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Site Audit

Part 2, 100-120 King Street, Randwick NSW

for Sir Moses Montefiore Jewish Home
October 2006

J0807.15R-rev0

CMJA

C. M. Jewell & Associates Pty Ltd

Site Audit
Part 2, 100-120 King Street, Randwick NSW

October 2006

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Controlled Copy 1	*Mr David Freeman* Sir Moses Montefiore Jewish Home 120 High Street HUNTERS HILL NSW 2110
2	*Ms Fran Mitchell* URS Australia Limited Level 3, 116 Miller Street NORTH SYDNEY NSW 2060
3	*The General Manager* Randwick City Council 30 Frances Street RANDWICK NSW 2031
4	CMJA Library

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CHRIS JEWELL
Auditor

NSW Site Auditor Scheme
SITE AUDIT STATEMENT

Department of Environment and Conservation (NSW)

A site audit statement summarises the findings of a site audit. For full details of the site auditor's findings, evaluations and conclusions, refer to the associated site audit report.

This form was approved under the Contaminated Land Management Act 1997 *on 21 February 2005. For more information about completing this form, go to Part IV.*

PART I: Site audit identification

Site audit statement no: SA183/3

This site audit is a **statutory audit**~~/non-statutory audit*~~ within the meaning of the *Contaminated Land Management Act 1997*.

Site auditor details (as accredited under the *Contaminated Land Management Act 1997*)

Name: Christopher Jewell

Address: 1/13 Kalinda Road, Bullaburra, NSW 2784

Phone: 4759 3251

Fax: 4759 3257

Site details

Address: 100-120 King Street, Randwick, NSW 2031

Property description:

The site is identified as Part 2 of Lot 202 in DP879576, in the Parish of Alexandria, County of Cumberland, as per attached survey plan.

Local Government Area: Randwick

Area of site: 2293 m² ***Current zoning:*** 2B and 2C Residential

To the best of my knowledge, the site ~~is~~/**is not*** the subject of a declaration, order, agreement or notice under the *Contaminated Land Management Act 1997* or the *Environmentally Hazardous Chemicals Act 1985*.

Declaration/Order/Agreement/Notice* no(s)

.....

** Strike out as appropriate*

Site audit commissioned by

Name: Mr David Freeman

Company: Sir Moses Montefiore Jewish Home

Address: 120 High Street, Hunters Hill, NSW 2110

Phone: 02 9879 2715

Fax: 02 9871 2700

Name and phone number of contact person (if different from above)

Purpose of site audit

☑ A. To determine land use suitability *(please specify intended use[s])*

OR

☐ B(i) To determine the nature and extent of contamination, and/or

☐ B(ii) To determine the appropriateness of an **investigation/remedial action/ management plan***, and/or

☐ B(iii) To determine if the land can be made suitable for a particular use or uses by implementation of a specified **remedial action plan/management plan*** *(please specify intended use[s])*

Information sources for site audit

Consultancy(ies) which conducted the site investigation(s) and/or remediation

URS Australia Limited

Title(s) of report(s) reviewed:

URS Australia Pty Ltd, Environmental Management Plan, Part 2 Lot 202 King Street, Randwick, dated 21 September 2006.

URS Australia Pty Ltd, Remediation Validation, Part 2 Area Lot 202 King Street, Randwick. Report No. 51072-001-558, Revision 0, dated 5 June 2006.

URS Australia Pty Ltd, Letter Report: Lead Remediation Lot 202 King Street, Randwick – RAP Modification, dated 26 August 2003.

URS Australia Pty Ltd, Remediation Action Plan, Lot 202 King Street, Randwick, dated 7 February 2003.

URS Australia Pty Ltd, Data Assessment Report - Lot 202, King St, Randwick. Report No. 51072-001-R001H dated 5 December 2002.

URS Australia Pty Ltd, Remediation Action Plan, Lot 202 King Street, Randwick. Report No. 51072-001 Rap_Rev1_Final dated 26 November 2002.

URS Australia Pty Ltd, Supplementary Sampling and Analysis Plan – Lot 202, King Street, Randwick. Letter/Report dated 12 June 2002.

**** Strike out as appropriate***

Other information reviewed (including previous site audit reports and statements relating to the site)

- Regional geological and topographic mapping
- Regional hydrogeological data

Site audit report

Title: Part 2, 100-120 King Street, Randwick NSW

Report no: J0807.15R-rev0 Date: 10 October 2006

** Strike out as appropriate*

PART II: Auditor's findings

Please complete either Section A or Section B, **not** both. *(Strike out the irrelevant section.)*

Use Section A where site investigation and/or remediation has been completed and a conclusion can be drawn on the suitability of land use(s).

Use Section B where the audit is to determine the nature and extent of contamination and/or the appropriateness of an investigation or remedial action or management plan and/or whether the site can be made suitable for a specified land use or uses subject to the successful implementation of a remedial action or management plan.

Section A

✓ **I certify that, in my opinion, the site is SUITABLE for the following use(s)** *(tick all appropriate uses and strike out those not applicable)*:

- ~~❑ Residential, including substantial vegetable garden and poultry~~
- ~~❑ Residential, including substantial vegetable garden, excluding poultry~~
- ~~❑ Residential with accessible soil, including garden (minimal home grown produce contributing less than 10% fruit and vegetable intake), excluding poultry~~
- ~~❑ Day care centre, preschool, primary school~~
- ~~❑ Residential with minimal opportunity for soil access, including units~~
- ~~❑ Secondary school~~
- ~~❑ Park, recreational open space, playing field~~
- ~~❑ Commercial/industrial~~
- ✓ Other *(please specify)*: A composite development as an aged care and community facility comprising areas of residential use with minimal opportunity for soil access, areas of commercial use (cafes) and areas of landscaped open space as shown on Figure 3 of attached Site Audit Report.

subject to compliance with the following environmental management plan in light of contamination remaining on the site:

Final Report, Environmental Management Plan – Part 2, Lot 202 King Street, Randwick (43346065) dated 21 September 2006.

~~OR~~

~~❑ I certify that, in my opinion, the site is NOT SUITABLE for any use due to the risk of harm from contamination.~~

Overall comments

The site is considered suitable for the uses identified above subject to compliance with the Environmental Management Plan identified above. As indicated in the Environmental Management Plan and Site Audit report, a Public Positive Covenant under Section 88E of the Conveyancing Act 1919, requiring management of the site in accordance with the Environmental Management Plan and nominating Randwick City Council as the Prescribed Authority should be made on the relevant land title. It is also recommended that Randwick council note the requirement for observance of the Environmental Management Plan on any Planning Certificate issued in respect of the site under Section 149(5) of the Environmental Planning and Assessment Act 1979. Any soil removed from the site should be appropriately classified in accordance with the Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Wastes. Any soil imported to the site should be validated as being suitable for use on the site. Due to regional contamination issues and because groundwater quality may change with time, groundwater should not be extracted for any purpose without appropriate assessment.

Section B

Purpose of the plan[1] which is the subject of the audit .....

I certify that, in my opinion:

- ☐ the nature and extent of the contamination HAS/HAS NOT* been appropriately determined

AND/OR

- ☐ the investigation/remedial action plan/management plan* IS/IS NOT* appropriate for the purpose stated above

AND/OR

- ☐ the site CAN BE MADE SUITABLE for the following uses (tick all appropriate uses and strike out those not applicable):
  - ☐ Residential, including substantial vegetable garden and poultry
  - ☐ Residential, including substantial vegetable garden, excluding poultry
  - ☐ Residential with accessible soil, including garden (minimal home grown produce contributing less than 10% fruit and vegetable intake), excluding poultry
  - ☐ Day care centre, preschool, primary school
  - ☐ Residential with minimal opportunity for soil access, including units
  - ☐ Secondary school
  - ☐ Park, recreational open space, playing field
  - ☐ Commercial/industrial
  - ☐ Other (please specify) .....

  if the site is remediated/managed* in accordance with the following remedial action plan/management plan* (insert title, date and author of plan)

  .....

  .....

  .....

  .....

  subject to compliance with the following condition(s):

  .....

  .....

  .....

[1] For simplicity, this statement uses the term 'plan' to refer to both plans and reports.
Strike out as appropriate

Overall comments

.....

.....

.....

.....

.....

.....

PART III: Auditor's declaration

I am accredited as a site auditor by the NSW Environment Protection Authority under the *Contaminated Land Management Act 1997* (Accreditation No: 9810)

I certify that:

- I have completed the site audit free of any conflicts of interest as defined in the *Contaminated Land Management Act 1997*, and
- with due regard to relevant laws and guidelines, I have examined and am familiar with the reports and information referred to in Part I of this site audit, and
- on the basis of inquiries I have made of those individuals immediately responsible for making those reports and obtaining the information referred to in this statement, those reports and that information are, to the best of my knowledge, true, accurate and complete, and
- this statement is, to the best of my knowledge, true, accurate and complete.

