Preliminary Contamination and Geotechnical Investigation
Columbia Precinct, Homebush, NSW

David Lhuede Pty Ltd
Kennard's Self Storage Pty Ltd
Four All Clothing (Hai Phong Properties Pty Ltd)
c/o P.D. Mayoh Pty Ltd

March 2011

QUALITY MANAGEMENT

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EXECUTIVE SUMMARY

WSP Environmental Pty Ltd, trading as WSP Environment and Energy (WSP) were commissioned by Mayoh Architects on behalf of David Lhuede Pty Ltd, Kennard's Self Storage Pty Ltd and Four All Clothing (Hai Phong Properties Pty Ltd) to prepare a Preliminary Contamination and Geotechnical Investigation for the Columbia Precinct project, located at 2-20 Parramatta Road and 11-13 Columbia Lane, Homebush, NSW (the site).

The objective of the Preliminary Investigation was to satisfy part of the Director-General's Requirements for an Environmental Assessment for the project. In particular, the investigation was required to assess the suitability of the site for a proposed mixed use redevelopment by considering potential acid sulphate soils, soil and groundwater contamination and geotechnical properties of the site.

The following works were undertaken:

- Desktop review and site inspection to assess the environmental setting of the site;
- Limited soil, groundwater and geotechnical assessment involving the drilling of ten (10) borehole locations and converting three of the soil borings into groundwater monitoring wells;
- Analysis of one soil sample from each borehole location and from each groundwater monitoring well for identified contaminants of concern; and
- Geotechnical investigation at each borehole including resistance testing and analysis of undrained shear strength, phi, cohesion and shrink/swell (ISS) parameters.

The key findings of the investigation were:

- Potential contamination sources were identified at the site including current and former USTs, asbestos containing materials in site structures and site soils, an electrical substation and fill material up to 4.5mbgl.
- The fill material is variably compacted and in its current state under load, it is expected to settle differentially and excessively.
- There is a variation in the depth to bedrock (3.1 to 7.6mblg) across the site.
- No known occurrences of acid sulphate soils were identified within the site area.
- Groundwater is located at a depth of approximately 3.0 – 4.0 mbgl and flows north-west. There is no registered beneficial use of groundwater within a 1km radius of the site.
- VOC compounds were detected at groundwater monitoring well MW3. MW3 represents upgradient groundwater quality at the site and downgradient wells did not report any concentrations of these VOCs.

On the basis of the investigation findings, WSP recommend the following works:

- Development of a Remedial Action Plan (RAP) to document methodologies for the handling of fill material and an 'unexpected finds protocol' to manage unexpected contamination encountered during site redevelopment.
- A hazardous building materials assessment, to assist with the development of site specific hazard controls for the demolition works.
- The location of potential underground storage tanks to facilitate decommissioning, removal and validation of UST locations as part of the proposed redevelopment works.
- Soil validation sampling and analysis following removal / replacement works at the substation location.
- An additional round of groundwater sampling to further assess the extent of VOC contamination identified in groundwater at the site.
- Recompaction and certification of fill materials (or pier suspension) during construction works, to support structural slabs or footings.
- Assessment and management of groundwater for basement design and construction.

Based on the information obtained and reviewed as part of this Preliminary Contamination and Geotechnical Investigation, it is the opinion of WSP that the contamination and geotechnical condition of the site represents a low risk to the proposed residential and commercial redevelopment. WSP consider that the site is suitable for the proposed mixed-use development subject to the results of further investigations and implementation of all recommendations outlined in this report.

1 INTRODUCTION

1.1 BACKGROUND

WSP Environmental Pty Ltd, trading as WSP Environment and Energy (WSP) were commissioned by Mayoh Architects, on behalf of David Lhuede Pty Ltd, Kennard's Self Storage Pty Ltd and Four All Clothing (Hai Phong Properties Pty Ltd), to prepare a Preliminary Contamination and Geotechnical Investigation for the proposed Columbia Precinct, Homebush, NSW (the site).

The investigation was conducted to facilitate planning associated with a proposed mixed residential / commercial redevelopment at the site. In particular, the investigation was required to satisfy the Director-General's Requirements (11 November 2010) for an Environmental Assessment for the project (Key Issues Ref 13 – Groundwater, Ref 16 – Contamination/Acid Sulphate Soil Plans and Documents, Ref 6 – Geotechnical Report).

It is understood that this Preliminary Contamination and Geotechnical Investigation will be incorporated into the project Environmental Assessment which will be lodged with the Department of Planning in March, 2011.

1.2 OBJECTIVES OF THE INVESTIGATION

The objectives of the investigation were to:

- Thoroughly document the site history;
- Assess current potential onsite and offsite sources of contamination including the potential for acid sulphate soils;
- Assess the potential for contamination from past onsite land uses;
- Assess the land contamination status (soil and groundwater) of the site by conducting limited intrusive investigations and providing a conclusion on the suitability of the site for the proposed use;
- Identify geotechnical constraints associated with the site by undertaking preliminary investigations and outline whether intrusive works are required to assist in design solutions to enable the proposed redevelopment;
- Assess groundwater resources and the potential impacts associated with the proposed development.

1.3 SCOPE OF WORK

In accordance with WSP's Proposal (3 December 2010) and to meet the project objectives, including the requirements of NSW EPA Guidelines and State Environment Planning Policy (SEPP) No.55, WSP conducted the following scope of work:

- Task 1 – Stage 1 Desktop Review and Site Inspection
  - Review of Land Titles, WorkCover searches for UST installations, Contaminated Sites Registers, acid sulphate soil maps, Council DA/BA files and historical aerial photos.
  - Site walkover and interviews with key personnel to obtain information on chemical storage, potential for underground storage tanks (USTs), waste generation, storage and disposal activities.
- Task 2 – Stage 1 Limited Soil and Groundwater Quality Assessment
  - Drilling of ten (10) boreholes to a maximum depth of 10m below ground level (bgl) to obtain representative coverage across the entire site.
  - Conversion of three soil borings into groundwater monitoring wells.
  - Collection of soil samples from nominal depths of 0.5m bgl, 1.0m, 2.0m and each metre thereafter.
  - Analysis of select samples for asbestos, heavy metals (8), total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAHs), phenolics and Volatile Organic Compounds (VOCs).
  - Collection and analysis of groundwater samples for heavy metals, TPH and VOCs.
  - Comparison of analytical results against NSW DECC (2000) endorsed criteria for residential and commercial landuse.
  - Preparation of a report consistent with NSW DECC (2000) reporting guidelines.

