

**Meriton Properties
Level 11 Meriton Tower
528 Kent Street
Sydney NSW 2000**

Project 85009.01
85009.01.R.001.Rev2
30 March 2017
PMM:PG:jlb

Attention: Mr Matthew Lennartz

Email: matthewl@meriton.com.au

Dear Sirs

**Summary of Previous Investigations
Pagewood Part II
128, 130-150 Bunnerong Road, Pagewood**

1. Introduction

This report presents the results of a contamination desktop study of part of 128, 130-150 Bunnerong Road, Pagewood, referred to herein as Pagewood Part II (or “the site”), as shown on the attached Drawing 1. The site comprises the whole of Lot 1 in DP1187426 (Lot 1) and the northern portion of Lot 2 in DP118746 (Lot 2) and covers an area of approximately 8.95 hectares (ha).

Preparation of this report was commissioned by Mr Matthew Lennartz of Meriton via email on 11 January 2017 and undertaken in general accordance with Douglas Partners Pty Ltd (DP) standard conditions of engagement. It is understood that the report will be used for due diligence purposes and in support of a rezoning application for mixed uses including residential (refer to proposed Masterplan layout shown on Drawing 1).

The objective of the desktop study was to assess the likely contamination conditions at the site and to identify issues (based on reviewed information) that may be detrimental to the proposed development layout.

2. Site Description and Geology

The site is bound by Heffron Road to the north, Bunnerong Road to the east, Banks Avenue to the west and an internal road (Meriton Boulevard) to the south. At the time of preparing this report, the eastern portion of the site was occupied by commercial / industrial buildings and pavements and was being used for storage. The western portion was occupied by a large warehouse building and was being utilised for materials storage associated with the ongoing development of Pagewood Part I (refer attached Drawing 1).

Reference to the Sydney 1:100,000 Series Geological Sheet indicates that the site is underlain by Quaternary alluvial deposits, which typically comprise fine to medium grained “marine” sands with podzols. Hawkesbury Sandstone, comprising medium to coarse grained quartz sandstone with minor shale and laminite lenses, underlies the site at depth.

The site is located over the Botany Sand Aquifer, a shallow unconfined to semi-confined groundwater system. The average saturated thickness of the Botany Sands Aquifer is 15 - 20 m. Hydraulic conductivity within the sand beds is highly variable and is typically around 20 m/day in clean sand.

3. Previous Reports

Douglas Partners Pty Ltd (DP) has completed a number of environmental and contamination investigations across the site and the remainder of Lot 2 since 2011. The attached Drawing 3 (Project 71631.01) and Drawing 3 (Project 71631.02) show the previous CPT, bore and groundwater monitoring well locations.

The general sequence of subsurface materials encountered in the previous investigations is described below in increasing depth order:

FILLING: Sand filling to typical depths of 1.0 m to 2.5 m, generally well compacted in the upper metre. In isolated locations the filling was as shallow as 0.3 m and as deep as 4.6 m.

SAND Medium dense and medium dense to dense sand to depths of 5 – 7 m, becoming dense and very dense with occasional thin (<0.5m) clay and peat bands to depths of 21 – 38 m. The base of the alluvial sand unit was found to be up to 44 m in isolated locations.

CLAY/SAND: Residual clayey sand and sandy clay of 0.4 – 2.0 m thick. In most locations no residual soil was encountered and in some isolated locations it was 4 – 8 m thick.

SANDSTONE: Hawkesbury sandstone was encountered at depths of between 21 – 49 m depth.

Groundwater levels varied from a depth of 5.9 m to 7.8 m bgl or an RL of 14.2 m AHD to 16.6 m AHD. Based on these measured groundwater levels the inferred direction of groundwater flow is south to south west, i.e. towards Botany Bay and the groundwater extraction exclusion zone.

4. Background

The site and the remainder of Lot 1 have been the subject of a number of environmental investigations by DP and others. The aspects of the previous investigations relevant to the site are presented in this section.

Site history information indicated that the site and the remainder of Lot 2 was originally formed in the 1930s through reclamation of virgin marshland. Since its reclamation a number of parcels along the

eastern boundary were used mainly for residential/rural purposes (possibly including paddocks and poultry farming) from at least 1929 (the year the records start) to 1938/1939.

