

5 POTENTIAL FOR CONTAMINATION

Contaminants may be present on-site due to placement of imported filling to form and/or level the site, or as a result of past and present site activities.

In particular, based on the site history and site observations potential contamination are of concern for Lot 9 petroleum hydrocarbons (petrol, diesel, waste oils), phenols and lead due to the service station that previously occupied the site. Furthermore solvents, cyanide, and hydrocarbons are considered to be contaminants of concern for Lot 1, given its previous use as a printing firm. Other potential sources of contamination include the smash repairs which may have used degreasers and solvents, the steel fabrication works and the unconfirmed UST on Lot 2-3 which have resulted in heavy metal, solvents and hydrocarbon contamination and the wash bay in Lot 7-8 which may have resulted in heavy metals and hydrocarbon contamination.

In general terms it is considered that there is a potential for contamination residue to be present in the imported filling placed throughout the site and may include heavy metals, hydrocarbons, pesticides and asbestos.

It is thus considered that the potential contaminants on the subject site may include:-

- Heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn);
- Monocyclic Aromatic Hydrocarbons (BTEX);
- Total Recoverable Hydrocarbons (TRH);
- Polycyclic Aromatic Hydrocarbons (PAH);
- Organochlorine Pesticides (OCP);
- Phenols; and
- Asbestos materials in soil.
- Cyanide
- Solvents.

6 FIELD WORK

6.1 Data Quality Objectives

The scope of the preliminary contamination assessment works has been devised broadly in accordance with the 7 step data quality objective process, as defined in Australian Standard "Guide to the Sampling and Investigation of Potentially Contaminated Soil Part 1: Non-volatile and semi-volatile compounds (AS 4482.1 – 1997). The DQO process is outlined as follows:

(a) State the Problem

It is proposed that the site will be developed for mixed residential/commercial use with basement level car parking. The 'problem' to be addressed is to provide preliminary information on the presence and type (if any) of contamination that exists at that subject site, and to evaluate the likely health and environmental impacts associated with these contaminants, in view of the proposed land use.

(b) Identify the Decision

In view of the proposed development the analytical results will be assessed against the guidelines for residential sites with minimal accessible soils as specified in Section 7.

(c) Identify Inputs to the Decision

Historical information, on-site observation and anecdotal evidence will be used to determine the chemicals of environmental concern. The sampling plan will be systematically positioned over the subject site.

(d) Define the Boundary of the Assessment

The boundary of the assessment is defined by the boundary of the subject site, as summarised in Section 2 and shown on the site plan in Appendix A.

(e) Develop a Decision Rule

The assessment criteria are the NSW EPA Guidelines for residential sites with minimal access to soils as specified in Section 7.

(f) Specify Acceptable Limits on Decision Errors

In order to ensure that the results obtained are accurate and reproducible, appropriate and adequate quality assurance and quality control (QA/QC) measures and evaluations have been incorporated into the sampling and testing regime. These are summarised in Section 6.2.

(g) Optimise the Design for Obtaining Data

Procedures for the collection of environmental samples, as described in Section 6.3, were developed prior to undertaking the contamination assessment phase of works, which were in line with NSW EPA guidelines and current industry practice. DP employs NATA-registered analytical laboratories to conduct sample analysis.

It is therefore considered that the data quality of assessment was of a satisfactory standard.

6.2 Quality Assurance/ Quality Control Objectives

Table 1 summarises Quality Assurance/ Quality Control (QA/QC) objectives and the procedures designed to enable their achievement.

Table 1 – Quality Assurance/ Quality Control Objectives

QA/QC Objective	Achievement Evaluation Procedure
Documentation completeness	Completion of chain of custody documentation, completion of test bore report sheets (Appendices C and D).
Data comparability	Use of NATA certified laboratory, use of consistent sampling technique (Section 6.3 and Appendix C).
Data representivity	Sampling on a systematic basis across the site (Section 6.4, Appendix A).
Precision and accuracy for sampling and analysis	Achievement of acceptable relative percentage difference (RPD) for replicate analysis, laboratory QC criteria (Appendix E).

6.3 Sampling Procedures

6.3.1 Soil Sampling Procedures and Rationale

Environmental sampling was performed according to standard operating procedures outlined in the *DP Field Procedures Manual*. All sampling data was recorded on DP chain of custody sheets. The general soil sampling procedure comprised:-

- soil samples were collected from auger returns using new sample bags for every sample;
- decontamination of all sampling equipment using a 3% solution of phosphate free detergent (Decon 90) and distilled water prior to collecting each sample;
- transfer of samples into laboratory-prepared glass jars, and capping immediately with teflon lined lids;
- collection of 10% replicate samples for QA/QC purposes;
- labelling of sample containers with individual and unique identification, including project number, sample location and sample depth; and
- placement of the sample jars and replicate sample bags into a cooled, insulated and sealed container for transport to the laboratory.

