW (UNSW). David's also Director of the UNSW Centre for Water and Waste Technology.

Second Speaker: **David Waite**

I'm going to talk about the industrial legacy and waste water treatment and I'll touch on some issues that were raised also this morning. One of the legacies is clearly our impacts on ground waters. I'll look at some of the past and present industrial activities very briefly and look at impacts as far as I can see them and then move on to treatment of waste waters and discuss that issue.

The industrial impacts show themselves through pollution in the incoming streams for the most part and I list here a number of the streams that show impacts in various ways. Cooks River and Alexandra Canal - there are signs of industrial activities through the heavy metals and hydrocarbon pollution. There is also nutrients and sewerage overflows impacting on those incoming streams. Georges River - also nutrient inputs and sewerage impacts on that stream. That's not simply industrial but it's certainly impact on incoming stream. Mill stream - again nutrients and sewerage overflows - I think that's a stream that picks up the sewerage outfalls - is that correct? - or the overflows and leakage and goes into that incoming stream. Penryn Estuary and the Botany aquifer, as we've heard this morning from our colleagues, showed the impact of the activities by ICI Orica at that Botany site; the organo-chlorides, the hexachloro benzenes and metal contamination. There is also some impact of sand mining and oil and petroleum activities on Kurnell Peninsula. So there are a range of impacts of industrial activities in and around the bay. Here are just examples. You can see pictures of the Northern part of the bay and the Orica and airport activities; these are some of the activities in the southern parts on Kurnell, and excavation and landfilling against sandmining in the southern part of the bay, shown there.

I must say, one issue that astonished me as I put this talk together, was the lack of data available to assess the legacy of industrial activities. It was quite difficult to provide a summary because the data simply wasn't there, either not there or not accessible. If we are going to progress, we must either develop a good compilation of studies - data that have been done, if they haven't been done we must obtain more information to assess the legacy. Here are some examples of the legacy, in this case looking at metals accumulating down the Cooks River and the bay, just showing lead as one example of an impact on incoming streams and bay. You'll see that only in the upper part of Cooks River are there very high levels, the bay isn't too bad, up near the top of Cooks river but there is some impact of metals. PCB's are again another common impact of industrial activity, You'll see a high concentration of PCB's up here on the left, but in the bay itself the concentrations don't show huge impacts.

We've heard about the groundwater site, the Orica site, the Botany sands contamination underlying or adjacent to the Orica site, there is a range of contamination there and the sort of chemicals that are found are listed here - carbon tetrachloride, tetrachloroethene, vinyl chloride,

ethylene dichloride, trichloroethylene and last one 1,1,2,2-tetrachloroethane. These are all quite nasty chlorinated compounds that have been observed. There is now quite good documentation on the impacts of activities at Botany on that region with three distinct plumes being identified going into Botany Bay. The concentrations of these contaminants are remarkably high, some of the highest contamination concentrations of any aquifer in the world, some of these levels are astonishing. There has also been some estimation of when this contamination will impact on the bay, when that legacy will have an impact on the bay. So you can see that the central plume has very high EBC concentrations straddling 5000, that's 5 grams per litre with the impact on the bay in about 2007 for the following 5 years. Similarly a smaller plume of EBC impacting on Foreshore Beach and Penryn Estuary in about 2 years' time. So we have some measure, some estimation of impacts of industrial activity.

There is clearly a need to take action and some sites, like the one I've been talking about are clearly high priority, but once there's action taken on this - and there's already action been taken on the Botany sands region - there is a need to prioritise future actions and there is a need to base actions on the severity of the extent of likely impacts. There is a need to document those impacts with the past or likely future impacts and on that basis prioritising remediation. So, in terms of future waste management strategies, they should be driven by likely impacts on both ecology and human health of the users of the bay. This may involve taking a precautionary approach. We may not have much certainty about the impacts. If we aren't sure it may require a precautionary approach being adopted. There are a range of actions that must be taken. Some of them are quite obvious. Remediation of the areas that are now quite contaminated - Alexandria Canal catchment. We must control, obviously, sewerage discharge, nutrient inputs into George's River, the sewerage leakage must be corrected. There are obvious actions that must be taken in very near term, as must the actions at the Orica site and underlying aquifer.

