



NSW Department of Planning and Environment  
Preliminary Site Investigation

Banksia Priority Precinct

21 August 2015  
50299/100849 (Rev 0)  
JBS&G

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## List of Abbreviations

ACM	Asbestos Containing Material
AEC	Areas of environmental concern
AHD	Australian Height Datum
B(a)P	Benzo(a)pyrene
BTEX	benzene, toluene, ethylbenzene, xylenes
COC	Chain of Custody
COPC	Contaminant of potential concern
CSM	Conceptual site model
DEP	Department of Environment and Planning
DP	Deposited Plan
DWE	NSW Department of Water and Energy
EPA	NSW Environment Protection Authority
ESA	Environmental Site Assessment
ha	Hectare
JBS&G	JBS&G Australia Pty Ltd
OEH	Office of Environment and Heritage
OCP	Organochlorine Pesticides
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PSI	Preliminary Site Investigation
SEPP	Statement Environmental Planning Policy
TPH	Total Petroleum Hydrocarbons

## Executive Summary

JBS&G Australia Pty Ltd (JBS&G) was engaged by the NSW Department of Planning and Environment (the client) to provide environmental services to support the planning of the Arncliffe and Banksia Priority Precincts, NSW, located as shown on **Figures 1 and 2**.

The Banksia Priority Precinct (Precinct) is centred on the Banksia railway station. Some preliminary planning work has been undertaken between Wolli Creek and Rockdale during development of the Princes Highway Corridor Strategy adopted by Rockdale City Council in September 2013.

The objective of the assessment was to identify and document the potential for contamination, based on a site history review, review of any previous investigations and observations made during inspection of accessible areas within the Precinct.

The scope of work comprised a review of the environmental setting and historical documentation to identify potential areas of environmental concern (AECs) and associated contaminants of potential concern (COPCs) and specifically within the opportunity sites and preparation of this ESA report.

The Precinct has many minor roads extending through it servicing the various residential and commercial properties in the area, however, the main roads are Princes Highway, Forest Road, and Wolli Creek Road.

The Precinct contained various site uses including a train station, various open space parkland areas, residential and commercial properties such as vehicle repair, service stations, car sale yards, etc. The site inspection identified specific properties such as the Caltex Service Station, public open space, new and used vehicle sales/maintenance operations and an independent service station, as well as numerous new residential developments.

The potential AECs and associated COPCs that were identified as part of the site inspection and historical review are shown in **Table 1** below.

**Table 1 Areas of Environmental Concern and Associated Contaminants of Potential Concern**

Area of Environmental Concern	Contaminants of Potential Concern
Fill material at the site used to obtain existing ground levels	Heavy metals, total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), polychlorinated biphenyls (PCBs) and asbestos
Vacant blocks (illegal dumping/filling)	Heavy metals, TPH, BTEX, PAHs, OCPs, PCBs and asbestos
Service Stations and underground petroleum storage on industrial/commercial properties	Heavy metals, TPH, BTEX, PAHs
Railway	Heavy metals, TPH, BTEX, PAHs
Former Site Building Structures	Asbestos, lead paint, synthetic mineral fibres
Schools/ Religious Buildings	Asbestos, lead paint, synthetic mineral fibres
Residential housing pre 2003	Asbestos, lead paint, synthetic mineral fibres
Car parts/mechanics	Heavy metals, TPH, BTEX, PAHs, asbestos
Car dealerships	Heavy metals, TPH, BTEX
Historical quarrying/potential landfill sites	Heavy metals, TPH, BTEX, PAHs, OCPs, PCBs and asbestos
Former Market Gardens	OCPs, OPPs, heavy metals
Furniture Manufacture	Heavy metals, chlorinated solvents

On the basis of the results of this investigation, and subject to the limitations outlined in **Section 7**, there is potential for contamination to be present resulting from previous site and offsite activities associated with the identified AECs. Potentially contaminated media present at the site may include fill material, natural soils and groundwater.

Potential hazardous building materials such as asbestos containing materials (ACM) and lead paint may exist within the site buildings including those in areas where redevelopment may occur.

Whilst the preliminary investigation identified the potential for contamination to be present on individual properties in some areas of the Precinct, it did not identify the potential for gross or widespread contamination which may preclude rezoning of the Precinct. Identified potential impacts are considered representative of common contaminants and potentially contaminating land use activities which can be readily dealt with during later development application (DA) stages (i.e. including completion of specific preliminary and detailed site investigations to assess land use suitability consistent with relevant planning instrument) for redevelopment of areas within the Precinct, once detailed development proposals are made.

In the absence of gross or widespread contamination, the requirements of the DUAP/EPA (1998) Managing Land Contamination: Planning Guidelines for rezoning have been satisfied, namely that the rezoning can proceed provided measures are in place to ensure that the potential for contamination and the suitability of the land for any proposed use are assessed once detailed proposals are made.

## **1. Introduction**

### **1.1 Background**

JBS&G Australia Pty Ltd (JBS&G) was engaged by the NSW Department of Planning and Environment (the client) to provide environmental services to support the planning of the Arncliffe and Banksia Priority Precincts, NSW, located as shown on **Figures 1 and 2**.

The Banksia Priority Precinct (herein referred to as the Precinct) is centred on the Banksia railway station. Some preliminary planning work has been undertaken between Wolli Creek and Rockdale during development of the Princes Highway Corridor Strategy adopted by Rockdale City Council in September 2013.

The dominant land use within the Precinct comprises low to high-density residential, with some open space recreational areas and other support services such as schools and religious centres. There is however a substantial retail/commercial and light industrial land use corridor along the Princes Highway and suburban railway line. There are a number of large landholdings that have been identified to offer opportunities for rezoning and/or redevelopment as part of the Princes Highway Corridor upgrade strategy.

In preliminary evaluation of information requirements to facilitate rezoning of these areas, it has been identified that there are a number of potential land uses that may have resulted in site contamination. These include open space land in urban areas that can be subject to uncontrolled filling that can incorporate wastes such as asbestos, waste chemicals and storage containers, spoil and general household/commercial rubbish. Additionally, the enterprise corridor along the Princes Highway is known to have properties which have chemical storage such as underground storage tanks (USTs).

Consequently, a preliminary environmental assessment was requested to understand potential areas of environmental concern (AECs) and associated contaminants of potential concern (COPCs) as may require further consideration as part of the rezoning process.

The scope of the assessment has been developed in general accordance with relevant guidelines made or approved by the NSW Environment Protection Authority (EPA).

### **1.2 Objectives**

The objective of the assessment was to identify and document the potential for contamination within the Precinct, based on a site history review, review of any previous investigations and observations made during inspection of accessible areas within the Precinct.

### **1.3 Scope of Works**

The scope of works completed for this assessment comprised:

- Review of the available documents provided by the client;
- Review and summary of relevant published geological and hydrogeological data including a review of licensed groundwater bore information;
- Review of available Council documentation, aerial photographs, legal title information, WorkCover NSW records, EPA records and Heritage records to identify potential AECs and associated COPCs;
- Inspection of accessible areas of the Precinct to identify potential AECs and COPCs identified in the historical review; and
- Preparation of this ESA report in general accordance with guidelines made or approved by the NSW EPA.



