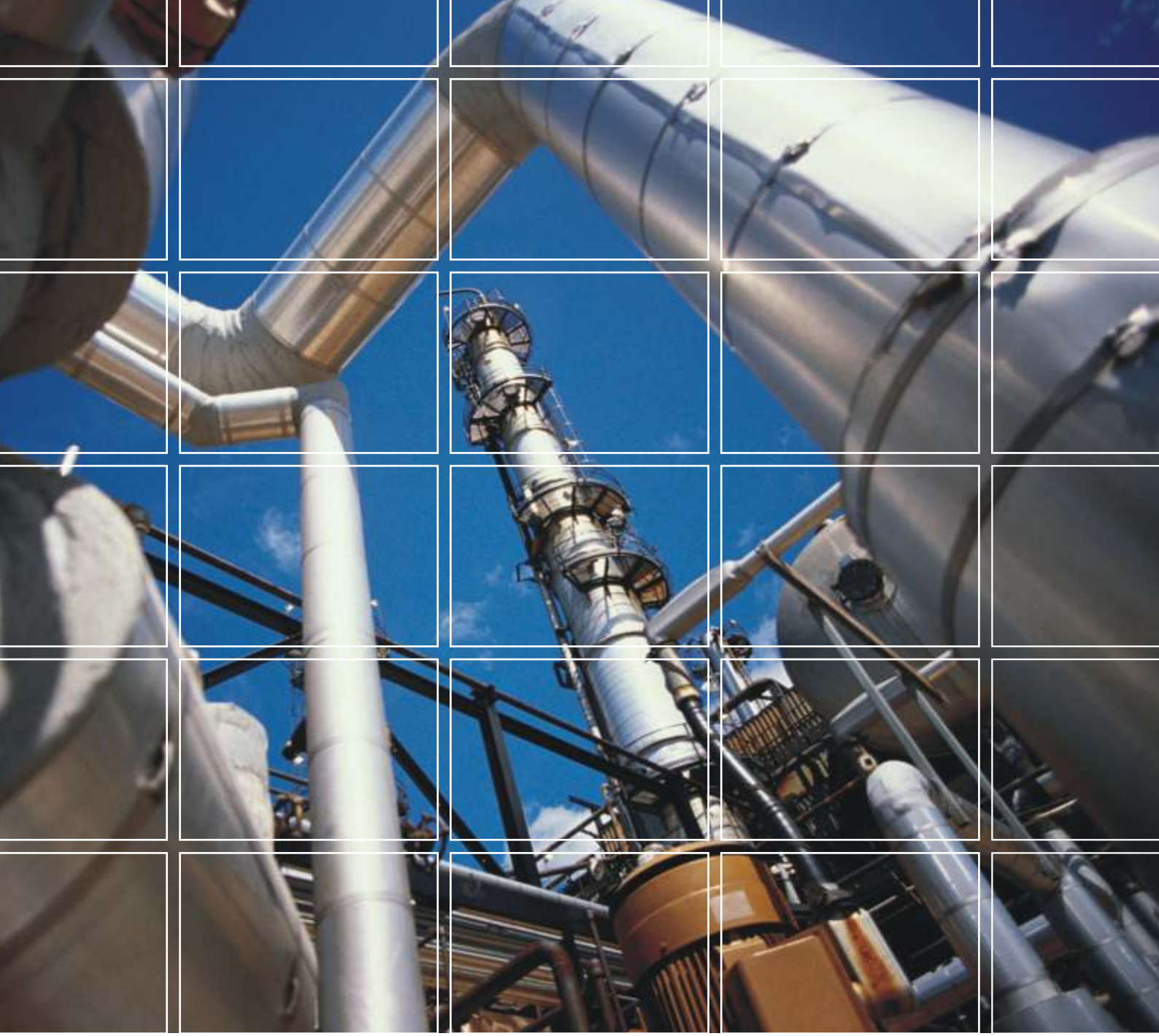

Preliminary Environmental Site Assessment

17 O'Riordon St, Green Square, Alexandria, NSW
Final

for Goodman International Limited

July 2008

J0086939RP01 FINAL

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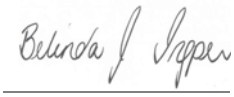
ERM

Approved by:	*Belinda Goldsworthy*
Position:	Project Manager
Signed:	
Date:	*July, 2008*
Approved by:	*Belinda Ingpen*
Position:	Partner
Signed:	
Date:	*July, 2008*

Environmental Resources Management Australia Pty Ltd Quality System

This report was prepared in accordance with the scope of services set out in the contract between Environmental Resources Management Australia Pty Ltd ABN 12 002 773 248 (ERM) and the Client. To the best of our knowledge, the proposal presented herein accurately reflects the Client's intentions when the report was printed. However, the application of conditions of approval or impacts of unanticipated future events could modify the outcomes described in this document. In preparing the report, ERM used data, surveys, analyses, designs, plans and other information provided by the individuals and organisations referenced herein. While checks were undertaken to ensure that such materials were the correct and current versions of the materials provided, except as otherwise stated, ERM did not independently verify the accuracy or completeness of these information sources

FINAL REPORT

Goodman International Limited

Preliminary Environmental Site Assessment

17 O'Riordon St, Green Square, Alexandria, NSW
Final

July 2008

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1 INTRODUCTION

Environmental Resources Management Australia Pty Ltd (ERM) was commissioned by Goodman International Limited (Goodman) to prepare an Preliminary Environmental Site Assessment (PESA) report for 17 O'Riordan Street, Alexandria, NSW (the site). ERM understands that this PESA will accompany a Major Project Application (PA) to the NSW Department of Planning (DoP) as supporting environmental information. The purpose of this ESA is to inform DoP of the potential impacts to soil and groundwater on the site and remediation requirements (if appropriate).

The location of the site is identified in *Figure 1* of *Annex A*.

1.1 BACKGROUND

The site is located at 17 O'Riordan Street, Green Square, Alexandria, NSW, within Lot 4 of Deposited Plan (DP) 794095, in the Parish of Alexandria County of Cumberland. The area of the site is approximately 7357 m^2 and is currently used as a warehouse and distribution facility. Various commercial or industrial entities have operated on the site for at least 90 years. The most significant of these being Austral Bronze Company Limited (Austral Bronze), who occupied the site between 1918 and 1989.

It is understood that Goodman proposes to redevelop the site for future use by the Australian Red Cross (Red Cross). It is understood that the proposed redevelopment consists of a four storey facility containing office space, a laboratory and a receiving terminal for blood samples. The building footprint is proposed to cover the majority of the site (approximately 62.5%) with a driveway, car park and landscaped gardens. Basement car parking, extending to approximately 2.6 metres below ground level (mbgl) is also proposed.

Goodman's original intention was to undertake a Phase II Environmental Site Assessment, prior to submitting the PA. The current tenant will be vacating the site at the end of August 2008. As a result of their current occupation, it is difficult to complete soil investigations in the interim. Consequently Goodman requested an Environmental Assessment to summarise the current understanding of environmental conditions on the site and to detail further works required to fully characterise the site. ERM have been commissioned to conduct these works subsequent to the tenant vacating the site.

A Phase I Environmental Site Assessment (ESA) of the site was previously conducted by ERM in 2003, *Project Match: 17 O'Riordan Street, Alexandria, NSW, Environmental Due Diligence Assessment* (Report reference: 8030154RP01), which assessed potential issues associated with soil and groundwater contamination and environmental compliance issues. In addition a limited Phase II investigation was conducted by Douglas Partners in 2008, *Report on Preliminary Contamination Assessment: Proposed Commercial Development, 17 O'Riordan Street, Alexandria,* (Report reference: 45586). Information previously supplied in the ERM Phase I ESA, conducted in 2003 is assessed within this Environmental Assessment and any changes to the site between 2003 and 2008 are detailed.

The Phase I ESA completed by ERM in 2003 is attached in *Annex B*.

1.2 REPORT OBJECTIVES

The objective of this PESA is to summarise the current understanding of environmental conditions on the site and to detail future works to characterise potential soil and groundwater impacts. It is understood that this PESA will accompany a PA to the DoP for the proposed redevelopment of the site for the Red Cross.

1.3 SCOPE OF WORK

To achieve the above objectives the following scope of works were undertaken:

- A site visit to gain an understanding of the current site conditions and to assess whether any potential environmental issues have arisen since the completion of the previous Phase I ESA by ERM in 2003.
- Preparation of an Environmental Assessment report summarising the current understanding of environmental conditions on the site and presenting recommendations for future works to fully characterise potential soil and groundwater impacts.

2 SUMMARY OF PHASE I ESA AND ADDITIONAL INFORMATION

The Phase I ESA (ERM, 2003) is provided in *Annex B* and is summarised below. Where site conditions have changed or additional information is available with respect to potential contamination issues these are included.

2.1 SITE SETTING

2.1.1 Site Description and Site Activities

A site visit was conducted on Wednesday 2 July 2008 by ERM Environmental Scientists Katie Raih and Elizabeth Watson. The general site layout and site infrastructure was found to be consistent with that previously described by ERM in the Phase I ESA in *Annex B*. The site was rectangular in shape, with the eastern side of the site fronting on to O'Riordan Street. Approximately 60 % of the site consisted of a warehouse and attached two storey office block (constructed in 1996), with the remainder occupied by a sealed roadway, parking area and landscaped areas around the perimeter of the site. A number of changes to the site were noted as outlined below.

- The single tenant at the time of the inspection was OO.com.au, an online discount goods store. It is understood that 00.com.au have occupied the site for approximately seven months.
- The bottom floor of the office was utilised as a display room of goods for sale, which included luxury items such as electrical goods, furniture, perfume, sunglasses and watches (*Photograph 1, Annex A*).
- A large shipping container was located adjacent to the receiving and dispatch bay (*Photograph 2, Annex A*).
- Goods were stored on pallet racking on the south side of the warehouse and a packaging and dispatch area was located on the north side (*Photograph 3, Annex A*).
- The surface of the warehouse was concrete. Some cracking was noted throughout the warehouse, however, the floor was generally in good condition.

2.1.2 Surrounding Land Uses

No changes to the surrounding land uses since 2003 were noted during the site visit with the exception of the following;

- North: Adjacent to the site is a vacant lot which appears to be utilised by several taxis companies for parking (*Photograph 8, Annex A*). The majority of the area is partially sealed with bitumen or concrete, which appears to be in poor condition. It is understood that this lot was used to obtain access to the airport line rail tunnel, constructed in 2000. An unsealed, open drain also runs along the boundary, adjacent to the site. Beyond the vacant lot is a distribution warehouse occupied by Combines Communication Network.

- East: No changes were noted to the surrounding land use (*Photograph 9, Annex A*).

- South: Adjacent to the site is a modern office and warehouse storage and distribution facility occupied by True Alliance.

- West: a vacant lot continues from the north of the site. An unsealed roadway runs parallel to the site and the remainder of the area is covered in vegetation. Some uncontrolled fill was noted within the vacant block including demolition rubble (*Photograph 7, Annex A*). Beyond this, further west, are a number of commercial type warehouses.

- No residential or other sensitive land uses were identified on immediate neighbouring land, however, residential properties were located approximately 50 metres south east of the site.

2.1.3 Hydrology, Geology and Hydrogeology

Information supplied in the Phase I ESA (ERM, 2003) summarises the local hydrology, geology and hydrogeology of the site and additional site-specific information was provided in the Douglas Partners (2008) report.