The last one, I've implied perhaps is the most urgent in the various concentrations of chlorinated hydrocarbons are very high, we can't know for sure about the impact. We don't know at this point the extent of dilution or degradation but chances are the impacts may be quite large, so on that basis there is a need to treat that plume and that's why the EPA I'm sure have told Orica you must do something immediately. There are a range of options though that can be taken, and I list here some of these treatment actions, according to, in this case, the ground water contaminated site, whereby one removes the contaminant and treats it and disposes of the waste elsewhere. The most common method of doing that is to in fact pump out the waste and treat it and I think the EPA have in fact ordered Orica to take that action. The problem is that it's expensive. It's also very very slow. The estimation is that it would take 100 years of pump and treat technology to hold that situation. I'm not sure how correct that estimation of time is, but it's a slow long term process, it's an engineered solution that is quite intensive. It also takes out the water that leads to contamination in the soils within the system. It only treats part of the problem. In situ methods are somewhat more attractive, where one tries to treat the problem in the ground and there are a couple of major approaches that I know Orica are looking at involving both biological treatment and physical chemical processes. The problem's biological and I think there's a program to start that in the next month or two. The problem is that in such a contaminated site, bugs have a very hard time surviving and so it's not clear just how effective such an approach may be.

In terms of physical chemical treatment, there are again quite a range of options that involve typically, in the case of organic compounds and even metals as well, either oxidising or reducing the contaminant and thereby degrading or changing its form. These can be either active, where there's again an engineered approach of treating, actively pumping down chemicals continuously to treat the waste until its gone, or passive where one puts in place in the ground some sort of technology that will treat the contaminant. The last approach has been investigated by Orica, particularly using what is known as zero balant iron barriers. These are barriers of elemental iron that are placed across a flow path of the contaminant and this iron, as it corrodes, releases electrons and that process in fact reduces, dechlorinates the contaminant. This process has been used in the US, in Canada, in a number of sites, to good effect, and so Orica have, in fact, invested considerably in this approach since about 1996. The problem is it doesn't treat all

chemicals. The bottom reaction shows carbon tetrachloride breaking down, but it leaves some contaminants like EBC and dichloro methane untouched to a large extent.

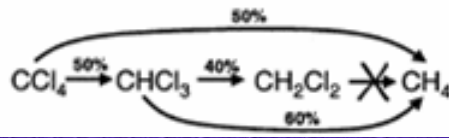
Reaction Summary



Abiotic reductive dehalogenation



e.g. carbon tetrachloride (CTC)



- ◆ **Dichloromethane (DCM) and ethylene dichloride (EDC) not degraded by this approach**

So technology doesn't treat all contaminants. There have been pilot studies at Botany. In such studies the performance has been quite impressive for some contaminants, not so much for others. The conclusion is the results of those pilot studies suggest that there should be, in fact, a full-scale installation installed, looking at putting in place a 300 metre long barrier, 7 metres deep, a couple of thousand tonnes of iron to treat the contaminant. That's one technology that's being investigated by Orica. There are other ways, in pumping particles into the system, particles of iron that follow the plume and treat it. Groups both in the US and also our own group here have developed these technologies that are effective on some contaminants.

Essentially the message I'd like to leave with you is there are a range of technologies, but my sense is we aren't, as a group, as academics, as the public, we aren't aware what's been looked at. I think we need to get our industrial partners around the table and work with them to discuss the technologies, look at the cost/benefits, assess its effectiveness and together come up with the best approach. In summary, it's my last point, you can view properly the proposed remediation activity approaches. We have great technology, great specialists here in Australia. We can do that with our industry partners. We also need to, as I said earlier, collate more information on the legacy and likely future impacts. We need to then use those likely impacts to prioritise remediation actions.

Chairperson: **Michael Johnson**

Thank you, David. The next speaker is John Black.