I am aware that there are penalties under the *Contaminated Land Management Act 1997* for wilfully making false or misleading statements.

Signed ..... Date 10 October 2006

PART IV: Explanatory notes

To be complete, a site audit statement form must be issued with all four parts.

How to complete this form

Part I identifies the auditor, the site, the purpose of the audit and the information used by the auditor in making the site audit findings.

Part II contains the auditor's opinion of the suitability of the site for specified uses or of the appropriateness of an investigation, or remedial action or management plan which may enable a particular use. It sets out succinct and definitive information to assist decision-making about the use(s) of the site or a plan or proposal to manage or remediate the site.

The auditor is to complete either Section A or Section B of Part II, **not** both.

In **Section A** the auditor may conclude that the land is *suitable* for a specified use(s) OR *not suitable* for any beneficial use due to the risk of harm from contamination.

By certifying that the site is *suitable*, an auditor declares that, at the time of completion of the site audit, no further remediation or investigation of the site was needed to render the site fit for the specified use(s). Any **condition** imposed should be limited to implementation of an environmental management plan to help ensure the site remains safe for the specified use(s). The plan should be legally enforceable: for example a requirement of a notice under the *Contaminated Land Management Act 1997* (CLM Act) or a development consent condition issued by a planning authority. There should also be appropriate public notification of the plan, e.g. on a certificate issued under s.149 of the *Environmental Planning and Assessment Act 1979*.

Auditors may also include **comments** which are key observations in light of the audit which are not directly related to the suitability of the site for the use(s). These observations may cover aspects relating to the broader environmental context to aid decision-making in relation to the site.

In **Section B** the auditor draws conclusions on the nature and extent of contamination, and/or suitability of plans relating to the investigation, remediation or management of the land, and/or whether land can be made suitable for a particular land use or uses upon implementation of a remedial action or management plan.

By certifying that a site *can be made suitable* for a use or uses if remediated or managed in accordance with a specified plan, the auditor declares that, at the time the audit was completed, there was sufficient information satisfying guidelines made or approved under the CLM Act to determine that implementation of the plan was feasible and would enable the specified use(s) of the site in the future.

For a site that *can be made suitable*, any **conditions** specified by the auditor in Section B should be limited to minor modifications or additions to the specified plan. However, if the auditor considers that further audits of the site (e.g. to validate remediation) are required, the auditor must note this as a condition in the site audit statement.

Auditors may also include **comments** which are observations in light of the audit which provide a more complete understanding of the environmental context to aid decision-making in relation to the site.

In **Part III** the auditor certifies his/her standing as an accredited auditor under the CLM Act and makes other relevant declarations.

Where to send completed forms

In addition to furnishing a copy of the audit statement to the person(s) who commissioned the site audit, statutory site audit statements must be sent to:

Department of Environment and Conservation (NSW)

Contaminated Sites Section
PO Box A290, SYDNEY SOUTH NSW 1232Fax: (02) 9995 5930

AND

the **local council** for the land which is the subject of the audit.

11-017/5940

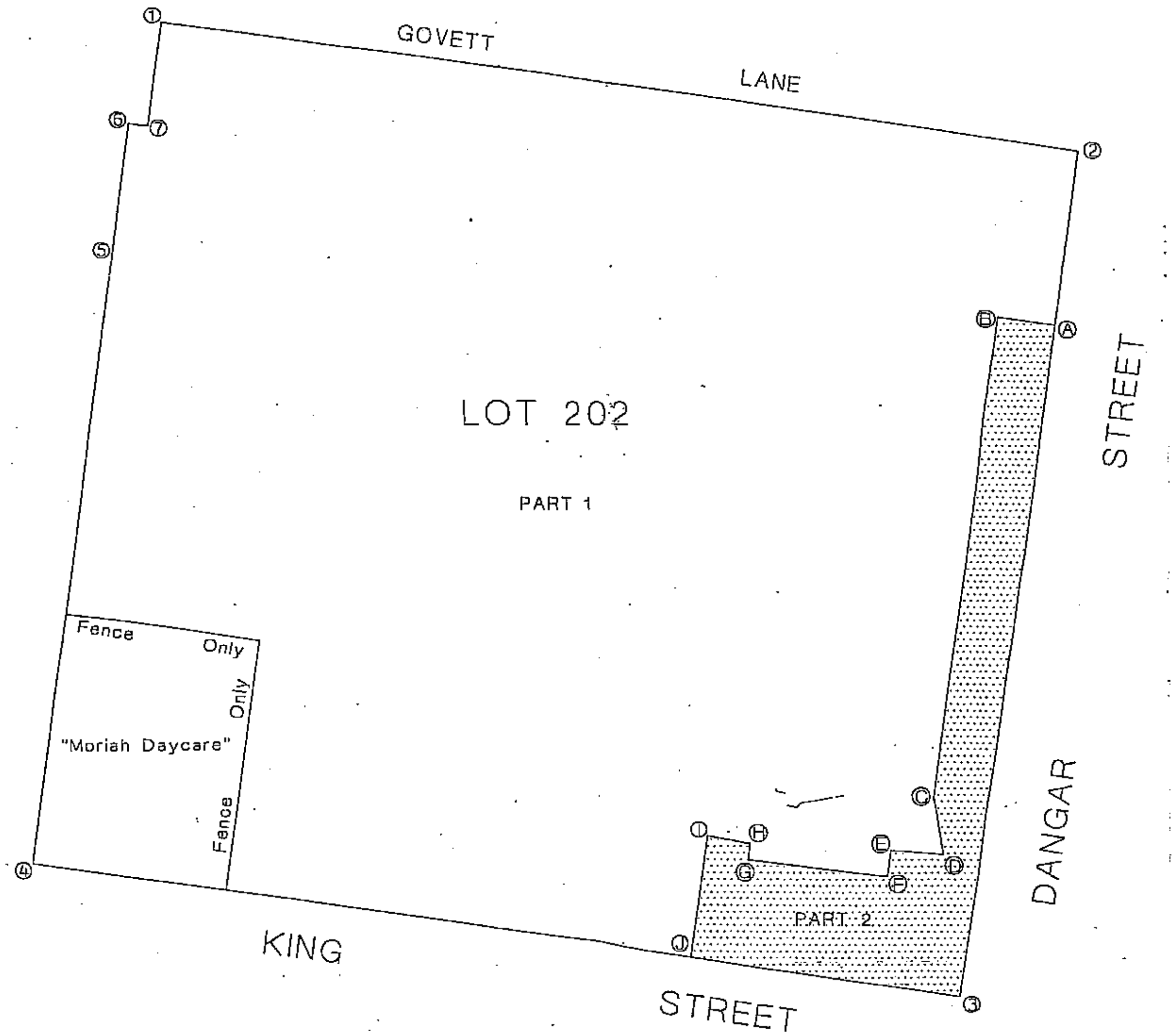

TABLE OF CO-ORDS		
POINT	EASTING	NORTHING
1	337058.68	6246924.26
2	337231.98	6246899.03
3	337208.58	6246736.20
4	337031.60	6246761.69
5	337048.90	6246880.90
6	337052.30	6246904.73
7	337055.82	6246904.23
A	337227.21	6246865.86
B	337216.19	6246867.35
C	337203.50	6246774.42
D	337205.32	6246763.29
E	337195.38	6246764.10
F	337194.56	6246759.12
G	337168.24	6246762.24
H	337168.49	6246765.29
I	337160.55	6246766.68
J	337157.40	6246743.54

SIGNED: [signature]
GLENN R. BEASLEY
REGISTERED SURVEYOR
IDENTIFICATION No. 446

ISSUE	DATE	AMENDMENT	DRAWN	CHKD
C	9/2003	'STAGE' REPLACED WITH 'PART'	G.B.	
B	9/2003	CO-ORDINATE ADJUSTMENT.	G.O.	
A	9/2003	ORIGINAL ISSUE	G.O.	

NOTES:
1) NO BOUNDARY SURVEY HAS BEEN MADE.
2) CO-ORDS IN TABLE ARE ON M.G.A. CO-ORDINATE SYSTEM.

SCALE :- 1:1000 | DATUM :- N/A
DATE :- SEPT. 2003 | DRAWN :- G.O.
JOB No. :- 19987 | APPROVED
CLIENT :- SIR MOSES MONTEFIORE JEWISH HOME

PREPARED BY:
PROUST & GARDNER
CONSULTING PTY LIMITED
SURVEYORS & PLANNERS

COUNCIL OF RANDWICK

REMEDIATION BOUNDARY
SHOWN AS STAGE 1 & STAGE 2
WITHIN LOT 202 D.P.878575
CORNER OF
KING STREET & DANGAR STREET
RANDWICK

REFERENCE :- 19987/DET/R. | SHEET No. 1 OF 1 | ISSUE :- C

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FIGURES

APPENDICES

ASSOCIATED REPORTS

URS Australia Pty Ltd, Environmental Management Plan, Part 2 Lot 202 King Street, Randwick, dated 21 September 2006.