According to Douglas Partners (2008) fourteen licensed groundwater bores were located within a 1 km radius of the site as of June 2008. The groundwater bores were reported to be licensed for domestic, industrial and monitoring purposes however it is understood that the site falls within the 'Domestic Ban Zone 2' area where domestic use of groundwater has been banned by the NSW State Government. This is an initiative by the NSW State Government in response to the identification of contaminated groundwater within the Botany Sands Aquifer. The site is also located within The Groundwater Embargo Area which incorporates localities with known or suspected contamination from past industrial activity. Within this embargo area, the NSW Government of Natural Resources has placed a restriction which precludes any new bore licences for the extraction of groundwater from being issued with the exception of temporary dewatering, monitoring or remediation bores. The embargo area was gazetted under the *Water Act 1912* by the Department of Natural Resources on 22 August 2003. The nearest bore was reportedly located 50 metres to the east of the site at the vehicle repair facility on the corner of O'Riordan and Johnson Streets.

Based on the limited groundwater investigation conducted by Douglas Partners in 2008, the groundwater elevation ranged between 3.6 and 4.2 metres below ground level (mbgl) (RL 7.6 to RL 7.9).

2.2 SITE HISTORY

2.2.1 *Aerial Photography*

The site appeared at the time of the site inspection as it did in the 2002 aerial photograph discussed in the Phase I ESA (ERM, 2003).

2.2.2 *Regulatory Agency Record Search*

A search of the New South Wales Department of Environment and Climate Change (DECC) database revealed that, as of 25 June 2008 there were no records of any notices issued under the *Contaminated Land Management Act 1997*.

2.3 ENVIRONMENTAL ISSUES

The Site inspection was undertaken on 2 July 2008 by Katie Raih and Elizabeth Watson of ERM. Mr Lee Ruben from 00.com.au accompanied the auditors for most of the inspection. The inspection comprised a site walkover which included the perimeter, parking lot, office and warehouse. Site photographs are presented in *Annex A*. Changes to the environmental conditions on the site, since those described in the Phase I ESA (ERM, 2003), are outlined below:

- No changes to emissions to the atmosphere on the site were determined between 2003 and 2008. The unsealed driveway located on the vacant land to the west of the site was a source of dust particles onto the site.

- No changes to water supply, stormwater, waste water and trade waste were determined between 2003 and 2008 with the exception of two groundwater wells which were located on the northern portion of the site in the car parking area. These wells were installed by Douglas Partners in 2008 for groundwater monitoring purposes.

- No significant changes to chemical storage on site were determined between 2003 and 2008. As discussed in the Phase I ESA (ERM, 2003) a 200 litre (L) aboveground storage diesel tank was located within an enclosure in the north east corner of the site and was used to power the emergency generator for the fire system. Some minor staining was noted on the concrete surface below a small storage tin within the enclosure (*Photograph 6, Annex A*). ERM was informed by Goodman that the diesel storage tank was manually filled. Some spills may have occurred during this process however the enclosure appeared to have adequate secondary containment. During the current site inspection some staining was also observed on the floor surrounding the forklift recharge area which may have been oil or hydraulic fluid leaked from the forklifts (*Photograph 4, Annex A*). In addition a small gas cylinder containing heptafluropropane, used as a fire suppressant, was stored on site.

- No changes to waste management were determined between 2003 and 2008.

- No new sources of environmental noise were determined between 2003 and 2008. The main source of noise associated with the site relates to vehicle movements inside and outside the warehouse with the deliveries to the site generally occurring between 9am and 4pm. In addition management was not aware of any noise complaints relating to the site operations.

- No new sources or evidence of PCB containing material were observed during the site visit.

- No new sources or evidence of ozone depleting substances were observed during the site visit.

- No new sources or evidence of asbestos containing material (ACM) were observed during the site visit. Although no ACM was observed within the uncontrolled fill, observed adjacent to the western boundary of the site its presence cannot be discounted.

- No new sources or evidence of radioactive substances were observed during the site visit.

2.3.1 Potential Soil and Groundwater Contamination

ERM identified a number of potential on-site and off-site contamination sources in the Phase I ESA (ERM, 2003), attached in *Annex B*. These included;

- potential spills or leaks from the 200 L diesel AST in the fire pump room;

- historical on-site and off-site activities of Austral Bronze. Contaminants of Potential Concern (COPC) associated with manufacturing by Austral Bronze may include heavy metals and hydrocarbons;

- the historical importation of uncontrolled fill prior to building in the area which was previously swamp;

- historical regional contamination of the Botany groundwater aquifer;

- five decommissioned underground storage tanks (USTs) located 60 to 80 metres north east of the site associated with a former petrol station, and more recently a taxis training centre and service garage; and

- uncontrolled fill, including demolition rubble on the vacant land to the west of the site.

No significant additional potential sources of contamination were identified during the site visit on Wednesday 2 July 2008.

A limited Phase II ESA was also conducted by Douglas Partners in May 2008 in which total Polycyclic Aromatic Hydrocarbons (PAHs), benzo[a]pyrene and lead contamination, were detected in soil and total petroleum hydrocarbons (TPH C_6-C_{36}) and zinc contamination was detected in groundwater. Five boreholes were advanced to a maximum depth of 6 mbgl (designated as E1 to E5) and two monitoring wells were installed on the site (E1 and E5). The location of the boreholes were restricted to the north east boundary of the site in the car parking area, as the building footprint was not accessible at the time of the investigation. The typical geology encountered was found to be clayey, gravelly, sandy fill material, containing some building rubble, between 0.1 and 3.4 mbgl, underlain by natural sands.

The maximum concentration of contaminants detected on the site is summarised in *Table 2.1* below.

Table 2.1 Maximum Concentrations of Contaminants in Soil (mg/kg)

Contaminant	Screening Criteria (mg/kg)	Maximum Concentration (mg/kg)	Borehole Location
Benzene	1[1]	<0.05	-
Ethylbenzene	3.1[1]	<1.0	-
Toluene	1.4[1]	<0.5	-
Xylene	14[1]	<2.0	-
TPH (C6-C9)	65[1]	<25	-
TPH (C10-C36)	1000[1]	910	E2/0.5
Total PAH	100[2]	**101.5**	E2/0.5
Benzo[a]pyrene	5[2]	**6.6**	E2/0.5
Total OCP	nc	<0.1	-
Total OPP	nc	<0.1	-
PCB	50[2]	<0.1	-
Total Phenol	42500[2]	<5.0	-
Asbestos	nc	not detected	-
Arsenic	500[2]	50	E1/1.5
Cadmium	100[2]	1.3	E1/1.5
Chromium	500[2]	16	E3B/0.5
Copper	5000[2]	3600	E1/1.5
Lead	1500[2]	**5900**	E1/0.5
Mercury	75[2]	0.47	E5/0.2
Nickel	3000[2]	41	E3B/0.5
Zinc	35000[2]	1700	E1/1.5

1. Health Investigation Level (HIL) 'F' for Commercial/Industrial Land Use - NEPM (1999) Schedule B (1) Guideline on the Investigation Levels for Soil and Groundwater.
2. Threshold concentration for sensitive land use - NSW EPA (1994) Contaminated Sites: Guidelines for Assessing Service Station Sites.
3. nc indicates that no screening criteria is derived.

Concentrations of total PAHs, benzo[a]pyrene and lead were detected above the Health Investigation Level (HIL) 'F' for commercial/industrial land uses, specified in National Environment Protection Measure (NEPM) (1999) *Schedule B (1) Guideline on the Investigation Levels for Soil and Groundwater* in soil samples collected from the fill material at a depth of 0.5 mbgl.

The maximum concentrations of contaminants detected in groundwater are summarised in *Table 2.2* below.

Table 2.2 Maximum Concentrations of Contaminants in Groundwater (ug/L)

Contaminant of Concern	Assessment Criteria (µg/L)	Maximum Concentration (µg/L)	Location
Benzene	950[1]	96	E1
Ethylbenzene	140[1]	18	E1
Toluene	300[1]	58	E2
Xylene	550[1]	113	E1
TPH (C6-C9)	nc	**390**	E1
TPH (C10-C36)	7[2]	**1920**	E2
Total PAH	nc	35.0	E2
Benzo[a]pyrene	0.2[1]	<0.1	-
Total OCP	nc	<0.2	-
Total OPP	nc	<0.2	-
PCB	nc	<2	-
Total Phenol	320[1]	<50	-
Arsenic	13[1]	<1.0	-
Cadmium	0.2[1]	<0.1	-
Chromium	4.4[1]	<1.0	-
Copper	1.4[1]	<1.0	-
Lead	3.4[1]	<1.0	-
Mercury	0.6[1]	<0.5	-
Nickel	11[1]	4.5	E1
Zinc	8[1]	8.8	E1

1. Trigger value for 95% protection of freshwater species, Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000).
2. ANZECC (2000) Low reliability trigger value for total petroleum hydrocarbons
3. nc denotes no criteria.

A review of the data presented in *Table 3.2* indicated elevated concentrations of TPH (C_6-C_{36}) in groundwater with the concentration of TPH (C_{10}-C_{36}) above ANZECC (2000) low reliability trigger value. In addition a marginally elevated concentration of zinc was reported and Douglas Partners considered this to be typical of industrial areas and not constitute an unacceptable risk of harm.

3 PRELIMINARY CONCEPTUAL SITE MODEL

A Conceptual Site Model (CSM) is a qualitative tool to provide an overall understanding of the environmental issues on the site and to assess the potential for significant risk of harm to human health or the environment. Key components of the qualitative description for the CSM include:

- Understanding the ***environmental setting*** in which contamination is present; in which contamination migrates; and in which receptors are located. This understanding forms the basis of understanding the potential linkages between contaminant sources, pathways and receptors;

- Delineating the ***contamination sources*** and assessing whether the concentrations present have potential to cause impact to human health and/or the environment;

- Identifying the ***receptors*** that may have potential pollutant linkages with the contamination present at the site;

- Identifying the ***pathways*** that may link sources of contamination to receptors; and

- Completion of a qualitative assessment using all of the above information to assess the credible linkages ('***pollutant linkages***') between identified sources, identified pathways and identified receptors such that an assessment of receptor exposure can be undertaken using the quantitative risk assessment process.

Pollutant sources, exposure mechanisms and receptors at the site, subsequent to the proposed re-development are discussed below. Based on the information presented in *Section 2* a schematic drawing illustrating the Conceptual Site Model has been created and is presented in *Figure 2* of *Annex A*. The details of the Conceptual Site Model are presented below.

3.1 CONTAMINATION SOURCES

As outlined above and detailed in the Phase I ESA (ERM, 2003) potential sources of contamination on the site include the following.

- total PAH, benzo[a]pyrene and lead contamination in fill material on the north east boundary of the site;

- TPH and zinc contamination in groundwater detected along the north east boundary of the site;

- the importation of uncontrolled fill to reclaim the site from swamp land;

- the operation of the site as a warehouse and distribution facility, including the storage a 200 litres of diesel in an above ground storage tank;
- operations on the site and surrounding area during the occupation of Austral Bronze between 1920 and 1989;
- regional contamination of the Botany groundwater aquifer due to historical industrial activities;
- five decommissioned USTs associated with a former petrol station, and more recently a taxis training centre and service garage, 60 to 80 metres north east of the site ; and
- potential ACM associated with building rubble on the adjacent lot.

It is likely that the majority of the contaminated fill material may be removed off-site during the construction of the basement car park as part of the proposed redevelopment.