- Task 3 – Geotechnical Investigation

  - Resistance testing of the strata within each borehole with a 9kg Dynamic Cone Penetrometer.
  - For clay based strata, insitu testing to determine the undrained shear strength of the strata.
  - Laboratory testing for phi and cohesion from depths of 2m and 5m at two borehole locations.
  - Laboratory testing of four tube samples for the shrink/swell (ISS) parameter.
  - Preparation of a geotechnical report which includes design parameters and identification of geotechnical issues which may need to be considered for the project.

1.4 REPORT STRUCTURE

The remainder of the report is organised as follows:

- Section 2 – provides a description of the site, current and proposed site activities, current surrounding land uses, topography, soil characteristics, geology, hydrogeology and hydrology of the site.
- Section 3 – provides a history of the site, review of previous reports, title deeds, aerial photographs, Council records and government databases. Identifies sensitive environments and potential receptors associated with the site;
- Section 4 – contains surface soil observations, soil sampling techniques, assessment criteria and results;
- Section 5 – contains groundwater observations, groundwater sampling techniques, assessment criteria and results;
- Section 6 – outlines the findings of the geotechnical investigative works;
- Section 7 – provides conclusions and recommendations;
- Section 8 – outlines the report limitations.

The appendices that accompany this report comprise:

A Figures

B Borehole logs

C Geotechnical report

D Site photographs from WSP's site inspection

E Title Deeds

F WorkCover search results

G Historical aerial photographs

H Table summaries of analytical results with comparison to adopted Guidelines

I Chain of Custody documentation and original laboratory analysis certificates

J Quality Assurance / Quality Control report for the investigation

K Field sheets for groundwater sampling event

2 SITE CHARACTERISTICS

2.1 SITE DESCRIPTION

The site is located at 2-20 Parramatta Road and 11-13 Columbia Lane, Homebush, NSW (refer to Figures 1 and 2, Appendix A). The site is commonly referred to as the Columbia Precinct and covers an area of approximately 30,000m^2. The site is largely developed and sealed with concrete hardstand, asphalt and various industrial and commercial premises, as described in Table 2.1. The buildings are primarily older warehouse-style structures of one to three storeys, dominated by the Kennard's Self Storage building in the north-eastern corner of the site.

An open, concrete lined stormwater channel runs along the southern boundary of the site and south-north through the centre of the site, before crossing under Parramatta Road.

Table 2.1 Site Description

Parameter	Site Details	
Street Address	2-20 Parramatta Road and 11-13 Columbia Lane, Homebush, NSW	
Lot / DP	Lot 9 DP 68910; Lot 8 DP 60261; Lot 1 DP 523775; Lot 2 DP 635483; Lot 1 DP 437118; Lot 1 DP 124584; Lots A & B DP 171468; Lot 5 DP 261926; Lot 4 DP 261926 and Lot 1 DP 814227(refer to Figure 3, Appendix A)	
Local Government Area	Strathfield Municipal Council	
Zoning	Mixed Use 10, Open Space 6(d), Proposed Open Space and Special Uses 5(b) Drainage under Strathfield Council Draft LEP Zoning Map 2003	
Current Landuse	2-10 Parramatta Road 12 Parramatta Road 14 Parramatta Road 16 Parramatta Road 18 Parramatta Road 20 Parramatta Road 11-13 Columbia Lane	Kennards, self-storage facility Westpac, historical services Deans Auctions, furniture sale and storage Martial arts studio Southern Cross Mowers, commercial mower business Auto-mechanic Auto-electrician Car yard Car yard Ausrestore, commercial 'emergency response' business
Site Area	30,000m^2 (approximately)	
Geographical Coordinates (MGA 56)	Easting: 323241.46 Northing: 6251056.96 (Approximate centre of site)	

2.2 FIELD OBSERVATIONS

During site inspections undertaken on 18 January 2011 and 4 February 2011, WSP made the following site observations:

- An exposed embankment near the eastern boundary of 2-10 Parramatta Road. The embankment comprised clayey fill, including bricks and tile fragments.
- Potential asbestos containing material in the external, eastern wall of the secondary building at 2-10 Parramatta Road. The wall had some damage (holes) but could not be inspected due to the presence of the steep embankment.

- An Energy Australia substation in the northeast corner of the building located at 6-8 Parramatta Road. Access is from Columbia Lane.
- During an on-site interview, WSP was informed by the tenant of 6-8 Parramatta Road that the roof may be constructed of asbestos containing materials.
- The storage and use of lubricants, degreasers, car batteries and coolants in the auto-mechanic and auto-electric workshop area within the building at the rear of 18 Parramatta Road. The products were generally neatly stacked on shelves. Minor staining was observed on the concrete floor. A $1m^3$ waste oil storage tank was located in the auto-mechanic workshop.
- A disused oil/water separator was located at the rear of 18 Parramatta Road, near the entrance to Southern Cross Mowers.
- During an on-site interview, property owner Mr David Lhuede advised that there was an Underground Storage Tank (UST) located at 18 Parramatta Road. Mr Lhuede advised that the UST had not been used for a number of years. The UST location, including dip / fill points, was observed by WSP personnel. Mr Lhuede advised that he was not aware of any historical USTs at 20 Parramatta Road.
- Minor chemical storage in a small workshop at the rear of 20 Parramatta Road was observed. Stored chemicals included degreasers, cleaners and paints. The majority of products were stored in 25L plastic containers. The products were stored on workbenches and the asphalt ground surface. No evidence of spillage was observed.
- Various chemical storage at 11-13 Columbia Lane, including window cleaners, detergents, floor treatments, methylated spirits, degreasers and paint strippers were observed. The chemicals were neatly stored and stacked on shelves and no evidence of spillage was observed.
- LPG tank storage at 11-13 Columbia Lane. The tanks were stored in a caged compound.
- A 'Dry Cleaning Office' sign at 11-13 Columbia Lane. The tenant advised that this building was for the storage of dry cleaned garments only and that no dry cleaning activities were undertaken on site.
- General rubbish storage (skip bins / Sulo bins, brick, plastic, timber and wood fragments) at most sites.

Selected photographs from WSP's site inspection are included in Appendix D.

2.3 CURRENT AND PROPOSED SITE ACTIVITIES

The current landuse of the site comprises various industrial and commercial premises including car yards, mechanical repairs and a storage warehouse.

