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PRELIMINARY SITE INVESTIGATION
74-78 BELMORE STREET, RYDE,
NEW SOUTH WALES

FOR

ACHIEVE AUSTRALIA
C/- NBRS AND PARTNERS

PROJECT NO. 17900/8471B **JANUARY 2011**
REPORT NO. 11/0026

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EXECUTIVE SUMMARY

A preliminary site investigation (PSI) was performed for the property at 74-78 Belmore Street, Ryde for Achieve Australia. The objectives of the investigation were to provide advice on the potential for environmental liabilities due to site contamination for a high-density residential land use. The investigation was performed in accordance with Department of Environment, Climate Change and Water (DECCW) and National guidelines for the assessment and management of site contamination.

The site is approximately 1.4 hectares and appears to have been used for residential purposes prior to the 1950s, after which time it has served as an accommodation and learning facility for special needs persons. A portion of the site has also been occupied by a preschool in recent years. No evidence of potentially contaminating facilities or installations was observed at the site during the investigation, however, minor filling has occurred for leveling purposes. An AGST that contained petroleum fuels is also reported to have previously been located in the southern corner of the site in an area currently occupied by a small building.

Soil was sampled at seven locations across the site for this investigation. The analytical results of the sampling program show that the concentrations of contaminants measured in the soil samples are low and well below criteria considered suitable for a high density residential land use with minimal opportunities for soil access, including high-rise apartments and flats. However, due to the presence of the building the sample locations targeting the AGST area could be ideally positioned.

Based on the results of the PSI, it is likely that the site will be suitable for the proposed residential redevelopment. However, further soil sampling targeting the AGST should be undertaken at the time of redevelopment when the buildings are demolished to determine if the soils are impacted with petroleum hydrocarbons. Should any unacceptable soil impacts be identified due to the AGST, they would most likely be isolated and confined to the near surface soil, and therefore could be readily remediated.

Should any soil be required to be removed from the site during redevelopment the natural soil and rock could potentially be beneficially reused as clean backfill on other sites. However, the fill material on the site and also any hydrocarbon impacted spoil identified in the vicinity of where the AGST was located may not be suitable for reuse and could therefore incur landfill disposal costs in addition to the costs of transport.

1. INTRODUCTION

On 18 October 2010 Achieve Australia engaged SMEC Testing Services Pty Limited (STS) to undertake a preliminary site investigation (PSI) for a property located at 74-78 Belmore Street, Ryde, NSW (the 'site'). The objective of the investigation was to provide advice on the potential for environmental liabilities due to site contamination for a high-density residential land use. The assessment was performed in accordance with Department of Environment, Climate Change and Water (DECCW) guidelines for the assessment and management of site contamination.

The PSI was undertaken in conjunction with a geotechnical investigation of the 74-78 Belmore Street property, the results of which are provided in a separate report.

The scope of the PSI included:

- Review of historical land title information relating to the site;
- Examination of aerial photographs to identify historical land uses at the site and its surrounds;
- Review of local Council and DECCW records;
- Site inspection;
- Appraisal of local geology and hydrogeology;
- Soil sampling from seven locations across the site;
- Laboratory analysis of the soil samples for a broad screen of potential contaminants;
- Assessment of analytical data and quality assurance (QA);
- Appraisal of the magnitude and extent of soil contamination identified at the site based on the results of the assessment, including an appraisal of potential harm to human-health and the environment, potential exposure pathways and off-site impacts;
- Recommendations for the site in accordance with DECCW guidelines; and
- Preparation of a confidential report to Achieve Australia on the results of the investigation.

2. SITE IDENTIFICATION

The site at 74-78 Belmore Street, Ryde has an area of approximately 1.4 hectares and is defined by six planning lots. The title details of each lot along with their zoning are listed in Table 2.1 below. The location of the site is shown on Drawing No. 11/0026/1.

TABLE 2.1 – SITE TITLE AND ZONING DETAILS

Lot No.	Deposited Plan	Parish/County	Zoning
1	1109537	Parish of Hunters Hill, County of Cumberland	B4 – Mixed Use
11	51349	Parish of Hunters Hill, County of Cumberland	B4 – Mixed Use
12	51349	Parish of Hunters Hill, County of Cumberland	B4 – Mixed Use
13	4481	Parish of Hunters Hill, County of Cumberland	B4 – Mixed Use
14	4481	Parish of Hunters Hill, County of Cumberland	B4 – Mixed Use
1	921633	Parish of Hunters Hill, County of Cumberland	B4 – Mixed Use

3. SITE FEATURES

The site was inspected on 10 November 2010 to confirm the condition of the land and to identify potential contamination sources. A plan showing the current site configuration is shown on Drawing No.11/0026/2. The key site features as determined by the site inspection are:

- The site is predominantly flat with a slight slope to the north-west. The southern portion of the site also has a slight slope to the south. It appears that some cutting and may have occurred in the east of the site, with filling also likely to have occurred, particularly in the north-west of the property.
- A number of small buildings are located across the site. The land surrounding the buildings comprises asphalt access roads and car parking areas as well as areas of grass and gardens, particularly in the northern portion of the site. The vegetation on the site was observed to be in a healthy condition.

- The majority of the site is occupied by a special needs education and accommodation facility. The north-eastern corner of the site is also occupied by a German preschool.
- No surface staining or stored chemical products or wastes were observed at the site during the inspection. Further, no evidence of current or former potentially contaminating facilities or installations was observed.
- The land surrounding the site to the north and north-east is used for residential purposes, whilst a commercial/industrial properties are is located to south, south-west and south-east of the site. A park is also located on the land to the north-west of the site across Belmore Street.

4. GEOLOGY AND HYDROGEOLOGY

The Geological Survey of NSW 1:100,000 Sydney Geological Map (Sheet 9130) shows that the site is located on the contact between two geological formations, these being the Triassic Age 'Ashfield Shale', which comprises black to dark grey shale and laminate, and the Hawkesbury Sandstone comprising medium to coarse grained quartz sandstone. The natural soils encountered during the investigation comprised silty clays underlain by shale and sandstone sequentially, and are consistent with those derived from the Ashfield Shale formation. Further, the sampling program has shown that filling up to 1.6 m depth has occurred at the site. The fill material comprised brown silty clays that included minor sand and gravel. No waste materials were observed within the fill.

Our review of the Acid Sulfate Soil (ASS) maps provided on the DECCW NSW Natural Resource Atlas (NR Atlas) shows that the site is located on land that is not expected to be affected by ASSs.