3.2 CHEMICALS OF POTENTIAL CONCERN (COPC)

COPCs associated with the contamination sources outlined above, include TPH, Benzene, Ethylbenzene, Toluene and Xylene (BTEX) compounds, PAH, metals, organochlorine and organophosphorous pesticides (OCP/OPP), polychlorinated biphenyls (PCBs) and asbestos.

3.3 POTENTIAL RECEPTORS

As discussed in *Section 1.1*, the site is proposed to be redeveloped as a Red Cross laboratory/office and receiving terminal for blood samples. The land use considered is 'commercial/industrial' land use and therefore Red Cross employees (adults) are considered to be the primary receptors of concern from soil and groundwater (dissolved) impacts on the site. The closest environmental receptor to the site is Alexandria Canal, approximately 1.2 kilometres south west of the site.

3.4 PATHWAYS AND POLLUTANT LINKAGES

For exposure to the identified receptors to be considered possible, some mechanism ('pathway') must exist by which contamination from a given source can reach a given receptor. Potential exposure pathways are evaluated for completeness based on the existence of:

- a source of chemical contamination;
- a mechanism for release of contaminants from identified sources;
- a contaminant adsorption or transport medium (e.g. soil, air, groundwater etc.);
- potential receptors of contamination; and
- a mechanism for chemical intake by the receptors at the point of exposure (ingestion, dermal contact or inhalation or a combination of the preceding).

Whenever one or more of the above elements is missing, the exposure pathway is incomplete and there is therefore no risk to the identified receptor (human health for example). An exposure pathway can be either "direct", where the receptor comes into direct contact with the affected environmental media (e.g. soil ingestion) or "indirect", where exposure occurs at a different location or in a different medium than the source (e.g. soil vapours volatilising to ambient air).

3.4.1 Pathways To Human Receptors

It is understood that the Red Cross facility and associated hardstand is proposed to cover the majority of the site (approximately 90%) with the building comprising 62.5% of the sealed area. In addition the proposed plans include the construction of a basement car park, therefore approximately 2.5 m of potentially contaminated fill may be removed off-site to accommodate for the basement. Direct exposure pathways to soil contamination (i.e. ingestion, dermal contact and dust inhalation) for potential future employees are therefore not considered to be relevant as a complete linkage is not considered to exist. Human exposure to groundwater via direct pathways (dermal absorption or ingestion) is unlikely as the only monitoring wells present on site were likely installed, and groundwater will be sampled, by trained environmental scientists/engineers, following site specific health and safety procedures, using appropriate personal protective equipment. In addition extraction of groundwater for domestic purposes is banned in the area surrounding the site.

However, exposure to the on-site receptors may potentially arise due to indirect (i.e. indoor and outdoor vapour inhalation) pathways from soil and groundwater contamination.

3.4.2 Pathways To Environmental Receptors

Contaminated fill material and soil on site is a potential source of contamination to groundwater. As outlined in the NSW Department of Natural Resources, *Botany Sands Aquifer Groundwater Strategy,* the Botany groundwater aquifer is acknowledged to be contaminated due to widespread historical industrial activities. The nearest water body to the site is the Alexandria Canal, approximately 1.2 kilometres south west of the site. Contaminated groundwater from the site and surrounding suburbs has the potential to migrate towards Alexandria Canal.

3.5 PRELIMINARY CONCEPTUAL SITE MODEL SUMMARY

The conceptual site model (CSM) is a tool that assists with the identification and assessment of environmental issues. The identified COPC include metals, TPH, BTEX, PAHs, OCP/OPP, PCB and asbestos. The receptors potentially at risk to the on-site soil and groundwater impacts are considered to be on-site future employees (adults) and on-site and off site environmental receptors.

The exposure pathways are limited to indoor and outdoor inhalation of vapours derived from soil and groundwater impacts for future on-site employees and the migration of contaminated groundwater towards Alexandria Canal (the nearest down-hydraulic gradient surface water receptor).

4 CONCLUSIONS AND RECOMMENDATIONS

The potential risk of contamination of soil and groundwater as a result of historical on site and off-site activities is considered to be high. Impacts to soil and groundwater have already been identified along the north east boundary of the site by Douglas Partners in 2008, and a more detailed Phase II ESA is required to characterise the concentration, location and extent of potentially contaminated soil and groundwater on the remainder of the site. In addition further work to assess if contamination is migrating on-site or off-site is also required.

The preliminary CSM indicates that subsequent to the proposed redevelopment of the site as a Red Cross facility, the exposure pathways to COPC will be limited to indoor and outdoor inhalation of vapours derived from soil and groundwater impacts. The primary receptors are considered to be future on-site employees and Alexandria Canal. The construction of a basement car park may result in the removal of potentially contaminated soil from approximately 80% of the site however this will be confirmed subsequent to completion of a detailed Phase II ESA.

To address the identified data gaps discussed above, a detailed strategy to characterise soil and groundwater contamination on site is outlined below.

The scheduled additional environmental assessment works will aid in the development of an appropriate remediation strategy, if required, to remediate the site to a level suitable for the proposed commercial/industrial land usage. Considering these scheduled works and the results available to date, ERM considers that there is no reason for the proposed development not to occur on the grounds of issues associated with contaminated land.

4.1 PHASE II ENVIRONMENTAL SITE ASSESSMENT STRATEGY

The objective of the Phase II ESA is to evaluate soil and groundwater conditions beneath the site with respect to potential contamination issues, in order to inform the proposed redevelopment of the site. The results from the Phase II ESA will also be expected to aid in the design of the remediation measure for the site (if applicable).

The investigation is designed to assess potential contamination issues from historical use of the site and potential off-site sources of contamination across the site. The proposed sampling density will meet the minimum requirements of the NSW EPA *Sampling Design Guidelines* (1995). The scope of work for the Phase II ESA will consist of the following.

General Fieldwork Preparation

- development of a site-specific Health & Safety Plan for the proposed site works;
- preparation of a Sampling, Analysis and Quality Plan (SAQP) for the proposed works;
- completion of a site-specific H&S induction (if required) by all ERM field staff and sub-contractors to gain access onto the site;
- completion of a "Dial Before You Dig" search; and
- scheduling and contracting subcontractors (eg subsurface clearance technicians and drillers).

Site Assessment Works

ERM proposes to advance up to 17 boreholes on the site to characterise subsurface conditions. In addition, groundwater monitoring wells will be installed in six of the 17 proposed boreholes. *Figure 3* of *Annex A* illustrates the location of the proposed borehole/monitoring well locations. The following activities are proposed as part of this task:

Drilling, Soil Sampling and Well Installation

- Underground service location scanning by a specialist sub-contractor.
- Drilling of up to 17 soil boreholes to an anticipated maximum depth of 6 m bgl or deemed refusal.
- Collection of soil samples at 0.5 m intervals or at each change in stratigraphy throughout the depth of each bore using a split spoon sampler. Where photoionisation detector (PID), visual or olfactory results indicate potential zones of contamination, additional soil samples will be collected and put on hold at the laboratory. At least two samples from each borehole will be analysed for a suite of potential contaminants of concern as identified in the Phase I ESA.
- Logging of soils and recording evidence of potential contamination (e.g., staining/odour);
- Installation of up to six groundwater monitoring wells to a depth of up to 6 m bgl using 50 mm Class 18 uPVC flush-jointed, threaded well screen;
- Decontamination of equipment between investigation locations; and
- Development of monitoring wells.

Annex A

Figures and Photographic Log

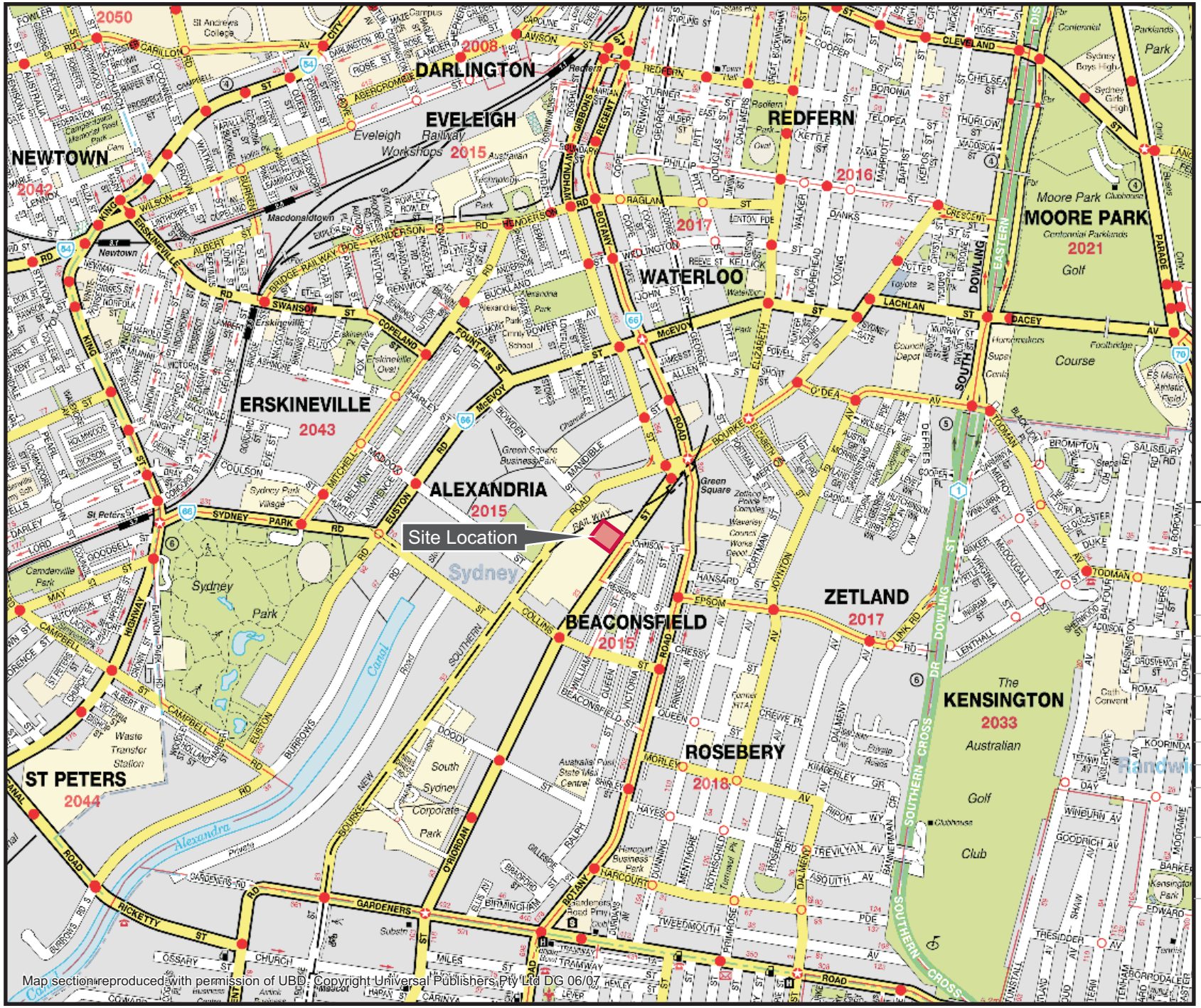

Figure 1

Site Location

Client:	Goodman International Limited	
Project:	O'Riordan Street, Green Square	
Drawing No:	0086939s_01	
Date:	01/07/2008	Drawing size: A4
Drawn by:	ML	Reviewed by: -
Source:	UBD	
Scale:	Refer to Scale Bar	