The site and remainder of Lot 2 was owned by General Motors Holden (GMH) and was operated as an automobile assembly plant from 1939 to 1982 when the plant was closed down. The land parcel was subsequently purchased by Quintilis Pty Ltd (a subsidiary of British American Tobacco Australia) in 1982. Quintilis Pty Ltd was incorporated into British American Tobacco Services Limited in 1989 and BATA in 2001.

The GMH factory was officially opened on 15 February 1940 by Prime Minister Menzies. The factory assisted in manufacturing of car bodies during WWII. Afterwards, the facility was used for the assembly and distribution of Holden vehicles. The manufacturing areas were largely concentrated in the north-eastern portion of the GMH owned land parcel.

BATA operated within the western and southern portions of the site and remainder of Lot 2, either as owner or tenant, until July 2014. The main factory building, used for the manufacturing and packaging of various cigarette products. Several ancillary buildings were located around the main factory building including corporate, administration, security, and IT buildings. Utility buildings (flavour room, boiler house, electrical substation, etc.), a technical centre and a canteen are other buildings detached from the main factory building and were located generally along the eastern portion of the operation. A large warehouse type building (No. 1 Bond Store) located on the western portion of the site still exists at the time of preparing this report. The south western portion of the site and remainder of Lot 2 was used for car parking by BATA staff and visitors.

4.1 Phase 1 and Phase 2 Assessments

Based on the historical information examined it appears that the site (and the remainder of Lot 2) was originally formed in the 1930's through reclamation of virgin marshland. Since its reclamation a number of parcels along the facility's eastern boundary were used mainly for residential/rural purposes (possibly including paddocks and poultry farming) from at least 1929 (the year the records start) to 1938/1939. The site was owned by General Motors Holden (GMH) and was operated as an automobile assembly plant from 1939 to 1982 when the plant was closed down. Most of the facility was subsequently purchased by Quintilis Pty Ltd (a subsidiary of British American Tobacco Australia) in 1982. A small parcel along the southern boundary of the site was owned from 1982 to 1986 by Amaretto Pty Ltd. Quintilis Pty Ltd was incorporated into British American Tobacco Services Limited in 1989 and BATA in 2001.

The site was used by BATA for the manufacturing and distribution of cigarettes. The main factory building occupied the greater portion of the site (and the remainder of Lot 2). Several ancillary buildings were located around the main factory building including corporate, administration, security, and IT buildings. Utility buildings (flavour room, boiler house, electrical substation, etc.), a technical centre and a canteen were detached from the main factory building and located generally along the eastern portion of the site adjacent to Bunnerong Road. A large warehouse type building (Bond no. 3) was used for storing raw tobacco and is located on the north western portion of the site (still remaining). Car parks occupied the south western portion of the site and the remainder of Lot 2.

Based on the history information, the areas of environmental concern (AEC) identified for the site (and the remainder of Lot 2) included filling, underground storage tanks (USTs), above ground storage tanks (AGSTs), the use of solvents, electrical substations, former spray painting booths, former engine and car assembly works, battery storage and disposal, former soldering booths, storage areas (dangerous and hazardous goods), former bus depot and car parking areas, and buildings (hazardous materials).

The Phase 2 contamination assessments conducted across the site and the remainder of Lot 2 in 2011 and 2012 included a review of the previous investigations undertaken at the site, the drilling and sampling of a total of nine cone penetration tests (CPT1 to CPT 9), the drilling and sampling of 144 test bores, and the installation and sampling of groundwater monitoring wells in 37 of the test bores. All relevant bore and well locations are shown on the attached Drawing 3 (Project 71631.01) and Drawing 3 (Project 71631.02).

Given the introduction of NEPC (2013), DP updated the Phase 2 contamination assessment in 2013. The main objective of the subsequent report (DP, 2013) was to update previously reported data (in regards to site contamination assessment) to then current guidelines and supplement the earlier data with additional soil sampling and testing to better characterise the contamination status of Lot 2, and to inform the preparation of a revised Remediation Action Plan (RAP) for Lot 1 that identifies areas of soil requiring remediation on this basis of the re-assessment of the data.

The updated assessment (labelled a Detailed Site Investigation (DSI) in keeping with the terminology used in NEPC, 2013) included the excavation of 63 test pits for asbestos assessment, additional testing to conduct a preliminary ecological risk assessment (ERA), the drilling and sampling of 16 test bores for further delineation of chemical contamination, the drilling of four test bores in the former corporate office.