Third Speaker: **John Black**

Thanks Mr Chairman. Let me start by saying Professor Chris Kissling should have been on the program to talk about ports and airports, and I'm not going to take up too much time. I just want

to give his apologies. He has to host a delegation from Canada in New Zealand - he's at Lincoln University. It, in a sense, illustrates the way the Botany Bay Studies Unit will work as far as research is concerned. Quite clearly as far as port and airport development is concerned, ground access, traffic access to ports and airports is a critical issue and it's clearly the case with Port Botany. I must confess my own research area is transport and I also must confess to you that the last time I published anything on urban freight movements was in 1980. I wrote a research framework and we looked at the container issue and it was in those days when containers were being moved from Port Jackson to Port Botany. That's how long ago it is and how irrelevant that work is today. But I was fortunate enough to have an Academy of Science fellowship when I was in Japan and at a conference there, and I'd only just been appointed as Director of Botany Bay Studies Unit, I formed a research alliance with the Lincoln University group, Chris Kissling, who has done a lot of current research on ports and airports and also another group at Melbourne University in civil engineering. They have the freight logistics group and that's led by Dr Russell Thompson. To give you a sense of how the Botany Bay Studies Unit might work with seeking research funding, in the case of freight transport using gateway port concepts as far as Port Botany is concerned, we have assembled a team and that is bringing together some of the best expertise as far as freight transport. That's not me. My knowledge is far too dated. This is the way that we're working in the future and associated with the proceedings of the conference, I've tabled a couple of other areas of transport that we're working on, like quality of life and appropriate environments for the aged and the economic impact of airports and ports and the social impact of airports, and that leads me, because I'm going to finish now, onto our next presentation. It's far better that you hear from one of my colleagues, Dr Stephen Samuels, who will talk a little bit more substantially about some of the research in terms of impact of aircraft noise.

Chairperson: **Michael Johnson**

Thank you John. Short and sweet. I'd now like to call on Dr Stephen Samuels

Fourth Speaker: **Stephen Samuels**

I'm going to talk to you about the issue of noise, primarily at the Kingsford Smith Airport. I'm a Visiting Fellow in the school next door and I also run my own small consulting company called Transport, Environmental and Forensic Engineers, the forensic partner for that accident reconstruction. I think we've probably got a room of ecological and waste water experts gathered together now. My experience as an acoustical consultant is the majority of people have had some experience with noise – the next door neighbour's air conditioning, or whatever. But most people don't understand a lot of the basic issues involved with noise. If you want to know about that, we run a number of courses on the university campus and you can do a masters degree if you want to. I've only got a couple of minutes. I need to tell you just a couple of things which will put in context what happens with aircraft noise.

Noise is unwanted sound. That's an international definition in all international and Australian standards. That may seem intuitively obvious, but it's not always. If you're having a party and you've got loud music going on in your lounge room and the people next door are trying to go to sleep, to you in your lounge room it's not noise, it's sound, but for them it's noise. It doesn't have to be loud, either. You can have a ticking clock in the bedroom at night which is generating a very low noise level and it will annoy you.

Most of us think about things in what I call a linear environment. We think about doubling the weight, or turning up the volume on the radio to what's double. Unfortunately, your ears don't work like that. They work in a logarithmic fashion and so, therefore, we use a logarithmic scale to measure noise. I'll just refer to it now as dB(A). Noise levels that are measured in a logarithmic scale that are electronically filtered to emulate human auditory response. That's what that 'a'

means. What does it sound like? If I had some music playing from the speakers here and I turned it up and I said, you tell me when it's louder, the noise has to go up 3dB for you to notice a change. That's the smallest change we can detect. If I kept on turning it up and said, I know you all think in a linear fashion, tell me when it's double, the noise would have gone up 10. Now, let me tell you, in terms of doing something about noise control, when you've got an industrial noise source or aircraft noise, changing things by 3dB is very difficult; changing it by 10 is almost diabolically impossible. For example, take a 747 (aircraft). If you turned off two of the engines on a 747, which is not a good idea, the noise level would go down by 3dB. You'd only just notice it.

Most of us in the community have a reasonably poor understanding of noise, but it's something we often identify with and talk about frequently. Here are some typical noise levels. If I stop speaking, the ambient noise level in here would be around about 35 to 40. That 70 there is a key thing. If you went down and sat in a bus stop in Anzac Parade outside this university campus and listened to the traffic noise, you'd typically hear around about 65 to 70. One of the ways we measure aircraft noise and the impacts of aircraft noise on people in residences, is the number of times the noise level exceeds 70 dB(A) and I've got some graphs and things to explain that to you in a moment.