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0 500m

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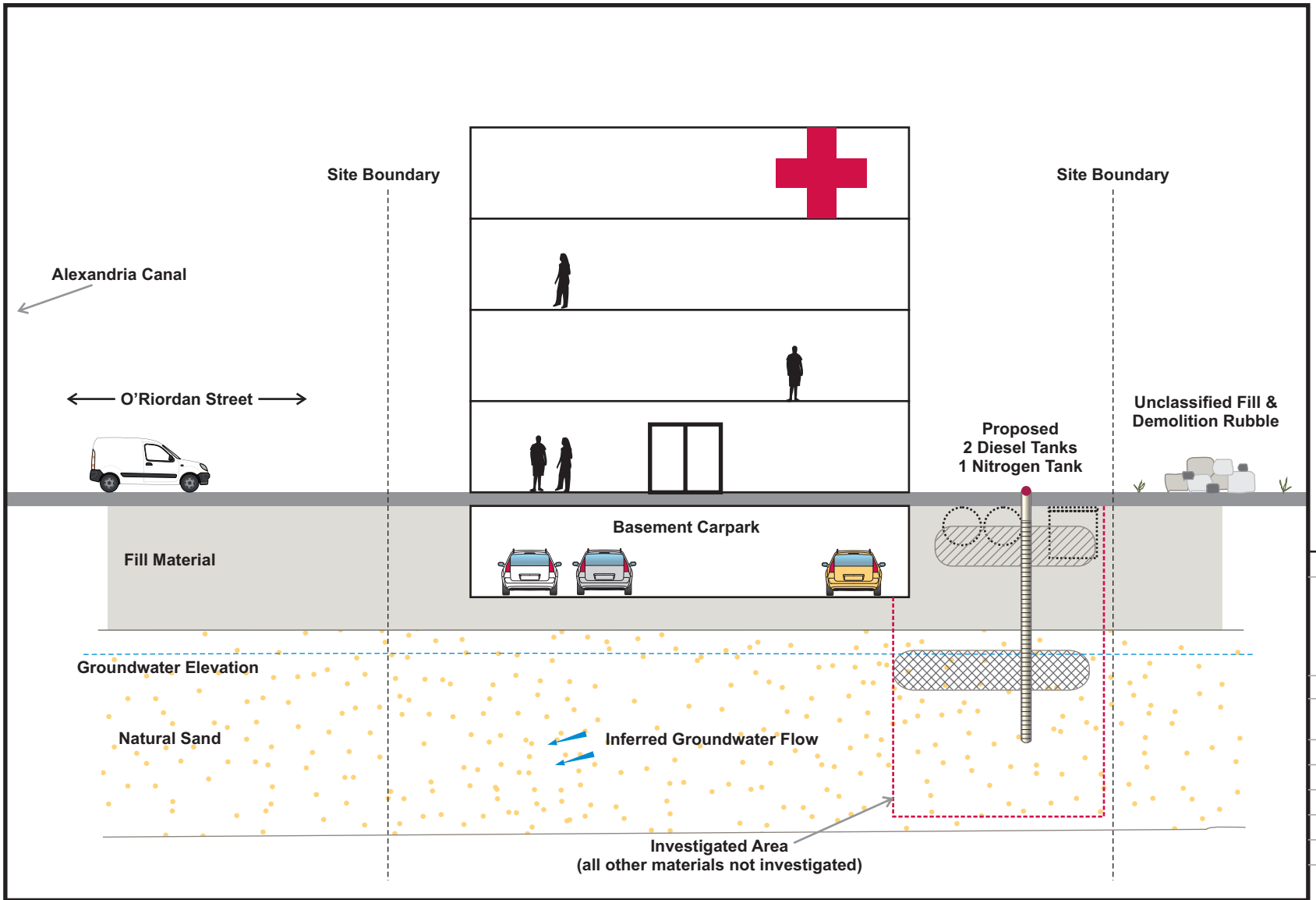

Legend

- Impacted Fill Material
- Impacted Groundwater
- Natural Sand
- Fill Material

Source	Receptor	Pathway
• Impacted Soil • Impacted Groundwater • Potential Asbestos Containing Material on Adjacent Lot • Offsite Impacts to Groundwater	• Future Red Cross Employees (Adult) • Alexandria Canal	• Indoor and Outdoor Vapour Inhalation • Migration of Contaminated Groundwater to Alexandria Canal

Figure 2

Preliminary Conceptual Site Model

Client:	Goodman International Limited	
Project:	O'Riordan Street, Green Square	
Drawing No:	0086939s_02	
Date:	03/07/2008	Drawing size: A4
Drawn by:	ML	Reviewed by: -
Source:	EW	
Scale:	Not to Scale	

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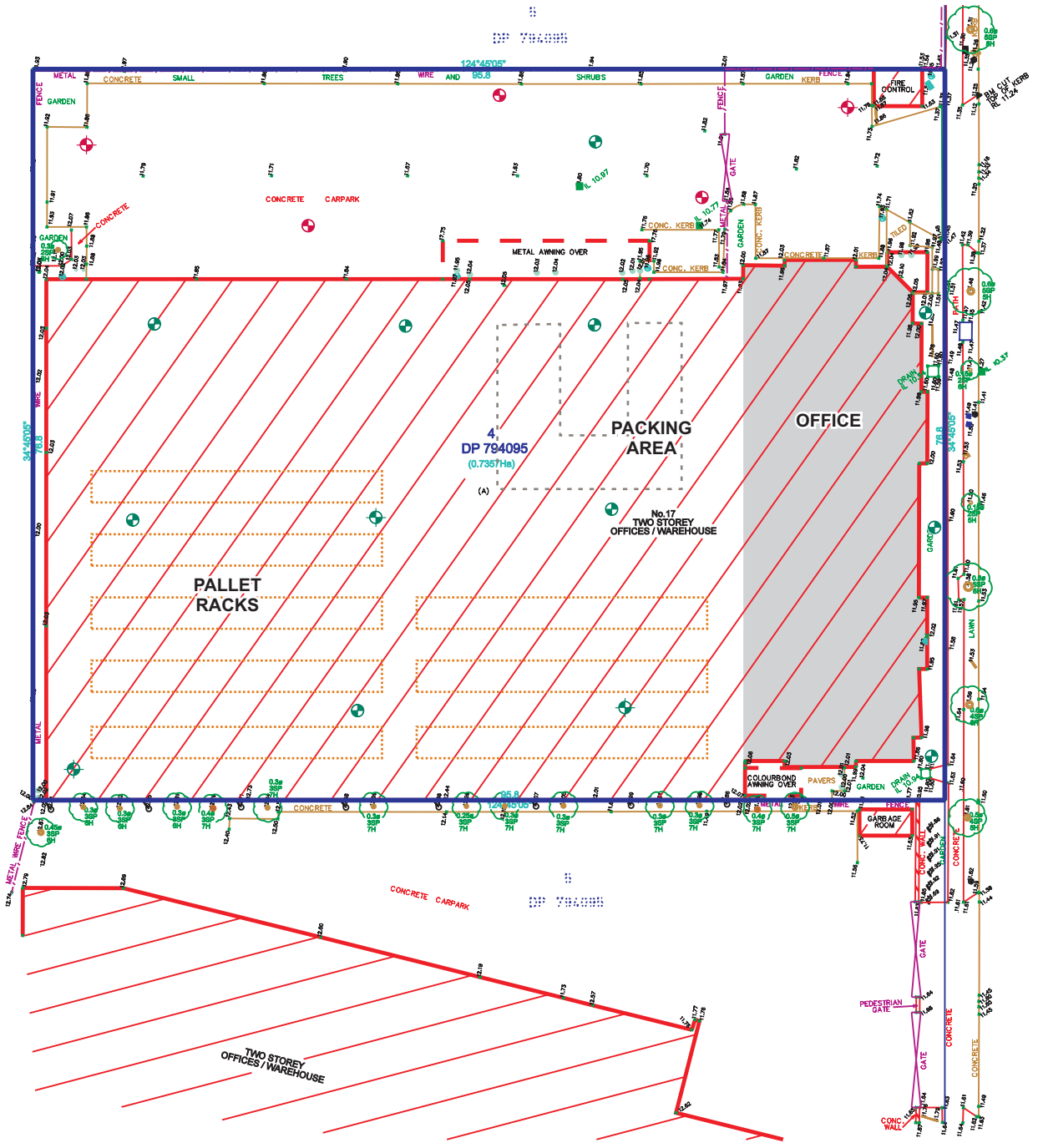

Legend

- Proposed ERM Monitoring Well
- Proposed ERM Borehole
- Approx. Location of Douglas Partners Monitoring Wells
- Approx. Location of Douglas Partners Boreholes

Figure 3

Proposed Borehole Locations

Client:	Goodman International Limited	
Project:	O'Riordan Street, Green Square	
Drawing No:	0086939s_03	
Date:	09/07/2008	Drawing size: A4
Drawn by:	ML	Reviewed by: BG
Source:	Hard & Forester Survey Plans (2007)	
Scale:	Not to Scale	

N

Environmental Resources Management Australia Pty Ltd
Building C, 33 Saunders St, Pyrmont, NSW 2009
Telephone +61 2 8584 8888

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Photograph 1

View across the goods display room.

Photograph 2

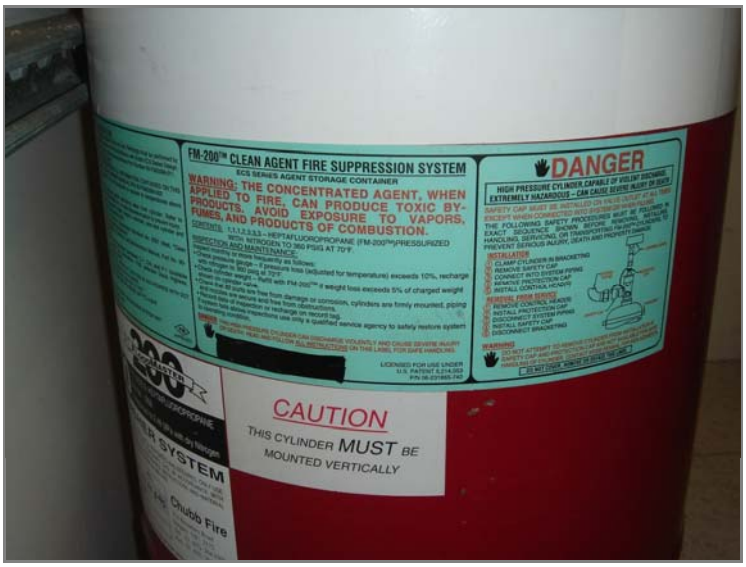
Looking south towards the warehouse and distribution facility.

Photograph 3

Looking west across the warehouse and distribution facility.

Photograph 4

Staining on the warehouse floor surrounding the forklift battery recharge area.



Photograph 5

Gas cylinder containing heptafluropropane, which was used as a fire suppressant within the computer server room.