#### 1.4 Opportunity Sites

The Precinct has been identified by NSW Department of Planning and Environment as a Priority Precinct. The aim is to encourage the development of a variety of housing choices within easy access to transport, services and employment.

The key strategic areas within the Precinct are reported to occur predominantly localised around the Arncliffe train station. In these areas opportunities for mixed residential/commercial uses will be considered to promote an active Precinct with vibrant streets and increased density around the train station, as well as the necessary supporting amenity and services which could include new and improved walkways, cycle ways, playgrounds, community facilities and public art.

NSW Department of Planning and Environment has identified a number of typical properties within the Precinct with the potential for some form of redevelopment in the future. These 'opportunity sites', located as shown on **Figure 4**, comprise:

- 324-326 Princes Highway, Banksia (Lot 9 DP10039);
- 286 Princes Highway, Banksia (Lot 1 DP135035); and
- 314 Princes Highway, Banksia (Lot A DP400715).

## 2. Precinct Condition & Surrounding Environment

### 2.1 Precinct Identification

The location of the Precinct is shown in **Figure 1**. Land within the Precinct is currently owned by various landowners. The Precinct details, as summarised in **Table 2.1** and shown in **Figure 2**, are described in detail in the following sections

**Table 2.1: Summary Precinct Conditions**

Address	Precinct areas surrounding the Princes Highway, Banksia, NSW as shown in <b>Figure 2</b> attached.
Local Government Authority	Rockdale City Council
Site Zoning	R1 General Residential, R3 Medium Density Residential, R4 High Density Residential, B4 Mixed use, B6 Enterprise Corridor , SP2 Special Uses, RE1 Public Recreation
Current Use	Residential and Commercial/industrial and open space parkland
Proposed Use	Residential and Commercial/industrial and open space parkland
Site Area	Approximately 135 Ha
MGA Coordinates (Zone 56) of approximate centre of Precinct	6242339 (S) 328155 (E)

### 2.2 Site Description

An inspection of the Banksia Precinct was undertaken by JBS&G personnel on 31 March 2015.

The Precinct layout is shown in **Figure 2**. The key observations made during the inspection relate to individual sites as shown on **Figure 3**.

The Precinct has many minor roads extending through the Precinct servicing the various residential and commercial properties in the area, however, the main roads are the Princes Highway, Roach and Bestic Streets.

The northern extent of the Precinct boundary was Terry and Avenal Streets. The eastern boundary was Marinea Street and the rear of properties facing the Princes Highway in the southern portion of the Precinct. The southern boundary was situated along the alignment of Bestic and Klimpton Streets either side of the Railway corridor. The western Precinct boundary extended along the eastern extent of Gardiner Park, to the rear of residences facing Knight Street and Mount Street.

Banksia train station is located in the central southern portion of the Precinct (Point 4), with the Princes Highway alignment located to the east of the station and the associated railway corridor. The Princes Highway extended through the entire Precinct from north to south, with various commercial properties located all along the highway. Along the Princes Highway in the northern portion of the Precinct, an independent service station and mechanics was present (Point 3). A single fuel bowser was observed at the front of the commercial property, with potentially one UST present.

Along the Princes Highway car dealerships were also present, including a Nissan outlet and independent dealerships. It was noted that groundwater monitoring wells were observed on the Nissan property (Point 1). The roads parallel with the Princes Highway in this portion of the Precinct were noted to be characterised by numerous properties occupied by mechanic workshops and second hand car parts yards. Staining on the concrete surface was observed throughout these properties.

In the southern portion of the Precinct (324 Princes Highway) a Caltex Service station was observed and appeared to contain potentially five USTs based on the fuel points present on the ground surface. A total of five vent pipes were observed (Point 5). A commercial development on the corner of Bestic Street and the Princes Highway also appeared to have several in-situ underground storage tanks and signage indicative of former vehicle repair activities, eventhough the current use was carpet sales.

To the east and west of Princes Highway, the predominant landuse within the Precinct was identified as residential housing, the majority of which appeared to be pre 2003 in construction.

Throughout the Precinct there are various public open spaces and parks. A large park known as Gardiner Park was also located adjacent to the western boundary of the Precinct (Point 2).

A selection of photographs of the site is provided in **Appendix A**.

### **2.3 Surrounding Land Use**

Land uses surrounding the Precinct consist of a mixture of residential, commercial/industrial and public open space similar to that observed within the Precinct.

To the north and south of the Precinct are predominantly commercial and residential properties associated with Arncliffe and Rockdale suburbs respectively.

To the east of the Precinct are residential properties, market gardens, with St George Soccer Stadium beyond. To the south east of the Precinct is vacant, vegetated land, with Muddy Creek beyond. As noted above, Gardiner Park, comprising a former quarry was situated adjacent to the west boundary of the Precinct.

Sydney International Airport is located approximately 1.5 km to the east of the Precinct, across the Cooks River.

### **2.4 Topography**

A review of the 1:100 000 topographic map for Sydney (9130<sup>1</sup>) identified that the Precinct is located within undulating to rolling rises and low hills on Hawkesbury sandstone. The Precinct ground levels vary from approximately 10-30 m AHD. The topography of the Precinct is generally flat, apart from the western and north western portion of the Precinct where ground levels rise significantly.

### **2.5 Hydrology**

There are no permanent surface water bodies/creeks etc within the Precinct. The closest surface water bodies to the Precinct are:

- A man-made creek line located adjacent to the eastern boundary of the site, which extends to Muddy Creek, approximately 400 m to the east of the Precinct. This man-made creek line was unnamed and is located adjacent to the Eve Street cycleway and extends to the west until Short Street, the eastern boundary of the Precinct; and
- The Cooks River is located approximately 1.4 km to the east of the Precinct, which flows into Botany Bay. Bardwell Creek which flows into Wolli Creek is located approximately 1.7 km from the western boundary of the Precinct.

For the roadway, railway, commercial/industrial and residential areas it is anticipated rainfall will generally flow into local and then regional stormwater drainage infrastructure present within the Precinct. Where rainfall falls on the ground surface within these parts of the Precinct, runoff is anticipated to flow into the constructed drains which flow to the Princes Highway and other major roads and then into surface water bodies beyond the Precinct, including the Cooks River, Muddy Creek and Wolli Creek. It is anticipated that rainfall in the vacant, vegetated areas within the Precinct will either infiltrate into the soil or be taken up by the vegetation present. For the remainder of the Precinct, flows are likely to continue overland based on topographical levels.

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<sup>1</sup> Topographic map for Sydney, 1:100 000 Sydney sheet series 9130, 1976 (9130a)

## 2.6 Geology

A review of the 1:100 000 Geological Series for Sydney (Geological Survey of NSW Sheet 9130<sup>2</sup>) indicates the Precinct and surrounds are underlain by Quaternary sediments consisting of silty to peaty sand, silt and clay with common shell layers and by Middle Triassic Hawkesbury Sandstone of the Wianamatta Group which consist of which consist of medium to coarse grained quartz sandstone with very minor shale and laminate lenses.