URS Australia Pty Ltd, Remediation Validation, Part 2 Area Lot 202 King Street, Randwick. Report No. 51072-001-558, Revision 0, dated 5 June 2006.

URS Australia Pty Ltd, Letter Report: Lead Remediation Lot 202 King Street, Randwick – RAP Modification, dated 26 August 2003.

URS Australia Pty Ltd, Remediation Action Plan, Lot 202 King Street, Randwick, dated 7 February 2003.

URS Australia Pty Ltd, Data Assessment Report - Lot 202, King St, Randwick. Report No. 51072-001-R001H dated 5 December 2002.

URS Australia Pty Ltd, Remediation Action Plan, Lot 202 King Street, Randwick. Report No. 51072-001 Rap_Rev1_Final dated 26 November 2002.

URS Australia Pty Ltd, Supplementary Sampling and Analysis Plan – Lot 202, King Street, Randwick. Letter/Report dated 12 June 2002.

Measures

µg/L	micrograms per litre
km	kilometre
L	litre
m	metre
m^2	square metre
µS/cm	microsiemens per centimetre
mS/cm	millisiemens per centimetre
mg/kg	milligrams per kilogram
mg/L	megalitres per litre
mm	Millimetre

General

AHD	Australian Height Datum
AMG	Australian Map Grid
ANZECC	Australian and New Zealand Environment and Conservation Council
AST	above-ground storage tank
CLM Act	Contaminated Land Management Act
CMJA	C. M. Jewell & Associates Pty Ltd
COPC	contaminants of potential concern
DA	development application
DEC	Department of Environment and Conservation
DECC	Department of Environment and Climate Change
DLWC	Department of Land and Water Conservation
DNAPL	dense aqueous-phase liquid
DNR	Department of Natural Resources
DP	deposited plan
DQO	data quality objectives
EPA	Environment Protection Authority
ESA	Environmental Site Assessment
HDPE	high-density polyethylene
NATA	National Association of Testing Authorities
NEPM	National Environment Protection Measure
PID	photoionisation detector
PQL	practical quantitation limit
ppmv	parts per million volume
PSH	phase-separated hydrocarbons
QA	quality assurance
QC	quality control
RAP	remediation action plan
RL	relative level
RPD	relative percentage difference
TCLP	Toxicity Characteristic Leaching Procedure
THI	target hazard index
TOC	top of casing
TWA	time weighted average
UCL	upper confidence limit
UST	underground storage tank

Analytes – Organic

BaP	benzo(a)pyrene
BTEX	benzene, toluene, ethylbenzene, xylene
OCP	organochlorine pesticides
OPP	organophosphorus pesticides
PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyls
SVOC	semivolatile organic compounds
TPH	total petroleum hydrocarbons
VHC	volatile halogenated compounds
VOC	volatile organic compounds

Analytes – Inorganic

As	Arsenic
Cd	Cadmium
Cr	Chromium
Cu	Copper
Fe	Iron
Hg	Mercury
Mn	Manganese
Ni	Nickel
Pb	Lead
Zn	zinc

1.0 INTRODUCTION

1.1 Background

This Site Audit Report relates to a portion of land within the property located at 100-120 King Street, Randwick, in New South Wales.

Specifically, the Site Audit relates to the validation work completed by URS Australia Limited (URS) on behalf of Sir Moses Montefiore Jewish Home (and as described in URS's Remediation Validation report dated June 2006).

The Site Audit that this report describes was requested by Mr David Freeman of Sir Moses Montefiore Jewish Home on 27 May 2002, for the purpose of complying with the conditions of the Notice of Determination of Development Application (DA) 02/00551/GI granted by Randwick City Council on 29 October 2002 under the Environmental Planning and Assessment Act 1979. Further conditions were imposed by Council in a letter dated 20 December 2002. In September 2003 Council granted an application to modify the development consent, allowing construction works to proceed within the Part 1 area. The Site Audit is thus a Statutory Site Audit under the provisions of Part 4 of the Contaminated Land Management Act 1997.

The site that is the subject of this audit report is the area designated as 'Part 2' of the overall property. The 'Part 1' area was the subject of a previous audit report and site audit statement, issued on 17 November 2003 by the Auditor, Christopher Jewell.

The audit was conducted for the purpose of determining

(i) the nature and extent of any contamination of the land,

(ii) the nature and extent of the investigation or remediation,

(iia) whether the land is suitable for any specified use or range of uses,

(iii) the suitability and appropriateness of a plan of remediation, a long-term management plan, a voluntary investigation proposal or a remediation proposal.

The Site Audit Report has been prepared in accordance with the guidelines issued by the NSW Department of Environment and Conservation (DEC) (*Guidelines for the NSW Site Auditor Scheme*, 2nd edition, 2006). It has been prepared by Christopher Jewell, who is a Site Auditor accredited under the NSW Contaminated Land Management Act 1997.

1.2 Involvement of Auditor

The Auditor became involved in this project at the start of URS's engagement in 2002, and has had input into the scope and planning of the assessment, remediation and validation works. He had no involvement in work previously undertaken on the site by others.

After reviewing URS's Draft Data Assessment Report (September 2002), the Auditor concluded that residual contamination of the site was such as to preclude development of the site without prior remediation. Accordingly, on 30 September 2002, the Auditor issued Site Audit Statement SA183, indicating that the site was not suitable for any beneficial use owing to risk of harm from contamination. A process of remediation planning, remediation and validation was recommended in the Site Audit Statement. The Auditor reviewed the work undertaken on the area now known as Part 1 and issued Site Audit Statement SA183/2 and a Summary Site Audit Report in November 2003.

The Auditor has visited the site on five occasions to observe and verify, as far as practicable, the site conditions and the progress of the work audited. A compliance checklist has been completed and is held on file.

1.3 Scope and Structure of Review Report

Section 2 of this report sets out basic identification and location information concerning the site, and briefly describes the site's topography, geology and hydrogeological setting. An indication of the site's history and an outline of the proposed future use and the associated assessment criteria are also provided. A list of identified contaminants of potential concern is provided in Appendix A.

Section 3 sets out a summary of the environmental assessment/s, remediation and validation undertaken on the site by URS, and includes the Auditor's evaluation of the work's adherence to DEC (2006) guidelines.

Section 4 of this report presents an audit of the completeness and adequacy of the environmental assessments, remediation and validation works that have been completed. The audit was carried out against the criteria established by the NSW DEC publication, *Guidelines for the NSW Site Auditor Scheme* 2nd edition (2006), but also incorporates the reviewer's own judgement; reference has been made to other guideline publications issued or endorsed by the NSW EPA, including *Guidelines for Consultants Reporting on Contaminated Sites* (1997), *Guidelines for Assessing Service Station Sites* (1994), *Sampling Design Guidelines* (1995) and the *National Environmental Protection (Assessment of Site Contamination) Measure* (1999), as appropriate.

Section 5 provides the Auditor's assessment of the site condition, including an assessment of risks to human health, the environmental and structures, groundwater and aesthetic issues and any long-term management that may be required.

Section 6 outlines the Site Auditor's conclusions including the suitability of the site for its intended use.

Throughout this report, extensive use has been made of the site assessment and validation reports prepared by URS; sections of those reports have been adopted for use in this report.

Communications with the Auditor that have ongoing relevance are attached as Appendix B; information relied upon by the Auditor is included in Appendix C.

The use of data quality objectives is detailed in Appendix D; quality assurance/quality control details are provided in Appendix E.

Appendix F provides the Environmental Management Plan developed by URS.

1.4 Limitations and Intellectual Property Matters

This report has been prepared by C. M. Jewell & Associates Pty Ltd for the use of the client and local or state government agencies identified in Section 1.1, for the specific purpose described in that section.

The work has been carried out, and this report prepared, utilising the standards of skill and care normally expected of a site auditor practising in New South Wales under the requirements of the Contaminated Land Management Act 1997. The level of confidence of the conclusions reached is governed, as in all such work, by the scope of the investigation carried out and by the availability and quality of the data. The Auditor has satisfied himself that the available data are adequate to support the conclusions he has reached, and comply with the minimum requirements indicated in the guideline documents specified for the NSW Site Auditor Scheme. Where limitations or uncertainties in conclusions are known, they are identified in this report. However, no liability can be accepted for failure to identify conditions or issues which arise in the future and which could not reasonably have been assessed or predicted using the site information and analytical data available for review.

Data collected by others have, of necessity, been used to support the conclusions of this report. Those data have been subjected to reasonable scrutiny but have essentially, and necessarily, been used in good faith. Liability cannot be accepted for errors in data collected by others where such errors could not have been detected by reasonable scrutiny of the data and supporting information supplied to or requested by the Auditor.

This report, any original data contained in the report, and its findings and conclusions remain the intellectual property of C. M. Jewell & Associates Pty Ltd. A licence to use the report for the specific purpose identified in Section 1.1 is granted to the persons identified in that section on the condition of receipt of full payment for the services involved in the preparation of the report.