A search of the Department Natural Resources (DNR) groundwater database was also performed to identify wells in the vicinity of the site. The search results identified 10 registered groundwater monitoring wells located within 2 km of the site, nine of which are registered for monitoring purposes and one for irrigation. The aquifer depths in the wells (where reported) varied between approximately 2 m and 138 m, and aquifer lithology is reported to comprise clay and sandstone. It also appears that multiple aquifers may be

present in the region, including an upper unconfined aquifer in unconsolidated materials (soil or sediment) and a deeper potentially confined or semi-confined aquifer in the underlying bedrock. A summary of the site hydrogeology is summarised in Table 4.1.

TABLE 4.1 – SITE HYDROGEOLOGY

Depth to Groundwater at Site:	Approximately 1-2 m[1]
Aquifer Type and Lithology:	Clay and shale[1]
Perched groundwater:	Not expected to be present[1]
Local Groundwater Flow Direction:	South to south-west
Regional Groundwater Flow Direction:	South to south-west
Receiving Environments:	Parramatta River approximately 600 m to the south of the site.

[1] Actual conditions based on observations made during sampling.

5. SITE HISTORY REVIEW

The site history of the land subject to the investigation was obtained from the following sources:

- Aerial photographs of the site and surrounds held by the Department of Lands;
- A Section 149 (2) Certificate provided by Parramatta City Council;
- Historical land titles; and
- DECCW records.

5.1 Aerial Photographs

Aerial photographs from 1930, 1951, 1961, 1970, 1986, 1994 and 2005 were examined to identify previous land uses at the site and its surrounds. A copy of each aerial photograph showing the location of the site is provided in Appendix A, and a description of the observations made are provided in Table 5.1.

TABLE 5.1 – AERIAL PHOTOGRAPH OBSERVATIONS

Year	Site Features	Surrounding Land Use
1930	The quality of the aerial photograph is poor and site features are not easily distinguished. However, it can be ascertained that the northern portion of the site comprises a vacant grassed area. One main building that appears to be residential in nature is located in the central-southern portion of the site. Two smaller buildings or sheds are also located in the southern portion of the site. The land surrounding the buildings appears to be grassed.	Residential developments and areas of grassland surround the site.
1951	The site features remain essentially unchanged from those shown in the 1930 aerial photograph, however, several additional buildings have been constructed in the central-southern portion of the site. Small areas of sealed land also appear to be located to the north of the buildings.	Surrounding land uses also remain essentially unchanged.
1961	The southern portion of the site has undergone significant redevelopment, which has included the construction of numerous additional small buildings. The land surrounding the buildings appears to comprise sealed access roads/paths and car parking areas. Minor grass and garden areas are also visible. The northern portion of the site remains a vacant grassed area.	Surrounding land uses remain essentially unchanged, although the density of the surrounding residential develops has increased. The land to the south of the site also appears to have been developed for commercial/industrial purposes.
1970	The 1970 aerial photograph shows that a new elongate rectangular building has been constructed along the southern site boundary. Two additional buildings have also been constructed in the north of the site adjacent to Belmont Street. The remaining site features are essentially unchanged, however, the grass cover in the northern portion of the site appears to have become sparse with areas of bare earth showing.	Surrounding land uses remain largely unchanged from those shown in the 1961 aerial photograph, however new commercial/industrial buildings have been constructed on the land to the south. The previously existing residential buildings to the north-west of the site across Belmont Street have also been removed leaving a vacant and grassed area.

Year	Site Features	Surrounding Land Use
1986	Site features are essentially unchanged from those shown in the 1970 aerial photograph, however, an additional building has been constructed in the north-eastern corner of the site. The grass cover in the vacant area in the north of the site is also more extensive than in the 1970 aerial photograph.	Surrounding land uses remain largely unchanged from those shown in the 1961 aerial photograph, however a new commercial/industrial buildings have been constructed on the land to the south-west of the site. Several small commercial/industrial buildings also appear to have been constructed on the land to the south-east of the site.
1994	Site features are largely unchanged from those shown in the 1986 aerial photograph. However, three new rectangular buildings have been constructed in the northern corner of the site.	Surrounding land uses also remain unchanged from the 1986 aerial photograph.
2005	Site features are unchanged from those shown in the 1994 aerial photograph.	Surrounding land uses also remain unchanged.

5.2 Section 149 (2) Certificates

Section 149 (2) Certificates were obtained from Ryde City Council to determine if any restrictions have been placed on the land due to contamination related risks. A copy of the certificates is provided in Appendix B. The Section 149 (2) Certificates shows that there are no notices under the provisions of the *Contaminated Land Management Act 1997* issued in relation to the site. Further, the site has not been the subject of a Site Audit.

5.3 Historical Title Search

Copies of the historical land title transfers were obtained from the Land Titles Office, and are provided in Appendix C. A summary of the property ownership and occupant details is summarised in Table 5.2.

TABLE 5.2 – HISTORICAL LAND TITLE SUMMARY

Year	Registered Owner
1997-present	German School (Johannes Guttenberg)
1952-1997	Challenge Foundation of New South Wales The Crowle Foundation Limited
Pre 1901-1952	Private title – various individuals

An internet search has shown that the Challenge Foundation of NSW and the Crowle Foundation Limited operate accommodation, training and employment centres for the intellectually disabled.

5.4 Anecdotal Reports

During our inspection of the property we were advised by site occupants that a small above ground storage tank (AGST) that had been used to hold petroleum fuel was once located in the southern corner of the site in an area now covered by a small building.

5.5 NSW DECCW Records

The DECCW contaminated land public register was inspected on 11 January 2011 to determine if any notices have been issued for the site by DECCW under the *Contaminated Land Management Act 1997* or if the site is registered under the *Protection of the Environment Operations Act 1997*. Our review shows that the site is not listed under the provisions of these Acts, nor is it located in the vicinity of a listed property.

5.6 Site History Summary

The site appears to have been used for residential purposes prior to the 1950s, after which time it appears to have been occupied by an accommodation and learning facility for special needs persons. A portion of the site has also been used as a preschool in recent years. There is also evidence to suggest an AGST was previously located in the southern portion of the site.

6. POTENTIAL CONTAMINATION SOURCES

The potential for the site to be contaminated from on-site sources, off-site sources and the potential for off-site migration of contamination was considered by STS during this investigation. Based on the findings of our site inspection and site history review the following potential contamination sources were identified:

- A range of organic and inorganic contaminants due to the presence of fill material imported onto the site for leveling purposes. As the origin of the imported soil has not been confirmed it has the potential to be contaminated; and
- Petroleum hydrocarbons due to an AGST that is expected to have once been located in the southern corner of the site.