A review of the Soil landscape map Series (9130<sup>3</sup>) indicates that the soils at the Precinct may consist of several separate soil landscapes, consistent with the geological conditions as noted above, and are described below:

- Newport: shallow, well sorted siliceous sands overlying moderately deep buried sands including yellow podzolic soils with sandy topsoils on crests and gentle slopes. Deep podzols on steep slopes low slopes and depressions;
- Lambert: shallow discontinuous earthy sands and yellow earths on crests and inside of benches, shallow siliceous sands/lithosols on leading edges, shallow to moderately deep leached sands, grey earths and gleyed podzolic soils in poorly drained areas, localised yellow podzolic soils associated with shale lenses; and
- Additionally, there is potential for Disturbed Terrain to occur in areas of land reclamation (low lying swamps etc) or those where the original soil has been removed, greatly disturbed or buried, landfill. This material has the potential to include soils, rock, building and waste materials.

## 2.7 Hydrogeology

Regional groundwater flows are expected towards Botany Bay to the south east of the Precinct, however it is anticipated that flows may be influenced beyond the Precinct boundary by surface water bodies including the Cooks River, Muddy and Wolli Creeks. On a local level it is anticipated that groundwater movement is anticipated to occur in sympathy with the surface topography.

The registered groundwater bore search information was obtained from the Office of Water on the 1 June 2015. A review of the registered bore information indicated that a total of seven monitoring bores were locations within the boundary of the Precinct.

The groundwater monitoring well information is provided in **Table 2.2** below and in **Appendix B**:

**Table 2.2 Groundwater Bore Summary**

Bore	Use	Total Depth (m)	Standing Water Level (SWL)	Water Bearing Horizon
GW024062	Domestic	3.70	1.50	Clay
GW0106955	Domestic	4.20	Unknown	Unknown
GW107580	Domestic	Unknown	Unknown	Unknown
GW109958	Monitoring Bore	5.20	Unknown	Clay
GW109959	Monitoring Bore	5.90	Unknown	Clay
GW109960	Monitoring Bore	8.00	Unknown	Shale
GW109961	Monitoring Bore	5.80	Unknown	Shale

## 2.8 Acid Sulfate Soils

Review of the NSW Natural Resource Atlas (NRA 2015<sup>4</sup>) indicated that for the Precinct there are no known occurrences of acid sulfate soil materials within the Precinct. The closest known occurrence

<sup>2</sup> Geological Series for Sydney, 1:100 000 Sydney sheet series 9130, 1983 (9130b)

<sup>3</sup> Soil landscape map Series, 1:100 000 Sydney sheet series 9130, 1989 (9130c)

<sup>4</sup> Website [www.nratlas.nsw.gov.au](http://www.nratlas.nsw.gov.au) accessed on 06 April 2015

of potential acid sulfate soils are located approximately 500 m to the east of the Precinct adjacent to Spring Street.

### 3. Site History

#### 3.1 Aerial Photographs

Aerial photographs were obtained from the Department of Land and Property Information and are included as **Appendix C**. Land use conditions in relation to historical use of the Precinct are discussed below for each image.

**1930:** The significant Precinct features including the Princes Highway, the railway line and the majority of the street networks had been established. Mixed low density residential and commercial properties surrounded both the railway line and the Highway. The aerial photograph showed that excavation works were being completed in Gardiner Park immediately to the west of the site. An exposed rock face appeared to extend from the east extent of Gardiner Park along the rear dividing line of the residential properties facing Godfrey and Knight Streets respectively, potentially indicative of former quarrying activities in this area of the Precinct.

In the east of the Precinct there appeared to be market gardening.

To the north, north east and east of the Precinct there appeared to be residential housing present, with a single vacant lot to adjacent to the northern boundary. Additionally, to the south, north and west of the Precinct appeared to be residential housing.

**1951:** The Precinct layout appeared to be similar to the 1930 photograph, with further residential development in the north eastern portion of the Precinct.

The excavation appeared to have been completed in Gardiner Park and vegetated open space constructed.

**1961:** The Precinct appeared to be similar in layout to the 1951 photograph. Along the Princes Highway further commercial/industrial buildings appeared to have been constructed, with former residential dwellings being demolished.

The market gardens properties to the east of the Precinct appeared to have been partially redeveloped for residential uses and earthworks were apparent to the north-east of this area.

**1970:** The Precinct appeared to be similar in layout to the 1961 photograph, with further residential development apparent to the east of the Precinct on land previously used for market gardening.

**1982:** Apart from further commercial/small scale development of land to the east of the railway corridor, the Precinct land uses generally appeared to be similar in layout to the 1970 photograph.

**1991:** The Precinct land uses appeared to generally be similar to the 1982 photograph.

**1998:** The Precinct land uses appeared to generally be similar to the 1991 photograph.

**2005:** The Precinct land uses appeared to generally be similar to the 2005 photograph.

#### 3.2 Title Deeds

A title search was completed by Mark Groll on behalf of JBS&G for three properties identified as being opportunity sites within the Precinct. Copies of the title deeds are provided in **Appendix D**.

For the historical titles obtained for the three properties, a summary is presented in **Table 3.1** following.