Photograph 6

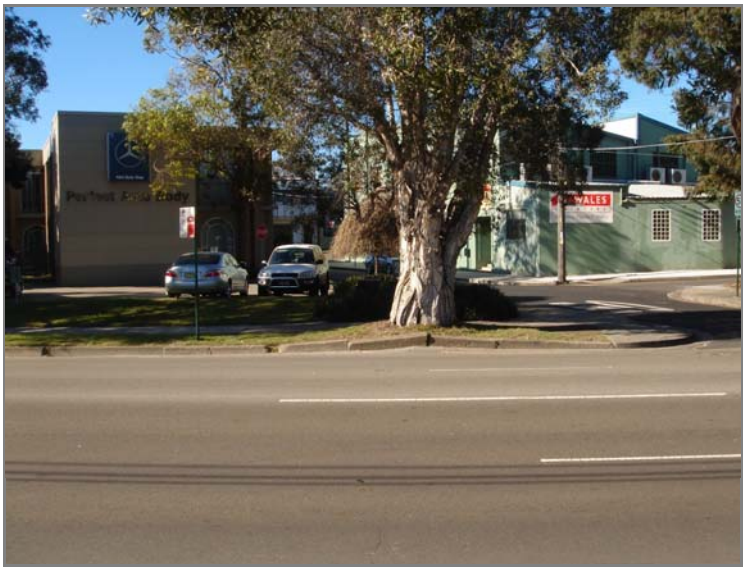
200 litre aboveground storage diesel tank, used to power the emergency generator for the fire system.

Photograph 7

Uncontrolled fill adjacent to the western boundary of the site.

Photograph 8

Taxis car parking on the adjacent vacant block, to the north of the site.

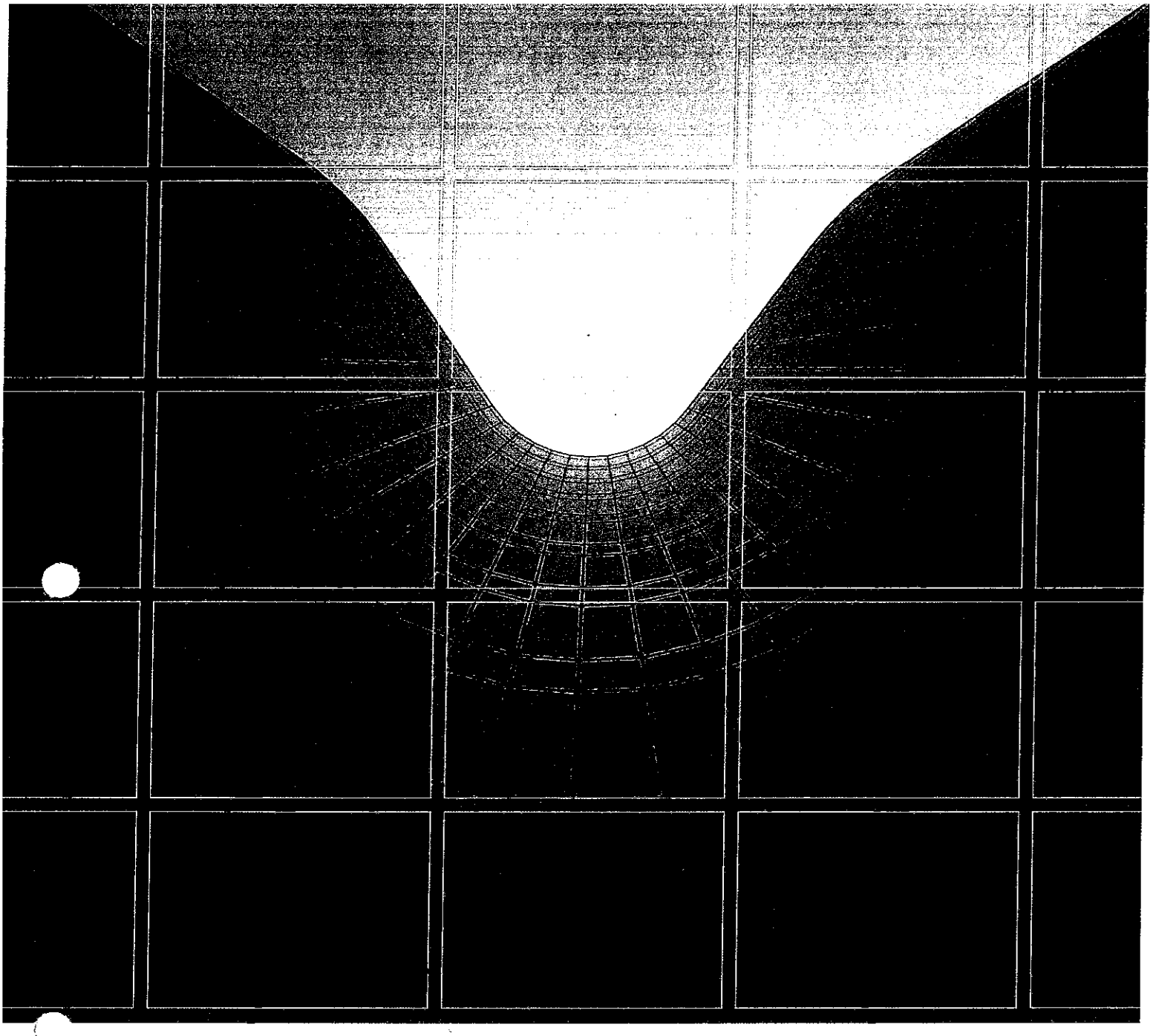


Photograph 9

Surrounding properties to the east of the site.

Annex B

Phase I Environmental Site Assessment



Project Match: 17 O'Riordan Street, Alexandria, NSW

Environmental Due Diligence Assessment

Macquarie Goodman Management Limited

March 2003

PRIVILEGED & CONFIDENTIAL

FINAL

8030154RP1

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Macquarie Goodman Management Limited

March 2003

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FINAL

Approved by:	M. ARRINGTON
Position:	Project Director
Signed:	
Date:	26 March, 2003

Environmental Resources Management Australia Pty Ltd Quality System

8030154RP1

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This report has been prepared in accordance with the scope of services described in the contract or agreement between Environmental Resources Management Australia Pty Ltd ABN 12 002 773 248 (ERM) and the Client. The report relies upon data, surveys, measurements and results taken at or under the particular times and conditions specified herein. Any findings, conclusions or recommendations only apply to the aforementioned circumstances and no greater reliance should be assumed or drawn by the Client. Furthermore, the report has been prepared solely for use by the Client and ERM accepts no responsibility for its use by other parties.

CONTENTS

EXECUTIVE SUMMARY

Environmental Resources Management Australia (ERM) was commissioned by Macquarie Goodman Management Limited to undertake an Environmental Due Diligence Assessment of 17 O'Riordan Street, Alexandria, New South Wales.

The overall objective of the assessment was to provide an assessment of the material liability issues associated with the site in relation to soil and groundwater contamination and environmental compliance issues.

The material threshold for this assessment was established at $1 million per issue and $3 million in aggregate. A summary of identified issues is provided below:

SITE DESCRIPTION

The site is located at 17 O'Riordan Street, Alexandria, New South Wales. The site is broadly rectangular in shape and covers a total area of 6095 square metres. The site fronts onto O'Riordan Street and consists of a warehouse and office covering approximately 81% of the property with the remainder of the site occupied by paved roadways, car parking and landscaped areas. The site and immediately surrounding area are generally level, however the overall slope of the area is slightly towards the south.

ENVIRONMENTAL AUDIT FINDINGS

One material issue was identified with regards to potential soil and groundwater contamination at the site:

The risk of contamination of soils and/or groundwater as a result of historical on-site and off-site activities (Austral Bronze) and current off-site activities (former petrol station) is moderate and is therefore considered a potential material issue.

Although the site is entirely sealed by concrete and bitumen which will limit exposure to potentially contaminated soils/ groundwater and has no current significant contamination sources, a significant source of contamination may exist beneath the site. ERM therefore recommended a detailed Phase II Investigation if an investigation has not been conducted prior to the development. A detailed investigation is estimated at $20, 000.

Another key environmental issue identified during the assessment was as follows:

- *Forklifts on site are electrically operated. It was not possible to confirm the state of the recharge area or assess the number of, or condition of, battery storage during the site inspection. It is recommended that confirmation be sought.*

1 INTRODUCTION

1.1 INTRODUCTION

Environmental Resources Management Australia (ERM) was commissioned by Macquarie Goodman Management Limited to undertake an Environmental Due Diligence Assessment of 17 O'Riordan Street, Alexandria, New South Wales.

The overall objective of the assessment was t provide an assessment of the material liability issues associated with the site in relation to soil and groundwater contamination and environmental compliance issues. In particular, the key objectives were to:

- assess the key environmental regulatory operating compliance of the site in order to identify whether there are *material* compliance issues associated with existing and imminent local and national environmental legislation;
- characterise the environmental setting, surrounding land use, historical land use (on and off-site) of the site and related issues concerning the environmental context;
- evaluate current and past activities and related practices at the site to establish known or potential sources of *material* soil, groundwater and/or surface water contamination; and
- indicate whether further work is required, in particular, any further investigation of possible soil/groundwater contamination.

The material threshold for this assessment was established at $1 million per issue and $3 million in aggregate.

1.2 SCOPE OF WORK

A phase I environmental assessment was conducted. This included:

- a desk study to obtain site setting information including review of available information, such as previous environmental reports, in the vendor data room;
- a site visit, comprising a site inspection, interviews with key personnel and review of relevant documentation;
- a review of the site setting to provide the context for the assessment by describing the site and its operations; and

- a background database review of publicly available information on the site.

An assessment of key material environmental issues as listed below. For each one, existing practices and conditions were assessed in relation to current regulatory requirements. The need for permits and authorisations was reviewed. Key issues included: integrated operating permits; emissions to air; wastewater; chemical handling and storage; bulk chemical storage; waste management; soil and groundwater contamination; polychlorinated biphenyls; ozone depleting substances; environmental noise; radioactive sources; and asbestos.

1.3 *LIMITATIONS OF USE OF THIS REPORT*

The findings of this report are based on the Scope of Work described above. ERM performed the services in a manner consistent with the normal level of care and expertise exercised by members of the environmental auditing profession. No warranties, express or implied, are made.

Subject to the Scope of Work, ERM's assessment is limited strictly to identifying typical environmental conditions associated with the subject property area and does not include evaluation of any other issues.

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 site. As this is a Phase 1 assessment only, it is not intended to be comprehensive.

Additionally, in this Phase 1 assessment, ERM did not conduct soil or wastewater analyses or perform contaminant sampling. Nor did ERM investigate any waste materials from the property that may have been disposed of off the site, nor related waste management practices.

The results of this assessment are based upon a site inspection conducted by ERM personnel and information from regulatory agencies. All conclusions and recommendations regarding the property area are the professional opinions of the ERM personnel involved with the project, subject to the qualifications made above. While normal assessments of data reliability have been made, ERM assumes no responsibility or liability for errors in any data obtained from regulatory agencies, statements from sources outside of ERM, or developments resulting from situations outside the scope of this project.

ERM is not engaged in environmental auditing 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. The client acknowledges that this report is for the exclusive use of the client, its representatives and advisers and any investors, lenders, underwriters and financiers who agreed to execute a reliance letter, and the client agrees that ERM's report or correspondence will not be, except as set forth herein, used or reproduced in full or in part for such promotional purposes, and may not be used or relied upon in any prospectus or offering circular.

1.4 *OTHER RELEVANT DOCUMENTS*

The following document was reviewed as part of this assessment:

- Technical Due Diligence Report for 17 O'Riordan Street Alexandria, No 4400/01/TDD, New Environment, December 2002.

2 SITE SETTING

2.1 SITE LOCATION AND CHARACTERISTICS

2.1.1 Site Description

The site is located at 17 O'Riordan Street, Alexandria, New South Wales. The site is broadly rectangular in shape and covers a total area of 6,095 square metres. The site fronts onto O'Riordan Street and consists primarily of a warehouse and office with the remainder of the site occupied by a paved roadway, parking area and some landscaped areas. The site and immediately surrounding area are generally level, however the overall slope of the area is slightly towards the south.