7. DATA QUALITY OBJECTIVES

The National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPM) and Australian Standard (AS) 4482.1-2005 recommend that data quality objectives

(DQOs) be implemented during the investigation of potentially contaminated sites. The DQO process described in AS 4482.1-2005 outlines seven distinct steps which are designed to ensure an investigation is performed in a structured and efficient manner. The seven steps and the associated processes that were implemented to ensure data and decision making quality are outlined below:

Step 1 – State the Problem

A high-density residential use is proposed for the site, which will involve the construction of residential unit blocks. Prior to this assessment there was insufficient data to determine if the site is likely to be suitable for the proposed residential land use.

Step 2 – Identify the Decision

To determine if the concentrations of contaminants in the soil at the site present an unacceptable risk to human-health or the environment for a high density residential land use with minimal opportunities for soil access.

Step 3 – Identify Inputs to the Decision

To enable a decision regarding the suitability of the site to be made, the following inputs were required:

- Soil sampling from seven locations across the site;
- Analysis of the soil samples for a broad screen or potential contaminants; and
- Implementation of a quality assurance/quality control (QA/QC) program.

Step 4 – Define the Study Boundaries

The assessment was undertaken within the boundaries of the site, located at 74-78 Belmore Street, Ryde, New South Wales.

Step 5 – Develop a Decision Rule

To determine if the site is suitable for a high-density residential land use, data was compared to relevant DECCW endorsed criteria. For the site to be deemed suitable, the average concentrations of contaminants in the soil must be statistically below the relevant criteria. Further, no single concentration can be above 2.5 times the relevant criteria. The criteria for this assessment are further discussed in Section 10.

Step 6 - Specify Limits on Decision Errors

To ensure the precision, accuracy, completeness and comparability of data a field QA program was implemented and acceptable error limits were defined. These are further discussed in Section 9.2.

Step 7 – Optimize the Design for Obtaining Data

To ensure there are sufficient, reliable data to enable the project objectives to be met the following was implemented:

- Collection, storage and transport of soil samples in an appropriate manner to ensure sample integrity (refer to Section 8.2);
- Obtaining samples from an appropriate number of locations to provide a preliminary screen of a 1.4 hectare site for potential contamination in accordance with DECCW guidelines;

- Analysis of samples for an appropriate analytical suite to provide a preliminary screen of the site for contamination potential, based on the potential contamination sources identified from our site inspection and site history review.

8. FIELD INVESTIGATION

The soil sampling activities for the contamination assessment were undertaken by STS on 10 November 2010. The assessment was performed according to:

- DECC guidelines comprising:
  - *Contaminated Sites: Guidelines for Assessing Service Station Sites, 1994*;
  - *Contaminated Sites: Sampling Design Guidelines, 1995*;
  - *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites, 1997*;
  - *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (2nd Edition), 2006*;
  - *Guidelines for the Assessment and Management of Groundwater Contamination, 2007*;
- Guidelines issued under Schedule B of the National Environment Protection (Assessment of Site Contamination) Measure (NEPM), December 1999;
- *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites* published by the Australian and New Zealand Environment and Conservation Council/National Health and Medical Research Council, January 1992 (ANZECC Guidelines); and
- Australian Standard 4482.1-2005*: Guide to the Investigation and Sampling of Sites with Potentially Contaminated Soil – Part 1: Non-volatile and Semi-volatile Compounds, 2 November 2005, Standards Australia.*

8.1 Sampling Methodology

The sampling program involved the collection of soil samples from seven locations across the site, including four general site locations and three locations in the southern corner of the site in the vicinity of where the AGST is reported to have been located. This is a sufficient number of sample locations to provide a preliminary screen of the site for potential soil contamination in accordance with DECCW guidelines and the NEPM. The sample locations are shown on Drawing No. 11/0026/2.

Locations for soil sampling were identified based on the results of our site inspection and site history review, and the location of on-site facilities. Sample locations were referenced to existing ground features and positioned subject to on-site services, subsurface conditions and other constraints, which were encountered during fieldwork activities.

The samples were collected by qualified and experienced environmental engineers and/or technicians. A description of all the samples collected and their corresponding sample locations is provided on the soil profile logs in Appendix D.

8.2 Sample Handling & Equipment Decontamination

The samples were collected using a drilling rig equipped with solid augers. The samples were placed directly into a stainless steel bowl before being transferred into new clean jars prepared by Australian Laboratory Services (ALS). Where fill was observed or where odorous soil was encountered no sample mixing was carried out to ensure volatile compounds that may be present are not lost. All sampling equipment was decontaminated prior to use and between sampling locations by washing with a mixture of water and DECON 90 and rinsing with potable water.

All jars were filled to the rim to minimize head space. The sample jars were then placed into ice-filled chests and transferred to ALS for analysis. Chain of Custody (COC) documentation was used to record and track the samples. COC documentation detailing the required analyses accompanied the samples to the laboratory. The environmental engineer signed the appropriate section of the COC form before providing the samples to the laboratories.

8.3 Analytical Program

The selection of analytes was based on the site history review, our observations made during the site inspection for this assessment and DECCW site assessment guidelines. The analytes for the soil samples included heavy metals, polycyclic aromatic hydrocarbons (PAH), total petroleum hydrocarbons (TPH), monocyclic aromatic hydrocarbons (BTEX), polychlorinated biphenyls (PCB), organochlorine pesticides (OCP), organophosphorus pesticides (OCP), phenolic compounds, sulfate, chloride and pH.

The analytical program for the soil samples is outlined in the COC documentation, which is provided in Appendix E. ALS Sydney was selected as the primary laboratory, and is NATA accredited for the analyses performed.

9. QUALITY ASSURANCE PROGRAM

The implementation of a QA/QC program is in integral component of a site assessment, and is used to confirm the reliability of analytical data. Apart from ensuring samples are collected and handled in an appropriate manner, a key component of a quality control program may include the collection and analysis of field inter-laboratory and inter-laboratory duplicate samples, and field blank samples. Laboratories are also required to perform their own internal QC programs in accordance with their NATA registration to ensure that the analytical procedures are followed correctly and with the required degree of accuracy.

9.1 Field Quality Control Program

Intra-laboratory and inter-laboratory samples are duplicates of primary samples that are collected in the field. Intra-laboratory samples are analysed by the primary laboratory and are used as a check on the precision of the sampling and analytical procedures. Inter-laboratory samples are analysed by a secondary laboratory and provide a check as to the accuracy of the analytical data. Field blank samples include rinsate blanks and trip blank samples. Rinsate blanks are samples of water collected from field equipment after decontamination, and are used to determine the effectiveness of the decontamination procedures. Trip blanks are samples of deionised water prepared prior to sampling, and are stored and transported with the samples. They are used to identify laboratory errors or to identify sources of contamination due to sample storage and handling.