**Table 3.1 Summary of Historical Title Deeds**

Address	Lot	Map Reference	Year	Title
286 Princes Highway	Lot 2 D.P. 135035	-	1912 to 1942	James Boyne Gibson (Grocer) (& His deceased estate)
			1942 to 1945	Lilian Thomson Gibson (Spinster)
			1945 to 1954	Roy Stephen Upton (Engineer)
			1954 to 1962	R.S. Upton Pty Limited
			1962 to 1975	W.T Coggins Holdings Limited
			1975 to 1977	Tynan Motors Pty Limited
			1977 to 1979	O.R. Utichi Pty Limited
			1979 to 1988	Stewart Properties (Banksia) Pty Limited
			1988 to 1990	Archar Charles Lockhart-Ross Peter John Norbury
			1990 to 2002	Ron James Properties Pty Limited
	2002 to date	Janside Pty Limited		
Land title records indicate the property located at 286 Princes Highway was possibly used as a residential property from at least 1912 until 1945 when an engineer and then car sales yard company owned the site. The site has since been used for commercial (vehicle sales etc) purposes. In 2002 the site was sold to the current owner who used the site as a car sales yard to the present.				
314 Princes Highway	Lot A D.P. 400715	-	1915 to 1927	Thomas Benjamin Robert Perry (No occupation noted) Charles Alonzo Pain (No occupation noted) Ethel Dora Beehag (Spinster) Now Ethel Dora Schwebel (Married Woman)
			1927 to 1927	Charles Alonzo Pain (No occupation noted) Ethel Dora Schwebel (Married Woman)
			1927 to 1934	Thomas Valentine Whitaker (Timber Merchant)
			1934 to 1957	Harold Frederick Whitaker (Foreman) Thomas Henry Whitaker (Traveller) Charles Francis Whitaker (Driver) (Transmission Application not investigated)
			1957 to 1957	Allan Burgess (Real Estate Agent)
			1957 to 1989	Shell Company of Australia Limited
			1989 to 1997	Michael Ronald Gray Janice Anne French
			1997 to date	Minos Stratiotis & Vassiliki Stratiotis
Land title records indicate the property located at 314 Princes Highway was possibly have been used initially for residential purposes and then subsequently for commercial purposes including from 1957 when Shell purchased the site for use as a service station. In 2002 the site was sold to the current owner with continued commercial land use.				
320-326 Princes Highway	Lots 9 and 10 D.P. 10039	Lot 9	1918 to 1919	John Thompson (Conveyancer)
			1919 to 1929	William Reynolds McMillan (Estate Agent)
			1929 to 1932	Frederick John Robinson (Garage Proprietor)
			1955 to 1983	F.J. Robinson Pty Limited
			1983 to date	Rifoko Pty Limited
		Lot 10	1918 to 1919	John Thompson (Conveyancer)
			1919 to 1929	William Reynolds McMillan (Estate Agent)
			1929 to 1937	Frederick John Robinson (Garage Proprietor)
			1937 to 1938	Gilbert Stanley Ricketts (Furniture Manufacturer)
			1938 to 1983	F.J. Robinson Pty Limited
	1983 to date	Rifoko Pty Limited		
The records indicate that the site may have initially been used for residential purposes, following which there may have been a period the site was used to store/repair vehicles from the late 1920s to the 1980s. Following this period the site title has been held by a holding company with the property being most recently leased to Fonebiz, a mobile phone repair agency. The site is currently vacant.				

### 3.3 EPA Records

A search of the NSW EPA's public register maintained under the Protection of the Environment Operations Act 1997 was undertaken for the Precinct and surrounding properties. The results of

the search are presented in **Appendix E**. The search identified that there were no current or former prevention, clean-up or prohibition notices for properties located within the Precinct and immediate surrounds.

A search of the EPA's public register for current and historical EPL records issued under the POEO Act identified no licences.

A search was also undertaken through the EPA public contaminated land register and relevant records are included in **Appendix E**. The search identified that there have been no notices issued for properties within the Precinct under the Contaminated Land Management Act 1997 or any nearby surrounding properties.

A search of the NSW EPA register of notified sites identified the a former Waste Disposal site located at 60 Lynwen Crescent located approximately 700 m to the east of the Precinct and to the south of Spring Street. This property has been identified as a former landfill and regulation under the CLM Act 1997 is currently considered to not be required. Additionally, properties around Lynwen Crescent are also identified on the NSW EPA register and are associated with the landfill. However, these are also indicated as not requiring regulation.

### 3.4 Heritage Records

A search of the Australian Heritage Trust database and the NSW Heritage Inventory was undertaken and the resulting records are included in **Appendix F**. The search indicated that the Precinct has 13 items of heritage significance. The majority of these heritage items relate to residential properties within the Precinct. Additionally, review of the Rockdale Development Control Plan (2011<sup>5</sup>) provides information on the development requirements for any heritage items listed but does not indicate whether the Precinct or parts of the Precinct are nominated as a conservation area.

Gardiner Park located immediately to the west of the Precinct boundary is noted to be listed on the NSW heritage register. Information in support of this listing provided in **Appendix F** has identified the following the information regarding this site:

- The site was initially part of a 38 acre property purchased at auction by George Wheeler in the 1850s.
- The Walz Brothers, immigrants from Germany operated a large sandstone quarry, one of three that operated in the Arncliffe area from 1885.
- The former Walz quarry site, possibly operating as Gillard's Dairy at the time, was purchased by Rockdale Council in 1911 and it is reported that the former quarry was subsequently 'filled with garbage'. In 1913, the site was subsequently opened as Hopetoun Park.
- Hopetoun Park was upgraded in the 1930s and renamed Gardiner Park. In 1931 as part of Depression Relief Work, additional sandstone rock was 'cut down in Gardiner Park'.

### 3.5 Council Records

A total of three s.149 certificates from Rockdale City Council were ordered for three properties representative of the Opportunity sites.

The certificates are included in **Appendix G**. The following information is noted in the certificates for the relevant properties:

- The following zoning is noted on the 149 certificates;

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<sup>5</sup> Rockdale Development Control Plan, Rockdale City Council, 2011 (2011)



- R2 Low Density Residential
  - B6 Enterprise Corridor; and
  - B7 Enterprise Corridor.
- The land is not located in a heritage conservation area;
- The land is not affected by any road widening or road realignment under Roads Act 1993;
- The land is not affected by any of the matters contained in Clause 59(2) as amended in the Contaminated Land Management Act 1997 as listed:
- That the land to which the certificate relates is not significantly contaminated land;
- That the land to which the certificate relates is not subject to a management order;
- That the land to which the certificate relates is not the subject of an approved voluntary management proposal;
- That the land to which the certificate relates is not subject to an ongoing maintenance order;
- That the land to which the certificate relates is not the subject of a site audit statement;
- The land is not subject to a Tree Preservation Order; and
- The land is not identified as being affected by implementation of the Coastal Protection Act 1979 or proclaimed to be within a mine subsidence district within the meaning of Section 15 of the Mine Subsidence Compensation Act 1961.

### **3.6 WorkCover Dangerous Goods Database**

WorkCover Dangerous Goods licence database searches were not undertaken as part of this assessment as specific written permission to undertake the search is required from the landowner and this was not available at the time of preparation of this report.

### **3.7 Previous Investigations**

No previous environmental investigations were provided by the client to JBS&G for review during this preliminary assessment.

### **3.8 Integrity Assessment**

The information obtained from formal published sources noted above has been found to be in general agreement regarding the history of the site.

Although the dangerous goods, titles and council searches were not completed for all properties within the site, the information gathered during the site inspection and the historical search were generally in agreement as to the location of former infrastructure and AECs.

Based on the range of sources and the general consistency of the historical information, it is considered that the historical assessment has an acceptable level of accuracy with respect to the potentially contaminating activities historically occurring at the site.

## 4. Conceptual Site Model

The information presented herein, together with the report figures, provides a conceptual site model (CSM) for the site based on the current understanding of the site and the specific project objectives.

### 4.1 Potential Areas of Environmental Concern

Based on the site history review, the Precinct inspections, and in consideration of the specific project objectives, potential AECs and associated COPCs for various portions of the Precinct have been identified and are presented in **Table 4.1**.

