

**Submission  
No 577**

**INQUIRY INTO IMPACT OF THE WESTERN HARBOUR  
TUNNEL AND BEACHES LINK**

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The Hon Daniel Mookhey MLC  
Chair

## **Parliamentary Inquiry into the impact of the Western Harbour Tunnel and Beaches Link**

Dear Honourable Member Mookhey,

I am a PhD in chemical engineering and director of my company SN2 Pty Ltd. I have consulted on contaminated sites and their remediation, a highly relevant report of 2012 being on coal-tar contamination at Barrangaroo, a legacy of AGL's gasworks.

This submission concerns the proposed dive sites for the *Western Harbour Tunnel* and the *Beaches Link* projects at Flat Rock Gully, Northbridge and Cammeray Golf Course respectively.

From my perusal of extracts of public-domain reports, I submit that both sites demonstrate significant levels of toxic contamination as a legacy of the land being used as a dump and, in relation to Flat Rock Gully, an open-air incinerator (which I witnessed as a youngster). The possibility of Cammeray Golf Course being a former landfill has been raised by the EPA and by North Sydney Council.

From my examination of borehole samples at Cammeray Golf Course, there is a conspicuous presence of substances consistent with gasworks wastes, namely coal tar and fly ash, most likely from the former coal gasworks at Neutral Bay. Coal tar is characterised by its content of polycyclic aromatic hydrocarbons (PAHs) a collective term for their “fused hexagonal rings” structures<sup>1</sup>. These substances are well known as carcinogens and/or teratogens, a notable example of which is benzo(alpha)pyrene (BaP), the first PAH to be identified as a carcinogenic substance.

Elevated levels of PAHs and benzo(a)pyrene have been found in tests from 2017 and 2018 and more recent testing by SMEC in 2020 and Jacobs in 2021. In my opinion, the combination of PAHs and benzo(a)pyrene together provide a virtual signature of coal tar contamination.

Given the *prima facie* evidence of gasworks waste, it would be reasonable to expect companion wastes as well, notably fly ash. Indeed this was found in several locations in 2014 as part of testing for an upgrade of the sports fields adjacent to the main early works construction site. As a result the site had to be remediated. Fly ash is the solid product of burning coke used to heat the gas retorts. It is composed largely of an aluminosilicate matrix in which are embedded a wide range of metallic minerals, some of them toxic, typically: arsenic, cadmium, lead, mercury, selenium, nickel and beryllium. Fly ash, as its name implies, exits the furnace together with the hot combustion gases. Being a finely divided dust it is readily respirable. There is a hazard associated with any such dust, the more so when the dust contains toxic metals as well.

The Flat Rock Gully site was an extensive tip equipped with an incinerator for mixed wastes. When wastes exceeded the incinerator's capacity, wastes were burned in the open air. Such uncontrolled low

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<sup>1</sup> A set of 18 different PAHs can be seen at [https://en.wikipedia.org/wiki/Polycyclic\\_aromatic\\_hydrocarbon](https://en.wikipedia.org/wiki/Polycyclic_aromatic_hydrocarbon)

temperature combustion can give rise to dioxin (a persistent toxin and known teratogen as a component of *Agent Orange*) especially when organochlorines such as PVC are present. On the same site Hallstrom refrigerators in their thousands used chromium plating likely giving rise to chemical toxins, carcinogenic chromium six (as portrayed in the film Erin Brokovich) and a mist suppressant, poly fluoro alkyl substances, PFOS, also known as the “forever chemical” (as it does not degrade and bioaccumulates). These properties pose risks to the environment as it is water soluble and mobile in both surface water and groundwater, as well as to human health because of its damaging effects on the liver and immune system. Another potential hazard arises from the possibility of release of toxic odiferous sulfides as a result of anaerobic digestion, a well recognised issue with mixed waste tips.

In assessing the sites, it is necessary to take into account the synergistic adverse health affects of mixed contaminants at the sites, notably toxic metals. In plain terms, this is where the combined toxicity of two or more contaminants can be significantly greater than that of each considered individually. A familiar example in everyday life is risk factors of heart disease where overall risk accumulates with every additional factor.

I believe that the true extent of the risks to public health are currently underestimated owing to the limited extent of testing and, to the extent there has been testing, considering contaminants individually, rather than in combination with other contaminants. There seems to be limited awareness of the history of the sites in that so many toxins are conspicuous by their absence from testing. It is impossible to dismiss their presence while they remain omitted from testing. Given such testing, and in the event that the extent and levels of contamination are significant, then the sites will require remediation, the very significant cost of which is absent from the WHT business case.

I conclude that it would be prudent to exercise responsible precautions in the face of serious financial implications that may arise from the extent of contamination across these sites.

I would be pleased to take questions on notice, from the Public Works Committee on the nature of the contaminants at the dive sites at Cammeray and Northbridge.

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