According to the NEPM a split of a minimum of 10% of the primary samples as field duplicate samples (5% inter-laboratory and 5% intra-laboratory) as well as blanks is required. Blanks are generally collected on each day that sampling is performed. Where less than 20 samples are to be analysed, a minimum of two field duplicate samples (one inter-laboratory and one intra-laboratory) and a blank is considered sufficient.

For this contamination assessment no field quality control samples were collected in view of the small number of primary samples analysed.

9.2 Quality Control Criteria

A check on the comparability of the field duplicate sample results is achieved by calculating the Relative Percent Difference (RPD). RPDs are calculated as the absolute value of the difference between the primary and duplicate sample results, divided by the average value, expressed as a percentage.

According to AS 4482.1-2005 (and referenced in the NEPM) RPDs below 50% are considered to demonstrate good correlation between duplicate sample results. However, AS 4482.1-2005 also states that the acceptable variation between results can be higher for organic analytes than for inorganics, and for low concentrations of analytes. In view of this, and based on STS's experience, RPDs up to 70% are considered to be acceptable for organic species. RPDs of 100% or more are generally considered to demonstrate poor correlation unless results are less than five times the laboratory detection limits.

9.3 Laboratory Quality Control

A laboratory QC program involves the preparation and analysis of their own duplicate samples, reagent blanks and control samples (where the analyte concentration is known) or matrix spikes. Duplicate samples are subjected to the same preparation and analytical procedures as primary samples. The laboratories are required to analyse matrix spikes or control samples at a minimum frequency of 5% of the total number of primary samples in each sample batch.

The results of method blanks, duplicates and control sample analyses are compared by the laboratory to established quality assurance criteria for data precision and accuracy. If the results do not meet the criteria, then the analyses should be repeated. The relevant criteria are:

- Method blanks should not return any positives on analysis;
- Duplicate samples should not vary by more than 35% from the mean result; and
- Control samples should generally give a recovery of 75-125%.

10. ASSESSMENT CRITERIA

The key criteria for assessing potentially contaminated sites in New South Wales are the Soil Investigation Levels (SILs), which are outlined in DECCW's "*Guidelines for the NSW Site Auditor Scheme, 2nd Edition*" (DEC, 2006). The SILs have been adopted from Schedule B(1) of the National Environmental Protection Council document "*National Environmental Protection (Assessment of Site Contamination) Measure 1999*."

The SILs comprise Health-Based Investigation Levels (HILs) and the Phytotoxicity-Based Investigation Levels (PILs). The HILs are threshold values that are indicative of potential adverse impacts to human health, whilst the PILs are values that indicate a potential phytotoxic effect to plants for a sandy loam soil. It is noted that the SILs do not provide criteria for petroleum hydrocarbon compounds. In the absence of SIL criteria the '*threshold concentrations for a sensitive land use*' (DECCW Threshold Concentrations) outlined in DECCW's "*Guidelines for Assessing Service Station Sites*" (EPA, 1994) are used, however, the HILs do provide threshold values for hydrocarbon fractions that may be adopted provided that speciation testing is undertaken for specific aromatic and aliphatic components.

There are four categories of HIL, which are each used to appraise the risks posed by site contamination for different land use settings. These include:

SIL (Column 1): for a residential land use with gardens and accessible soil

SIL (Column 2): for a residential land use with minimal opportunities for soil access, including high-rise apartments and flats

SIL (Column 3): for parks, recreational open space, playing fields, including secondary schools

SIL (Column 4): for a commercial/industrial land use.

Where the proposed land use will include more than one land use category (e.g. mixed residential/commercial development) the exposure setting of the most "sensitive" land use is adopted for the site.

10.1 Criteria for this Assessment

The redeveloped of the site is proposed to include the construction of multiple residential unit complexes surrounded by landscaping and recreational areas. Therefore, the SILs (Column 2) criteria for a residential land use with minimal opportunities for soil access and the PILs have been adopted. The DECCW Threshold Concentrations have also been adopted for petroleum hydrocarbon compounds. These criteria are shown in Table 10.1.

TABLE 10.1 – SITE SOIL ASSESSMENT CRITERIA
(all concentrations in units of mg/kg)

Contaminant	HIL (Column 2)	Guidelines for Assessing Service Station Sites (1994)	PILs
Inorganics			
Arsenic (total)	400		20
Cadmium	80		3
Chromium (III)	48%		400
Copper	4000		100
Lead	1200		600
Mercury	60[1]		1[2]
Nickel	2400		60
Zinc	28000		200
Organic Contaminants			
TPH (C_6-C_9)		65	
TPH (C_{10}-C_{36})		1000	
Benzene		1	
Toluene		1.4	
Ethyl benzene		3.1	
Total Xylenes		14	
Total PAHs	80		
Benzo(a)pyrene	4		
Aldrin + Dieldrin	40		
Phenols	34000		70
Chlordane	200		
DDT+DDD + DDE	800		
Heptachlor	40		
PCBs (Total)	40		

[1] Criterion for methyl mercury
[2] Criterion for inorganic mercury

11. ANALYTICAL RESULTS AND INTERPRETATION

The analytical results for the soil samples are presented in the NATA endorsed laboratory reports included in Appendix F and are summarised in the Tables of Results attached to this report. The results exceeding the assessment criteria are highlighted in the tables accordingly.

11.1 Interpretation

The analytical results for the soil samples are presented in Table A. The results show that the concentrations of organic and inorganic species analysed for are low and well below the SIL (Column 2) criteria for a residential land use with minimal opportunities for soil access, the DECCW Threshold Concentrations and the PILs.

The pH values of 4.9, 5.1 and 7.3 measured in three samples are marginally outside the conservative ANZECC background ranges for Australian soils of 6-8. However, they are within the range of natural variability for soils within the Sydney region and are therefore not considered to be significant.

12. EVALUATION OF QUALITY ASSURANCE

Given the small number of samples analysed field duplicate and blank samples were not collected. However, our review of the laboratory's internal QC program has shown that the majority of internal duplicate samples, spike recoveries, surrogate standards and laboratory blanks were within the laboratories' recommended range for acceptable reproducibility. Therefore, STS considers the laboratory data obtained in the sampling program to be of acceptable precision, accuracy and reliability and representative of the site conditions encountered.

13. CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the PSI for the property at 74-78 Belmore Street, Ryde, NSW, the following conclusions are made:

- The site appears to have been used for residential purposes prior to the 1950s, after which time it appears to have been occupied by an accommodation and learning facility for special needs persons. A preschool has also occupied a portion of the site in recent years.
- The current configuration of the site comprises numerous buildings surrounded by asphalt access roads and car parking areas as well as areas of grass and gardens, particularly in the northern portion of the site. No evidence of potentially contaminating facilities or installations was observed at the site during our inspection. Further, the site is not likely to be affected by ASSs. However, minor filling has occurred at the site for leveling purposes and the origin of the fill material could not be confirmed.
- Anecdotal evidence suggests that an AGST used to store petroleum fuels was once located in the southern corner of the site in an area where a small building is currently located.
- The results of the soil sampling program for this investigation show that the concentrations of contaminants measured in the soil samples retrieved from the site are low and well below criteria considered suitable for a high-density residential land use with minimal opportunities for soil access.
- The results of the sampling program also show no evidence of gross soil contamination in the vicinity of where the AGST is believed to have been located. However, due to the presence of a building the targeted sampling locations could not be ideally positioned to determine the extent of any soil impacts due to the use of the AGST.
- Based on the results of the PSI, it is likely that the site will be suitable for a residential land use with minimal opportunities for soil access, including high-rise apartments and flats. However, further targeted soil sampling is recommended at the time of redevelopment when the buildings on the site are demolished. This is to determine if any unacceptable soil impacts remain in the area where the AGST is reported to have been located.

- Should any soil impacts due to the AGST be encountered they would most likely be isolated in extent and confined to the near surface soil, and therefore could be readily remediated.
- Should any soil be required to be removed from the site during redevelopment the natural soil and rock could potentially be beneficially reused as backfill on other sites. However, the fill material, and also any hydrocarbon impacted soil identified in the south of the site where the AGST is reported to have been located, may not be suitable for reuse and therefore could incur landfill disposal costs in addition to the costs of transport.

14. LIMITATIONS

SMEC Testing Services Pty Limited has performed its services for this project in accordance with its current professional standards. Laboratory analyses were undertaken as part of this investigation by Australian Laboratory Services, which are NATA accredited for the analyses performed.

When making an assessment of contamination across a site from a sampling program there is the possibility that variations may occur between sample locations and the actual presence of contaminated material at the site may differ from those inferred herein, since no sampling program, no matter how comprehensive, can reveal all anomalies and hot spots that may be present.

The data collected is used to form an opinion about contamination with regard to the proposed development, that being high-density residential. If the nature of the proposed development changes, the conclusions given may need to be revised. Also, regulatory evaluation criteria are constantly changing and as a consequence, concentrations of contaminants presently considered low may, in the future, fall under different regulatory standards that may require remediation.

Opinions and judgments expressed herein, which are based on our understanding and interpretation of current regulatory standards, should not be construed as legal opinions.

This document and the information herein have been prepared solely for the use of Achieve Australia for the purposes nominated in this report. No person or organization other than Achieve Australia is entitled to rely on any part of the report without the prior written consent of STS. Any party relying on this report shall have no legal recourse against STS or its parent organizations or subsidiaries and shall indemnify and defend them from all and against all claims arising out of, or in conjunction with such use or reliance.

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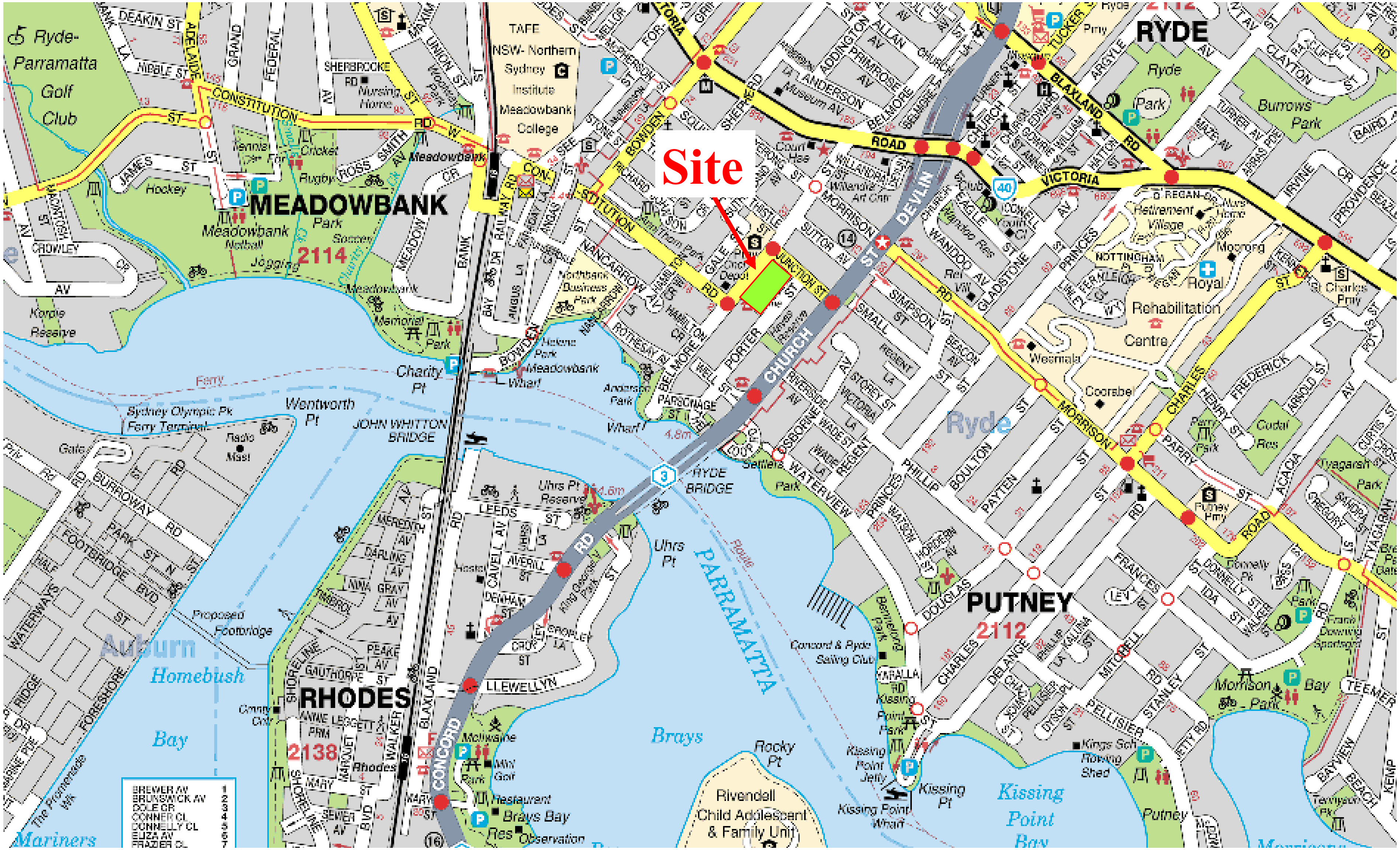
Manager, SMEC Testing Services Pty Limited