**Table 4.1 General Areas of Environmental Concern and Associated Contaminants of Potential Concern**

Area of Environmental Concern	Contaminants of Potential Concern
Fill material at the site used to obtain existing ground levels	Heavy metals, total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), polychlorinated biphenyls (PCBs) and asbestos
Vacant blocks (illegal dumping/filling)	Heavy metals, TPH, BTEX, PAHs, OCPs, PCBs and asbestos
Service Stations and underground petroleum storage on industrial/commercial properties	Heavy metals, TPH, BTEX, PAHs
Railway	Heavy metals, TPH, BTEX, PAHs
Former Site Building Structures	Asbestos, lead paint, synthetic mineral fibres
Schools/religious buildings	Asbestos, lead paint, synthetic mineral fibres
Residential housing pre 2003	Asbestos, lead paint, synthetic mineral fibres
Car parts/mechanics	Heavy metals, TPH, BTEX, PAHs, asbestos
Car dealerships	Heavy metals, TPH, BTEX
Historical quarrying/landfill site (now public open space) that may extend to the site boundary	Heavy metals, TPH, BTEX, PAHs, OCPs, PCBs and asbestos
Former Market Gardens	OCPs, OPPs, heavy metals

Based on the historical review the potential AECs and COPCs within the opportunity sites are provided below in **Table 4.2**.

**Table 4.2 Opportunity Sites**

Opportunity Site	AEC	COPCs
As per <b>Figure 4</b>	Service Stations and underground petroleum storage on industrial/commercial properties	Heavy metals, TPH, BTEX, PAHs
	Car parts/mechanics	Heavy metals, TPH, BTEX, PAHs, asbestos, VOCs
	Residential housing pre 2003	Asbestos, lead paint, synthetic mineral fibres

Sensitive receptors within portions of the Precinct as may be redeveloped are considered to include: site workers and visitors who may come into contact with potentially contaminated media within the specific sites, especially during the future redevelopment activities, as per **Section 4.5**.

### 4.2 Potentially Contaminated Media

Potentially contaminated media targeted for this investigation:

- Fill material;
- Natural soils;

- Surface water; and
- Groundwater.

Some potential for filling has been identified in various areas of the Precinct, including the reported historical burial of waste material. Given the absence of specific records in relation to the source of fill material used and the age of fill material in various areas of the Precinct, fill material is considered to comprise a potentially contaminated medium.

Current and historical site activities, including industrial land uses, automotive operations, market gardens, etc, have been identified as having the potential to have resulted in impacts to surface and near-surface soils. Additionally, petroleum storage has occurred within a range of individual premises within the Precinct such that natural soils in various areas within the Precinct are considered to comprise potentially contaminated soils.

Where fill is exposed at the ground surface there is the potential for impacted materials on the ground surface to have impacted natural soil through potential leaching or direct impacts from historical site activities.

The potential leachability of identified contaminants of concern and subsurface contamination sources (e.g. underground petroleum storage systems (UPSS), fill) contribute to groundwater being nominated as a potentially contaminated medium. As with the natural soils, the potential for contamination of groundwater will depend upon the actual nature, occurrence and characteristics of contamination within overlying fill material (where present) and/or potentially natural soils.

Given the close proximity of surface water bodies to the site and that rainfall would flow into these surface water bodies through overland flow, surface waters in some areas of the Precinct are also considered to be a potentially contaminated media.

#### **4.3 Potential for Migration**

Contaminants generally migrate from site via a combination of windblown dusts, rainwater infiltration, groundwater migration and surface water runoff. The potential for contaminants to migrate is a combination of:

- The nature of the contaminants (solid/liquid and mobility characteristics);
- The extent of the contaminants (isolated or widespread);
- The location of the contaminants (surface soils or at depth); and
- The site topography, geology, hydrology and hydrogeology.

The potential contaminants identified at the site are present in solid (e.g. impacted soil or fill, asbestos), liquid (e.g. dissolved in water) and gaseous (eg. soil vapour) forms.

Rainfall infiltration at the site is expected to occur in unsealed areas. There is therefore the potential for contaminants in fill to leach into underlying natural soils and into shallow/perched groundwater.

As the site is covered primarily with vegetation or hard stand (bitumen/concrete/buildings), the potential for windblown dust migration of contamination from the site is generally low other than in localised areas where unsealed surfaces exist.

The potential for generation of vapours or ground gases associated with volatile contaminants will be limited to localised areas where such contaminant sources occur (e.g. UPSS sites etc).

#### 4.4 Potential Exposure Pathways

Based on the contaminants of potential concern identified in various media as discussed above, existing land uses identified within the Precinct and with consideration of future potential site development activities, the exposure pathways considered to be potentially complete for various areas of the Precinct include:

- Potential dermal and oral contact to impacted soils (and associated dust) during future maintenance/development works within various areas of the Precinct;
- Potential oral and dermal contact to shallow groundwater, where present, during maintenance and/or development works in areas of the Precinct where excavations may be required for new or existing underground services, basements, etc;
- Potential contaminant uptake by vegetation established in the various vegetated areas of the Precinct, potentially including large street tree plantings and landscaped areas;
- Potential contaminant uptake by site occupants as a result of ingestion via eating edible plant (including fruit and vegetable) matter grown in areas of the Precinct;
- Direct ingestion of soil, particularly by young children playing on the ground surface in non-paved areas of the Precinct; and/or
- Inhalation of contaminant vapours migrating upward to the ground surface and/or accumulating within existing/future service excavations, basements, etc or above ground structures as may occur in areas where volatile contaminants maybe present.

#### 4.5 Receptors

Potential receptors of environmental impact as may occur within areas of the Precinct include:

- Future site occupants whom may potentially be exposed to COPCs through direct contact with impacted soils and/or inhalation of dusts / fibres / vapours associated with impacted soils; and/or
- Excavation / construction / maintenance workers conducting activities at or in the vicinity of various properties within the Precinct, whom may potentially be exposed to COPCs through direct contact with impacted soils and/or groundwater present within excavations and/or inhalation of dusts / fibres / vapours associated with impacted soils;
- Flora species established in the vegetated areas of the Precinct inclusive of large trees and edible plants; and/or
- The aquatic ecosystem of various localised creek lines located hydro-geologically down-gradient of the Precinct.

#### 4.6 Preferential Pathways

For the purpose of this preliminary investigation, preferential pathways have been identified as natural and/or man-made pathways that result in the preferential migration of COPCs as either liquids or gases.

Man-made preferential pathways are present in limited areas of the Precinct, generally associated with historical and/or current underground services infrastructure and in areas of fill material. Fill materials are anticipated to have a higher permeability than the underlying natural soil and/or bedrock.

Where sub-surface infrastructure easements occur within the Precinct, preferential pathways can be formed by the generally higher permeability backfill used to re-instate these trenches.

Preferential pathways are also important in the assessment of potential off-site sources of COPCs. Preferential pathways are potentially present in the adjoining road network, as associated with service easements.

## 5. Discussion

Based on the review of historical land uses within the Precinct and the opportunity sites a number of potential contamination issues have been identified. These issues are common to many urban areas currently undergoing renewal.

There exists the potential for impacts associated with the use and storage of petroleum hydrocarbons throughout the Precinct. This is mainly associated with underground fuel/chemical storage at commercial/industrial properties including services station, vehicle repair, vehicle sale yards, etc.

