MARINE POLLUTION RESEARCH PTY LTD

Marine, Estuarine and Freshwater Ecology, Sediment and Water Quality Dynamics

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SUPPLEMENTARY REPORT ON CONTAMINATION INVESTIGATION

1 Introduction

Marine Pollution Research Pty Ltd was requested by Mr M Hundleby of Gladesville Bridge Marina (GBM) to provide a letter report regarding the conclusions of the ZOIC Contamination Investigation in relation to the requirement to prepare a Remedial Action Plan (RAP) "for site development works on the slipway and workshop area" including the necessity for "additional assessment of contamination concentrations along the slipway", management of "slipway site materials contaminated with organotins" and management of slipway site materials "containing hydrocarbon and heavy metal impact." The report bases these recommendations on the "need to avoid/reduce sediment disturbance in areas proximate to the slipway to minimise impacts on marine flora and fauna".

In relation to sediments at the base of the slipway the Aquatic Ecology Assessment report prepared by MPR for the GBM Refurbishment makes the following recommendations:

- *The termination of active slipway activities including termination of vessel washdown, scraping and anti-fouling activities will remove the present source of contamination runoff from the marina to the inshore aquatic habitats, and retention of the concrete slipway base ramp will ensure that the highly contaminated sediments in the immediate surrounds of the slipway will not be disturbed. This is considered the most beneficial impact arising from the proposal in regard to the protection of the aquatic ecology of the locality (Section 4.1.2 1st paragraph).*
- *Cessation of slipway activities is the biggest benefit for overall water quality and aquatic ecology of the locality, and the decision to only remove the sliprails and leave the concrete*

ramp in situ will ensure that there are no impacts from disturbance of the highly contaminated sediments immediately surrounding the slipway (Section 5 Summary & Conclusions).

Both the Zoic and MPR reports had access to the two sets of sediment chemistry results from their respective studies.

2 Application of Section 12 of *Contaminated Land Management Act 1997 (CLM Act)*

Both Zoic and MPR made their conclusions with regard to the tests provided in Section 12 of the CLM Act, but the Zoic application in regard to "sediments in the slipway" was qualitative in that the conclusions were made from a desktop study and on presumed toxicity related to the application of the various contamination guidelines in regard to the two samples obtained "from the slipway".

MPR undertook the ecological assessment of the marine flora and fauna of the seabed at the base of the slipway, on the rails of the slipway and on the seabed away from the slipway and collected sediment cores from a further eight sites along the foreshore to the east and west of the slipway. Core depths were between 450 and 500 mm and were split to obtain surface and sub-surface samples for both site location and depth contamination analysis. The MPR application of Section 12 of the CMA is therefore quantitative and was applied as follows:

a. Our site observations did not indicate any actual environmental harm at the site - there were burrows indicating benthic life, there is marine algae growing in close proximity and there is a small seagrass bed in close proximity that has been in this location for a number of years. That is, the plant and animal life is similar to that observed away from the immediate slipway site.
b. While some of the substances are toxic, persistent or bio-accumulative, they are contained at the site as undisturbed sediments to the extent that marine life is similar in the immediate locality to marine life away from the site. Further, the contaminants are of the same class as contaminants that are wide spread throughout the estuarine habitats of the lower Parramatta River and upper Sydney Harbour estuary and are likely to be at similar concentration levels as at other slipways not deemed *significantly contaminated land* once toxicity of raw concentrations are considered in relation to silt fraction and total organic carbon concentrations.
c. There are no significant exposure pathways available to the substances in that the sediments are sub-tidal and confined to a highly restricted site at the bottom of a slipway, hemmed in by hardstands either side - making physical access for people or marine animals difficult and unlikely. Also, if required, access can be easily limited by appropriate fencing if that were actually deemed necessary.

d. The current uses of the land and of adjoining land include slipway activities that increase the risk of harm, but the proposal includes **cessation** of these activities.
e. The uses of the land and of adjoining land are being minimised by cessation of slipway activities thus **decreasing** the risk of harm from substances contained in the sediments to humans or the environment.
f. The patterns of contamination in sediments to the east and west of the slipway shown in Section 3.3.1 of the MPR Report indicate that the actual high contamination from the slipway usage is localised to the area of historical vessel wash water discharging directly into the waters and contaminants settling in the immediate vicinity of the slipway. Water quality assessments at locations where people may be in the water included copper as a representative contaminant, and this sampling did not indicate any migration from the contained sediments to the waters.