FIGURES



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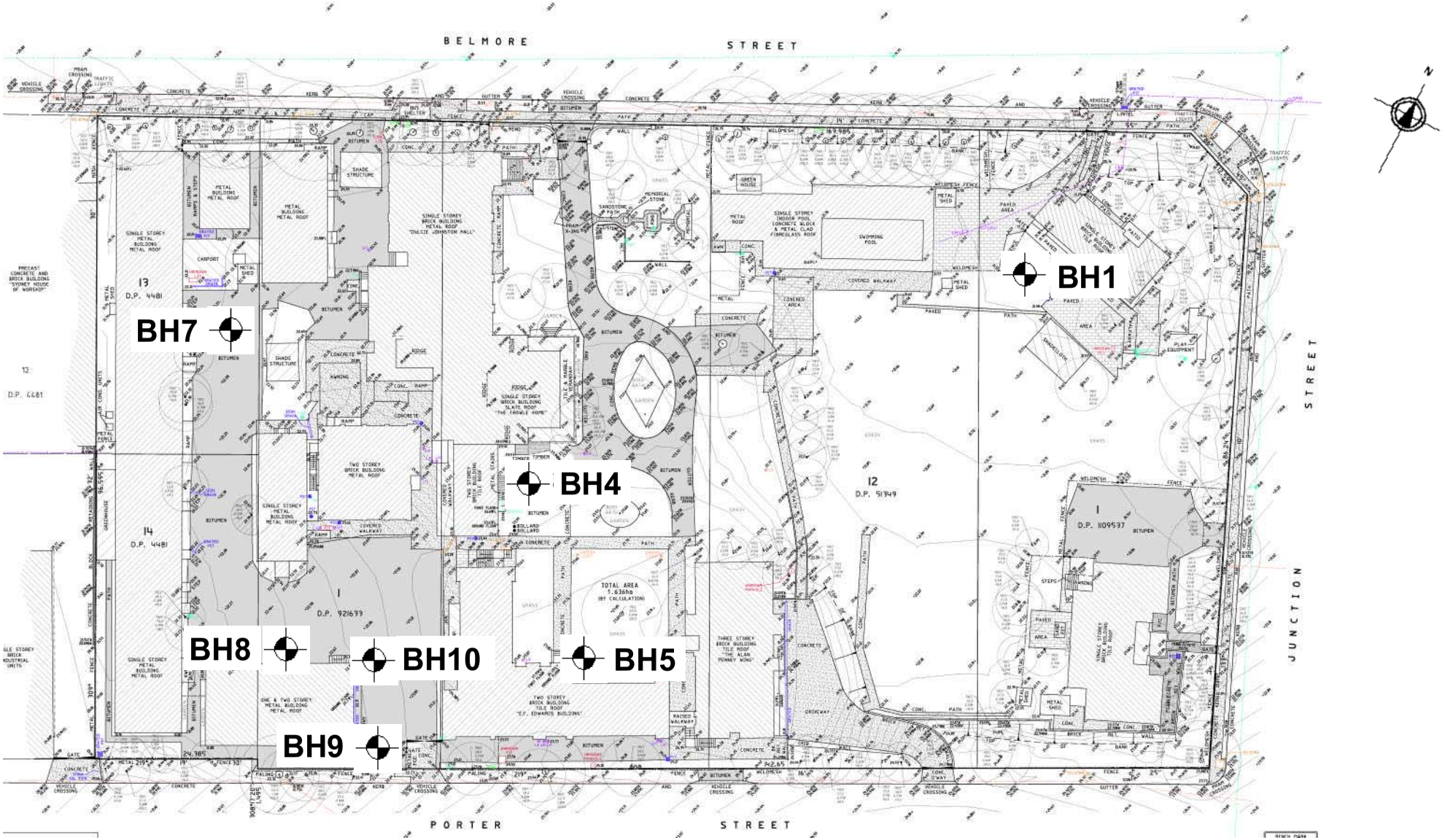
SMEC TESTING SERVICES Pty. Ltd.	Scale: 1: 20 000	Date: January 2011
Client: Achieve Australia		
PRELIMINARY SITE INVESTIGATION **74-78 Belmore Street, Ryde, NSW: Site Location**	Project No. 17900/8471B Drawing No: 11/0026/1	



SMEC TESTING SERVICES Pty. Ltd.	Scale: 1: 833	Date: January 2011
Client: ACHIEVE AUSTRALIA		
PRELIMINARY SITE INVESTIGATION: **74– 78 Belmore Street, Ryde:** **Plan Showing Soil Sampling Locations**	Project No. 17900/8471B	
	Drawing No: 11/0026/2	

TABLES OF RESULTS

Table A Analytical Results for Soil Samples

Analyte	Sample Numbers S1	S2	S3	S4	S5	S6	S7	S8	NEPM Background Ranges	PILs	NSW DECCW Threshold Concentrations	SIL (Column 2) Residential Land Use with Minimal Opportunities for Soil Access
Metals												
Arsenic	<5	<5	7	<5	<5	10	5	5	1-50	20		400
Cadmium	<1	<1	<1	<1	<1	<1	<1	<1	1	3		80
Chromium	19	18	7	17	16	10	16	15	5-1 000	400 (c)		48% (c)
Copper	13	22	24	24	38	10	12	41	2-100	100		4,000
Lead	19	24	16	56	300	19	26	50	2-200	600		1200
Mercury	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	0.001-0.1 (a)	1 (d)		60 (d)
Nickel	2	3	5	36	14	<2	4	5	5-500	60		2400
Zinc	24	18	24	32	105	<5	13	30	10-300	200		28,000
Monocyclic Aromatic Hydrocarbons (MAHs)												
Benzene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.05-1 (a)	1		
Ethylbenzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		3.1		
Toluene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.1-1 (a)	1.4		
Xylenes	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0		14		
Total Petroleum Hydrocarbons (TPHs)												
Total C_6-C_9	<10	<10	<10	<10	<10	<10	<10	<10			65	
Total C_{10}-C_{36}	<50	<50	<50	<50	<50	<50	<50	<50			1,000	
Polycyclic Aromatic Hydrocarbons (PAHs)												
Benzo(a)pyrene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5				4
Total PAHs above detection limits	ND	ND	ND	ND	2.0	ND	ND	ND	0.95-5 (a)			80
Organochlorine Pesticides (OCPs)												
Total OCPs above detection limits	ND	ND	ND	ND	ND	ND	ND	ND				
Organophosphjorus Pesticides (OPPs)												
Total OPPs above detection limits	ND	ND	ND	ND	ND	ND	ND	ND				
Phenols												
Total Phenols above detection limits	ND	ND	ND	ND	ND	ND	ND	ND	0.03-0.5 (a)	70		34,000
Polychlorinated Biphenyls (PCBs)												
Total PCBs above detection limits	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.02-0.1 (a)	1 (b)		40
Sulfate	30		20				20			2000 (e)		
Chloride	40		90				40					
pH (units)	5.1		4.9				7.3		6-8 (a)			