Although large scale excavation and subsequent placement of materials does not appear to have taken place there is the potential for historical uncontrolled filling activities within or immediately adjacent to land within the Precinct, such as in Gardiner Park. This along with the potential for more widely spread uncontrolled filling activities across the Precinct to establish current ground levels has potential to have resulted in impacts in the Precinct.

There are existing buildings that may contain hazardous materials based on their age, including residential properties built before 2003 in the opportunity sites footprint.

Several vacant properties were identified within the Precinct which may have had illegal dumping of anthropogenic materials, including household rubbish.

Despite the potential for contamination from historical land uses as discussed, there is no indication of the potential for gross or widespread contamination that would preclude rezoning, and the associated potential impacts are common and readily able to be assessed and if required managed when future redevelopment is planned. Potential contamination from historical land use in areas of recent or current redevelopment are assumed to have been addressed through the planning approvals process.

Identified potential impacts are considered representative of common contaminants and contaminating land use activities which can be readily addressed during later development approval (DA) stages. This would include completion of more specific preliminary and detailed site investigations consistent with relevant planning instruments including and SEPP 55 requirements, for redevelopment of areas within the Precinct once detailed development proposals are made.

## 6. Conclusions and Recommendations

Based on the desktop review and discussion above and the limitations in **Section 7**, the following findings have been reached.

- There is the potential for contamination to be present in areas of the Precinct where rezoning and redevelopment may occur, typically associated with underground petroleum infrastructure, the presence of fill material, historical use for furniture manufacture, automotive sales and repair activities and hazardous building materials;
- In areas where there has been relatively new development, or development is currently occurring, it is assumed that requirements for assessment and management of potential contamination have already been captured during the planning process;
- Potential contamination issues identified are considered unlikely to have resulted to be gross or of significant widespread occurrence such that they would preclude rezoning; and
- Off-site activities at some locations (e.g. where service station sites are present within or in proximity to the Precinct boundaries, landfill, former market gardens) could have the potential to result in contamination migrating beyond the extents of individual properties within the Precinct through soil, groundwater and/or soil vapour migration.

Whilst the preliminary investigation identified the potential for contamination to be present in some areas of the Precinct, the investigation did not identify the potential for gross or widespread contamination which may preclude rezoning of properties within the Precinct, including the identified opportunity sites. Identified potential impacts are considered representative of common contaminants and potentially contaminating land use activities which can be readily dealt with during the DA stage (i.e. including completion of specific preliminary and detailed site investigations to assess land use suitability consistent with relevant planning instruments, including SEPP 55, requirements) for redevelopment of areas within the Precinct, once later detailed development proposals are made.

In the absence of gross or widespread contamination, the requirements of the DUAP/EPA (1998) Managing Land Contamination: Planning Guidelines for rezoning are considered to have been satisfied, namely that the rezoning can proceed, *“provided that measures are in place to the ensure that the potential for contamination and the suitability of the land for any proposed use are assessed once detailed proposals are made”* (s.4.1.2 DUAP 1998).

It is recommended that individual properties within the Precinct proposed to be developed be suitably investigated in accordance with relevant NSW EPA endorsed guidelines to assess site-suitability, when detailed development proposals are made.

It is also recommended that Hazardous Building Material Surveys (HBMS) be undertaken prior to any demolition and redevelopment works on individual land parcels where redevelopment is proposed.

## 7. Limitations

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the client and other parties.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

JBS&G accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced without prior approval by the client, or amended in any way without prior approval by JBS&G, and should not be relied upon by other parties, who should make their own enquires.

Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements.

Limited sampling and laboratory analyses were undertaken as part of the investigations undertaken, as described herein. Ground conditions between sampling locations and media may vary, and this should be considered when extrapolating between sampling points. Chemical analytes are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site.

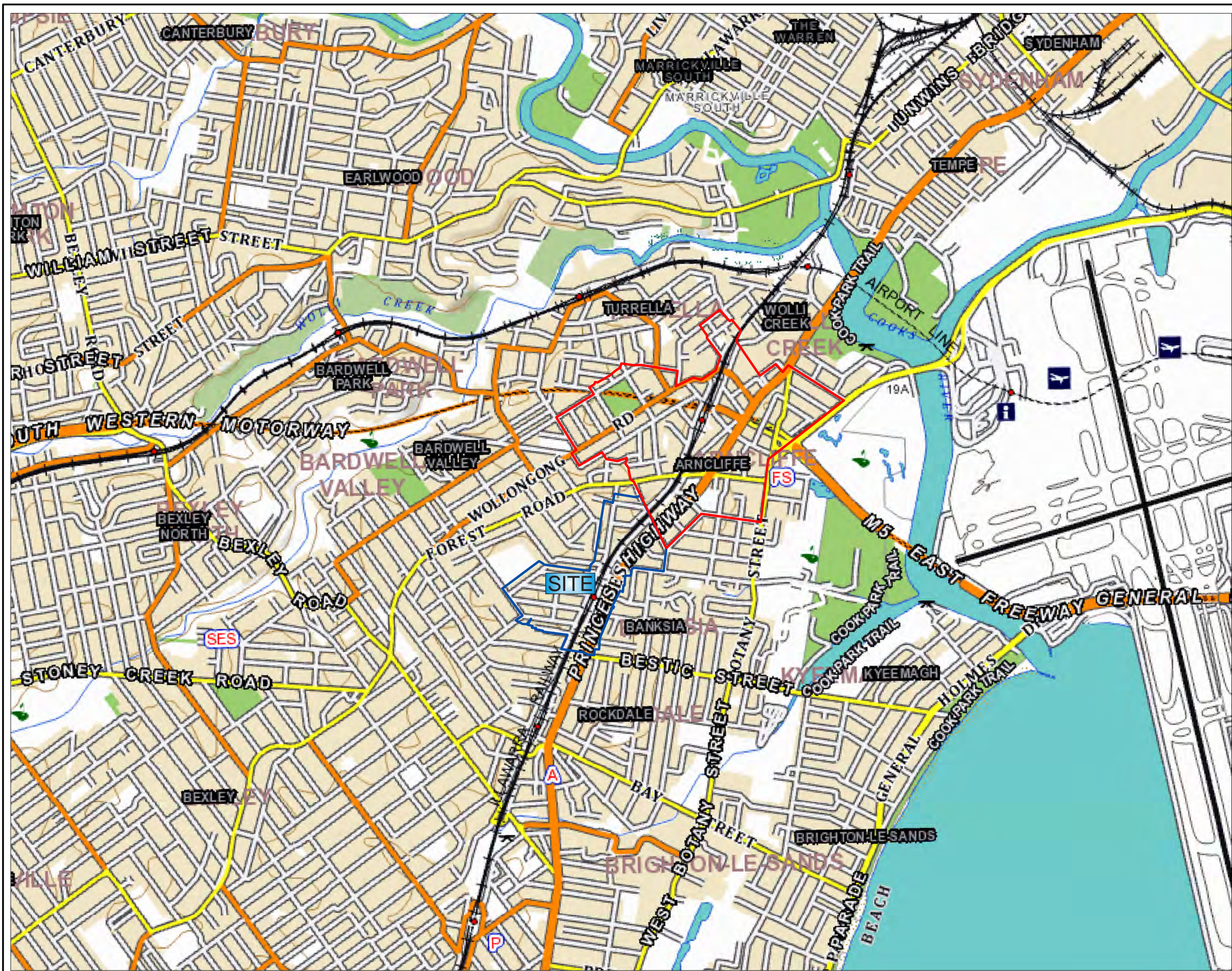
Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigations.