The site location is shown in *Figure 1.*

A site visit was conducted on 18 February, 2003. At the time of inspection the following key features were noted and are shown in *Figure 2:*

- The complex consists of a single rectangular warehouse and an attached two storey office block covering approximately 81% (approximately 4955m^2) of the site. The eastern end of the site fronting onto O'Riordan Street containing the office space. The single tenant at the time of the inspection was the Nuance Group.
- A car parking area is located along the northern part of the site.
- There are two points of access to the warehouse for goods, these being the receiving and dispatch bays which were located along the northern side of the warehouse and front on to the parking lot.
- The roof of the facility was surrounded by electric fencing for security purposes and no access to the roof was possible during the site inspection.
- One above ground storage tank (AST) was located in a locked enclosure housing the emergency fire pump in the north east corner of the site.

2.1.2 Site Activities

The building is understood to have been constructed in the mid 1990's, before which it was vacant land and prior to that warehousing. Since the present structure was built in the early 1990s, it has reportedly been used solely as a warehouse and distribution facility, primarily for consumer goods. Goods

stored are luxury goods distributed to duty free shops including liquor, tabacco, chocolates, cosmetics and clothes. While no walk through was permitted of the warehouse, a view from the top a mezzanine level was possible.

2.1.3 *Surrounding Land Uses*

The following land uses were noted in the area surrounding the site:

- **North**: To the north, adjacent to the site, is a vacant lot followed by a storage and distribution warehouse occupied by Combines Communication Network.
- **East**: Businesses to the east across O'Riordan Street are J.A Wales Printers, Mercedes Perfect Auto Body (paint and body shop) and a Taxi Training Centre and service garage.
- **South**: Adjacent to the site is a similar office and warehouse storage and distribution facility for Reebok and Rockport.
- **West**: To the west of the site the vacant lot continues from the north of the site. Beyond this further west are a number of commercial type warehouses.

No residential or other sensitive land uses were identified on immediate neighbouring land.

2.1.4 *Hydrology*

The nearest water bodies to the site are the Alexandra Canal which is located approximately 1.2 kilometres southwest of the site, and Botany Bay which is located approximately 4.5 - 5 kilometres south of the site.

2.1.5 *Geology, Soils, Fill & Hydrogeology*

Geology

According to the *100 000 Sydney Geological Series Sheet 9130 (First Edition) 1983,* the site is underlain by medium to fine-grained "marine" sand with podsols.

Soils & Fill

According to the Sydney *1:100 000 Sydney Soil Landscape Series Sheet 9130 (1983),* the site is located on Tuggerah landscape which is characterised by deep Podzols on dunes and Podzol/Humus Podzol intergrades on swales.

The limitations of these soils include an extreme wind erosion hazard, non-cohesive, highly permeable soil with very low soil fertility, localised flooding and permanently high water tables.

Hydrogeology

The surrounding local topography slopes marginally to the south towards Botany Bay. Groundwater is expected to flow in a similar southerly direction.

Information obtained from the Department of Land and Water Conservation (DLWC) indicated that a total of two registered groundwater bores are located within a 2.5 km radius of the site. A review of the bore logs indicated that both of these bores were established for industrial purposes. The bores were 600 metres and 1 kilometre north east of the site respectively. Drillers logs for the bores showed sand, peat and various clays up to 15 metres. Water bearing zones were encountered between 2 and 15 metres.

The site is likely to be situated over the Botany Aquifer. This aquifer is generally of potable natural water quality. However, in industrial areas such as Alexandria, the aquifer is likely to be contaminated due to a long history of industrial activity in the area.

2.2 SITE HISTORY

2.2.1 *Review Of Aerial Photographs*

A site history review was conducted as part of the Phase 1 Assessment and consisted of a review of historical aerial photographs and title deed information. The main findings from each of these sources are summarised below.

Review of Aerial Photographs

Historical aerial photographs dated 1951, 1961, 1971, 1978, 1986, 1994, 1999 and 2002 were reviewed by ERM at the Land and Property Information office. The main findings are summarised as follows:

- **1951**(B&W): The site appears to have been developed with large commercial/industrial type warehouse structures. The surrounding area has been similarly developed to the north and northeast. To the south and southwest the surrounding area is undeveloped. To the southeast is a dense residential area.

- **1961** (B&W): No visible changes to the site. Previously vacant land directly to the south of the site is now developed with another large commercial/industrial type warehouse structure.

- 1970 (B&W): No visible changes to site. The immediate surrounding area is now almost entirely developed with commercial/industrial type buildings.

- 1978 (B&W): No visible changes to site or surrounding area.

- 1986(Colour): No visible changes to site or surrounding area.

- 1994 (Colour): Buildings have been demolished and the site is now partially covered with grass. Adjacent lots to the north and west appear to have also been cleared. To the immediate south of the site the adjacent property appears to be undergoing construction.

- 2002 (Colour): The site appears as it did at the time of inspection. A large commercial type warehouse/building is present, as well as a paved parking area along the northern end of the site. The surrounding area is almost entirely built up with commercial industrial type properties with the exception of the vacant land to the north and west.

2.2.2 *Title Deed Information*

A search of historical title deeds was undertaken for the site by Advance Legal Search. A summary of title deed information is provided in *Table 2.1*.

Table 2.1 Summary of Site Ownership

Period	Registered Owner(s)
	(Lot 4 DP 794095)
2000-todate	Perpetual Nominees Limited
1999-2000	Colonial First State Property Limited
1997-1999	Prudential Corporation Australia Limited
(1996-todate)	*(Lease to Allders International (Oceania) Pty Limited)*
1995-1997	The Prudential Assurance Company Limited
1990-1995	Court Developments Pty Limited
	(Lot 4 DP 794095)
	(Lots A, B & C DP 84117 & Part Lot 1 DP 83768)
1989-1990	Leda Holdings Pty Limited
1970-1989	Austral Bronze Crane Copper Limited
(1941-1958)	*(Lease to The Sydney County Council of part)*
(1921-1941)	*(Lease to The Municipal Council of Sydney of part)*
	(Lot 1 DP 83768)
1920-1970	Austral Bronze Company Limited
1918-1920	Austral Bronze Company Limited (in Liquidation)
1919-1919	Benjamin Christopher Dalwood, machinery merchant
	Albert Edwin Dalwood, merchant
1915-1918	Tom Raine Raine, esquire ,Percy Arundel Rabett, esquire

Period	Registered Owner(s)
1890-1915	Sir William Charles Cooper, baronette

The following points are noted from the review of site ownership:

- The site was originally established in 1890 when it was owned by Sir William Charles Cooper, a baronette.
- From 1915 - 2000 the site was owned by various individuals and commercial/industrial entities the most significant of these being the Austral Bronze Company Limited which occupied the site for the period between 1918-1989.
- The site was purchased by its current owners Perpetual Nominees Limited in 2000.

2.2.3 *Summary*

The Alexandria area was traditionally the early industrial area of Sydney. Before the building was constructed, title deeds and aerial photographs indicate that the site was alternatively vacant and used for commercial/industrial purposes. Based on previous experience, ERM understands that Austral Bronze (who no longer exist) were plant manufacturers of brass fittings, copper and brassware products. These activities had high potential for site contamination. As the site was developed in the mid-1990's, the site may have had an investigation or may have been remediated.

As part of this Phase I assessment, information on potential investigation or remediation was not available from South Sydney Council.

In addition, it should be noted that groundwater in the Alexandria region has traditionally been relatively contaminated due to the historic contamination of the Botany Bay aquifer.

2.2.4 *Regulatory Agency Record Search*

A search of the EPA database revealed that, as of 17 February 2003, there were no records of any notices issued under the *Contaminated Land Management Act, 1997* or the *Environmentally Hazardous Chemicals Act, 1985* for the subject site.

There were no records of any notices issued under the *Unhealthy Building Land Act 1990* for the subject site.

3 ENVIRONMENTAL AUDIT FINDINGS

The site inspection was undertaken on 18 February, 2003 by Danny Ptak and Andrea Berelowitz of ERM. Ross Hollingsworth from The Nuance Group (current tenants) accompanied the auditors for most of the inspection. The inspection comprised a site walkover including the outer perimeter, parking lot and most internal areas of the office. The warehouse was viewed from a mezzanine level and could not be fully inspected. Access to the rooftop area was completely restricted due to the electric security fence. Site photographs are presented in *Annex A*.

3.1 EMISSIONS TO ATMOSPHERE

No significant sources of emissions to air were identified. Minor sources of emissions relate to discharge of circulated air from within the building via the air conditioning system and from particulate matter from vehicle emissions from the car park. The warehouse area is vented via fans mounted in the roof.

No material issues were identified with respect to emissions to atmosphere.

3.2 WATER AND WASTEWATER

3.2.1 *Water Supply*

Water on the site is primarily used for drinking and sanitary purposes. Water is supplied to the site by Sydney Water Corporation through its municipal mains operation.

No groundwater bores were identified on the site during the inspection and none were reported on the site in the search done by the Department of Land and Water Conservation (DLWC).

3.2.2 *Stormwater*

Stormwater sources at the site comprised the following:

- Rainwater collected from the building's rooftop area (covering approximately 81% of the site). No stormwater down pipes were visible along the outside of the building however there may be down pipes located in the warehouse which could not be confirmed due to access restrictions.
- ~~Rainwater collected from paved external areas of the site, ie the concrete~~ and bitumen-sealed areas, and to a lesser extent landscaped areas.

It is likely that most of the stormwater collected in the site's stormwater drainage system is discharged to South Sydney Council's stormwater system.

Of the stormwater drains seen, these appeared to be free of debris and oil stains. It was not possible to gain access to the warehouse to determine if drains were present on the floor of the warehouse.

3.2.3 *Wastewater And Trade Waste*

Wastewater sources at the site are likely to include the following:

- Sanitary wastewater from the toilets and kitchenettes located in the office area and warehouse; and
- Wastewater from cleaning of offices and or warehouse.

General wastewater generated on the site is likely to be discharged to Sydney Water's sewer system.

No material issues were identified with regard to water supply, stormwater or wastewater.

3.3 *CHEMICAL STORAGE AND HANDLING*

3.3.1 *Bulk Storage Tanks*

One 200 litre above ground storage diesel tank (AST) was identified on site used to power the emergency generator for the fire system. The pump and tank are housed in an enclosure in the north-eastern corner of the site. The enclosure had adequate secondary containment.

No under ground storage tanks (USTs) were present and no evidence of former UST locations was identified during the site inspection. Site management were not aware of any current USTs located on site.

3.3.2 *Chemical Storage*

Chemical storage on site related primarily to cleaning fluids including minor quantities of dishwashing liquid and surface sprays. Commercial cleaners are contracted and do not store bulk cleaning fluids or equipment on site. At the time of the inspection there was no evidence of leaking or spillages of chemicals.

All forklifts are electrically operated. It was not possible to confirm the state of the recharge area or assess the number of, or condition of, battery storage during the site inspection.

No material issues were identified with regard to chemical storage. Recommendation to confirm that batteries are stored in an area with secondary containment and with appropriate spill kits.

3.4 WASTE MANAGEMENT

Wastes generated on site are likely to comprise the following:

- general / office (mixed) waste; and
- recyclable wastes, eg cardboard, paper, plastics (generally packaging waste); packaging wastes such as wooden pallets (these are recycled and reused in the warehouse).