Soil samples from the bores were analysed for a variety of potential contaminants including heavy metals, PAH, TPH, BTEX, PAH, OCP, OPP, PCB, VOC, phenols, synthetic pyrethroids, hexavalent chromium, cyanide, ammonia and asbestos. Analytical results for soil samples were compared to site assessment criteria (SAC) applicable for residential (western portion of the site) and commercial and industrial (eastern portion of the site) land uses. The concentrations of contaminants in soil were within the SAC for all samples and analytes with the following general exceptions:

- Elevated TPH in soil at MW110 and BH39; and
- Marginally elevated lead and OCP at BH46.

Recovered groundwater samples were analysed for potential contaminants including heavy metals, PAH, TPH, BTEX, PAH, OCP, OPP, PCB, VOC, phenols, hexavalent chromium, cyanide and ammonia. Groundwater analyses were compared predominantly to the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, (ANZECC 2000) guidelines for marine water for the protection of 95% of species.

Elevated concentrations of tetrachloroethene (PCE) were found in groundwater at a number of wells in the eastern portion of the site, namely MW18, MW108, MW109, MW110 and MW112, with only two locations (MW18 and MW110) exceeding the adopted assessment criteria. The generally clustered results are an indication of a potential dissolved phase PCE plume, and possible source sites, in this area. Elevated concentrations of TPH were also found in groundwater at MW18, MW106, MW109, MW110, MW111 and MW114. The source around MW18 and MW109 to MW111 may be one or a

number of the former USTs located in the eastern portion of the site, whilst the detections at MW106 and MW114 may be attributed to a former UST located along the northern access road, or localised spills or leaks within the main building.

DP concluded that based on the results of the assessment that the site can be rendered suitable for the proposed land uses subject to the findings of additional investigations, monitoring and validation works.

4.2 Passive Soil Gas Assessment (Draft)

DP conducted a passive soil gas survey in the south eastern portion of the site in an attempt to assess potential source sites for the chlorinated solvents and petroleum hydrocarbons concentrations in groundwater, the extent of associated groundwater contamination plumes (if present) and the potential for migration of the contaminants on to site from off-site sources. The assessment included the installation of 39 passive soil gas samplers, the retrieval of the PSG samples, semi-volatile organic compounds (SVOC) and VOC analysis (of the passive soil gas samplers) and the preparation of isopleth maps.

PCE, TCE, xylenes and trimethylbenzene (TMB) were detected in the PSG samplers (as well as other VOC), however the concentrations were typically low. The following conclusions were drawn from the results of the PSG assessment:

1. No significant on or off-site potential contamination source had been identified through the distribution and/or the soil vapour measurements reported; and
2. Although the soil vapour distribution identified some of the highest soil vapour measurements at or close to the fringes of the study area, an extension of the study area was not considered necessary as the measurements were low and not considered to represent a source within the study area. Groundwater results beyond the study area do not suggest a likely source of significant groundwater contamination elsewhere within the site.

Based on the findings of the PSG assessment the following recommendations were made:

- Installation of soil vapour ports for active soil vapour sampling, nominally in locations of highest detected groundwater and passive soil vapour concentrations, and one up-gradient of the study area for background purposes;
- An additional round of groundwater monitoring across Lot 1 to obtain current concentrations to use in a human health risk assessment, if considered appropriate; and
- Based on the outcomes of the above complete a human health risk assessment considering industrial, residential and construction worker receptors.

4.3 Active Soil Vapour Assessment (Draft)

An active soil vapour assessment was undertaken within a portion of the proposed Industrial Zone (the study area) in the vicinity of MW118 and MW110. The location of the ASVA was designed to target

previous comparatively elevated petroleum hydrocarbon and chlorinated solvent concentrations detected in groundwater and passive soil vapour samples.

The assessment included the review of the previous reports and the installation of a six nested active soil vapour sampling ports (with sample depths of 1 m, 4 m and 7 m below ground level) and one shallow active soil vapour sampling port (1 m bgl) and collection of soil vapour samples for VOC analysis and general gases.