Typical range of noise levels

- 140 dB(A) Near an aircraft jet engine
- 100 dB(A) In a noisy factory
- 70 dB(A) Beside a busy main road
- 40 dB(A) In a private office
- 20 dB(A) Human auditory threshold

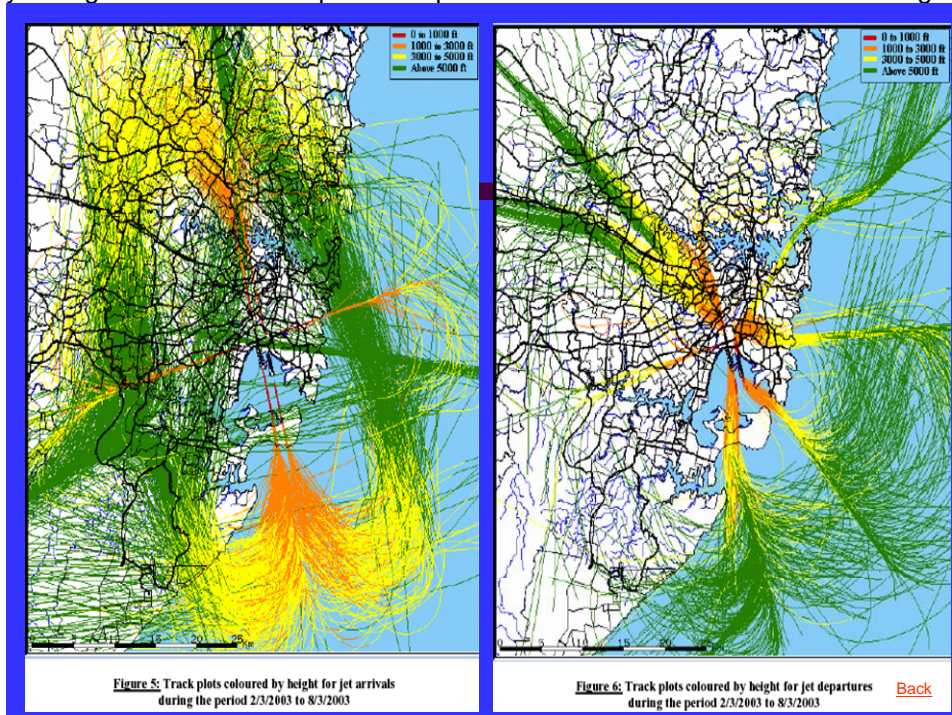
That's pretty much all you need to know about noise to understand the rest of the things that I'm going to talk to you about. It's a very simple explanation, but I've only got a couple of minutes. Around about 35 to 40 per cent of the population in Sydney is exposed to undesirable noise levels. About 35 to 40 per cent of urban residents in Sydney are adversely affected by noise and that's where it comes from. Aircraft noise will happen in amongst it.

Let me now talk about what's going on at Kingsford Smith Airport in relation to aircraft noise. The issue that they're dealing with is primarily to do with aircraft take offs and landings and again that may seem intuitively obvious, but there are a lot of other things that go on in an airport, such as ground operations and transport to and from, but with aircraft noise it's not the flyovers, it's take offs and landings. And it's not just at the airport, and I've got some quite dramatic shots to show you in a minute about this. The aircraft noise impacts cover a very wide area of the Sydney Metropolitan Area. The big league is around Botany Bay, the areas that most people discussed in this theme in the presentations from the workshops thus far today. Most of the people that I

speaking to about this include residents who are very concerned about these issues and generally in the community. You only have to look at the uproar that happens when a political proponent proposes an airport in another location. It takes about two days for resident action groups to form and to hit the headlines. It's an issue of substantial concern to a wide cross-section of the community.

What's it doing? These are the primary things that we know about now. The bottom one there is also something of great concern. We know that as noise exposure goes up, property values go down. That's one way to get the population of Sydney motivated to do things, if you start playing around with their property values. We don't know that very well - we don't know the relationships very well but we know there are general relationships there.

Various graphs which were given to me by one of our PhD students, who is sitting over there, whose work I'm going to talk to you about in a moment, show the flight paths on the lefthand side of jet aircraft arriving in Sydney airport, on the righthand side take offs. They're colour coded and you might be able to see up in the top there the colour code of each line changes colour.



When it's green it's above 5000 feet going down to that red colour where it's below 1000 feet. A typical incoming flight path comes down over here, round the industrial area out there, back over there, over Kurnell and down here. You can see the majority of the movements are on the north south runways. Take offs a similar thing, up there and around. You can see quite clearly - we downloaded these graphs from the Department of Transport regional ?? website - they're readily available - you can see the aircraft movements over all of the areas that we've been talking about thus far, over the catchment, if you like, of Botany Bay.