2.1 Other Considerations

2.1.1 Application of the Organotin CCO

The Zoic Contamination report suggests that "Site materials impacted with organotins will require management in accordance with the *Organotin waste materials chemical control order (1989)".* This order is for the control of anti-foul material collected from vessels that were anti-fouled with organotins and this would have precluded recreational vessels from the time the order took effect, as onganotin was banned for vessels under 25m length in 1989. Thus, the organtins in the sediments adjacent to the slipway are residual from activities prior to the CCO taking effect and could not be considered accumulated sediments on the slipway arising from slipway activities post 1989 or thereabouts. It is also noted that where a marina still needed to deal with organotin waste containing TBT in the interim years post TBT ban (as vessels came in for new antifouling - say up to 3 years) they required an environmentally hazardous chemicals licence issued by the EPA. This was apparently not a requirement for GBM over the period from when the CCO took effect and this is consistent with the way the original ban was treated where most marinas did not apply for the specific license but sent affected vessels to the few specialist marinas that did hold the license.

2.1.2 Limitations of the Zoic Sample results

In regard to application of relevant contamination guidelines, the MPR report noted the following limitations with the two Zoic 'slipway' sample results:

- The samples were grab samples taken from the lower part of the slipway but with no gps or other measurements provided at to where the samples were obtained in relation to tidal depth. Mr Tyler Creese (Zoic) provided the following information; that the samples were

collected at 12:00 on 13 June 2019 around low tide and that the samples were collected from under the tide level.

- From my analysis of the tides for that day and applying the tide lag for the marina that we have calculated from our own work, it is estimated that the actual water level at the time of sampling was 0.4m above Indian Spring Low Water ISLW) and, given that samples were collected from underwater, the level of the seabed from which the samples were obtained was at least 0.1m below the water level, thus the high contamination samples are taken from seabed sediments at around 0.2 to 0.3m above ISLW.
- This depth is close to the depth measurements of the seabed at the bottom of the exposed concrete slipway, so the sample sites as indicated on the Zoic Sample Diagram (Figure 3) are too far up the slipway and must have been located further offshore.
- It is noted that 0 m ISLW approximates Lowest Astronomical Tide which occurs a few times of the year, and that seabed sediments along this foreshore are banked up to- and above LAT by virtue of wave and wake action, particularly long-period wash from passing River Cats (see also MetOcean Wave Climate Study for the GBM Refurbishment EIS).

From this re-assessment of the *sampling locations* I conclude that sediment this close to LAT is indeed sediment accumulated onto the lower slip **from the river** and not accumulated from recent wash-off *from the slipway*. This is also confirmed by the organotin results. There is no way that the slipway activities over the last 30 years could have contained organotins, as they were banned for recreational boats and any boat below 25m length in 1989 (see also **Section 2.1.1** above).

The two slipway samples were analysed by a NATA registered laboratory for Metals, TRHs, PAHs, BTEX and Total Organotin. However, there was no analysis of the silt fraction (%silt) or of the total organic carbon fraction (%TOC) for the samples so the results cannot be correctly compared against guideline values which require metal results to be normalised to silt fraction and for PAH and Organotin results to be normalised to 1% TOC. Given that the sediments at the base of the slipway are most likely to have high silt content and high TOC, the actual normalised results are more likely to match those obtained from other disused slipway sites in Port Jackson and Pittwater.

TBT deteriorates over time to Dibutyl-tin (DBT), and then to Monobutyl-tin (MBT), each fraction becoming less toxic. Accordingly, it is standard practice to analyse organotin into the three fractions as the relative proportions provide an indication of the age of the organotin in the sediments. This has not been done for the present study and it is unclear whether the laboratory result is total organotin or just the TBT fraction.

3 Conclusions and Recommendations

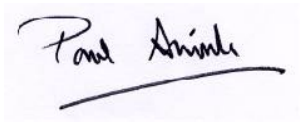
It is concluded that the seabed sediments at the bottom of the slipway are contaminated with metals and organics including organotin. It is also concluded that these sediments are seabed sediments accumulated at the bottom of the slipway, continuous with the surrounding seabed, and there is not an isolated quantity of sediment lying on the slipway. it is also concluded that the contaminants are 'locked up' in the sediments and do not present any risk to local marine biota provided they are left undisturbed.

Accordingly, if these sediments were to be removed, this would simply provide a void in the existing seabed that would be rapidly refilled from collapse of the edge void walls and re-working of the inshore sediments by wind and wash to 'relevel' the seabed. This would lead to localised destabilisation of other contaminated sediments which would certainly result in large pulses of contaminants into the water column which could then result in adverse impacts to the local biota.

It is recommended that the preferred action is to leave the seabed sediments intact as per the recommendations of the MPR report, AND ensure low risk to human health by minimising the opportunity for contact with the sediments. This can be achieved by (a) only allowing marina personnel on the slipway (as it the present prohibition), (b) fencing off access to the lower slipway and/or (c) posting signage that access to the seabed from the slipway is not safe and is prohibited. This latter prohibition is also logical on purely physical grounds as the lower intertidal slipway supports algae growth that makes the slipway slippery. Signage to prevent access for slip- falls is required in any case.

On this basic, as the risk to human health and the risk of adverse impacts on local marine biota is minimised there is no requirement for a RAP.

Yours Sincerely,



Paul Anink
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