DP provided the following conclusions in the report:

- (i) The report quantifies the concentrations of VOC in soil gas in the target locations;
- (ii) The results indicate that it is unlikely that there is a significant off-site source of VOC or petroleum hydrocarbon contamination and no significant on-site source of VOC or petroleum hydrocarbon contamination such that active remediation and/or management is required. The results from sample location ASV1 suggest that there may be a previously unidentified (minor) on-site source of VOC (PCE/TCE) in the vicinity of ASV1 or that a narrow vapour/groundwater plume migrates onto the site from up-gradient sources to the north east of the site near the northern side of the canteen block. However if this was a significant off-site source it would be expected it would have been reflected in the groundwater and/or passive soil vapour assessment but there was no indications of a significant off-site source in these; and
- (iii) The three data sets, passive soil vapour, active soil vapour and groundwater generally do not show a strong correlation.

DP concluded that the significance or otherwise of the detected soil vapour concentrations be determined via the site specific human health risk assessment. DP also recommended that following completion of the human health risk assessment it is possible that a period of groundwater and soil vapour monitoring will be recommended such that a suitable data base of groundwater and soil vapour results can be established to show that concentrations of the contaminants of concern are either stable or falling over time.

5. Conclusion and Recommendations

State Environmental Planning Policy (SEPP) No. 55 refers to the planning and development control process as provided for in the Environmental Planning and Assessment Act 1979 (EP&A Act) plays an important role in the management of land contamination. The integration of land contamination management into the planning and development control process will:

- ensure that changes of land use will not increase the risk to health or the environment
- avoid inappropriate restrictions on land use
- provide information to support decision making and to inform the community.

SEPP55 also specifies that:

Essentially, the Guidelines recommend that rezonings, development control plans and development applications (DAs) are backed up by information demonstrating that the land is suitable for the

proposed use or can be made suitable, either by remediation or by the way the land is used. Where remediation has already occurred but residual contamination is above the recommended thresholds, it may be necessary to restrict the land uses allowed. This approach may also be appropriate for cases where investigation shows that only some land uses would be suitable. In situations where the land is not suitable for the proposed use and cannot be rendered suitable for technical or practical reasons, the proposal should be refused.

Based on Figure 2 of SEPP55 – Options Available in the Rezoning Process where the Specific End Use is Known, DP provides the following responses:

1. *Is information sufficient for decision making?* Yes – see previous sections on various documents reviewed above which provide a reasonable amount of information on site contamination.
2. *Has land been proven suitable for proposed uses without need for further testing or treatment?* No. Recommendations are provided below.
3. *Remediation or further investigation required – consider need for provisions in LEP/REP to ensure investigation or remediation occurs before development of land?* Yes – see specified documents and recommendations listed below.
4. *Proceed with process of rezoning?* Yes.
5. Record decision and information.

On this basis, DP considers that the site is suitable for rezoning for mixed uses (including residential), and can be made suitable for the proposed development contingent on the following additional investigations and documents being prepared and provided to Council and the Site Auditor, prior to development consent:

- Additional soil, groundwater and soil vapour investigations to meet the NSW EPA sampling guidelines and with reference to the intended site use as residential and to supplement the previous works undertaken from 2011-2013;
- Preparation of a Remediation Action Plan (RAP);
- Preparation of an Asbestos Management Plan (AMP);
- Site Remediation and Validation reporting; and
- Preparation of a Site Audit Statement (Part A).

In accordance with the NSW EPA hierarchy for remediation, the preferred remediation strategy is likely to comprise the retention and management of contaminated soils on site, either through relocation to less sensitive areas and/or physical encapsulation or capping, therefore reducing the need to remove large volumes of soil to landfill. Any design configuration that supports this strategy (e.g. no basement excavations) would be preferred. Furthermore, large excavations could impact on the groundwater dynamics and make it more difficult to isolate and/or manage any identified contaminated groundwater.

6. Limitations

Douglas Partners (DP) has prepared this report (or services) for this project at 128 and 130-150 Bunnerong Road, Pagewood in accordance with DP's proposal dated 11 January 2017 and acceptance received from Mr Matthew Lennartz dated 11 January 2017. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of Meriton for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

Please contact the undersigned if you have any questions on this matter.