It is recommended that this report should not be used by other persons or for other purposes than those identified in Section 1.1 without prior reference to the Auditor. The report must not be reproduced except in full and with the permission of C. M. Jewell & Associates Pty Ltd.

2.0 SITE INFORMATION

2.1 Site Identification and Location

The property is located at 100-120 King Street, Randwick, New South Wales, as shown on Figure 1. Australian Map Grid Zone 56H co-ordinates of the centre of the property are approximately 33700E 6246650N. At the date of this report, the site was owned by the Honorary Board of Management of the Sir Moses Montefiore Jewish Home.

The property lies within Randwick local government area and is currently zoned 2B and 2C Residential. The property is identified as Lot 202 in DP879576, in the Parish of Alexandria, County of Cumberland. The property comprises Part 1 and Part 2 for the purposes of the remedial and validation works. The area that is the subject of this Site Audit Report is known as Part 2, and hereafter is referred to as 'the site'. As the site is part of Lot 202, a surveyed plan showing its layout within the property and lot is attached to the Site Audit Statement and is also reproduced on Figure 2.

The overall property is rectangular and has an area of approximately 29,400 m^2. The site is L-shaped, with an area of 2293 m^2, and is situated in the property's south-eastern corner and along much of its eastern boundary.

2.2 Site Setting

The site is located in a predominantly residential area, bounded as outlined below.

To the north	The Part 1 area (of the overall property), which is bounded by Govett Lane, then residential properties.
To the east	Dangar Street, then residential properties.
To the west	Part 1 and the Moriah Daycare facility situated in the corner of the property which is bounded by Centennial residential apartments, then a NSW STA bus depot.
To the south	King Street, then residential properties.

Centennial Park is located approximately 300 metres from the site, to its north and west, and Randwick Racecourse is approximately 330 metres to the south-west.

2.3 Topography and Drainage

The site is approximately 40 metres above Australian Height Datum (AHD).

Prior to the remediation and development works on Part 1, the property's surface had a gentle slope to the west. A cutting with a concrete retaining wall constructed in the eastern portion of the property divided the property into a higher eastern section and a lower western section.

Demolition works and remedial and bulk excavations have been conducted across the property. During and following these works, sediment, runoff and erosion controls were put in place. These included drainage swales, sediment filters and traps, siltation fences, and sediment/erosion and detention ponds.

The site surface has been levelled in accordance with the specifications for the proposed development, which incorporates engineered stormwater drainage systems.

2.4 Geology

Reference to the 1:100,000-scale Sydney Geological Sheet (9130, Edition 1, 1983) indicates that the site is situated on the Holocene sediments of the Botany Basin. Sediment thickness ranges up to 35 metres, but is commonly of the order of 15 metres in the north of the basin. The sediments predominantly consist of well-sorted quartz sands interbedded with minor clay, peat and ironstone lenses. Most of the formation overlies the eroded bedrock surface of the Triassic Hawkesbury Sandstone, consisting of medium to coarse grained quartz with very minor shale and laminate lenses, although moderately to highly weathered horizons of Ashfield Shale have been observed to underlie the Botany Sands in the north and west of the basin.

Site observations during assessment and validation have confirmed the presence of Holocene Sands to the maximum depth of investigation.

Reference to the Sydney 1:100,000 Soils Landscape Series Sheet (9130) indicates that the site is underlain by aeolian soil of the Newport soil landscape. The typical characteristics are shallow (less than 0.5 metre), well-sorted siliceous sands, overlying moderately deep (less than 1.5 metres), buried soils including yellow podzolic soils, with sandy topsoils on crests and gentle slopes. Deep podzols are found on steep slopes, on lower slopes, and in depressions. Limitations of this soil landscape group include very high soil erosion hazard, localised steep slopes, non-cohesive topsoil, and very low soil fertility.

The fill layer across the property varies in depth from 100 millimetres up to several metres. It consists of material similar to the natural underlying material. Below the fill the soils are natural Botany Sands – unconsolidated sand deposits of Quaternary age.

2.5 Hydrogeology

The Quaternary alluvial, estuarine and, in places, aeolian sediments are known locally as the Botany Sands. The Botany Sands host an unconfined aquifer that has in the past been used extensively for water supply purposes. The aquifer is still used for industrial and irrigation purposes.

Groundwater movement within the Botany Sands occurs via primary porosity (i.e. intergranular flow). The hydraulic conductivity of the cleaner sands ranges up to 30 metres per day (m/d), with 10-15 m/d more typical for the clayey and peaty sands in the area. Yields obtained from the Botany Sands are generally moderate to high, usually of the order of 10 litres per second (L/s), although yields of up to 35 L/s have been obtained from the aquifer for industrial purposes.

The groundwater in the Botany Basin is naturally of good and generally potable quality. It has a low salinity, typically less than 200 milligrams per litre (mg/L), although higher concentrations of up to 4000 mg/L occur. The pH of the water is generally low, usually of the order of 5.0 to 6.0 pH units, allowing for the enhanced solubility of most metals in the aquifer, including iron. Currently, abstractions from two large areas of the Botany Sands aquifer are restricted due to the presence of chemical contamination.

Intrusive investigations at the site indicated the presence of groundwater at depths of less than 3 metres. It was assessed that the hydraulic gradient at the site was towards the west, although the regional gradient in the Botany Aquifer is generally towards the south-west.

The nearest receptors of groundwater flowing from the site are likely to be irrigation wells at Randwick Racecourse. At its closest point, Randwick Racecourse is approximately 330 metres south-west of the site.

2.6 Site History

A 1990 review of site history found that the area now comprising Lots 201 and 202 had been used for tram and bus servicing from 1881. Documented activities and uses of the building and land of Lot 202 included the following:

- Foundry
- Stores and air compressor room
- Blacksmith, boiler and welding shop
- Woodworking shop, car body repair shop, trades shop
- Oil and paint store
- Paint shop and bus maintenance garage
- Laboratory
- Timber store
- Bus parking area, washing station, offices and fuelling area
- Mechanics locker room
- Canteen and recreational building
- Tennis courts and administration building

A remediation program was undertaken between 1991 and 1995, while the depot was operational. In 1997 demolition works were completed, so that Lots 202 and 201 could be subdivided and divested by the then site owner, the NSW State Transit Authority (STA). Further demolition works were conducted in 1997, and in 1998 the current site owner purchased the property. At that time a number of derelict buildings remained on site. The owner leased a portion of the site in the south-west corner to Moriah College, which established a day-care centre for pre-school children.

In 2002, site preparation works were initiated, including demolition of the remaining buildings, and investigation and remediation works. By 2003 the site comprised the day-care centre, a number of partially demolished buildings, and stockpiles of demolition rubble and soil.

In 2003 Council granted permission for construction works on Part 1 of the property. At the date of this report, construction was continuing on this portion of the site.

2.7 Site Contamination

On the basis of the site history, the potential sources of site contamination were considered to be:

- petroleum products and paints associated with tram and bus maintenance, storage and refuelling;
- fill;
- stockpiles; and
- asbestos-containing building materials.

2.8 Contaminants of Concern

For the property as a whole, the contaminant groups of concern were identified as:

- heavy metals;
- monocyclic aromatic hydrocarbons, particularly benzene, toluene, ethyl benzene, and xylenes (BTEX);
- total petroleum hydrocarbons (TPH);
- polycyclic aromatic hydrocarbons (PAH); and
- asbestos.

Investigations on the Part 2 area, however, indicated that the contaminants of concern were asbestos and lead.

The individual compounds that make up these contaminant groups are listed in Appendix A.

2.9 Proposed Development

The property is being redeveloped as an aged-care residential facility comprising 277 beds, a synagogue, a function room, a day-care centre and associated car parking.

At the date of this report, construction had commenced on the Part 1 area. The Part 2 area is designated as landscaped open space and paved areas. URS informed the Auditor that at the date of the validation report, the design of the site had not been finalised.

The current design is shown on Figure 3. Any alteration to this design must ensure that the surface areas of the containment cells are either paved or part of a building footprint. Other areas must be either paved, part of a building footprint or landscaped.

2.10 Assessment Criteria

The criteria adopted by the Auditor to assess the data contained in URS's reports are listed in Table 1.

2.10.1 Soils

The appropriate soil investigation criteria are the guideline levels set out in Columns 2 and 3 of the table: 'Soil Investigation Levels for Urban Redevelopment Sites in NSW', in the NSW DEC's *Guidelines for the NSW Site Auditor Scheme* 2nd edition (2006).

Criteria derived from Column 2 are health-based soil investigation levels for residential settings where there is minimal opportunity for soil access, originally developed by Imray and Langley in 1996, and currently reissued as Imray and Langley (1999): *Health-Based Soil Investigation Levels, National Environment Protection (Assessment of Site Contamination) Measure* (the NEPM), Schedule B,

Guideline 7A. These soil investigation levels are also listed in Column D of Table 5-A, Schedule B(1) of the NEPM.