What noise does that produce? This is a map of the number of times the noise level exceeds 70 dba - the number of times that happens. This was for the year of 2002 and it's the average you get for a day in 2002, and the redder the thing the more noise. The catchment we're talking about around Botany Bay is where the major noise impacts from aircraft operations from Kingsford Smith Airport occur.

I now move on to a research project that we're doing here at the university on the effects of aircraft noise. In that study we've got three or four different study areas. We're looking at the

impacts on health and well being of aircraft noise. As I said, the PhD student is doing this work under the supervision of John Black and myself. We think there's a line between aircraft noise exposure and health and well being. To do that we're using that field laboratory I've just shown you in the previous slide, and doing noise measurements, interviewing people, finding out about their health and wellness. That's an actively on going project now. I've been meeting with some people from Kurnell who are very annoyed about aircraft noise and who are ineligible for noise treatment – from the Sydney airport noise treatment program, and on the basis of those discussions we've come up with a concept that we want to look at - at a better way of identifying where the noise impacts are and how they can be dealt with in an equitable way. Currently we think they're not. There are some fairly rigid rules and regulations as to whether people get compensation or continuation treatment. There are a lot of inequities in that process and we want to explore these further. We've got some research to put up to the Federal Government for that at the moment. That's quite a substantial shift from the way things are done at the moment, but it's a way forward. We think we need to address those inequities.

Finally, just to wrap up – we've got some interesting work going on at the moment and are on a way forward of trying to address some of the inequities that exist at the moment.

Thank you.

Chairperson: **Michael Johnson**

I'd like to call on Sue Green now. Sue is the Director of Aboriginal Studies and Research Centre at the University of New South Wales.

Fifth Speaker: **Sue Green**

Actually the Aboriginal Research and Resource Centre has just become part of the Aboriginal Studies and Aboriginal Support Program Centre here at UNSW, so we're moving forth into some very exciting areas at the moment. I'd just like to commence by acknowledging the Eora people who's land we're on, and the Eora nation goes south to the Georges River, west to the Nepean River and north to the Hawkesbury River. This land in Botany Bay is the site of the tremendous impact of European colonisation within these lands now called Australia. These are the lands that have suffered the longest and hurt the most in any part of this continent and the people that have lived on these lands for ever are the ones that have suffered the most at the hands of colonisation and the growth of industrialisation on these lands. Eora people started to move out of these lands in the late 1700s. There is some myth that the Eora people died out by the end of the 1700s and there are some documents that say, by the 1790s there were only three Eora people left. This isn't true. Yes, there were great numbers of people who died, but there were also numbers of people who moved off into other communities as a means of survival. Then in the late 60s and early 70s we saw a groundswell of people moving back into the lands of the Eora, amongst them Eora people, but also people from other nations around this continent. I, myself, am a Wiradjiri woman. I'm the second female in my direct family line to live beyond the age of 30, not unusual for aboriginal women. That doesn't mean there's been a change in my family's history, because two of us have lived passed that age, because for both myself and my aunty we've lost our younger female siblings before they got out of infancy. Our children struggle to survive.

What I want to talk about today is about this human impact on Botany Bay, the effects upon aboriginal culture and heritage, and to do that we cannot talk about that without mentioning the cost, because aboriginal culture and heritage is aboriginal people. What we saw in Redfern the other week is the impact upon aboriginal culture and heritage in Botany Bay. The death of young TJ Hickey, regardless of how it actually happened - and none of us, except for those who were there at that point of time, will most probably ever know exactly what happened at the moment of

time. But what we do know is the death of T J Hickey and of so many aboriginal children, is because of the impact upon this area, the impact upon aboriginal culture and heritage, the impact upon our people. Aboriginal people have struggled to maintain their heritage, their culture and their integrity, as the sovereign people of these lands. We've watched the land get sicker and sicker as we pollute it and crowd it even more. We've watch Botany Bay struggle to survive, to continue to be a living entity, and it continues to struggle to survive. Without the land, the water and the air, the people, both indigenous people and the newer arrivals since 1788, will also struggle to survive. Many of the diseases that we now experience, suffer from and die from, are directly related back to what we do with these lands. We cannot separate ourselves as human from the land, because we are part of it. We are part of the ecology of the land. What we do to the land directly impacts back onto us ourselves and it also directly impacts back to the social, to what environment our children inherit, the physical, the social and the cultural.