Yours faithfully

Douglas Partners Pty Ltd



Paula Maurici

Environmental Scientist

Reviewed by



Paul Gorman

Environmental Manager, Principal

Attachments: About this Report
 Drawing 1 (Rev2)
 Drawing 3 (Project 71631.01)
 Drawing 3 (Project 71631.02)

About this Report

Douglas Partners



Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;

- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

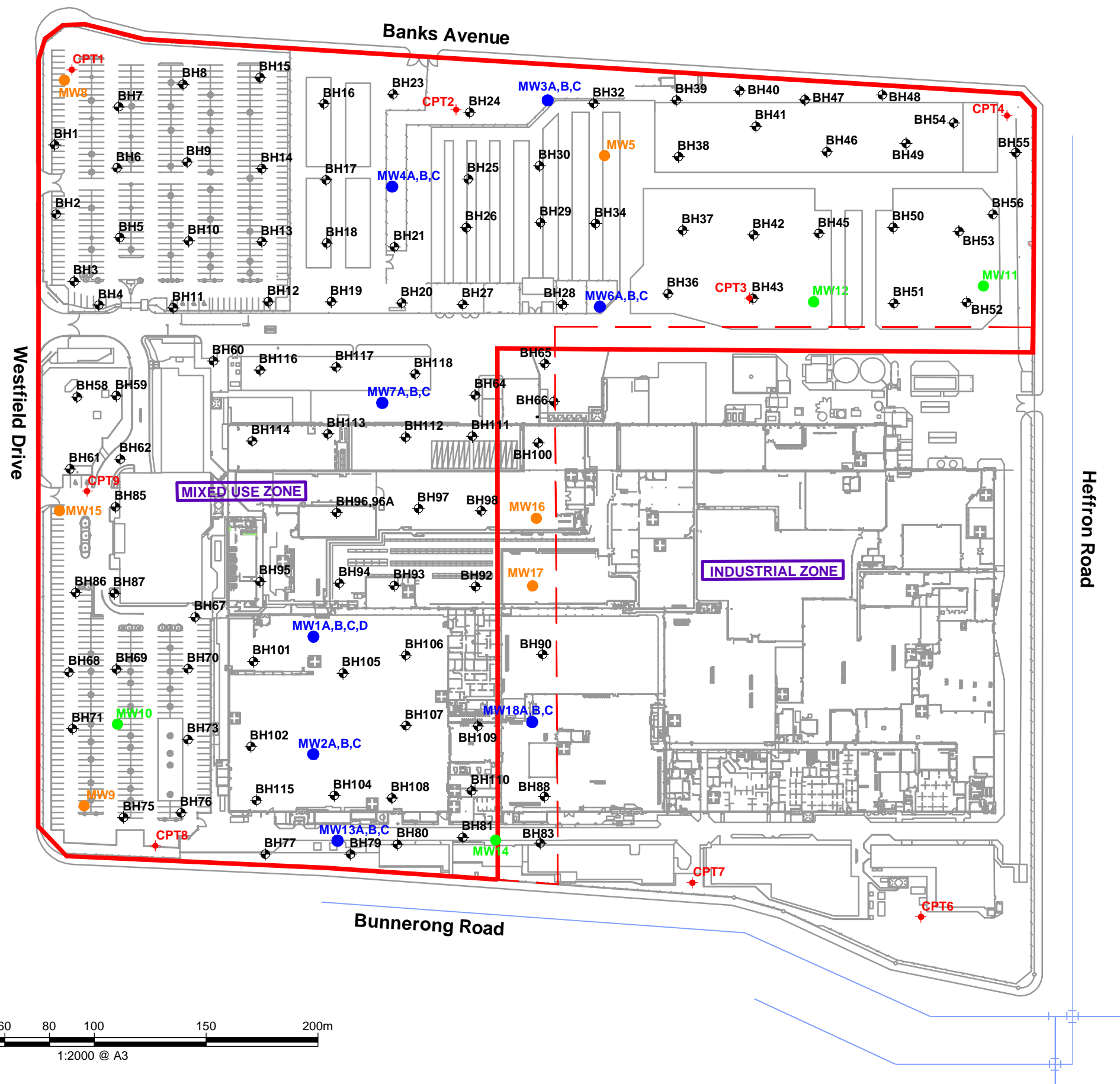
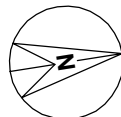
Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

