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PROPOSED KIAORA LANDS REDEVELOPMENT  
AT 1 KIAORA ROAD, DOUBLE BAY NSW 2028

HEALTH REFERRAL COMMENTS  
SUPPLEMENTARY CONTAMINATION ASSESSMENT  
PREPARED BY DOUGLAS PARTNERS  
KIAORA LANDS REDEVELOPMENT, DOUBLE BAY  
DEVELOPMENT APPLICATION No. 531/2011/1

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## **SUPPLEMENTARY SOIL CONTAMINATION ASSESSMENT**

A Supplementary Soil Contamination Assessment has been undertaken by Douglas Partners Pty Ltd (Report Ref. 36280.05 April 2012). The objective of the assessment was to supplement the previous sampling locations with a view to providing data on areas of the site that were previously inaccessible, and in doing so, to assess the suitability of the site for the proposed commercial development from a contamination perspective.

### **Scope of new works**

The current assessment comprised soil sampling from 16 sampling locations. In this regard, the adopted sampling density during the current assessment in combination with the sampling locations from the previous assessments at the site, exceed the minimum sampling density as defined by the NSW EPA's *Sampling Design Guidelines*, 1994. The 16 test bores drilled during the current assessment were extended to nominal depths ranging between 1.5 – 3.5 m below ground level (bgl), or 0.5 m into natural or prior refusal (whichever was the lesser). The selected soil samples were analysed for contaminants of concern namely heavy metals, PAH, TPH / BTEX, OCP, PCB, Phenols, VOC and asbestos. The investigation comprised:

- Drilling a total of 7 test bores to a nominal depth of 3 – 4 m bgl, 0.5 m into natural or prior refusal (whichever is the lesser). 4 of the bores were placed within the Council car park adjoining Kiaora Lane and 3 of the bores were placed within Anderson and Patterson Street;
- Drilling a total of 9 test bores to nominal depths of 1.5 – 2 m bgl, 0.5 m into natural or prior refusal (whichever was the lesser) within the Woolworths residential properties (2 – 7 Kiaora Road, 1, 2 and 4 Anderson Street and 2 Patterson Street) that were previously inaccessible;
- Drilling a total of 3 step-out test bores to nominal depths of 1.5 – 2 m bgl, 0.5 m into natural or prior refusal (whichever is the lesser) in the immediate vicinity of sampling location DP6 (adjacent to Kiaora Road) with a view to delineating the extent of B(a)P contamination identified during the previous assessments;
- A total of 45 selected soil samples were analysed for the following common contaminants of heavy metals arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc (34 soil samples); Polycyclic Aromatic Hydrocarbons (PAH) (44 soil samples plus 8 soil samples from step-out sampling locations);

### **Results**

In view of the recommendations of the DP (2010a) report, a Supplementary Contamination Assessment (DP 2011a) was undertaken to assess the contamination status of the Woolworths footprint and to supplement previous data for the overall KPR site. The assessment also included a preliminary *in situ* waste classification for the subsoils within Woolworths footprint only. The assessment comprised a review of the previous reports for the site and excavation of six hand auger bores in accessible parts of the Woolworths supermarket. The test bores were extended to nominal depths of 2 – 4 m, 0.5 m into natural soils or prior refusal or to groundwater (whichever was

the lesser). The analytical scheme for the assessment comprised analysis of eleven soil samples (plus one QA/QC sample) for various combinations of heavy metals, PAH, TPH / BTEX, OCP, PCB, Phenols, VOC and asbestos.

The analytical results of the assessment showed that with the exception of one B(a)P exceedance (concentration of 9.6 mg/kg in sample BH106/0.3-0.6), the remainder of the soil samples were within the adopted SAC for a commercial land use. The detected B(a)P exceedance was attributed to the presence of slag observed in the filling at this locations. The results of TCLP analysis on the sample showed that the leachable concentration of B(a)P was below the laboratory's limit of reporting, suggesting that the detected B(a)P was immobilised within the slag fragments present in the filling.

### **Previous Remediation Proposal**

Based on the results, the DP (2011a) report concluded that whilst the Woolworths footprint had a low risk of widespread or significant soil contamination, the site could be rendered suitable for the proposed development, subject to the following:

- Development of a Remedial Action Plan to address identified B(a)P contamination in the filling at BH106. In view of the proposed development plan, wherein the Woolworths site (and practically the entire KPR site) will be sealed under permanent pavements and building slabs, it was considered that a 'cap and contain' remediation strategy would be a suitable and practical remediation option;
- Remediation and validation of the site in accordance with the RAP;
- Preparation of a validation report and an EMP (at the completion of remedial works and/or construction) to demonstrate compliance with the RAP.

### **Soil and Groundwater Assessment (October 2011b)**

In view of the recommendations of the DP (2010a) report, a soil and groundwater assessment (DP 2011b) was undertaken to primarily assess the contamination status of the groundwater at the KPR site. The assessment comprised soil and groundwater sampling from 4 test bores which were placed at inferred up-gradient and down-gradient locations (including locations in the vicinity of the Woolworths boundary, adjacent to the former telephone exchange and the section of the site boundary adjacent to the offsite dry cleaning establishment).