The proposed use comprises mixed commercial, retail, food and entertainment services with multi-storey residential premises, recreational areas and open landscaping (refer to Figure 4, Appendix A).

2.4 SURROUNDING LAND USES

The site is surrounded by the following land uses:

North: Parramatta Road beyond which is a carwash and parking lot. George Street and Railway Street intersect Parramatta Road along the northern boundary;

East: Rail corridor beyond which are high-density residential properties. The South-eastern boundary borders commercial/industrial premises;

South: Open and lined stormwater channel and electricity sub-station;

West: Open and lined stormwater channel along the south-western boundary. Residential/commercial high-rise properties along the western boundary (these are accessed via Station Street beyond which are further residential properties).

2.5 ENVIRONMENTAL SETTING

2.5.1 Topography

The 1:25,000 Topographic and Orthophoto Map, Parramatta River 9130-3N, shows that the site is elevated approximately 5m to 10m above the Australian Height Datum (AHD). The site inspection by WSP personnel observed that the site was mostly sealed (asphalt and concrete), with some vegetation adjacent to the western boundary of the stormwater channel. A general, gradual slope was noted to the west / southwest.

2.5.2 Soils

According to the 1:100,000 Department of Infrastructure, Planning and Natural Resources, Soil Landscape Sheet 9130 Sydney Third Edition, the site it situated in the Blacktown landscape. This is characterised by gently undulating rises on Wianamatta Group shale and Hawkesbury shale. Local relief is to 30m with slopes usually less than 5%. The landscape is also characterised by broad rounded crests and ridges with gently inclined slopes. The shallow to moderately deep (<100cm) soils are generally red and brown podzolic soils on crests, upper slopes and well drained areas. Deep soils (150-300cm) are generally yellow podzolic soils and soloths on lower slopes and in areas of poor drainage. Limitations of the landscape include moderately reactive highly plastic subsoils, low soil fertility and poor soil drainage.

2.5.3 Acid Sulphate Soils

The 1:25,000 Acid Sulphate Risk Map for Prospect/Parramatta River, Edition Two 1997, developed by the Department of Land and Water Conservation, indicates that there are no known occurrences of acid sulphate soils in the site area. Land redevelopment activities are therefore not likely to be affected by acid sulphate soil materials.

2.5.4 Geology

According to the Sydney 1:100,000 Geological Series Sheet 9130 Edition 1 (1983), the site is situated on Ashfield Shale of the Wianamatta Group. Ashfield Shale is characterised by black to dark-grey shale and laminate.

2.5.5 Hydrogeology and Hydrology

A groundwater bore search of NRAtlas (January 2011) identified eight registered boreholes within a 1.5km radius of the site (refer to Table 2.2). The nearest borehole is located approximately 750 metres northeast of the site. Six (6) of the bores are registered for monitoring purposes with the registered purpose of the remaining two bores being domestic and dewatering respectively. The groundwater bore registered for domestic purposes is located 1km to the north-east of the site. It is not expected that this bore will be influenced by groundwater from the site as the inferred direction of groundwater flow is to the north-west.

For registered bore locations refer to Figure 5, Appendix A.

Site surface water and runoff from adjacent properties is expected to discharge to the open stormwater channel which runs along the south-western boundary of the site and north-south through the centre of the site (between 18 and 20 Parramatta Road). The stormwater flows north-west and passes through Bicentennial Park before discharging into the Parramatta River approximately 2.5km north of the site.

Table 2.2 Details of Groundwater Bores within 1.5 km radius of Site (NSW NRAtlas, January 2011)

Bore ID	Bore Purpose	Drilled depth (mbgl)	Depth to groundwater (mbgl)	Direction from site	Approximate Distance from site (m)
GW102560	Monitoring	4.00	1.83	Northwest	1000
GW102670	Monitoring	2.00	-	Northwest	750
GW15170	Monitoring	8.20	1.55	East	800
GW15171	Monitoring	8.20	1.55	East	800
GW15172	Monitoring	8.20	1.54	East	800
GW15173	Monitoring	8.20	1.61	East	800
GW305646	Domestic	6.00	-	Northeast	1000
GW102215	Dewatering (Groundwater)	15.00	-	Northeast	1200

3 DESKTOP INVESTIGATIONS

3.1 SITE HISTORY

The history of the site and surrounding area was obtained from a review of previous environmental reports, land title deeds search, WorkCover NSW Dangerous Goods records and aerial photographs. Copies of the title deeds search, WorkCover records and aerial photographs are included in Appendix E, Appendix F and Appendix G respectively.

3.2 REVIEW OF PREVIOUS REPORTS

3.2.1 *Columbia Precinct, 2-20 Parramatta Road and 11-13 Columbia Lane Homebush - Part 3A Major Project Application For Mixed Use Development: Preliminary Environmental Assessment*, Colston Budd Hunt And Kafes Pty Ltd With Mayoh Architects, July 2010

This report outlined the basic elements of the proposed development and assessed whether the project constitutes a 'Major Project' for assessment under Part 3A of the *Environmental Planning and Assessment Act.*

The report concluded that the proposed development is:

- consistent with the statutory provisions of the deemed instrument, the Strathfield Planning Scheme;
- consistent with the planning objectives and directions of the Metropolitan Strategy (2005) and the Inner West Sub-Regional Strategy (2008), and with the Objects of the Act;
- will have negligible adverse impacts and strong environmental performance;
- will have substantial planning benefits;
- will involve development works of a value of some $300 million which qualifies as a Major Project under the SEPP.

3.2.2 *Environmental Site Assessment – 6-18 Parramatta Road, Homebush NSW*, Environmental Investigations, 2 November 2007

Environmental Investigations Australia conducted an Environmental Site Assessment on 6-18 Parramatta Road (part of the site subject to WSP's assessment). The report was prepared to assess the degree of site contamination (if any) and included a desktop review and a sub-surface investigation. The sub-surface investigation comprised the drilling of twenty-one (21) boreholes and laboratory testing of selected soil samples for relevant analytical parameters.