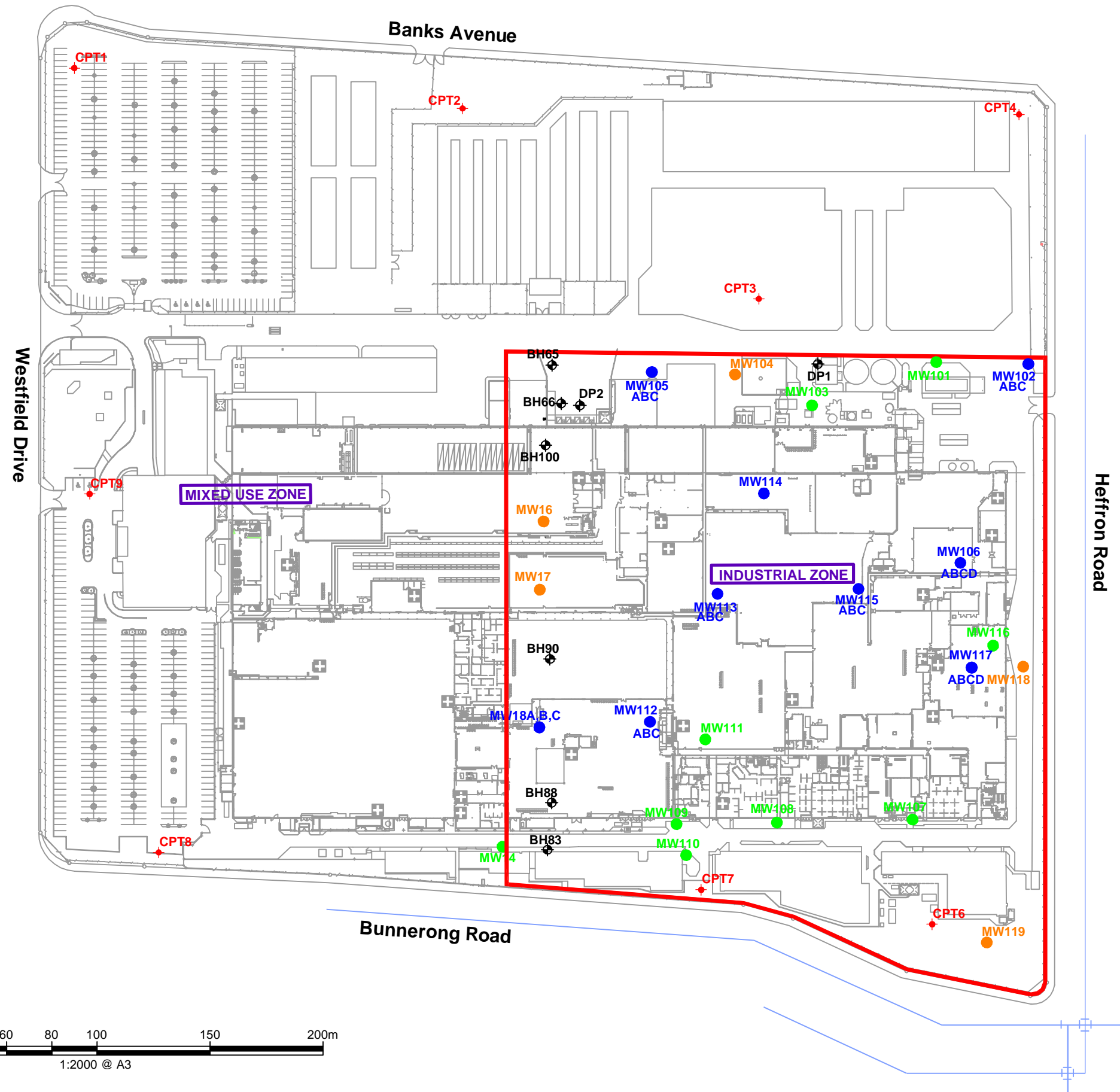
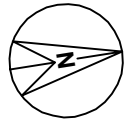
The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.





LEGEND

- Site Boundary
- Initial site boundary identified prior to fieldwork
- Borehole
- Groundwater Monitoring Wells (nested)
- Groundwater Monitoring Wells (shallow)
- Groundwater Monitoring Wells (long screen)
- Cone Penetration Tests (CPT)



LEGEND

- Site Boundary
- Borehole
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