



Barneson Boulevard

Contamination Assessment Summary

November 2017

Community Information Sheet

Background

In July 2017, Department of Infrastructure, Planning and Logistics (DIPL) engaged GHD Pty Ltd (an independent consultancy company) to complete a soil, groundwater and surface water sampling program for the site of the proposed Barneson Boulevard road corridor. The road corridor is located in the Darwin City area, extending from Cavenagh Street to Tiger Brennan Drive near Dinah Beach Road.

Previous Investigations

Douglas Partners Pty Ltd had undertaken a preliminary environmental assessment including a review of available historical environmental reports, historical aerial photographs, site geology and identification of surrounding waterways and sensitive land uses. The desktop assessment identified historical activities that may have resulted in contamination impacts to the project area. The information was used to identify types and concentrations of contamination that required further investigation.

Seven areas requiring further environmental investigation, including soil, groundwater and surface water sampling, were identified (Figure 1).

Current Investigation Areas

The seven areas identified in the preliminary environmental assessment, have been investigated by GHD as part of this current study. These areas are shown in Figure 1 and include:

- Area 1: The electrical switching station on Woods Street;
- Area 2: A former primary school where buildings had previously been demolished;
- Area 3: Three areas of imported fill material;
- Area 4: The north western and north eastern boundary of the former Shell terminal;
- Area 5: A stormwater drainage channel near Tiger Brennan Drive;
- Area 6: A former quarantine nursery located at the corner of Tiger Brennan Drive and Dinah Beach Road; and
- Area 7: A mangrove area adjacent to Tiger Brennan Drive.

Investigation Objectives

The objectives of the soil, groundwater and surface water sampling program were to:

- Investigate the seven areas of potential environmental concern identified in the site history and background assessment. Identify the nature and extent of any soil

and water impact and any potential risk to people or the environment; and

- Develop recommendations and management options to manage the risk associated with any identified contamination.

Scope of Investigation

The soil, groundwater and surface water sampling program was conducted in accordance with the National Environmental Protection Measure, 1999 (NEPM) which provides the standard for undertaking environmental assessments. Works undertaken included:

- Drilling of 19 soil bores and excavation of 21 test pits;
- Drilling and installation of five groundwater monitoring wells;
- Sampling of the five wells installed and one existing groundwater monitoring well;
- Collection of one surface water sample;
- Soil and water sample analyses by a National Association of Testing Authority (NATA) accredited laboratory; and
- Comparison of laboratory results to national guidelines to assess the impact to the environment and human health.

Investigation Results

The investigation identified low level contamination at some locations across the proposed construction area, both in soil and groundwater, this included:

- Minor buried asbestos in fill material (Area 3). There was no evidence that significant quantities of asbestos are present at the site;
- Some zinc samples in soil exceeding the soil ecological investigation levels (EIL) – urban residential/public open space guideline in Area 2, Area 3 and Area 5. The guideline assesses the risk to land ecosystems, in this case the vegetation planted within the road reserve. Considering the applied guideline value was conservative and that these areas are planned to be filled and covered by the road, the exceedances represent a low risk to the vegetation within the road corridor;
- Lead exceeding the soil HIL-C (Recreational) guideline in Area 3 north of the former Shell Terminal. The guideline assesses the risk to people undertaking recreational activities within the road reserve. Considering the sample was collected from 2.5 m below ground level and the area is planned to be filled the exceedance represent a low risk;
- Groundwater in Areas 4 and 7 containing concentrations of nickel and zinc marginally exceeding the GIL marine waters guidelines. The guidelines assesses the risk to marine ecosystems and the concentrations were typical of levels

detected in groundwater;

- Stagnant surface water (Area 5) containing concentrations of zinc and copper with minor exceedences of the GIL marine waters guidelines total arsenic exceeding the GIL drinking waters guidelines. These concentrations are typical of urban water runoff and concentrations that would be expected in an acid sulphate soil environment. The urban storm water runoff is unlikely to be consumed by people; and
- Groundwater in Area 4 containing concentrations of PFOS exceeding freshwater ecosystem criteria for protection of 95% species. The exceedences are not considered to be a concern given that the guidelines are for freshwater systems and marine ecosystems are present down gradient of the site. Marine ecosystem criteria are generally less conservative than freshwater ecosystems. It should also be noted that the results are consistent with the test results at the Shell site and the Shell site results decreased closer to the discharge point in Darwin Harbour, the groundwater has a low hydraulic conductivity therefore the discharge rate (flux) into Darwin Harbour would be very low and the dilution in the harbour is very large given its expanse and therefore concentrations would reduce to levels well below the conservative guideline values before contact with those ecosystems.

The concentrations of PFHxS and PFOS (sum total) also exceed the HSL drinking water guidelines, but this is not considered to be a concern given that the water has variable salinity, the groundwater yield is low and the area has access to the town water supply. It is unlikely that groundwater will be extracted and consumed from this area;

- Naturally occurring potential acid sulphate soils in the mangrove area (Area 7);
- Odorous (hydrocarbons) groundwater in Area 4; and
- Some areas of fill containing significant amounts of building rubble material (Area 3).

Conclusions and Recommendations

An investigation was conducted on the proposed Barneson Boulevard road corridor for the purpose of identifying contamination of the project site related to historical activities in the area. Some contamination was identified, however due to the low levels present, the limited excavations proposed and the recommended mitigation measures, the contamination represents a low risk to the road construction project, people and the environment.

The recommendations to manage any identified contamination encountered are specified as follows:

- Contamination of soil and/or groundwater at the site presents a low but acceptable risk to the people (including

construction workers and the surrounding community) and the environment from road construction activities, provided it is managed in accordance with a construction environmental management plan (EMP). The EMP, which forms part of the construction contract between the contractor and DIPL, should consider mitigation measures to protect the health and safety of the surrounding community, construction workers and the environment. It is recommended that the EMP specifications include the following:

- Minimise disturbance of contaminated material. If disturbance of the material is necessary, it should be classified to determine the appropriate management. For example building rubble material may not be aesthetically suitable for landscaping of the road verges and garden beds, however it may be suitable for deep burial or offsite disposal;
- Mitigation measures to control any potential impact to the community from the generation of dust or odours during the construction process;
- Health and safety protocols to protect construction workers and the community from exposure to potential contamination during the road corridor construction; and
- Measures to appropriately manage acid sulphate soils in the instance that excavation or dewatering is required.

An EMP should be implemented for the post construction operational phase of the project to manage any residual contamination, for example, in the event that road penetration works into contaminated soil are required.





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