Notes : Results expressed as mg/kg unless otherwise indicated

ND = No individual species detected abovelaboratory detection limits.

Results shaded yellow exceed the PILs

Results shaded yellow exceed the NSW DECCW threshold concentrations for a sensitive land use.

Results shaded red exceed the SILs (Column 2) criteria for a residential land use with minimal opportunities for soil access

(a) ANZECC background ranges used where no NEPM criteria available.

(b) ANZECC B criterion used where no PIL available.

(c) Criterion for chromium (III).

(d) Criterion for inorganic mercury.

(e) NEPM EIL used where no PIL available

SMEC Testing Services

NOTES RELATING TO GEOTECHNICAL REPORTS

Introduction

These notes have been provided to outline the methodology and limitations inherent in geotechnical reporting. The issues discussed are not relevant to all reports and further advice should be sought if there are any queries regarding any advice or report.

When copies of reports are made, they should be reproduced in full.

Geotechnical Reports

Geotechnical reports are prepared by qualified personnel on the information supplied or obtained and are based on current engineering standards of interpretation and analysis.

Information may be gained from limited subsurface testing, surface observations, previous work and is supplemented by knowledge of the local geology and experience of the range of properties that may be exhibited by the materials present. For this reason, geotechnical reports should be regarded as interpretative rather than factual documents, limited to some extent by the scope of information on which they rely.

Where the report has been prepared for a specific purpose (eg. design of a three-storey building), the information and interpretation may not be appropriate if the design is changed (eg. a twenty storey building). In such cases, the report and the sufficiency of the existing work should be reviewed by SMEC Testing Services Pty Limited in the light of the new proposal.

Every care is taken with the report content, however, it is not always possible to anticipate or assume responsibility for the following conditions:

- Unexpected variations in ground conditions. The potential for this depends on the amount of investigative work undertaken.
- Changes in policy or interpretation by statutory authorities.
- The actions of contractors responding to commercial pressures.

If these occur, SMEC Testing Services Pty Limited would be pleased to resolve the matter through further investigation, analysis or advice.

Unforeseen Conditions

Should conditions encountered on site differ markedly from those anticipated from the information contained in the report, SMEC Testing Services Pty Limited should be notified immediately. Early identification of site anomalies generally results in any problems being more readily resolved and allows re-interpretation and assessment of the implications for future work.

Subsurface Information

Logs of a borehole, recovered core, test pit, excavated face or cone penetration test are an engineering and/or geological interpretation of the subsurface conditions. The reliability of the logged information depends on the drilling/testing method, sampling and/or observation spacings and the ground conditions. It is not always possible or economic to obtain continuous high quality data. It should also be recognised that the volume or material observed or tested is only a fraction of the total subsurface profile.

Interpretation of subsurface information and application to design and construction must take into consideration the spacing of the test locations, the frequency of observations and testing, and the possibility that geological boundaries may vary between observation points.

Groundwater observations and measurements outside of specially designed and constructed piezometers should be treated with care for the following reasons:

- In low permeability soils groundwater may not seep into an excavation or bore in the short time it is left open.
- A localised perched water table may not represent the true water table.
- Groundwater levels vary according to rainfall events or season.
- Some drilling and testing procedures mask or prevent groundwater inflow.

The installation of piezometers and long term monitoring of groundwater levels may be required to adequately identify groundwater conditions.

Supply of Geotechnical Information or Tendering Purposes

It is recommended tenderers are provided with as much geological and geotechnical information that is available and that where there are uncertainties regarding the ground conditions, prospective tenders should be provided with comments discussing the range of likely conditions in addition to the investigation data.