The analytical results for the soil samples analysed during the assessment showed that the contaminants of concern in the soil were within the adopted SAC for a commercial site. With regard to groundwater, whilst the concentration of TPH, BTEX, PAH, OCP, PCB, total phenols and VOCs in the samples were below the laboratory's limit of reporting and also within the adopted GILs, the following heavy metal exceedances were detected:

- The concentration of arsenic in samples BH203 (5 µg/L), BH204 (5 µg/L) and BD1/160911 (6 µg/L) exceeded the adopted GIL of 2.3 µg/L;
- The concentration of copper in samples BH201 (2 µg/L) and BH203 (3 µg/L) exceeded the adopted GIL of 1.3 µg/L;

- The concentration of zinc in three samples viz., BH201 (22 µg/L), BH202 (38 µg/L) and BH203 (77 µg/L) exceeded the adopted GIL of 15 µg/L.

Given the urbanised setting of the site, the detected heavy metal exceedances were considered insignificant and attributed to background concentrations in the groundwater. As a result, the report concluded that the heavy metal exceedances were not considered to constitute unacceptable impacts, and that groundwater remediation was not warranted. Importantly, the analytical results showed that the concentration of all organic contaminants TPH/BTEX, PAHs and VOCs in both the up-gradient and down-gradient wells were below the limit of reporting and were also within the adopted GILs. The absence of apparent organic contaminants in the groundwater samples indicated that the groundwater at the site had not been impacted by previous and current commercial/industrial activities (including the off-site dry cleaner located adjacent to the northern boundary of the site). Further, the absence of apparent PAH contamination in the groundwater samples suggested that the PAHs identified in the soil samples (DP 2011a, Supplementary Contamination Assessment) are immobilised within the slag fragments present in the filling material and that the groundwater at the site had not been impacted by the previously identified PAH exceedances in the soil.

### **New Remediation Option**

The supplementary investigation by DP and the 95% UCL of average B(a)P concentrations in the fill material (excluding samples BH302/0.2-0.6 and BH305/0.4-0.5), it is considered that remedial works at DP6 and BH106 are not warranted. However, the recorded hot-spot concentrations at BH302 and BH305, remedial works in the vicinity of these two bores will be required.

The results of the assessment also show that the asphalt/road profile material sourced from Anderson and Patterson Street is not suitable for reuse within the proposed commercial/industrial development or for off-site use including recycling. On the other hand, the subsoils at Anderson and Patterson Street (i.e., fill below the asphalt road profile) are compatible with a commercial/industrial land use.

Based on the results of the investigation, it is considered that there is a low risk of widespread or significant soil contamination associated with the current site features and current and past site activities. However, minor remedial works will be required in the vicinity of BH302 and BH305 to render the site suitable for the proposed commercial development. Further, the road pavement/asphalt profile present over Anderson and Patterson Street is also considered to be unsuitable for reuse or recycling.

### **Conclusion**

Based on the results of the current assessment, it is considered that the site can be rendered suitable for the proposed development, subject to the following:

- Revision of the existing RAP ('cap & contain') to address the identified B(a)P contamination in the filling at BH302 and BH305. In view of the proposed development plan, wherein the existing building will be demolished along

with minor excavations, it is considered that the excavation, off-site disposal and subsequent validation of the remedial excavations would be a suitable and practical remediation option;

- Remediation and validation of the site in accordance with the RAP; and
- Preparation of a validation report at the completion of remedial works to demonstrate compliance with a RAP.

## **Recommendation**

The Supplementary Contamination Assessment Report prepared by Douglas Partners (Project 36280.05 April 2012) for the Kiaora Lands Redevelopment has concluded that areas of the existing site are contaminated when assessed against the Health-based Investigation Levels (HILs) for commercial/industrial land use (Appendix II, Column 4 of Table 2) and NSW EPAs Guidelines for Assessing Service Station Sites (December 1994). The documentation provided by Douglas Partners is adequate in providing an assessment of soil contamination at the development site and a **new Remediation Option** has been proposed to address the site contamination.

1. A Remediation Action Plan (RAP) of the preferred remediation option of excavation and off-site disposal is to be prepared by Douglas Partners for the Kiaora Lands Redevelopment and presented to the consent authority. Any variations to the preferred remedial option must be approved by Council.
2. A Validation and Monitoring Report must be submitted to the consent authority within 30 days of completing remediation works and prior to the commencement of building construction works pursuant to Clause 18 of SEPP No. 55 – Remediation of Land.

The objectives of the Validation and Monitoring Report are to demonstrate that the objectives stated in the preferred remedial option of the Remediation Action Plan to be prepared by Douglas Partners for the Kiaora Lands Redevelopment site, including compliance with relevant development consent conditions have been achieved.

3. The development of an Environmental Management Plan (EMP) is to be prepared for the Kiaora Lands Redevelopment site. The EMP is to be prepared and finalised for Council review before the commencement of demolishing and excavation works at the development site. The objectives of the EMP shall detail but not be limited to:
  - Identify the environmental issues/risks associated with development works focusing on pollution control measures. These measures are to be designed to prevent migration of contaminated soil from the designated excavation areas; suppress dust & odours; prevent surface water/sediment run-off from excavations and stockpiles; minimise noise.
  - Excavation pump-out of site waters.
  - Site access and all haulage routes for trucks transporting soil, materials and equipment to and from the site.

- Management practices to restrict access to contaminated materials & responsibilities for implementing the EMP.