No waste documentation was available for review during the site visit.

Two waste skips are provided by SITA Environmental Solutions who are contracted to remove general office and recyclable wastes. Recycling bins were also noted for paper products in the office.

No material issues were identified with regard to waste management.

3.5 ENVIRONMENTAL NOISE

No significant noise sources were identified at the site. Hours of operation are generally between 7am and 5pm, with some night shifts occurring during busy seasons. The main source of noise associated with the site relates to traffic and vehicle movements within the warehouse, although given that the surrounding area is primarily commercial/industrial this is not considered to be significant.

Management was not aware of any noise complains relating to site operations.

No material issues were identified with regard to environmental noise.

3.6 OTHER ENVIRONMENTAL ISSUES

3.6.1 *Polychlorinated Biphenyls (Pcbs)*

Oils containing polychlorinated biphenyls (PCBs) were used in electrical and hydraulic equipment in Australia until the early 1970s. There is potential for capacitors in old light fittings and old electrical control equipment to contain small quantities of PCB-containing oil.

The building was constructed in the 1990s therefore it is considered unlikely that PCBs could be present in electrical equipment. No old style light fittings or electrical control equipment that were likely to contain PCB oil were noted during the site inspection although no detailed inspection of individual fittings has been undertaken.

No material issues were identified with regard to PCBs.

3.6.2 *Ozone Depleting Substances*

A total of thirteen air conditioning units are located on the rooftop area which contain the refrigerant R22. R22 is scheduled to be phased out of use by 2015.

Building management confirmed that portable fire extinguishers were either carbon dioxide, foam or dry chemicals and no halons are used.

No material issues were identified with regard to ozone depleting substances.

3.6.3 *Asbestos Containing Materials (Acm)*

Asbestos was used as a building and industrial material in Australia until the mid 1980s. The building was constructed in the 1990s, therefore it is considered unlikely that asbestos containing materials are contained within the building.

No material issues were identified with regard to asbestos containing materials.

3.6.4 *Radioactive Substances*

Building management was not aware of any radioactive sources present at the site and none were observed by ERM during the site visit.

No material issues were identified with regard to radioactive substances.

3.7 *Soil and Groundwater Contamination*

3.7.1 *Historical On-Site Potential Contamination Sources*

Historical title deed information showed that the Austral Bronze Company had previously occupied the site from 1920-1989. Contaminants associated with this type of manufacturing may be various heavy metals and hydrocarbons. As Austral Bronze was present on this site for a period of years between 1920-1989 the likelihood of soil and or groundwater contamination

may be high. There are no records pertaining to remediation of the site prior to the current warehouse being built.

The risk of significant soil and groundwater contamination on the target site associated with historical on-site activities is considered to be high.

3.7.2 *Existing On-Site Potential Contamination Sources*

Existing on-site potential contamination sources could include the 200-litre diesel AST in the fire pump room. The AST had adequate secondary containment at the time of the audit therefore the risk posed by existing on-site potential contamination sources is considered to be low.

3.7.3 *Historical Off-Site Potential Contamination Sources*

The following are considered potential historical off-site contamination sources:

- the presence of heavy metals and hydrocarbons in soil and or groundwater due to the Austral Bronze Company ownership of the site and surrounding area from 1920-1989.
- Importing of fill to the area occurred prior to any building as the area was previously swamp (early 1900's). There are no records of types of fill used.
- There is regional contamination of the Botany Groundwater Aquifer due to a long history of industry in the region.

The risk of significant soil and groundwater contamination on the target site associated with historical off-site activities is considered to be high.

3.7.4 *Existing Off-Site Potential Contamination Sources*

The following is considered existing potential off site contamination sources:

- the taxi centre and refuelling depot located approximately 60-80 metres northeast was a former petrol station which ceased operating in May 2000. Reportedly there were five UST's present on site that have been filled with water. Groundwater is inferred to flow from the service station towards the site.
- Piles of building rubble were visible on the adjacent vacant site along northern and western fences, which may contain asbestos.

The risk of significant soil and groundwater contamination on the target site associated with existing off-site activities is considered to be moderate.

3.7.5 *Site Vulnerability And Sensitivity*

Site vulnerability should be considered high due to a prolonged history of heavy industry in the area. The closest bores to the site are 600 metres and 1 kilometre north east of the site respectively and were established for industrial purposes.

The nearest water bodies to the site are the Alexandria Canal which is located approximately 1.2 kilometres southwest of the site. Beaconsfield, a residential area is located 400 metres to the south east of the site.

The likelihood of contamination in the area is considered high due to the underlying Botany Bay aquifer, which is contaminated in this region due to historical activities. In addition, the site formed part of a large parcel of land owned by Austral Bronze. Anecdotal evidence suggests the site is within a large area, which was subjected to historical filling to elevate the ground surface in large portions of Mascot and Alexandria. This filling was conducted prior to WWII at the Local Councils insistence and was undertaken with uncontrolled fill.

The Botany Bay aquifer is unconfined to semi-confined in the vicinity of the site and comprises well-graded sands of relative high permeability. These features therefore have enabled historic contamination from both industry and regional fill material to disseminate widely throughout the area.

As the surrounding area is largely commercial/industrial and groundwater bores were established for industrial purposes only, site sensitivity is considered low/ moderate.

3.7.6 *Risk Assessment*

The risk of material contamination of soils and/or groundwater as a result of historical on-site and off-site activities (Austral Bronze) and current off-site activities (former petrol station) is therefore considered high.

A worst case scenario is that may be a significant source of contamination existing beneath the site. A best case scenario is that a soil and groundwater investigation was conducted prior to the current development. The likely consequences and extent of remediation required for a worst case scenario associated with the potential contaminant sources is considered to be a material issue.

3.7.7 *Conclusion*

The risk of material contamination of soils and/or groundwater as a result of historical on-site and off-site activities (Austral Bronze) and current off-site activities (former petrol station) is moderate and is therefore considered to be a potential material issue.

Although the site is entirely sealed by concrete and bitumen which will limit exposure to potentially contaminated soils/ groundwater and has no current significant contamination sources, a reasonable worst case scenario may be a significant source of contamination existing beneath the site.

ERM therefore recommended a detailed Phase II Investigation if an investigation has not been conducted prior to the development. A detailed investigation is estimated at $20, 000.