A laboratory certified by the NATA, was employed to conduct the sample analysis. The laboratory is required to carry out routine in-house QC procedures.

The Preliminary Contamination Assessment was conducted with the objectives of determining the subsoil conditions, and identifying the likely sources of contamination. The sampling locations were generally placed in a broad grid pattern over the site subject to access constraints. Targeted samples were placed to assess the potential for contamination as a result of the known USTs present and the known placement of contaminated material in the sump pit in Lot 1.

Test Bores were constructed in 10 locations throughout the site (Test Bores 101-110). It should be noted however, that 2 bores were constructed in the concrete sump pit in Lot 1 (110 and 110A). Bore 110 was constructed on 18/05/05 but only constituted a surface sample due to time constraints (Paragon Cosmetics which occupies Lot 1 was closing for the day). The sample collected on 18/05/05 is labelled as 110/0.1. A second bore was constructed in the same location in the concrete sump pit, Test Bore 110A on 23/05/05 in order to collect deeper

samples from the sump pit and to determine the extent of the pit. The samples collected from the sump pit on 23/05/05 are labelled 110A/0.15, 110A/0.5 and Z3. Whilst 110 and 110A are identified as being different bore they are considered to be from the same location.

Soil samples were taken at depths of 0-0.5 m or beneath the concrete pavement, then at 1.5 m and 3.0 m or at the maximum extent of drilling prior to refusal. Samples were also taken upon any signs of contamination and at the observed watertable. Soil samples were collected to determine the presence of contaminants in filling and natural soil materials. Field replicates were collected for QA/QC purposes.

6.3.2 Acid Sulphate Soil Sampling

Collection of acid sulphate soil samples was carried out in accordance with the methodology outlined in *NSW Acid Sulphate Soil Management Advisory Committee Manual (1998)* [ASSMAC] as follows:-

1. Collect soil samples of material at approximately 0.5 m intervals upon encountering groundwater table at all boreholes, to a depth of 1 m below the proposed maximum depth of excavation.
2. Four selected samples were despatched to Envirolab Services, a National Association of Testing Authorities (NATA) registered analytical laboratory, for suspension peroxide oxidation acidity and sulphate (SPOCAS) testing as per Method 21 of the *NSW Acid Sulphate Soil Management Advisory Committee Manual (1998)* [ASSMAC].

6.3.3 Piezometer Installation and Groundwater Sampling Methods

Three piezometers were installed in Test Bores 101, 104 and 109 to a depth of 4.5 m. Installation was conducted using a bobcat mounted drill rig and solid flight augers. Piezometer construction details are presented in Appendix D.

The piezometer was constructed of 50 mm diameter acid washed class 18 PVC casing and machine slotted well screen. Joints were screw threaded, thereby avoiding the use of glues and solvents which may contaminate the wells. The wells were completed with a gravel pack

extending to 0.5 m above the well screen, and thence a bentonite plug of 0.5 m thickness, and backfill with drill returns to the surface. End Caps were secured to both ends of the piezometers and gastic covers were placed over the piezometers to prevent damage or vandalism.

Subsequent to piezometer installation, the bore was developed by removing a minimum of 3 bore volumes of water, using a disposable bailer and the analysis of field parameters to ensure that the samples obtained were representative of local groundwater conditions. The bore was allowed to recharge and then the groundwater sample was collected on the same day.

Collection of a groundwater samples from the wells was carried out in accordance with the methodology prescribed in the Standard DP field procedures.

Samples were obtained using a disposable bailer, with the groundwater sample poured gently into the appropriate container to minimise aeration. Non-disposable sampling equipment was decontaminated between sampling events by washing in a 3% solution of Decon90 and rinsing with demineralised water.

Sample handling and transport was as set out below:-

- sample containers were labelled with individual and unique identification, including project number and sample number;
- collecting 10% replicate samples for QA/QC purposes;
- samples were placed in insulated coolers and maintained at a temperature of approximately 4°C until transported to the analytical laboratory, and
- chain of custody documentation was maintained at all times and countersigned by the receiving laboratory on transfer of samples.

All samples were dispatched to Envirolab Services, a NATA accredited laboratory for analysis.

Table 2 presents the sampling and analytical rationale.