Criteria derived from Column 3 are health-based soil investigation levels for parks, recreational open space and playing fields including secondary schools, originally developed by Imray and Langley in 1996, and currently reissued as Imray and Langley (1999): *Health-Based Soil Investigation Levels, National Environment Protection (Assessment of Site Contamination) Measure* (the NEPM), Schedule B, Guideline 7A. These soil investigation levels are also listed in Column E of Table 5-A, Schedule B(1) of the NEPM.

Criteria derived from Column 5 – provisional phytotoxicity-based investigation levels (PPBILs) – are usually applied to open-space land use. The Auditor nevertheless accepts URS's and Council's use of Column 3 criteria as appropriate for this development.

The rationale for that decision is that PPBILs are intended to provide screening levels to assess whether adverse impacts on plant growth are likely. Where land may be on-sold for residential or open space use, it is considered appropriate that future owners and users be able to grow the range of plant species that would normally thrive under the climatic and natural soil conditions prevalent in an area.

However, when land it to be used by a known owner for a known purpose for the life of a particular development, it is reasonable for that owner to accept, by consent, some limitation on plant species that may be successfully grown, as in an open space area under professional management, there are many alternative planting options.

Criteria for TPH and BTEX are those published in the NSW EPA's *Guidelines for Assessing Service Station Sites* (1994) and listed in its Table 3 – 'Threshold Concentrations for Sensitive Land Use – Soils'.

With regard to asbestos, advice provided to auditors by the NSW EPA is that 'no asbestos in soil at the surface is permitted'.

TABLE 1
Assessment Criteria – Soils (mg/kg)

Analyte	*DEC Column 2** (NEPM Column D) Residential with Minimal Access to Soil	*DEC Column 3** (NEPM Column E) Parks, Recreational Open Space, Playing Fields Including Secondary Schools	Sensitive Land Use – Soils†
Metals and Metalloids			
Arsenic (total)	400	200	-
Beryllium	80	40	
Cadmium	80	40	-
Chromium (III)	48%	24%	-
Chromium (VI)	400	200	
Cobalt	400	200	
Copper	4000	2000	-
Lead	1200	600	-
Manganese	6000	3000	
Methyl mercury	40	20	
Mercury (inorganic)	60	30	-
Nickel	2400	600	-
Zinc	28,000	14,000	-
Organics			
Aldrin + Dieldrin	40	20	
Chlordane	200	100	-
DDT + DDD + DDE	800	400	-
Heptachlor	40	20	-
PAHs (total)	80	40	-
Benzo(a)pyrene	4	2	-
Phenol	34,000	1700	
PCBs (total)	40	20	-
Petroleum Hydrocarbon Components			
TPH C_6-C_9	-	-	65
TPH C_{10}-C_{40}	-	-	1000
TPH C_{16}-C_{35} (aromatics)‡‡	360	180	-
TPH C_{16}-C_{35} (aliphatics)	22,400	11,200	-
TPH >C_{35} (aliphatics)	224,000	112,000	-
Monocyclic Aromatic Hydrocarbons			
Benzene	-	-	1
Toluene	-	-	1.4‡/130§
Ethylbenzene	-	-	3.1‖ /50¶
Total xylenes	-	-	14**/25¶
Other			
Boron	12,000	6000	
Cyanides (complex)	2000	1000	
Cyanides (free)	1000	500	

Notes:
* NSW DEC (2006)
‡‡ The carbon number is an 'equivalent carbon number', based on a method that standardises according to boiling point. It is a method used by some analytical laboratories to report carbon numbers for chemicals evaluated on a boiling point GC column.
† and notes below: NSW EPA (1994)
‡ The toluene threshold concentration is the Netherlands MPC to protect terrestrial organisms in soil. This value is obtained by applying a US EPA assessment factor to terrestrial chronic No Observed Effect Concentration (NOEC) data. The MPC is an 'indicative' value (Van de Plassche et al. 1993; Van de Plassche & Bockting 1993).
§ Human health and ecologically based protection level for toluene. The threshold concentration presented here is the Netherlands intervention value for the protection of terrestrial organisms. Other considerations such as odours and the protection of groundwater may require a lower remediation criterion.
‖ The ethylbenzene threshold concentration is the Netherlands MPC for the protection of terrestrial organisms in soil. No terrestrial ecotoxicological data could be found for use in the Netherlands criteria derivation. Therefore, equilibrium partitioning has been applied to the MPC for water to obtain estimates of the MPC for soil. The MPC for water has been derived from aquatic ecotoxicological data (Van de Plassche et al. 1993; Van de Plassche & Bockting 1993).
¶ Human health based protection level for ethylbenzene or total xylenes as shown. The threshold concentration presented here is the Netherlands intervention value. Other considerations such as odours and the protection of groundwater may require a lower remediation criterion.
** The xylene threshold concentration is the Netherlands MPC for the protection of terrestrial organisms in soil. No terrestrial ecotoxicological data could be found for use in the Netherlands criteria derivation. Therefore, equilibrium partitioning has been applied to the MPC for water to obtain an estimate of the MPC for soil. The MPC for water has been derived from aquatic ecotoxicological data. The concentration shown applies to total xylenes and is based on the arithmetic average of the individual xylene MPCs (Van de Plassche et al. 1993; Van de Plassche & Bockting 1993).

3.0 INVESTIGATION/S, REMEDIATION AND VALIDATION

3.1 Assessments Prior to 2002

At the Auditor's request, URS evaluated the quality and usability of pre-existing data at the beginning of its involvement. Only data of acceptable quality were to be included in the data set used by URS.

URS reviewed the following reports:

- Sinclair Knight Partners (SKP, 1991) Preliminary Geotechnical and Environmental Investigation of the State Transit Authority's Randwick Bus Depot;
- Dames & Moore (D&M, 1991) Feasibility/Design Study for a Site Remediation Program at the Randwick Bus Depot;
- D&M (1992) EPA Compliance Report, Site Remediation Program: Phase I, Randwick Bus Depot;
- D&M (1994) EPA Compliance Report, Initial Site Validation Program, Randwick Bus Depot;
- D&M (1995) EPA Compliance Report, Final Site Validation Program, Randwick Bus Depot; and
- D&M (1998) EPA Compliance Report Post Demolition Site Validation Program Lot 202 King and Dangar Streets Randwick.

URS reviewed the data presented in these reports, concluding that all data prior to and including 1994 were unusable for reasons such as lack of laboratory certificates and inadequate field and/or laboratory quality assurance/quality control (QA/QC).

Table 2 shows details of historical data (1995–1998) that URS considered suitable for incorporation into the data set used to assess the property (Parts 1 and 2).

TABLE 2
Usable Historical Samples

Analytes	No. of Retained Samples
Heavy metals	30
TPH/BTEX	54
TPH only	7
PAHs	10

3.2 URS, Data Assessment Report (2002)

3.2.1 Objectives and Scope

The stated objective was to:

> Combine the results of recent investigations (July, August and September 2002) and historic investigations (1995 and 1998) in order to characterize the site condition for review by the site auditor and preparation of a SAS.

In June 2002, before the property was divided into Parts 1 and 2, URS developed a sampling and analysis plan for the additional assessment works at the site, with the objective of filling the data gaps identified in the above review. The plan was submitted to the Site Auditor for approval. The selected contaminants of concern were asbestos, metals, TPH/BTEX and PAHs. While historical sampling data could be retained, the intention of the supplementary works was to achieve better site coverage.

The scope of work for the overall property comprised:

- the excavation of twenty-eight test pits (identified as TP1 to TP28) across the property on a grid pattern, with an approximate spacing of 40 metres;
- the installation of four groundwater monitoring wells;
- investigation and sampling of the stockpiles present (total volume of 9000 m^3);
- analysis of selected samples for the contaminants of concern.

Four sample locations from the 1995 investigation and two test pits (TP02 and TP06) were within the site that is the subject of this audit (Part 2). These locations are shown on Figure 2.

3.2.2 Results

Soils

Analytical results for samples obtained within the site indicated that the concentrations of contaminants of concern were within the assessment criteria, with the exception of lead in sample TP02/0.2_0.4 (1880 mg/kg). Asbestos was not detected in any of the test pit samples.

Other relevant results are shown below.

Dames & Moore 1995 Investigation

- Analytical results for samples Z7-2, Z7-3, Z7-4 and Z7-8 showed that lead concentrations exceeded the PQL in two samples (one at 5 mg/kg and the other at 6 mg/kg).

URS 2002 Investigation

- The sole TP06 sample was not tested for metals; TPH fractions and PAH analytes were all below the PQL.
- In TP02_0.2-0.4, the total PAH concentration was 8.2 mg/kg.

The summary of laboratory results for these samples (for lead only) is included with the delineation and validation data provided in Appendix C1.

Groundwater

Four wells were installed at the property during the URS investigation. None of these were within the Part 2 area, and so the results were relevant to the investigation, remediation and validation of the Part 1 area. In summary, significant concentrations of TPH were detected in samples from three wells. The groundwater remediation work was described in URS's validation report and in the Summary Site Audit Report for Part 1.