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, JBS&G reserves the right to review the report in the context of the additional information.



## Figures





Legend:

- Approximate Site Area - Arncliffe
- Approximate Site Area - Banksia



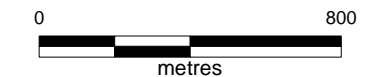
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Client: APP Corporation

Version: R02 Rev B Date: 13-Aug-2015

Drawn By: SE Checked By: JR

Scale 1:20,000



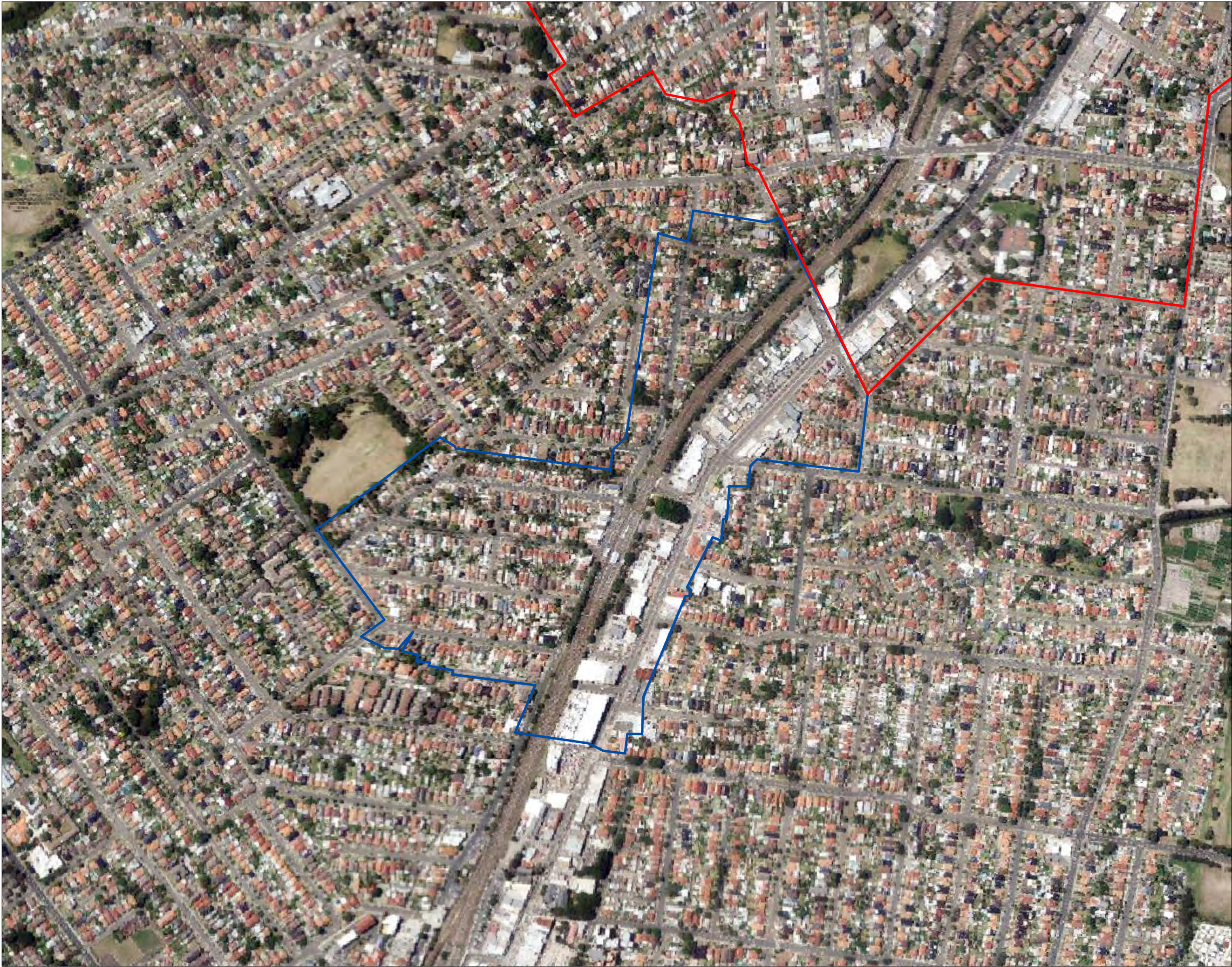
Coord. Sys. GDA 1994 MGA Zone 56

Banksia Precinct

SITE LOCATION

FIGURE 1






- Legend:**
- Approximate Site Area - Arnccliffe
  - Approximate Site Area - Banksia




Job No: 50299	
Client: APP Corporation	
Version: R02 Rev B	Date: 13-Aug-2015
Drawn By: SE	Checked By: JR