APPENDIX A

AERIAL PHOTOGRAPHY

Approximate Scale: 1: 8333

Source: Department of Lands

2005 Aerial Photograph Showing the Site and its Surrounds

Approximate Scale: 1: 8333

Source: Department of Lands

1994 Aerial Photograph Showing the Site and its Surrounds

Approximate Scale: 1: 5000

Source: Department of Lands

1986 Aerial Photograph Showing the Site and its Surrounds

Approximate Scale: 1:4545

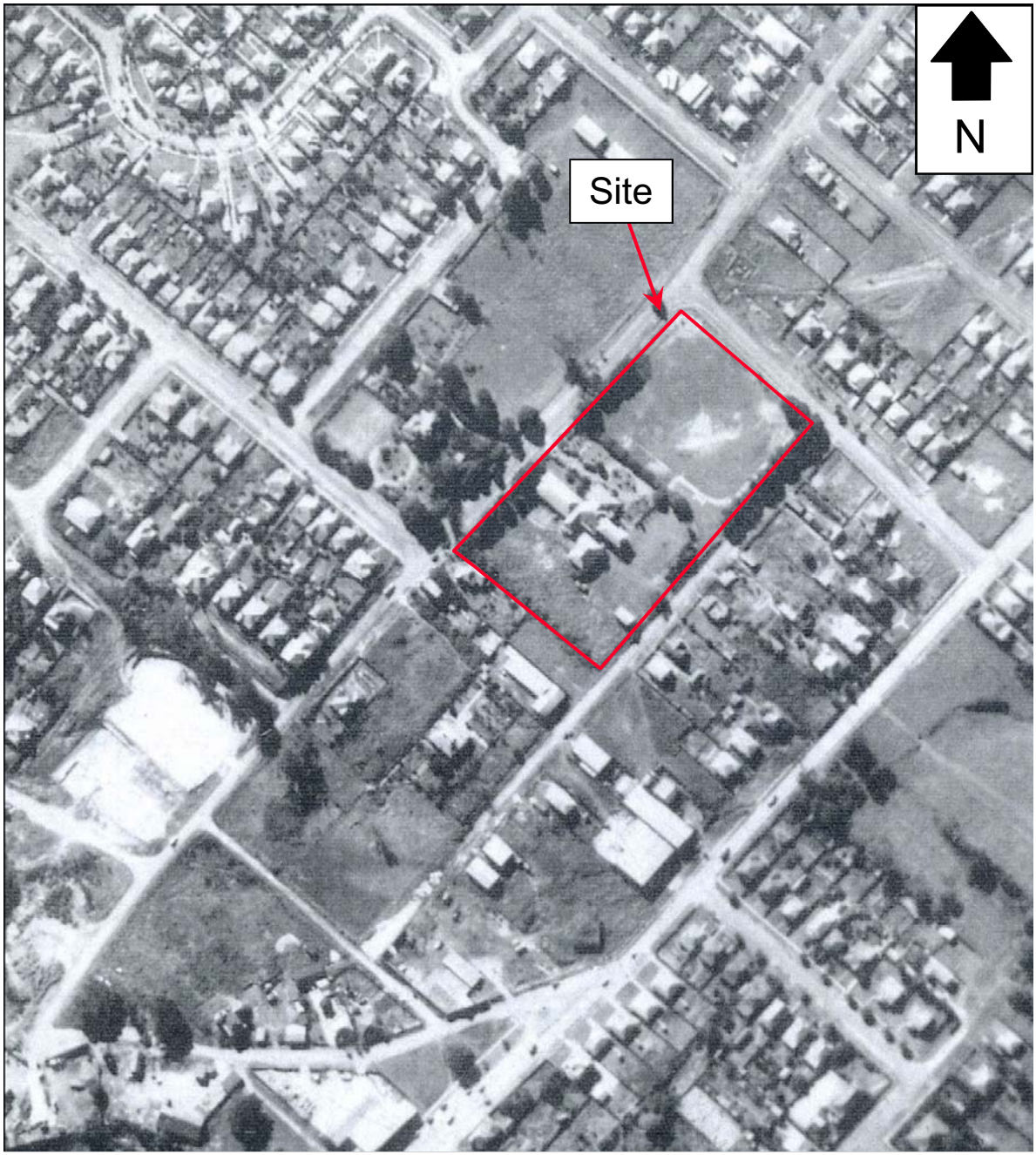
Source: Department of Lands

1970 Aerial Photograph Showing the Site and its Surrounds

Approximate Scale: 1: 4000

Source: Department of Lands

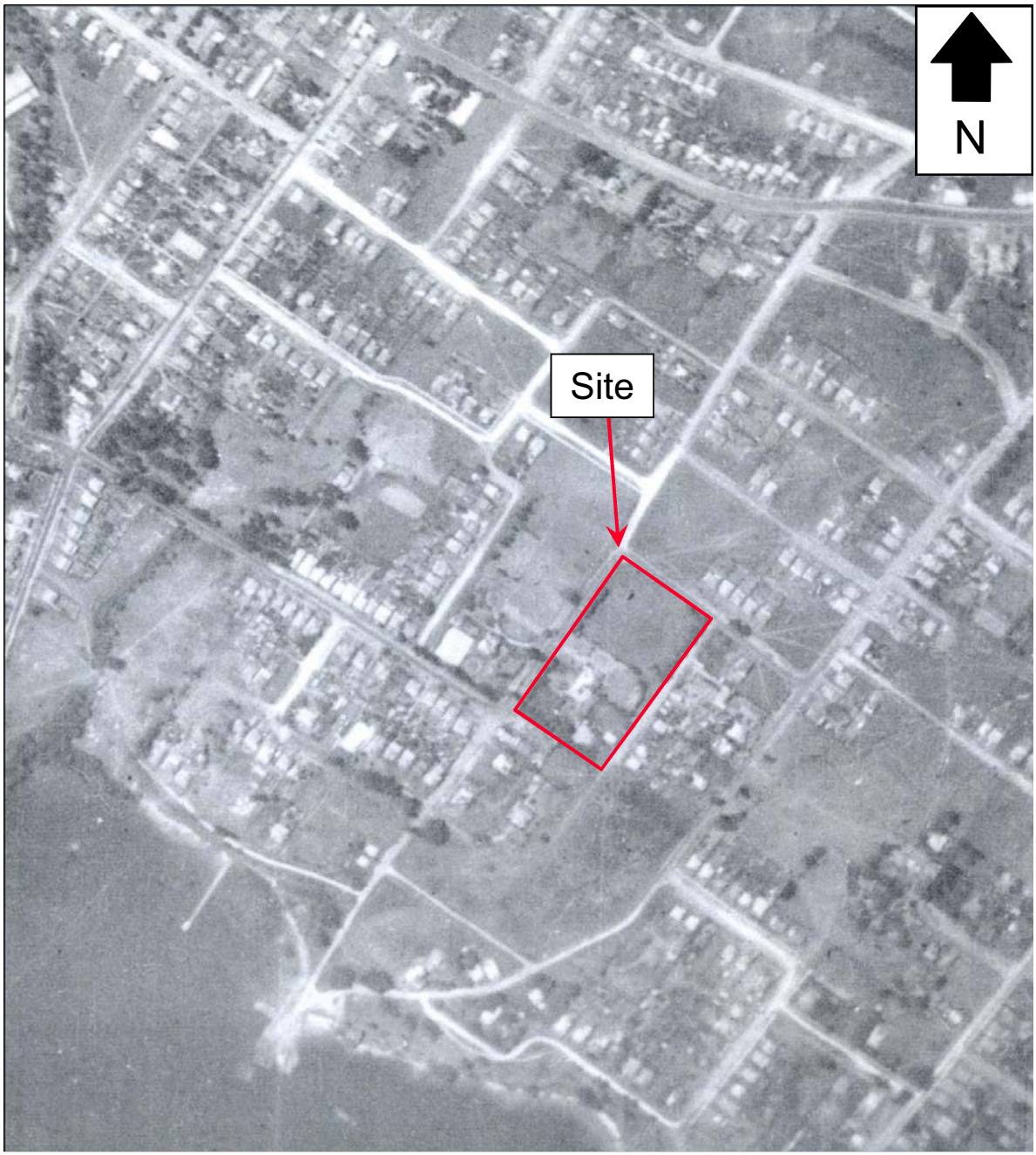
1961 Aerial Photograph Showing the Site and its Surrounds



Approximate Scale: 1:3700

Source: Department of Lands

1951 Aerial Photograph Showing the Site and its Surrounds



Approximate Scale: 1: 6250

Source: Department of Lands

1930 Aerial Photograph Showing the Site and its Surrounds