3.2.3 Hibbs & Associates, Asbestos Survey (2002)

In 2002, Hibbs & Associates Pty Ltd (Hibbs) undertook an asbestos inspection of the property. The subsequent letter report was included as an appendix to the URS 2002 report described above.

The survey identified the following issues relating to the site that is the subject of this report:

- Fragments of bonded asbestos cement sheeting were noted at various locations around the site including within the assessment zones No. 1, 4, 5 . . . .[part of Zone 1 was within the area subject to this audit]
- Some demolition rubble mixed with soil was spread across the eastern area of the site (grid location A3 – A5) adjacent to the site boundary [within the site that is the subject of this report]. Cement bonded asbestos fragments were observed in this material.

The asbestos impact identified within the site (Part 2), was an area approximately 50 by 15 metres along the boundary of Parts 1 and 2, parallel to Dangar Street. The area is shown on Figure 5.

3.2.4 URS's Conclusions and Recommendations

URS's conclusions and recommendations largely concerned the contamination and remediation of the Part 1 area and the groundwater. The lead concentration within the sample from TP02 was not considered to represent a hotspot, as it did not exceed 250 per cent of the guideline criterion adopted at that time (from Column 2 – residential with minimal access to soil).

With regard to asbestos, URS recommended manual removal of fragments, with a follow-up inspection by Hibbs.

3.3 URS, Remedial Action Plan (2003)

The Remedial Action Plan (RAP) produced by URS outlined the proposed works for the whole property. The works relevant to the site that is the subject of this site audit report are described below.

Lead Remediation Program

Because the lead concentration identified in the sample from TP02 exceeded 250 per cent of the newly adopted criterion (from Column 3 – parks, recreational open space), the location was considered a hotspot, requiring remediation. The proposed works involved excavation of the area, off-site disposal of the soil, and collection of validation samples from the excavation.

Asbestos Remediation Program

To remediate the asbestos-impacted areas identified during the 2002 inspection, URS proposed the following.

- Excavation, removing a minimum of 300 millimetres of the surface soil from the impacted areas, and off-site disposal.
- A visual inspection of the scraped surfaces. If the surface was deemed clear of asbestos, validation sampling was to be conducted on a 20-by-20-metre grid.

The works were to be conducted under the supervision of an environmental consultant and an asbestos specialist, using appropriate environmental and occupational health and safety controls.

Following the delineation works described below in Section 3.4, a 'RAP modification' letter report was produced, outlining the chosen remedial option for the site. This involved excavation of the soil where exceedances of the Column 3 criterion for lead were identified. This material was to be placed in containment cells beneath areas designated for building or paving footprints, and capped. Validation sampling of the walls and base of the excavated area was to be conducted on a 10-by-10-metre grid basis.

3.4 URS, Pre-Remediation Works (2003)

3.4.1 Objectives and Scope

Between 12 and 24 April 2003, during the remediation of Part 1, URS conducted additional works in order to further delineate the extent of the hydrocarbon impact (in the Part 1 area) and the lead impact (in the Part 2 area). The hydrocarbon delineation is not relevant to the site that is the subject of this audit, and it will therefore not be summarised or reviewed.

Delineation sampling of the area previously identified as lead-affected (TP02) was carried out at thirty-two locations (identified as TP02, HA201 to HA209, TP201 to TP212, TP301 to TP304, TP306, TP307, TP309, and TP311 to TP313). Some of these locations extended into the Part 1 area. A total

of eighty-six samples collected from these sampling locations were analysed for lead; their locations and the analytical results are shown on Figure 4.

3.4.2 Results

Laboratory analysis detected numerous exceedances of the adopted criteria for lead within the site; fourteen of DEC Column 3 (600 mg/kg) and eight of the less stringent Column 2 (1200 mg/kg). The impact was associated with a strip of fill material adjacent to Dangar Street, and also with fill material sourced on site and placed in the area of a building footprint at depths up to 1.0 metre.

A summary of laboratory results is provided in Table 1 of Appendix C1.

Because these works were described in the validation report, together with results, the Auditor's evaluation of adherence to DEC guidelines is presented in Section 3.6.

3.5 URS, Remediation and Validation (2006)

During 2003 the site was divided into two parts for the purpose of remediation and validation. Development of the larger Part 1 could then be initiated before remediation of Part 2 had been completed.

3.5.1 Objectives and Scope

URS outlined the objectives of the Part 2 remediation as follows:

- To make Part 2 of the site suitable for the following proposed landuses;
  - Paved areas, which are considered, for the purpose of this report, as residential use with minimal opportunities for access to soil; and
  - Landscaped areas surrounding the building and paved areas, which are considered, for the purpose of this report, as open space land areas.
- To protect human health (residents, site workers, off-site workers and off-site residents) and the environment from hazards relating to remediation works;
- To demonstrate that lead and asbestos impacted soil identified during environmental assessments are remediated to a level appropriate for the proposed land use of the site;
- To comply with regulatory and legislative requirements; and
- To comply with RCC [Council] Contaminated Land policy, 1999.

The remediation methodology for the site was detailed in the RAP (URS, February 2003) and the RAP Modification (URS, August 2003). The proposed and actual remedial and validation works are summarised below.

Asbestos-Impacted Materials

The preferred and undertaken strategy was the excavation and off-site disposal of the fill and building materials containing asbestos. The extent of the excavation was to be based on visual observations. Appropriate environmental and occupational health and safety controls, including air monitoring, were implemented during the works. Validation sampling was conducted within the excavation.

Hibbs oversaw the removal and disposal of asbestos pieces and impacted material, and validation of the impacted area. Its report documenting the works and providing clearance certificates was provided as an appendix to the URS report, and is reproduced as Appendix C2 of this site audit report. The area within the site, described by Hibbs as 'the footprint of the former building located between grid co-ordinates A2 and A5', is shown on Figure 5.

Demolition fill material containing asbestos was excavated to a depth of between 300 millimetres and 1.0 metre along the eastern site boundary. The volume of material was approximately 600 m^3. The excavation extended beneath the fill to the natural Botany Sands.

The asbestos-containing material was transported off site to Penrith Waste Services, and documentation provided to the Auditor.

Lead-Impacted Materials

The remediation strategy for the delineated lead-impacted area involved excavating the material and collecting validation samples from the walls and base of the excavation. The proposed remediation area is shown on Figure 4.

The area identified as impacted included all locations from which samples had exceeded one or both adopted criteria, with two exceptions: samples from TP206 and TP202, at depths of 0.5-0.6 metre below ground level, with concentrations of 2330 mg/kg and 1390 mg/kg respectively. Remediation was not considered necessary at these two locations because of their proximity to the edge of a proposed building, which rendered the soils effectively inaccessible. The Column 2 criterion (1200 mg/kg) was therefore appropriate, and the concentrations were less than 250 per cent of that criterion.

The excavated area was roughly rectangular, as shown on Figure 6. Its final dimensions were approximately 49 metres in length by a maximum width of 9 metres; the depth (intruding into Botany Sands) ranged from 0.9 metre to 1.3 metres.

The project managers confirmed that, at the date of this site audit report, the excavated area had been reinstated during additional excavation and backfilling works conducted at the site as part of site development.

Containment Cells

The excavated material was placed in two prepared containment cells on site, together with lead-impacted material excavated from Part 1. The cells were lined with a geo-fabric marker layer, filled with the contaminated material, and covered with another geo-fabric layer. Cell depth was a minimum of 40 metres above AHD, ensuring that cells were above the groundwater table.

Groundwater monitoring was undertaken by Jeffrey and Katauskas. The August 2003 and July 2003 monitoring reports indicated that the groundwater level in the south-east of the property was approximately 38 metres above AHD. Cell locations are shown on Figure 3.

URS confirmed that the containment cells would be capped with 100-millimetre-thick non-reinforced concrete. At the date of the validation report, URS understood that paving would be laid on top of these concrete slabs.

The Auditor inspected the cells following completion and confirmed the construction to be as specified by URS.

3.5.2 Results

Asbestos was not detected in any of the four samples collected from the asbestos-impacted area. Sample locations are shown on Figure 5.

To validate the excavated lead-impacted area, twenty-five samples were collected on a 10-by-10-metre grid basis. Sample locations are shown on Figure 6. The laboratory results for lead were assessed against the Column 3 criterion (600 mg/kg). Lead concentrations in samples VAL200, VAL203,

VAL209, VAL210 and VAL220 exceeded the criterion, at 2420, 1470, 2270, 650 and 1440 mg/kg respectively, and the excavations at those locations were extended (see Figure 6).

Lead concentrations in samples VAL206, VAL211 and VAL222 (all from the western side of the excavation) exceeded the criterion, at 602, 655 and 902 mg/kg respectively. These concentrations were less than 2.5 times the criterion.