The report concluded that;

- The site was free of statutory notices used by the NSW DECC;
- The site currently had one UST onsite with a possibility that further USTs remain at 6 Parramatta Road;
- Fibre Cement Sheeting (FCS), likely containing asbestos, was identified within the site building structures;
- Highly heterogeneous fill material was located at the site;
- Elevated concentrations of Copper were identified in two shallow (0.7m) samples within the vicinity of the UST and elevated concentrations of Lead were identified in two soil samples (<0.5m), in the north-west and north-east portions of the investigation area;
- All detectable levels of TPH and BTEX compounds were found to fall within the adopted thresholds;
- Trace or non-detectable concentrations of PAHs were identified in the tested samples;

- All samples tested for OCPs, PCBs, OPPs and VOCs showed concentrations to be within the adopted thresholds; and
- Apart from Asbestos Containing Material (ACM, Chrysotile Asbestos) identified in one soil sample, no detectable concentration of Asbestos or traces of respirable fibres were identified.

It was concluded that the site soils at **6-18 Parramatta Road** present a low risk to human health, the environment or the aesthetic enjoyment of the land, and may be suitable for the proposed development after carrying out the following recommendations;

- Preparation of a Remediation Action Plan (RAP) and notification to Council in accordance with the local government guidelines; and
- Excavation and removal of any asbestos contaminated soils from the location of BH3 in accordance with WorkCover Authority guidelines.

3.3 REVIEW OF TITLE DEEDS SEARCH

The site comprises eleven (11) parcels of land, identified as Lot 9 DP 68910; Lot 8 DP 60261; Lot 1 DP 523775; Lot 1 DP 437118; Lot 2 DP 635483; Lot 1 DP 8142277; Lot 5 DP 261926; Lot 1 DP 124584; Lots A & B DP 171458 and Lot 4 DP 261926 (refer to Figure 3, Appendix A).

The review of Title Deed records indicates that the current registered proprietors for the site are David Lhuede Pty Limited, Kennard's Self Storage Pty Limited and Four All Clothing (Hai Phong Property Pty Limited). A summary of the title deeds is listed below. For a detailed record of previous ownership refer to the title searches provided in Appendix E.

Table 3.1 Summary of Title Deeds

Year	Proprietor	Likely Landuse
Lot 9 DP 68910 (18 Parramatta Road)		
1994-Current	David Lhuede Pty Ltd/ Southern Cross Mowers Pty Ltd	Car yard / Commercial mower business
1987-1994	EMI Properties Pty Ltd	Music production and recording
1963-1987	Hayes Properties Pty Ltd	Real estate
1959-1963	Swallow's Biscuits Pty Ltd	Biscuit manufacturer
1954-1959	Wormald Brother Industries Ltd	Fire and security equipment
1950-1954	A.B. Carr Pty Ltd	-
1914-1950	Number of private proprietors	Residential
Lot 2 DP 635483 (18 Parramatta Road)		
1994-Current	David Lhuede Pty Ltd/ Southern Cross Mowers Pty Ltd	Car yard / Commercial mower business
1982-1994	EMI Properties Pty Ltd	Music production and recording
1953-1982	Hayes Properties Pty Ltd	Real estate
Lot 8 DP 60216 (16 Parramatta Road)		
1994-Current	David Lhuede Pty Ltd/ Southern Cross Mowers Pty Ltd	Commercial mower business
1989-1994	EMI Properties Pty Ltd	Music production and recording
1965-1989	Hayes Properties Pty Ltd	Real estate
1965-1965	Centaur Constructions Pty Ltd	Mining equipment
1897-1965	Number of private proprietors	Residential

Lot 1 DP 523775 (14 Parramatta Road)		
1994-Current	David Lhuede Pty Ltd/ Southern Cross Mowers Pty Ltd	Commercial mower business
1987-1994	EMI Properties Pty Ltd	Music production and recording
1966-1987	Hayes Properties Pty Ltd	Real estate
1903-1966	Number of private proprietors	Residential
Lot 1 DP 437118 (12 Parramatta Road)		
1994-Current	David Lhuede Pty Ltd/ Southern Cross Mowers Pty Ltd	Commercial mower business
1985-1994	EMI Properties Pty Ltd	Music production and recording
1985-1985	The Metropolitan Water Sewerage and Drainage Board	Management of Sydney Water
1962-1985	Hayes Properties Pty Ltd	Real estate
Lot 1 DP 124584 and Lots A & B DP171468 (2-10 Parramatta Road)		
1994-Current	Kennards Self Storage Pty Ltd	Commercial storage warehouse
1982-1994	EMI Properties Pty Ltd	Music production and recording
1951-1982	Hayes Properties Pty Ltd	Real estate
1926-1951	Columbia Graphophone (Australia) Ltd	Music production and recording
1918-1926	Gold's Hosiery Mills Ltd	-
Lot 5 DP 261926 (11-13 Columbia Lane)		
1998-Current	Hai Phong Property Pty Limited	Clothing wholesale / emergency response business
1988-1998	Vercast Pty Ltd	-
1966-1969	Mauri Brothers & Thomson (Aust) Pty Ltd	Mechanical seal manufacturer
1965-1966	Richmond Products Pty Ltd	-
1948-1965	Barretts Food Company Pty Ltd	Frozen food wholesale
1936-1948	Independent Manufacturing Pty Ltd	-
1891-1936	Number of private proprietors	Residential
Lot 4 DP 261926 (11-13 Columbia Lane)		
1994-Current	David Lhuede Pty Ltd/ Southern Cross Mowers Pty Ltd	Commercial mower business
1985-1994	EMI Properties Pty Ltd	Music production and recording
1952-1985	Hayes Properties Pty Ltd	Real estate
1948-1952	Barretts Food Company Pty Ltd	Frozen food wholesale
1936-1948	Independent Manufacturing Pty Ltd	-
1891-1936	Number of private proprietors	Residential
Lot 1 DP (20 Parramatta Road)		
1995- Current	David Lhuede Pty Limited	Car yard
1984-1995	State Railway Authority of New South Wales	Operation and maintenance of StateRail
1943-1984	The Commissioner for Railways	Operation and maintenance of StateRail

3.4 REVIEW OF WORKCOVER RECORDS

WorkCover historical records note that up to seven (7) USTs have been registered at the site over the period 1927 to 1992 as detailed in Table 3.2:

Table 3.2 Details of Underground Storage Tanks

Address	USTs Registered	UST Details
2 – 18 Parramatta Road	1 x UST registered from the 1930s – 1950s. Additional UST potentially registered in 1930s.	Capacity of known UST approximately 5,000L. Used to store oil for air conditioning unit. Location of UST unclear (site sketches only), however potentially located in North-Eastern corner of 2 Parramatta Road.
20 Parramatta Road	3 x USTs registered from 1970s – 1990s. 2 x USTs removed in early 1990s.	Capacity of USTs 10,000L, 20,000L and 20,000L. Registered use for petrol and diesel storage. Location of USTs unclear (site sketches only), however potentially located near western boundary of site.
11 – 13 Columbia Lane	2 x USTs registered from 1960s – 1970s.	No details available.