We're actually at a point of time when we can turn it around before it's too late, but we're not very far away from when it will be too late. Another generation of children are growing up in an environment that is sick and all indicators around the world will tell you that the children that suffer most from environmental illness, from social illness, are those of indigenous people. But it doesn't stop there, because it also spreads out to all the other children. The cost of not looking after the Bay is a heavy cost and it is a heavy cost we are paying and will continue to pay for many years to come. This land is the essence of who we all are. We eat from it, we drink from it, we breathe it. It actually makes up our biological beings. Without it we will no longer exist and if we don't take this opportunity now to turn around the damage that we have already done, we will not exist for much longer, maybe 50 maybe 100. But seeing that the Eora people have managed to be here since the beginning of time, a hundred years is only a twinkle in our eye.

We have to take the responsibility for fixing the ills that we and our ancestors have caused. We have to take that responsibility for our children and our grandchildren and their grandchildren. We can continue to reap the economic benefits at this point of time from the exploitation of the Bay, but that cannot continue. It will not continue, because the Bay will die. It cannot continue, because without the Bay our children will die. They will die from environmental poisons, but just as T J Hickey died, they will also die from the social cost that we put out there upon our own people. You cannot separate the social cost from the environmental cost. And as an aboriginal woman and a mother, I implore you all to move on this issue before it is too late. These lands are just too precious, and every part of the land, the sea and the air is sacred. It is sacred to all of us. Do not let it die.

Thank you.

Chairperson: **Michael Johnson**

Thank you Sue. And now I call upon Professor Ian Tyrell from the School of History at UNSW. Ian is a very new kind of social scientist. He's an environmental historian and it's about time. It's a great thing to see this emerging.

Sixth Speaker: **Ian Tyrell**

As a resident of the Bay area, I certainly heard quite a few interesting things in the papers that I've listened to today, especially about the industrial contamination that was mentioned a little earlier and the aircraft noise. They both affect me and also what Sue had to say about the aboriginal heritage.

As a self-conscious discipline, environmental history can be dated only from the 1980s, but it does have antecedents going back to the work of French and other historians, back to the turn of the 20th century. Today there are over a thousand environmental historians operating in the United States alone and many in Europe as well. They are very inter-disciplinary and they are often closely connected with public history, including the idea of making history useful for public policy. So what does history offer that is different? I would argue that a great deal of environmental discourse, including our public discourse, is implicitly historical, whether this is recognised or not. Environmental damage occurs over time. It involves comparing the present with previous states of environmental damage, and then explaining these environmental changes. Environmental historians can help establish benchmarks. Similarly, environmental perceptions can be charted historically to throw light on present movements. How different today are our environmental concerns? What mistakes have been made before? Are we simply reinventing the wheel? These are the sorts of questions that historians can ask and help answer.

As far as Botany Bay is concerned, environmental historians were present in the project of the 1970s, the Botany Bay Project, of that era of which some of you would be aware, a project which involved the vital contribution of historian Sir Keith Hancock, who was one of the driving forces in that project, which was effectively scuttled by disagreements between the Federal and the State Governments over funding and access to materials. And the residues of that exist in our library in the form of such books as Dan Coward's "Out of Sight, Out of Mind" on the Botany Bay region. So there is a kind of an earlier history to all of this.