Scale 1:6,000



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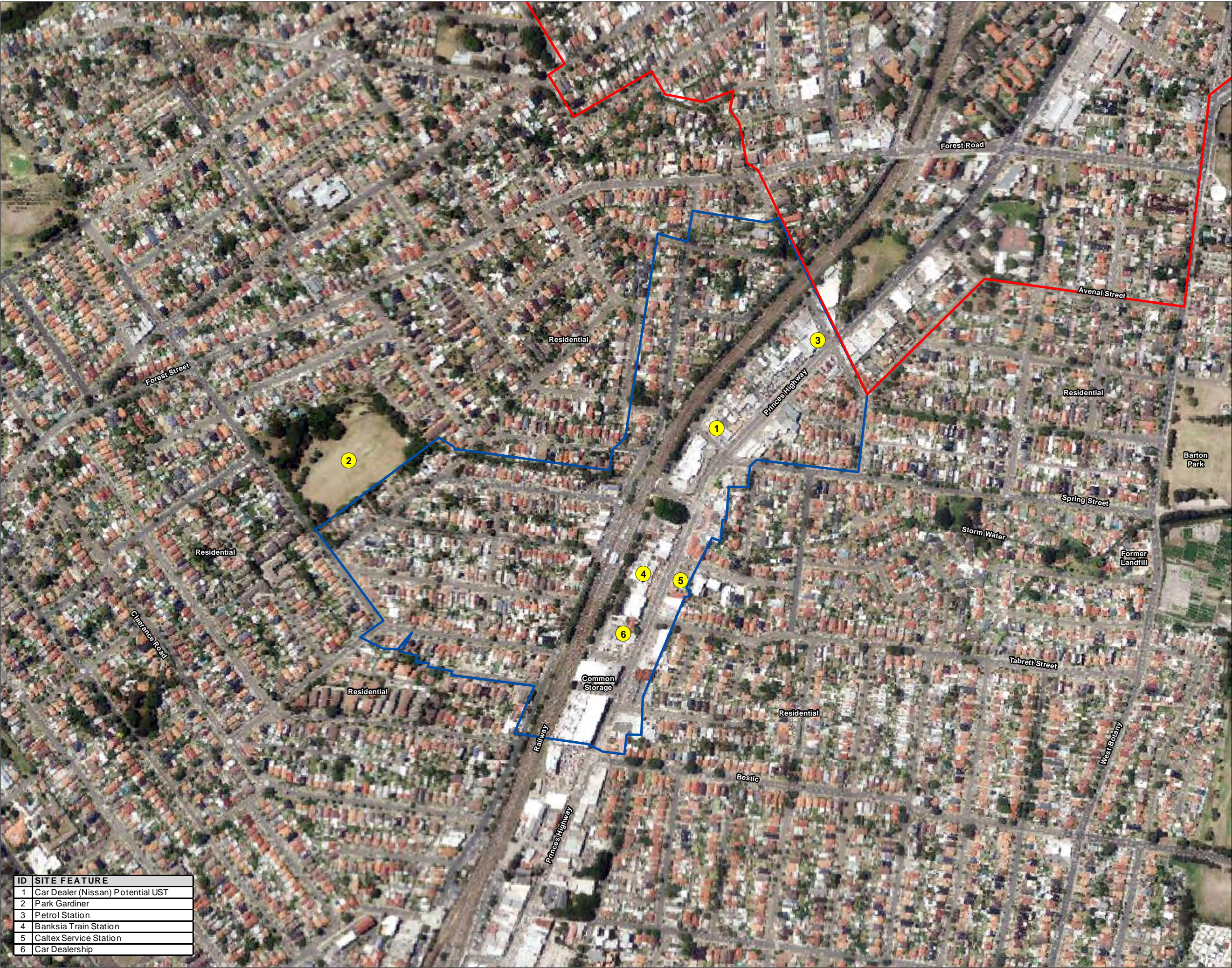
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**Banksia Precinct**

**SITE LAYOUT**

**FIGURE 2**



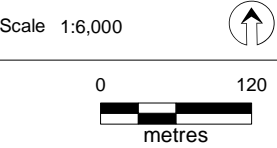


ID	SITE FEATURE
1	Car Dealer (Nissan) Potential UST
2	Park Gardiner
3	Petrol Station
4	Banksia Train Station
5	Caltex Service Station
6	Car Dealership

- Legend:
- Approximate Site Area - Arnccliffe
  - Approximate Site Area - Banksia



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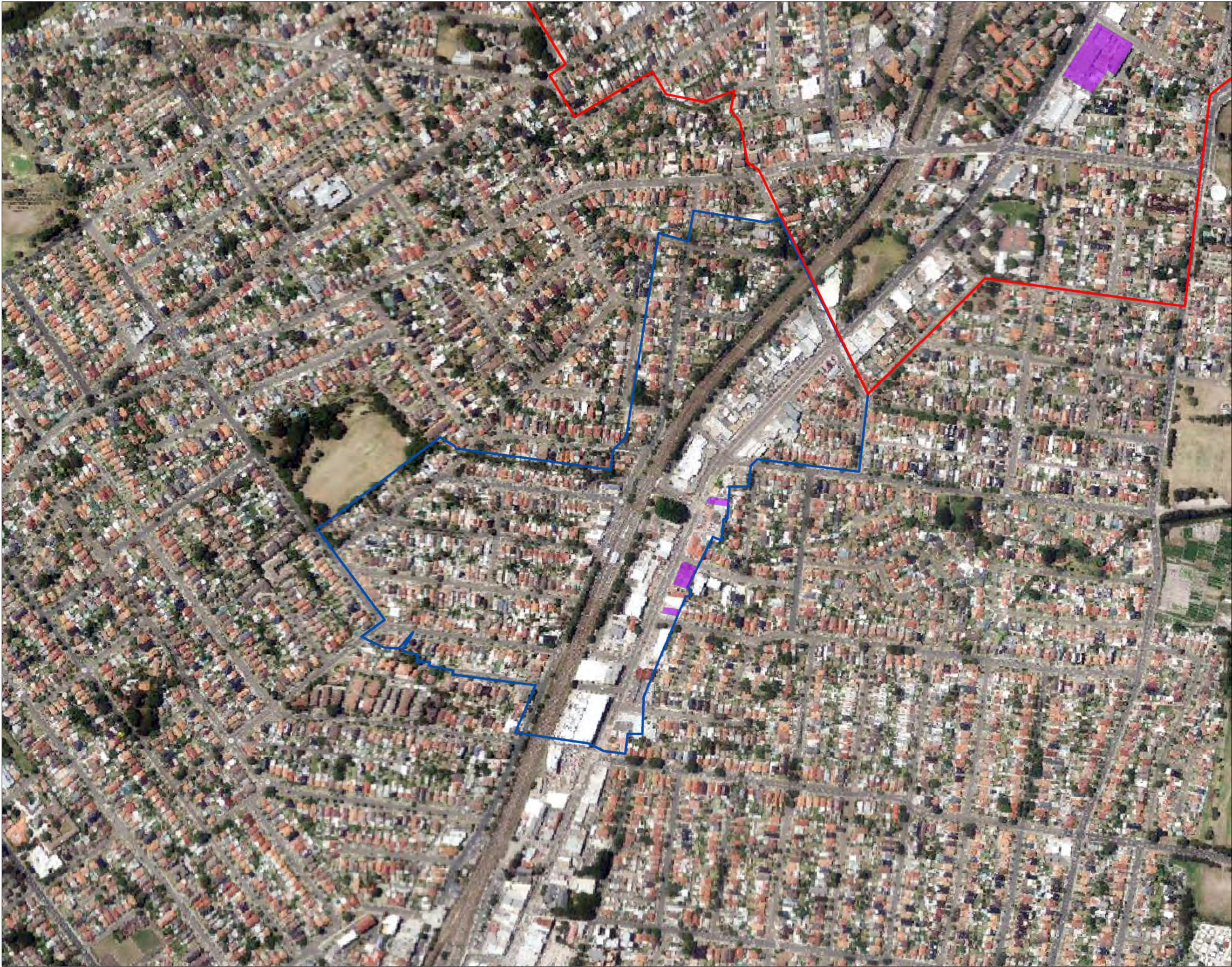
Coord. Sys. GDA 1994 MGA Zone 56

**Banksia Precinct**

**SITE FEATURES**

**FIGURE 3**






- Legend:**
- Approximate Site Area - Arncliffe
  - Approximate Site Area - Banksia
  - Approximate Opportunity Sites



Job No: 50299	
Client: APP Corporation	
Version: R02 Rev B	Date: 21-Aug-2015
Drawn By: SE	Checked By: JR

Scale 1:6,000



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metres

Coord. Sys. GDA 1994 MGA Zone 56

**Banksia Precinct**

**OPPORTUNITY SITES**

**FIGURE 4**