It is unknown which (if any) of these USTs remain at the site. WSP did not observe any evidence of USTs during site works, with the exception of one UST at 18 Parramatta Road, near the entrance to Southern Cross Mowers.

LPG tanks have also historically been registered at 2 – 18 Parramatta Road.

Refer to Appendix F for details of WorkCover search results.

3.5 REVIEW OF AERIAL PHOTOGRAPHS

Aerial photographs were reviewed to assist in identifying the history of the site and the surrounding area. The selected aerial photographs reviewed were from 1930, 1951, 1961, 1970, 1986, 1994, 1995, 2005 and 2011. Copies of all aerial photographs reviewed are included in Appendix G. Table 3.3 presents a summary of the review of each of these photographs.

Table 3.3 Historical Aerial Photo Review

Year of Aerial Photograph	Description of Site	Description of Surrounding Area
1930	Existing small buildings along north boundary with two large buildings in the northeast corner. The west and southern areas of the site appear undeveloped and cleared of vegetation.	Rail corridor exists along eastern and southern boundaries. Residential lots beyond railway line to the east. To the north lie George Street and Railway Street with building developments between. Residential properties along western boundary.
1951	Stormwater channel constructed running north-south through site and along southern boundary. Buildings constructed along eastern edge of site.	Large building constructed to the southwest.
1961	The site is now fully developed apart from the western boundary which is still cleared of vegetation.	Electricity sub-station to the south. Building upgrade on site adjacent to Railway Street to the north. Extension of Columbia Lane south to rail corridor. Large development to the southeast.
1970	Buildings demolished at 14-16 Parramatta Road except for three buildings in south-west corner of lot. Construction of car lot on northern half of 20 Parramatta Road. Southern half of lot appears un-vegetated	More buildings constructed along western boundary.
1986	Construction of building occupying majority area of 14-16 Parramatta Road.	Motorway constructed parallel to Parramatta Road to the north.
1994	No changes to the onsite landuse were observed.	No changes to the surrounding area were observed.

2005	Car park and small buildings developed in north-west corner of site.	No changes to the surrounding area were observed.
2011	No changes to the onsite landuse were observed.	Building to the north between George St and Railway St removed. Area appears vacant with sealed surfaces.

3.6 GOVERNMENT DATABASE SEARCHES

WSP reviewed publically available NSW Government databases to determine if the site is subject to any environmental constraints. WSP concludes the following:

- The site is not within land declared to be an investigation area or remediation site under Part 3 of the *Contaminated Land Management Act 1997*;
- The site is not subject to any outstanding orders or notices requiring an investigation order or remediation order;
- The site is not registered as an EPA Contaminated Site; and
- The site does not possess a licence under the *Protection of the Environment Operations Act 1997*.

3.7 SENSITIVE ENVIRONMENTS AND POTENTIAL RECEPTORS

The nearest sensitive environments are as follows:

- High-density residential properties adjoining the western site boundary.
- Stormwater channel running north-south through the centre of the site (between 18 and 20 Parramatta Road) and along the south western boundary.
- Site occupants and visitors for the commercial businesses currently located at the site.
- Site workers associated with the proposed redevelopment works at the site.
- Future site occupants.

3.8 POTENTIAL CONTAMINATION SOURCES

Based on the desktop investigation and the site inspection, the following potential contamination sources were identified.

- UST which remains at 18 Parramatta Road.
- 2 x USTs which were formerly located at 20 Parramatta Road.
- Three USTs which potentially remain at 2 Parramatta Road and 11-13 Columbia Lane.
- Asbestos building materials in site structures.
- General rubbish onsite (empty containers, plastic bags, brick, wood and plastic materials).
- Potential past spillage from oils and chemical storage at 18 Parramatta Road and 11-13 Columbia Lane.
- Electrical substation, in northeast corner of 6 – 8 Parramatta Road.
- Fill material located across the site.
- Hazardous building materials in surface soils from the historical demolition of buildings at 14-16 Parramatta Road.

4 PRELIMINARY SOIL INVESTIGATION

4.1 SOIL SAMPLING METHODOLOGY

WSP field personnel conducted intrusive works on 27 and 28 January, 2011.

A total of 54 soil samples (plus collection and analysis of one intra-laboratory duplicate and one inter-laboratory duplicate soil samples for QA/QC purposes) were collected from ten (10) boreholes as part of the investigation. The boreholes were drilled using a truck mounted rotary auger drilling rig.

Due to the preliminary nature of this investigation, the number of sampling locations does not meet the minimum sampling requirements for site characterisation, as defined in the *Sampling Design Guidelines* (NSW EPA, 1995). Sampling locations were chosen to give representative coverage across the site, target future proposed building footprints and where possible, target potential contamination sources identified in Section 3.8. Sampling locations are shown in Figure 6, Appendix A.

At least one sample from each borehole was sealed in a zip lock bag and analysed for organic compounds using a Flame Ionisation Detector (FID) (refer to the bore logs in Appendix B for FID results). One sample from each borehole was submitted for laboratory analysis. The sample was selected according to FID readings, visual and olfactory assessment of soil.

Each sample was collected and placed directly into a laboratory supplied glass sample jar using new disposable nitrile gloves. The samples were then immediately placed into an ice filled Esky and kept below approximately four degrees Celsius for appropriate laboratory preservation. Samples were refrigerated until transferred to the laboratory. A chain of custody was completed and the samples were dispatched to Envirolab (NATA certified), where chemical analysis was performed on the submitted soil samples.

4.2 SURFACE SOIL OBSERVATIONS

The following observations were made by WSP personnel on 18 January 2011:

- The majority of the site was currently in use. The site surface was generally sealed with buildings, concrete slabs and asphalt car park.
- Minor soil staining associated with car yards and mechanical repairs at 18-20 Parramatta Road.