Two significant lead exceedances were detected in samples from the eastern excavation wall – VAL207 (3990 mg/kg) and VAL204 (3790 mg/kg). Chasing out was not possible, however, given that the sample locations were only 200 millimetres from the property boundary and a footpath.

The data sets presented by URS within the validation report included:

- analytical results for the lead delineation samples described in Section 3.4 (URS's Table 1);
- results for lead excavation validation samples (URS's Table 2a);
- data from the remaining Stage 2 area (URS's Table 2b);
- results for the impacted soil that was excavated and placed within the containment cells (URS's Table 3); and
- the asbestos validation results (URS's Table 4).

These tables are provided in Appendix C1.

URS conducted a statistical analysis of the validation sampling, using a 95 per cent upper confidence limit (UCL) of the mean concentrations. The data set excluded the exceedances from the eastern boundary (VAL201, VAL204, VAL207, VAL214 and VAL217) because further excavation was not possible and they were considered to be 'representative of the boundary conditions'. Samples from the western boundary (TP202 and TP206 samples) were also excluded from the data set for the reasons stated in Section 3.5.1 (application of different criterion). The 95 per cent UCL was calculated to be 305.3 mg/kg, meeting the adopted criterion for lead of 600 mg/kg (Column 3).

3.5.3 URS's Conclusions

URS stated :

> As a consequence of the remediation and the validation program . . . URS considers that Part 2 of Lot 202 . . . is suitable for the land use as paved or built areas with minimal opportunity access to soils and open space landscaped area in accordance with the current DEC guidelines. The physical definition of the two land use areas is presented in [Figure 3 of this report].
>
> A post remediation Environmental Management Plan (EMP) will be prepared to address future management of Part 2 of the Site with regard to placement of restrictions on excavation in the containment areas such that they are undertaken in accordance with specific requirements.

URS produced an EMP dated 21 September 2006, which is discussed further in Section 3.7 below.

3.5.4 Auditor's Evaluation of Remediation

The Auditor was consulted about the proposed remediation prior to implementation and considered it to be technically feasible and environmentally justifiable.

Although the encapsulation option is not high on the DEC-endorsed ANZECC – NHMRC preferred order of remediation options, it is a reasonable approach for a highly managed site such as this. Neither on-site nor off-site treatment is applicable to relatively small volumes of lead-contaminated soil, so the only available alternative would have been landfill disposal.

The strategy proposed and implemented does ensure long-term stability of the capping (by use of reinforced concrete) and similarly minimises the potential for leachate formation. The lead contamination is not volatile.

No structures will be erected on the capped area, and a management plan will be implemented.

3.5.5 Auditor's Evaluation of Validation Results

Summary statistics of the validation data are provided in Table 3. This data set includes validation data from the lead excavation and investigation data from all sampling locations that remain on site, with the exception of those on the eastern boundary (VAL201, VAL204, VAL207, VAL214 and VAL217) and those on the western boundary (TP202 and TP206).

TABLE 3
Summary Statistics of Validation Data
(mg/kg)

Analyte	PQL	Set	Min.	Max.	Mean	Standard Deviation	C.V.	95% UCL*
Lead	1	32	<PQL	902	227	254	1.1	303

Notes: PQL laboratory practical quantitation limit
Set number of samples in data set
Min. minimum concentration
Max. maximum concentration
Mean arithmetic mean
C.V. coefficient of variation (standard deviation/mean)
UCL upper confidence limit
* calculated via US EPA Non-parametric Jack-knife

The Auditor has reviewed the validation data. He notes that the lead concentrations are very variable. There were three exceedances of the 600 mg/kg validation criterion. The 95% UCL is well below the criterion, but the standard deviation of the concentrations is high – greater than the mean, but nevertheless less than half the criterion.

3.6 Auditor's Evaluation of Adherence to DEC Guidelines

This evaluation has been conducted using the information and data presented in URS's validation report, which incorporates investigation sampling within the site area and validation sampling.

Data Quality Objectives (DQOs)

URS appropriately adopted the data quality objectives (DQO) process endorsed by DEC (2006).

A detailed DQO checklist is included as Appendix D of this site audit report.

Data Quality Indicators (DQIs)

Data quality indicators (DQIs) were not used to assess field procedures and analytical results, but much of the information required in a DQI assessment was provided in another form.

This part of the auditing checklist is included as Appendix E.

QA/QC Evaluation

The field and laboratory QA/QC measures presented have been reviewed and are considered to comply with DEC guidelines and to be adequate to ensure the integrity of the data set used to assess the site.

Specifically, a detailed QA/QC checklist is provided in Appendix E.

The QA/QC criteria list examined in this review included:

- Precision
- Accuracy
- Sensitivity
- Representativeness
- Comparability
- Completeness
- Holding times
- Blanks

URS adopted and described an appropriate sampling plan, sample handling, and sample collection and transport processes.

URS's sampling procedures, as outlined in the reports, have been reviewed. These procedures are considered to substantially comply with DEC guidelines and to be adequate to ensure the integrity of the data set used to assess contamination on this site. A QC sampling issue was noted: wash and trip blanks were used, but not at an acceptable frequency.

URS collected blind intra-laboratory duplicates at the standard frequency of 1 in 10. Two significant RPD outliers were attributed to the heterogeneous nature of the lead-impacted material. Inter-laboratory duplicates were collected, but not at the required frequency.

Also reviewed were laboratory QA/QC procedures and results. The NATA-accredited laboratory identified methods used, and provided satisfactory reporting limits. QA/QC procedures comprised method blanks, matrix spikes and calculated recoveries, laboratory control samples, duplicates with RPDs calculated, and surrogates.

The review confirmed that targeted frequencies and control limits were met, that method blanks were free of contamination, and that duplicate RPDs were within control limits.

The Auditor considers that the overall quality of data and their presentation are of an adequate standard to support the conclusions he has reached.

3.7 URS, Environmental Management Plan (2006)

The objective of the Environmental Management Plan (EMP) is

> to provide a framework for the management of contaminated materials that have been retained on the site following the completion of remediation and validation work.

The EMP is required to provide a framework for monitoring and managing the containment cells into the future, and as a reference for future activities undertaken on the site that may expose the impacted materials within the containment cells. Montefiore (the site owner) is responsible for implementing and adhering to the EMP.

It is noted that the EMP is intended to address minor maintenance works only. Construction or excavation work requiring planning consent is not covered, and would require the preparation of a more detailed, specific EMP.

URS made the following recommendations:

- a Public Positive Covenant under Section 88E of the Conveyancing Act 1919 is made to the property title, with Randwick Council as the prescribed authority;
- that Council place a notation on the Planning Certificate (Section 149 (2) certificate), addressing the restrictions relating to works on the site, and
- that, where a DA is submitted, Council enforce implementation of the EMP through the conditions of consent.

The Auditor has reviewed the EMP and endorses those recommendations.

The EMP outlined procedures and protocols for management of any future minor intrusive works conducted at the site. URS stated:

> Procedures for current and future site occupants/workers to ensure contact with the contaminated fill and/or soils during maintenance of the site is in accordance with suitable occupational health and safety (OH&S) environmental controls.
>
> This will include the identification of potential occupant/worker exposure pathways and methods for minimising occupant/workers exposure to the contaminated fill and/or soils.

The Auditor's review indicates that the EMP is consistent with the requirements of *Guidelines for the NSW Site Auditor Scheme*, 2nd edition (2006).

The EMP is provided as Appendix F of this report.

4.0 AUDITOR'S ASSESSMENT OF THE ADEQUACY OF THE CONSULTANT'S WORK AND REPORTING STANDARDS

The Auditor has assessed the adequacy of URS's work and the assessment and validation reports.

The following information was provided and considered to be adequate for the purposes of this audit:

- site location and description of site
- review of site history, including potentially contaminating activities
- identification of potential contaminants of concern
- description of soil stratigraphy and hydrogeology
- discussion of groundwater issues
- outline of actual or potential contamination
- investigation and remediation works
- quality assurance and quality control plan
- discussion of analytical results
- environmental quality criteria
- assessment of risks to human health
- recommendations for ongoing management of residual contamination
- recommendations and conclusions

The following information was not provided, but was not considered relevant by the Auditor, given the results of the investigation:

- assessment of chemical mixtures
- discussion of evidence of migration of contaminants
- assessment of aesthetic issues

Overall the standard of reporting presented within URS's report is considered satisfactory and to comply with the NSW EPA's *Guidelines for Consultants Reporting on Contaminated Sites* (1997) and the NSW DEC's *Guidelines for the NSW Site Auditor Scheme* 2nd edition (2006).

The Auditor considers that there has been compliance with requirements imposed by the planning consent authority.

5.0 AUDITOR'S ASSESSMENT OF SITE CONDITION

5.1 Risks to Human Health

The assessment and validation of site soils and groundwater indicated that all identifiable contamination risks to human health remaining at the site will be effectively managed under the proposed management plan.