Environmental historians typically acknowledge the intervention of indigenous land management over many millennia. History is not marked off at 1788 and started then. Historians agree that both continuity and change and indigenous input into landscape must be assessed, and this includes Botany Bay. My own work has been in comparative environmental history in the 19th and 20th centuries to do with social movements. My principal area of interest is actually US and Australian comparisons, but for the purposes of Botany Bay and environmental studies within the Faculty of Arts and Social Sciences, I have done research on and directed projects on the history of the Cooks River, in which students have looked at patterns of recreational use, the changing engineering concepts governing the fashioning of the river by governments, etc. The River, as you'll probably know, is said to be Australia's most polluted and one of the most altered rivers in the country. It has been affected by wave after wave of European land settlement since 1788. Principally the effects of agriculture for the period 1788 to 1880 were considerable in adding to problems of siltation of the river due to excessive land clearing. This case has never been closely studied. The river's catchment and the adjacent Botany area was, from the early days of European occupation, a place outside of European settlement, a provider of resources in the shape of water and spare places into which waste could be dumped. The tale of Botany Bay is really a tale that needs to be seen in the light of the choice of Sydney Harbour as the place of white settlement. Botany Bay became the other, in post modern terms - a service centre in which less desirable things like noxious industries and their waste products could be safely located, particularly after 1848. The Cooks River shared this industrial heritage. The sugar mill of the 1840s in Canterbury provides the best known archaeological remnant of this activity, which included dams, tanneries and wool scouring and a number of other industries. Sewerage was also conveyed to the area in the 1880s to 1918 period to the Arncliffe sewerage and Botany farms and used for market gardening. The vestiges of the former farm at Arncliffe still remained in recent times as market gardens.

The area in the 19th century, as today, was subjected to conflicting land uses between the demand that the aquifer be used as water for Sydney's water supply, but that it also be a place in which waste could be dumped. Later on towards the end of the 19th century, when Sydney secured a new water supply further west, the area became an area of conflict between these industrial uses and the residential uses, because from the 1840s onwards, that area became an area in which there was an extension of the European idea of garden landscape settlement, mixing the best of town and country for the gentry in the 1850s and 1860s and their middle class descendants by the late 19th century. Not until the 1920s and 30s, especially the 1930s,

because this conflict was partly resolved, and then only temporarily, the urban infill and industrialisation of the inner west converted this partly bucolic landscape into the working class and ethnic working class set of enclaves that it became by the 1950s and 1960s. This is a prime example of the operation of the social geography of class about which historians have written. The decision to establish Sydney Airport in the vicinity of the river actually began after World War I, but a small impact until the late 1940s, must be seen as part of the same social geography and also one with profound natural impacts. The mouth of the river was extensively sculpted in the mid 1950s, to produce a flow and direction reminiscent more of a canal than of a river. Subsequently the Bay itself suffered in this manner, although writ on a much larger scale, of course, with the extension of the runways into the Bay after 1964, and then the third runway after 1989.

The same period of the 1940s also saw the pinnacle of ideas of technological manipulation of the river, with depression era and 1940s projects to line the banks with concrete and steel piles to make the river flow; an extensive drainage of the river, too. This, of course, has subsequently been changed because we don't think that it is really such a good idea any more.

Finally, there has been the revival in the interest in the river in the form of new cultural landscape ideas for recreation, for example, parks and bike paths and since the 1980s, increasing concern about the level of pollution in the river associated with new ecological ideas, but also with the demands for an aesthetic of recreation.

Environmental historians can tell you much more about the ideas of cultural management, landscape management and cultural landscape that underlie these successive changes, but the research projects that need to be done are paradigmatic of the need for the wider bay area. Historians can help to chart the extent of land alteration through access to historical documents and pictorial sources, such as works of art depicting the natural and built landscapes of the period. Historians can help to benchmark the changes with the help of other disciplines. For example, it would be interesting and important to be able to know more about the composition and types of silting that have occurred in the river - when this occurred, what the chemicals were in the river, and when those chemicals were added - and this could be done, for example, through the analysis of mud cores. This has certainly been done in studies of the late 18th and early 19th century for Scotland and other 19th century industrial areas, using a wide variety of scientific techniques. I think this could also be accomplished here with the co-operation of scientists. Historians could then help to explain the context of these changes, correlating the data with evidence of land settlement uses and also provide explanation as to why these changes and impact occurred and what the attitude of people was towards these changes.

Environmental history is also vital to the understanding of how heritage impacts upon the subsequent renovation of the landscape occurred and the understanding of those heritage changes. There is little evidence in the way that the recreational and other attempts to revive the river over the last 20 years have had any sense of its significant European or indigenous cultural heritage, a heritage which could engender greater respect for the landscapes created and their need for preservation. All in all history has a vital part to play; it is part of the larger picture. In some respects, many other disciplines are also doing work which is essentially historical, using different sources and providing different data which needs to be put together in an inter-disciplinary effort. Thank you.

* Afternoon session cont'd on session 4 & 5 work docs

End of Session