4.3 FIELD OBSERVATIONS ON SOIL PROFILE

Fill was encountered within borehole locations at depths between 0.3-4.5mbgl. The fill depth was typically less than 1.0mbgl. The western portions of the site showed an increase in fill depth which may be attributed to development works associated with the stormwater channel. The fill was classified as a mixture of brown, black, grey and orange silty clay. Brick and asphalt fragments were noted in some bores. Fill was generally dry to moist with no odour, with the exception of BH9 which had a hydrocarbon odour and black staining at 0.5m depth.

Natural soil material, comprising mostly grey, black and orange non-plastic silty clay was observed beneath the fill material. Ironstone content was noted by red banding, particularly at BH7. The natural soil moisture condition ranged from moist to saturated. No odours were noted in natural soils.

The silty clays were underlain by shale / siltstone bedrock typically encountered between depths of 3 - 6m. Depth to shale appears to be shallowest in the northeast corner of the site and increasing in depth to the southwest. Shale was extremely weathered and light grey in colour.

Auger refusal was encountered at depths between 3.1 - 7.8m in weathered shale.

Refer to Appendix B for bore log details.

4.4 SOIL ASSESSMENT CRITERIA

The analytical suite included asbestos, heavy metals (M8), total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAH), phenolics and Volatile Organic Compounds (VOCs) (which included BTEX and solvents). A broad analytical suite was adopted due to the wide variance in historical site uses.

In accordance with the proposed future mixed use of the site, the applicable soil assessment criteria for the contaminants of concern include the following:

- *The National Environment Protection (Assessment of Site Contamination) Measure, 1999 Schedule B(1)* (NEPM,1999) Health-based Investigation Level D – residential with minimal access to soil (including high rise apartments), Level F – Commercial/Industrial use and EIL – for the protection of plant species.
- *The NSW Environmental Protection Agency, 1994 Service Station Guidelines* (EPA, 1999) criteria for TPH and BTEX not stated in the NEPM guidelines.

Table 4.1 summarises the soil assessment criteria.

Table 4.1 Soil Assessment Criteria

Parameter	Standard Residential HIL D (mg/kg)	Commercial/Industrial HIL F (mg/kg)	EIL (mg/kg)	Source
Heavy Metals				
Arsenic	**400**	**500**	**20**	NEPM (1999)
Cadmium	**80**	**100**	**3**	NEPM (1999)
Chromium(VI)	**400**	**500**	**1**	NEPM (1999)
Copper	**4000**	**5000**	**100**	NEPM (1999)
Lead	**1200**	**1500**	**600**	NEPM (1999)
Mercury	**60**	**75**	**1**	NEPM (1999)
Nickel	**2400**	**3000**	**60**	NEPM (1999)
Zinc	**28000**	**35000**	**200**	NEPM (1999)
PAHs				
Benzo(a) pyrene	**4**	**5**		NEPM (1999)
Total PAHs	**80**	**100**		NEPM (1999)
TPH				
TPH C_6-C_9	**65**	**65**		EPA (1994)
TPH C_{10}-C_{36}	**1000**	**1000**		EPA (1994)
Phenols				
Phenol	**34000**	**42500**		NEPM (1999)
BTEX				
Benzene	**1**	**1**		EPA (1994)
Toluene	**1.4**	**130**		EPA (1994)
Ethylbenzene	**3.1**	**50**		EPA (1994)
Total Xylenes	**14**	**25**		EPA (1994)
Other VOCs	No guidelines, site specific risk assessment where VOCs (other than BTEX) detected at concentrations greater than the laboratory limit of reporting			
Asbestos	Adopted NSW DECCW level of 'zero asbestos'			

4.5 SOIL ANALYTICAL RESULTS

Laboratory results are summarised in Appendix H with laboratory reports provided in Appendix I.

4.5.1 Heavy Metals

Concentrations of heavy metals in all soil samples submitted for analysis were below the NEPM (1999) guidelines with the following exceptions:

- Concentrations of copper in sample BH4 1.2m (500mg/kg) exceeded the NEPM EIL (1999) guideline of 100mg/kg; and
- Concentrations of zinc in sample BH4 1.2m (420mg/kg) exceeded the NEPM EIL (1999) guideline of 200mg/kg.

4.5.2 Organic Results

Concentrations of organics in all soil samples submitted for analysis were either below the NEPM (1999) and EPA (1994) guidelines or below laboratory detection limits, with the following exception:

- Concentrations of Total TPH (C_{10}-C_{36}) in sample BH6 1.0m (1,075mg/kg) exceeded the EPA (1994) guideline of 1,000mg/kg.

4.5.3 Asbestos

No asbestos fragments or fibres were detected in the ten soil samples analysed.

4.6 DATA QUALITY ASSESSMENT

A comprehensive QA/QC is contained in Appendix J.

An assessment of sample QA/QC found that the chain of custody requirements, sample integrity and holding times, laboratory QA/QC and analytical data check are acceptable and complete.

5 PRELIMINARY GROUNDWATER INVESTIGATION

5.1 GROUNDWATER WELL INSTALLATION METHODOLOGY

A total of three (3) boreholes were converted into groundwater monitoring wells. Groundwater well construction details are included on the borehole logs presented in Appendix B.

The well screen comprised 4.5-6.0m of 50 mm ID, Class 18, threaded, flush jointed uPVC with machine slots of 0.5 mm to 1.0 mm width. Casing for the well comprised approximately 1.5 m of 50 mm ID, Class 18, threaded, flush jointed uPVC. The screen and casing were joined using Viton™ O-rings which are chemically resistant to petroleum hydrocarbons and chlorinated solvents.

The void was gravel packed with 1-2mm graded sand to approximately 0.5m above the top of the screen followed by a bentonite seal installed above the gravel pack to the surface using bentonite pellets. The top of the well casings are below ground level and covered with steel Class D road boxes which were 'cemented in' flush with the ground surface.

5.2 GROUNDWATER OBSERVATIONS

Table 5.1 indicates the depth to groundwater at each borehole location as observed during drilling.

Table 5.1 Depth to groundwater encountered during drilling works

Borehole Location	Depth (mbgl)	Borehole Location	Depth (mbgl)
BH1	-	BH6	-
BH2	2.6	BH7	-
BH3	3.5	BH8	-
BH4	1.9	BH9	-
BH5	2.3	BH10	-

Groundwater wells were installed in BH2 (MW01), BH4 (MW02) and BH10 (MW03). After a period of 7 days, the groundwater level was observed at 3.06, 3.01 and 3.64mbgl respectively.