Annex A

Site Figures And Photologs

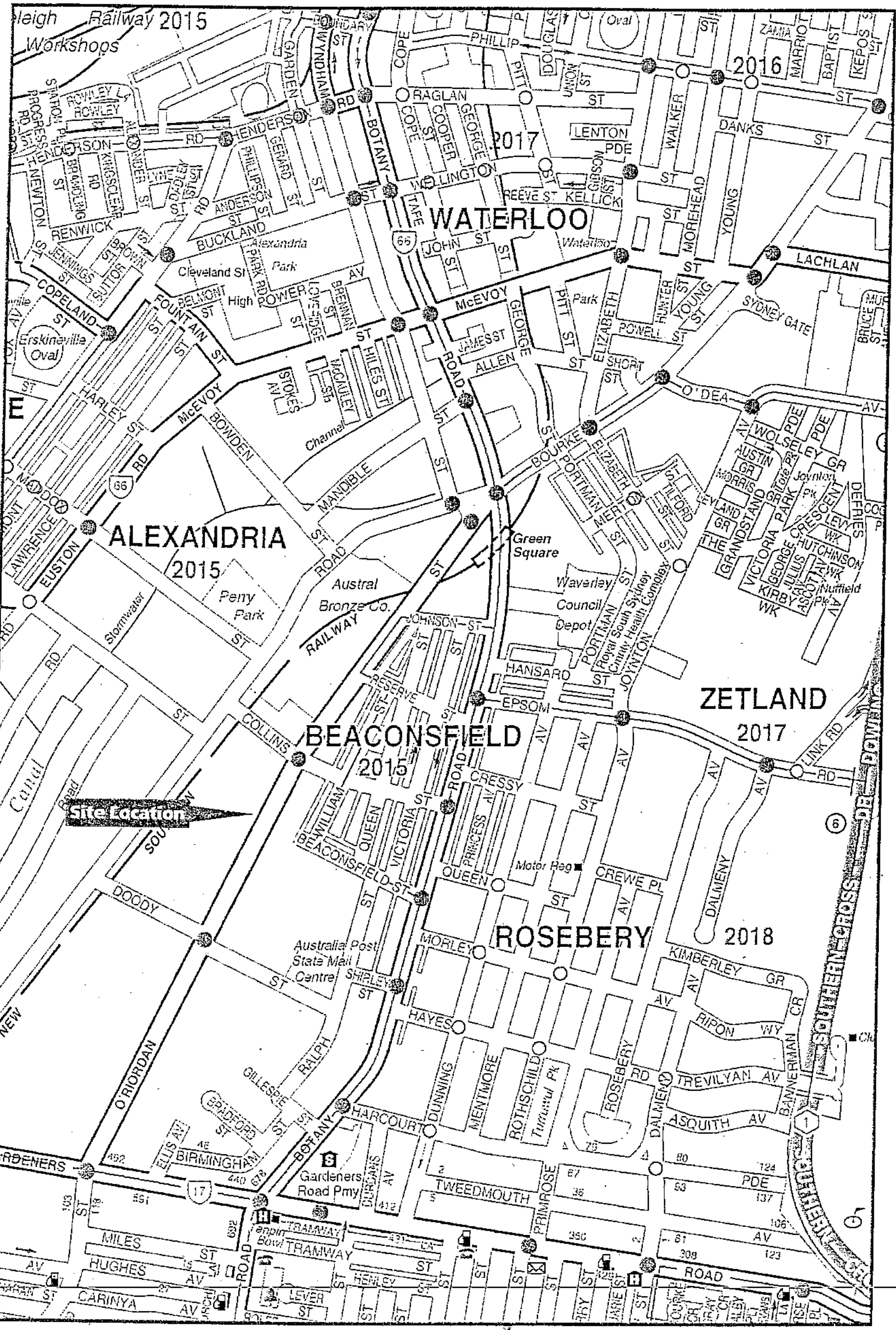

Figure 1 | **Site Location**

Match Phase 1 - O'Riordan Street

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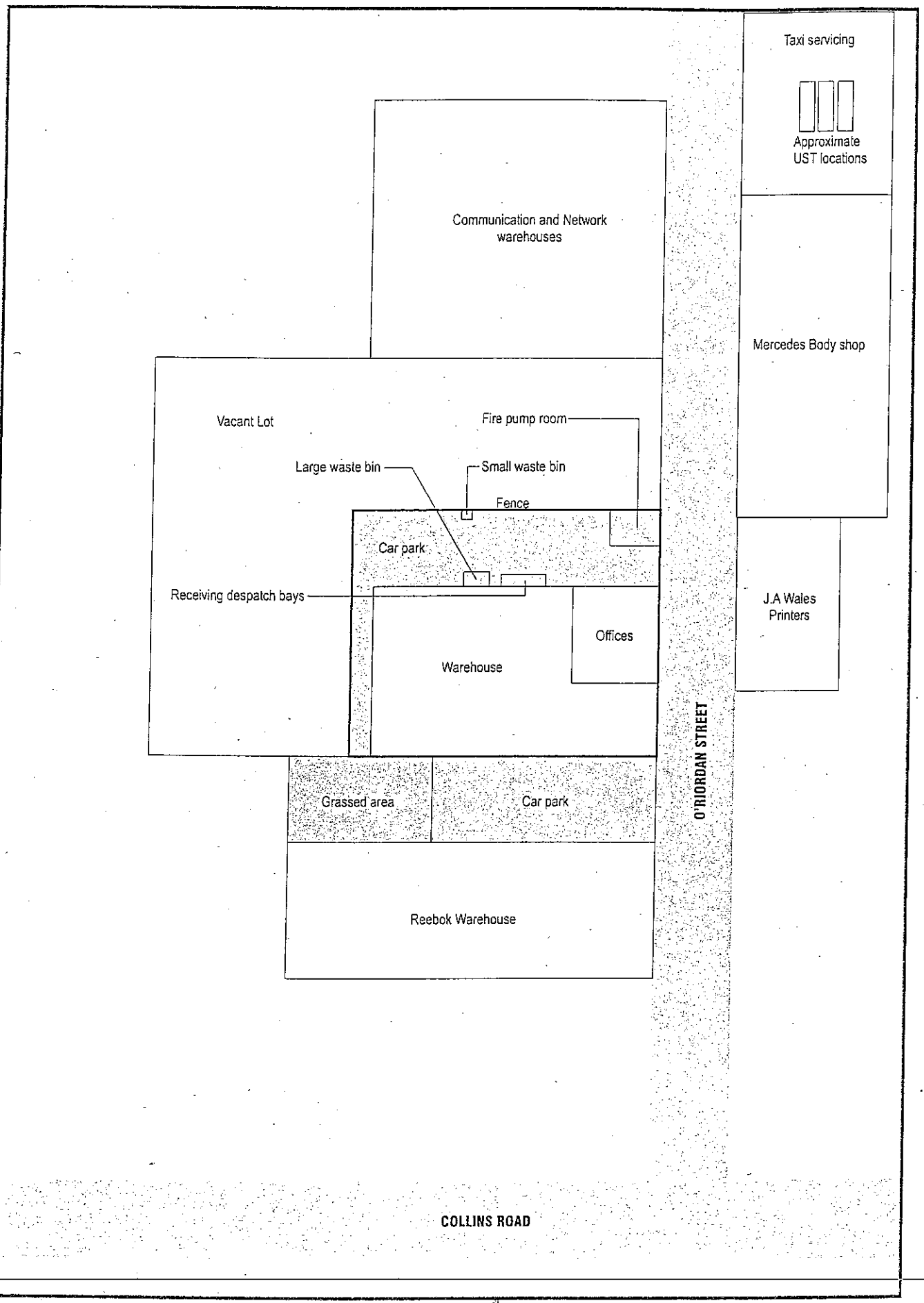

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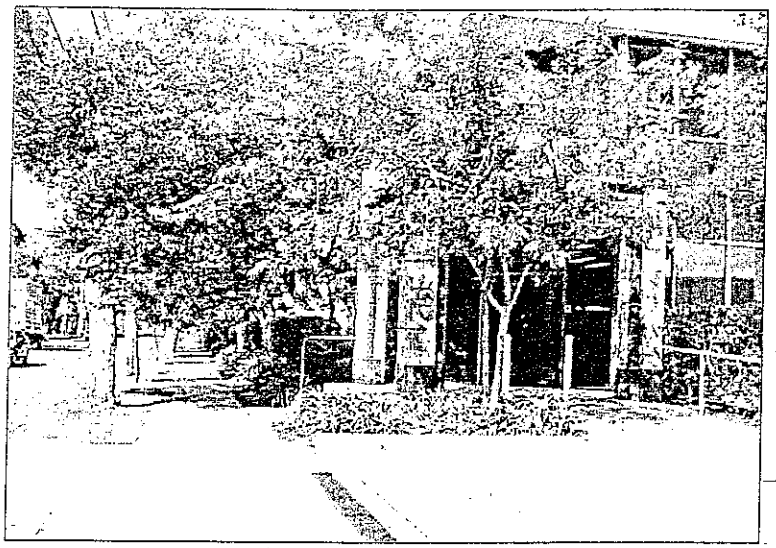
Boundary of area assessed

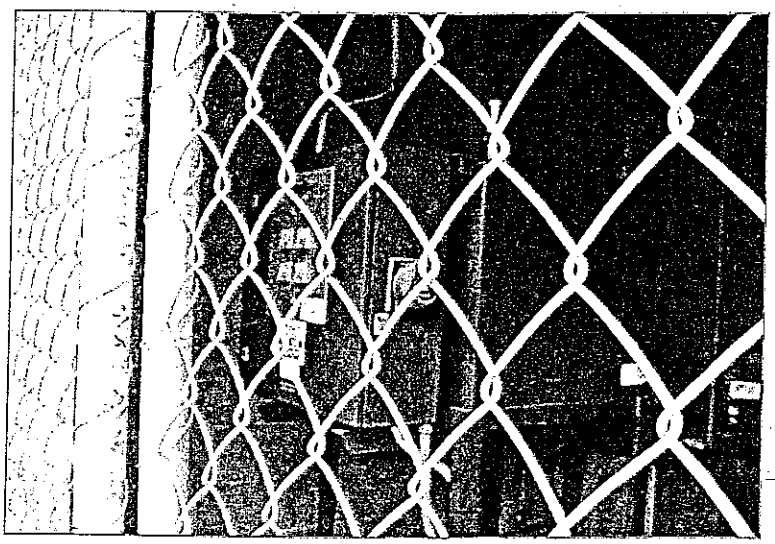
Figure 2 Site Layout

Match Phase 1 - O'Riordan Street



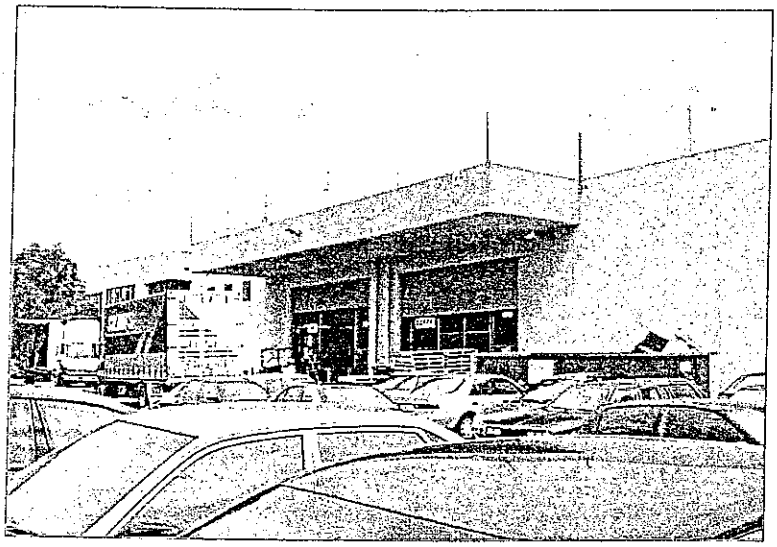
Photograph 1

Entry to site from O'Riordan Street



Photograph 2

Above ground storage tank (200L) in fire pump building (north eastern corner)



Photograph 3

Warehouse receiving and dispatch bays (northern end of site) . Large waste skip and wooden pallets also visible

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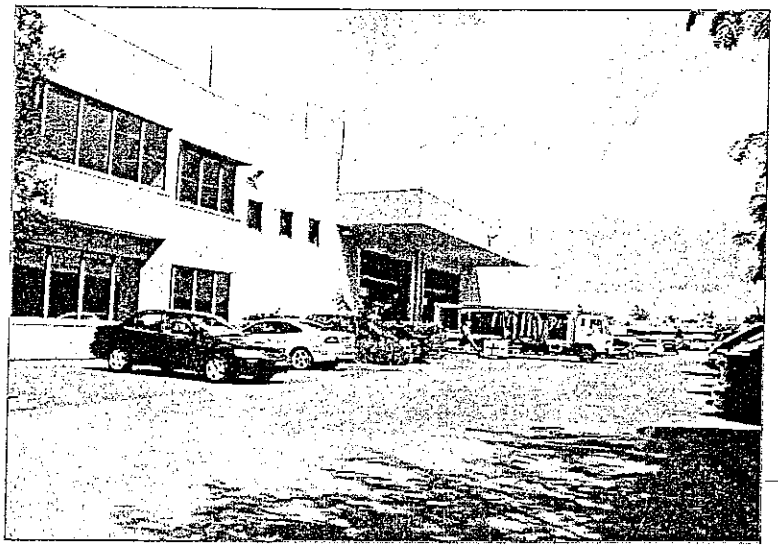
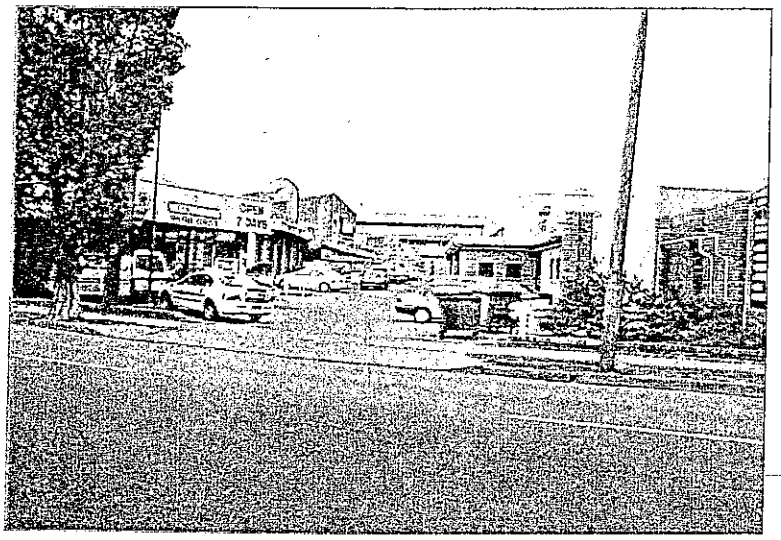
Photographs

Match Phase 1 -O'riordan Street



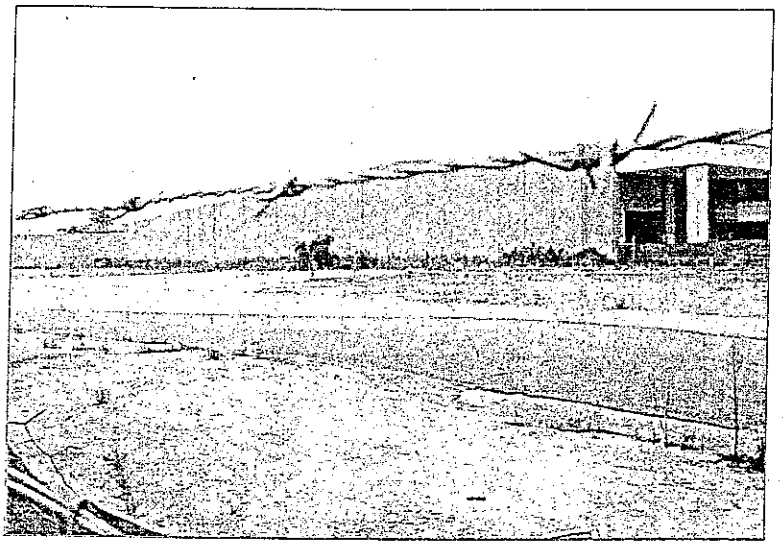
Photograph 4

Parking lot and warehouse bays



Photograph 5

Taxi centre and LPG tank located approx. 70 metres to north east of site across O'Riordan Street



Photograph 6

Vacant lot adjacent to site on northern and western ends

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Match Phase 1 -O'riordan Street

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