The Relative Levels (RL) of each well was surveyed with reference to Australian Height Datum (AHD). The RL of each well and calculated RL for groundwater are summarised in Table 5.2.

Table 5.2 Calculated RL for Groundwater

Monitoring Well ID	RL, TOWC (m AHD)	Depth to Groundwater (m)	RL, Groundwater (m AHD)
MW01	5.63	3.06	2.57
MW02	5.02	3.01	2.01
MW03	7.88	3.64	4.24

TOWC = Top Of Well Casing

On the basis of calculated depths to groundwater, the inferred groundwater flow at the site is North-West.

No odours were noted within sampled groundwater.

5.3 GROUNDWATER SAMPLING

A total of three (3) groundwater wells were sampled (plus collection and analysis of one duplicate groundwater sample and one rinsate sample for QA/QC purposes) as part of the investigation. Groundwater well locations are shown in Figure 6, Appendix A. Groundwater wells were positioned to assess groundwater conditions at the up and downgradient boundaries of the site.

Development of the wells was conducted following installation using a stainless steel bailer. The stainless steel bailer was cleaned with Decon 90 wash mixture and rinsed with water between sampling events at each well. Between 15 and 30L of sediment and water was removed from the three wells during development. All monitoring wells had a low yield with slow recovery and were consequently developed dry.

Prior to sampling, all wells were gauged with an interface water level meter to determine the depth to groundwater and presence of separate phase product and then purged using a low flow peristaltic pump. Wells were purged until groundwater parameters stabilised to within 10% of the previous reading.

Water quality parameters recorded included pH, redox potential (Eh), electrical conductivity, dissolved oxygen and temperature. Purging equipment was thoroughly decontaminated between purge events with a phosphate free detergent (Decon 90) and rinsed with potable water.

Groundwater samples were placed directly into water sampling containers. Samples for metals were field filtered using a 0.45micron millipore filter unit and placed into HNO_3 preserved bottles.

The samples were then immediately placed into an ice filled Esky and kept below approximately four degrees Celsius for appropriate laboratory preservation. Samples were refrigerated prior to being transferred to the laboratory. A chain of custody was completed and the samples were dispatched to Envirolab (NATA certified), where chemical analysis was performed on the submitted groundwater samples.

Field records of purging and sampling event are provided in Appendix K.

5.4 GROUNDWATER ASSESSMENT CRITERIA

The groundwater samples were analysed for heavy metals, TPH and VOCs. A broad analytical suite was adopted due to the wide variance in historical site uses.

The applicable groundwater assessment criteria comprise the following:

- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000* (ANZECC, 2000). The marine 95% level of protection guidelines have been adopted given that the nearest environmental receptors are marine ecosystems that can be classified as slightly – moderately disturbed according to the ANZECC (2000) guidelines;
- *The NSW Environmental Protection Agency, 1994 Service Station Guidelines* (EPA, 1999) criteria for benzene and xylene not stated in the NEPM guidelines;
- *The Dutch Intervention Levels, 2000* (Dutch, 2000) for mineral oil has been adopted as a screening criterion only for TPH.

Table 5.3 presents a summary of groundwater assessment criteria.

Table 5.3 Groundwater Assessment Criteria

Parameter	Trigger Values for Marine Water 95% Level of Species Protection (μgL^{-1})	Source
Heavy Metals		
Cadmium	**0.7**	ANZECC (2000)
Chromium	**4.4**	ANZECC (2000)
Copper	**1.3**	ANZECC (2000)
Lead	**4.4**	ANZECC (2000)
Mercury (inorganic)	**0.1**	ANZECC (2000)
Nickel	**7**	ANZECC (2000)
Zinc	**15**	ANZECC (2000)
TPH		
TPH C_{10}-C_{36}	**600**	Dutch (2000)
BTEX		
Benzene	**500**	ANZECC (2000)
Xylene	**380**	EPA (1994)

Other VOCs	No applicable guidelines, site specific risk assessment where VOCs (other than Benzene / Xylene) detected at concentrations greater than the laboratory limit of reporting

5.5 GROUNDWATER RESULTS

Laboratory results are summarised in Appendix H with laboratory reports provided in Appendix I.

5.5.1 Physiochemical Results

Physiochemical results of the groundwater were measured during sampling on 4 February 2011 and are shown in Table 5.4.

Table 5.4 Summary of physiochemical results

Monitoring Well ID	Temp (°C)	pH (pH units)	Dissolved Oxygen (ppm)	Redox / ORP 1 (mV)	Conductivity (µs/cm)
MW1	22.0	6.70	0.35	105	1876
MW2	27.3	6.87	0.23	-47	5.17
MW3	25.2	6.22	1.40	108	17.67

ORP field results converted to Standard Hydrogen electrode (SHE) readings by adding 206mV

- The temperature of the groundwater ranged from 22.0°C to 27.3°C across the three monitoring wells;
- pH ranged from 6.22 to 6.87 pH units indicating neutral groundwater conditions;
- Dissolved oxygen in the groundwater ranged from 0.23ppm to 1.40ppm;
- ORP (oxidation reduction potential) levels measured ranged between -47mV to 108mV. Indicates oxidising and reducing groundwater conditions. ORP (or Redox) is a measure of a water system's capacity to either release or gain electrons in chemical reactions;
- Conductivity levels ranged from 5.17 micro-siemens/cm (µs/cm) to 1876 µs/cm indicating fresh to saline groundwater conditions across the site.

5.5.2 Heavy Metals

The concentrations of heavy metals in all groundwater samples submitted for analysis were below the adopted site assessment criteria with the following exceptions:

- Concentrations of cadmium in MW2 (1.3µg/L) exceeded the ANZECC (2000) Marine Water criteria of 0.7µg/L;
- Concentrations of lead in MW2 (7µg/L) exceeded the ANZECC (2000) Marine Water criteria of 4.4µg/L;
- Concentrations of nickel in MW2 (41µg/L) exceeded the ANZECC (2000) Marine Water criteria of 7µg/L; and
- Concentrations of zinc in MW2 (47µg/L) exceeded the ANZECC (2000) Marine Water criteria of 15µg/L.

5.5.3 TPH / BTEX

Concentrations of TPH and BTEX in all groundwater samples submitted for analysis were either below the laboratory limit of reporting or below the adopted site assessment criteria.

5.5.4 VOCs

Concentrations of VOCs in all groundwater samples submitted for analysis were below the laboratory limit of reporting with the following exceptions:

- Concentrations of cis-1,2-dichloroethane (34µg/L), trichloroethene (1.9µg/L) and vinyl chloride (16µg/L) in MW3, located in the south-western corner of the site. Notification triggers for these contaminants (marine water) are not defined in the *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997*. Groundwater samples obtained from downgradient wells MW1 and MW2 did not report any concentrations of these VOCs.

5.6 DATA QUALITY ASSESSMENT

A comprehensive QA/QC is contained in Appendix J.

An assessment of sample QA/QC found that the chain of custody requirements, sample integrity and holding times, laboratory QA/QC and analytical data check are acceptable and complete.

6 GEOTECHNICAL INVESTIGATION

6.1 GEOTECHNICAL SAMPLING

A preliminary geotechnical investigation was undertaken Auswide Geotechnical. The geotechnical assessment involved resistance testing of the strata within each of the ten boreholes using a 9kg Dynamic Cone Penetrometer. For clay based strata, insitu testing was carried out to determine the undrained shear strength of the strata. Tube samples (U50) were retrieved from 2 metre and 5 metre depths from selected boreholes and laboratory tested for phi and cohesion. Three tube samples were retrieved from BH2, BH8 and BH9 for shrink/swell (ISS) parameter testing by the laboratory.

6.2 GEOTECHNICAL ANALYTICAL RESULTS

The geotechnical report compiled by Auswide Geotechnical is provided in Appendix C.

7 CONCLUSIONS AND RECOMMENDATIONS

7.1 CONCLUSIONS

Based on the findings of the preliminary contamination and geotechnical investigation, WSP makes the following conclusions:

- Through a desktop review and site inspection, a number of potential contamination sources have been identified at the site including current and former USTs, asbestos containing materials in site structures and site soils (from a previous investigation), an electrical substation and fill material.
- Groundwater is located at a depth of approximately 3.0 – 4.0 mbgl and flows north-west. Due to the shallow depth of groundwater, any basement design and construction undertaken as part of the proposed development will need to assess and manage impacts to local groundwater.
- No groundwater bores are registered for beneficial use within a 1km radius of the site.
- The majority of the site is underlain by fill material up to 4.5mbgl.
- EIL excceedences for copper and zinc were recorded for one borehole location (BH4). Environmental Investigations also reported elevated metal (copper and lead) concentrations in fill material across 12 - 18 Parramatta Road. As such, the selection of metal tolerant plant species should be considered for the proposed redevelopment.
- Total TPH (C10-C36) was reported in excess of the adopted criteria for one borehole location (BH6 1.0m). It is likely that this impact is isolated and associated with the heterogeneous fill material. This area is intended for multi-storey residential/commercial use restricting access to the soil and WSP does not consider that the exceedance poses any restrictions on the proposed redevelopment.
- Heavy metal exceedances of ANZECC (2000) Marine Water criteria were recorded at one location (MW2). The elevated metal concentrations are not considered to present a risk to the environment and are likely to be representative of background concentrations.
- cis-1,2-dichloroethane, trichloroethene and vinyl chloride were detected at MW3. MW3 represents upgradient groundwater quality at the site and it is unlikely that the elevated concentrations of these contaminants are a result of site activities. Notification triggers for these contaminants (marine water) are not defined in the *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997*. Groundwater samples obtained from downgradient wells MW1 and MW2 did not report any concentrations of these VOCs.
- Site structures potentially comprise hazardous materials, including asbestos.
- Refer to Appendix C for geotechnical conclusions provided by Auswide Geotechnical.

7.2 RECOMMENDATIONS

Based on the findings and conclusions of the preliminary contamination and geotechnical investigation, WSP makes the following recommendations:

- A Remedial Action Plan (RAP) be developed to document the proposed methodologies for the excavation, handling and off-site disposal of fill material. The RAP shall also document an 'unexpected finds protocol' to outline the process for managing unexpected contamination which is encountered during site redevelopment works.
- Fill material excavated as part of the proposed redevelopment is stockpiled on site and subject to waste classification sampling to determine the most appropriate method of off-site disposal.
- A hazardous building materials assessment is undertaken prior to demolition, to assist with the development of site specific hazard controls for the demolition works.
- Up to five USTs potentially remain onsite. WSP recommend that USTs are located, decommissioned, removed and UST locations validated as part of the proposed redevelopment works.

- Consultation will be required with Energy Australia prior to removal / replacement of the substation identified at the site. WSP recommend soil validation sampling and analysis following removal / replacement works at the substation location.
- An additional round of groundwater sampling to further assess the extent of VOC contamination identified in groundwater at the site. Based on the results of the additional groundwater sampling, additional works may be required to identify the source and extent of VOC contamination.
- Where feasible, groundwater monitoring wells installed as part of this investigation are retained on site.
- Refer to Appendix C for geotechnical recommendations provided by Auswide Geotechnical.

Based on the information obtained and reviewed as part of this Preliminary Contamination and Geotechnical Investigation, it is the opinion of WSP that the contamination and geotechnical condition of the site represents a low risk to the proposed residential and commercial redevelopment, noting the recommendations provided in the report.

8 REPORT LIMITATIONS

The findings of this report are based on the scope of work outlined in section 1.3. WSP performed its services in a manner consistent with the normal level of care and expertise exercised by members of the environmental assessment profession. No warranties, express or implied are made.

Subject to the scope of work, WSP's assessment was limited strictly to identifying the environmental conditions associated with the subject property and does not include evaluation of any other issues. This report is not a detailed contamination assessment across the entire site and only encompasses a limited intrusive investigation. The absence of any identified hazardous or toxic materials on the subject property should not be interpreted as a guarantee that such materials do not exist on the subject property.

This report does not comment on any regulatory obligations based on the findings. This report relates only to the objectives stated and does not relate to any other work undertaken for the Client.

All conclusions and recommendations regarding the property are the professional opinions of the WSP personnel involved with the project, subject to the qualifications made above. While normal assessments of data reliability have been made, WSP assumes no responsibility or liability for errors in any data obtained from regulatory agencies, statements or sources outside of WSP, or developments resulting from situations outside the scope of this project.

WSP is not engaged in environmental assessment and reporting for the purpose of advertising sales promoting, or endorsement of any client interests, including raising investment capital, recommending investment decisions, or other publicity purposes. It is acknowledged that this report is for the exclusive use of the client.