The remediation and validation of the site ensured that the contaminants of concern (namely asbestos and lead) were removed from the site or appropriately contained, in order to ensure that the risk to human health is minimal. The EMP was designed to ensure ongoing management of the impacted soils held within the containment cells, and appropriate management of any exposure, in order to reduce the potential risk to human health.

5.2 Risk to Structures

The assessment of site soils and groundwater indicated that there are no identifiable contamination risks to structures at the site.

5.3 Risk to the Environment

The assessment of site soils and groundwater indicated that there are no identifiable contamination risks to the environment at the site.

5.4 Regulatory Compliance

The remediation of the site was defined as Category 2 under SEPP 55. As required under this regulation, notice was provided to Council at least 30 days before remediation commenced. Council responded with several requirements, which were addressed in the RAP outlined in Section 3.3.

After delineation works had been completed, URS submitted its RAP modification letter report to Council. In response, Council's letter of 5 September 2003 imposed a number of additional conditions relating to adherence to the conditions of consent dated 22 October 2002, and development of an Auditor-approved EMP addressing management of the containment cells. Specifically, Council stipulated that the Site Audit Statement should include a reference to the EMP and the covenant on the title.

Other regulatory requirements identified by URS and addressed in the RAP (2003) were those imposed by Council's Contaminated Land Policy (1999). They included environmental controls;

access and signage requirements; OH&S measures; the requirement for Category 2 notifications; provision of investigation and RAP reports prior to remediation; and provision of a validation report.

5.5 Potential Contaminant Migration

The Auditor does not consider that the potential for off-site migration of contamination originating from the site is an issue of concern because remaining lead-impacted soils have been contained in accordance with regulations and current industry-endorsed practice. As long as the EMP is adhered to, the risk of leaching or migration of the contaminated contained material is low.

5.6 Groundwater Issues

The Auditor considers that groundwater issues have been effectively addressed and are no longer of concern on the site.

5.7 Aesthetic Issues and Odours

The Auditor does not consider that aesthetic issues or odours are of concern on this site.

5.8 Chemical Mixtures

On the basis of the data that he has reviewed, the Auditor does not consider that the potential for chemical mixtures to be present is an issue of concern on this site.

5.9 Long-Term Management

The EMP developed by URS (as outlined in Section 3.7 and provided in Appendix F) adequately addresses long-term management of the impacted soil remaining on site within the containment cells.

6.0 AUDITOR'S CONCLUSIONS AND RECOMMENDATIONS

6.1 Adequacy of Investigation, Remediation and Validation

The Auditor considers that the investigation, remediation and validation works were adequate and conducted substantially in accordance with the appropriate guidelines, as demonstrated earlier in this Site Audit Report.

6.2 Suitability of Site for Proposed Use

The Auditor considers that the site has been validated to the required standard, and that analysis of validation samples demonstrates that concentrations of contaminants of concern remaining on the site are within the criteria applicable to residential use with minimal access to soil with open space areas or are contained on site in such a way as not to impact upon that use.

The Auditor has thus concluded that it is appropriate to issue a Site Audit Statement which indicates that the site is suitable for a composite development as an aged-care and community facility including areas of residential use with minimal opportunity for soil access, areas of semi-commercial use as publicy-accessible cafes and areas of open space use, as indicated on Figure 3 of this report, subject to a condition requiring implementation of the environmental management plan that is attached as Appendix F of this report, and subject to the adoption of measures to ensure that the environmental management plan continues to be applied in the future, even if there are successive changes in ownership of the land, or changes to the land title details. It is also appropriate to ensure that potential purchasers of the land are aware of these requirements.

These requirements will be met by placing a Public Positive Covenant under Section 88E of the Conveyancing Act 1919, on the land title. The covenant should require that the site be managed in accordance with the EMP, and should nominate Randwick City Council as the Prescribed Authority.

REFERENCES

ANZECC 2000, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.* National Water Quality Management Strategy, Australian and New Zealand Environment and Conservation Council/Agriculture and Resource Management Council of Australia and New Zealand.

ANZECC 1992, *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites*, Australian and New Zealand Environment and Conservation Council/National Health and Medical Research Council.

Imray, Paula and A. Langley 1999, *Health-Based Soil Investigation Levels, National Environment Protection (Assessment of Site Contamination) Measure, Schedule B, Guideline 7A.*

NSW DEC 2006, *Guidelines for the NSW Site Auditor Scheme*, 2nd edition, NSW Department of Environment and Conservation, Sydney NSW.

NSW EPA 1994, *Guidelines for Assessing Service Station Sites*, NSW Environment Protection Authority, Chatswood NSW.

NSW EPA 1995, *Sampling Design Guidelines*, NSW Environment Protection Authority, Chatswood NSW.

NSW EPA 1997, *Guidelines for Consultants Reporting on Contaminated Sites*, NSW Environment Protection Authority, Chatswood NSW.

NSW EPA 1999, *Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Wastes*, NSW Environment Protection Authority, Chatswood NSW.

Taylor, Roscoe and A. Langley 1999, *Exposure Scenarios and Exposure Settings, National Environment Protection (Assessment of Site Contamination) Measure, Schedule B, Guideline 7B.*

Van de Plassche, E. J. and G. J. M. Bockting 1993, *Towards Integrated Environmental Quality Objectives for Several Volatile Compounds.* National Institute of Public Health and Environmental Protection, Bilthoven, The Netherlands, Report No. 679101 011.

Van de Plassche, E. J., M. D. Polder and J. H. Canton 1993, *Derivation of Maximum Permissible Concentrations for Several Volatile Compounds for Water and Soil.* National Institute of Public Health and Environmental Protection, Bilthoven, The Netherlands, Report No. 679101 008.

Important Information About Your Site Audit Report

These notes will help you to interpret your Site Audit report. They are based on guidelines prepared by the NSW Department of Environment and Conservation.

Introduction to the NSW Site Auditor Scheme

Objectives

The objectives of the NSW Site Auditor Scheme are to:

- ensure that public health and the environment are protected through proper management of contaminated sites, particularly during changes of land use
- improve access to technical advice on contaminated sites for planning authorities and the community by establishing a pool of accredited site auditors
- provide greater certainty for planning authorities and the community through the independent review by those auditors of contaminated site assessment and remediation reports, and reports that validate the successful completion of the assessment of remediation.

Background

In Australia, the use of accredited auditors to review work conducted by contaminated site consultants was first introduced in Victoria in 1989 through the Victorian EPA's Environmental Auditor (Contaminated Land) Scheme.

In 1998, NSW commenced its own Site Auditor Scheme under the *Contaminated Land Management Act 1997* (CLM Act). The scheme is administered by the Department of Environment and Conservation (DEC).

The CLM Act empowers DEC to accredit individuals as site auditors and to establish guidelines for them.

The Contaminated Land Management Regulation 1998 (CLM Regulation) specifies some of the procedural requirements of the scheme.

Site Audits in Relation to Contaminated Sites

Site auditors review the work of contaminated site consultants. The CLM Act calls these reviews 'site audits' and defines a site audit as an independent review:

a) that relates to investigation or remediation carried out (whether under the CLM Act or otherwise) in respect of the actual or possible contamination of land, and

b) that is conducted for the purpose of determining any one or more of the following matters:

   i) the nature and extent of any contamination of the land

   ii) the nature and extent of the investigation or remediation

   iii) whether the land is suitable for any specified use or range of uses

   iv) what investigation or remediation remains necessary before land is suitable for any specified use or range of uses

   v) the suitability and appropriateness of a plan of remediation, a long-term management plan, a voluntary investigation proposal or a remediation proposal.

The main products of a site audit are a 'site audit statement' and a 'site audit report'.

A **site audit statement** is the written opinion by a site auditor, on a DEC-approved form, of the essential findings of a site audit. It includes, where relevant, the auditor's conclusions regarding the suitability of the site for its current or proposed use.

Before issuing a site audit statement, the site auditor must prepare and finalise a detailed **site audit report**. The report must be clearly expressed and presented and contain the information, discussion and rationale that support the conclusions in the site audit statement.

In some circumstances a site audit is required by law. These audits are known as '**statutory site audits**' and may be carried out only by site auditors accredited under the CLM Act. A statutory site audit is one that is required by:

- a regulatory instrument issued under the CLM Act, including DEC agreements issued by DEC to voluntary proposals.
- the *Environmental Planning and Assessment Act 1979*, including an environmental planning instrument or development consent condition
- any other Act.

Role of Site Auditors

The services of a site auditor can be used by anyone who needs an independent and authoritative review of information relating to possible or actual contamination of a site. The review may involve independent expert technical advice or 'sign-off' of contaminated site assessment, remediation or

validation work conducted by a contaminated site consultant.

Site Assessment and Audit Process

The usual stages in the assessment, remediation and validation of a contaminated site, and in the audit of those activities, are as follows:

Consultant is Commissioned to Assess Contamination

In most cases, a site owner or developer engages a contaminated site consultant to assess a site for contamination and, where required, to develop a remediation plan, implement the plan and validate the remediation.

The contaminated site consultant designs and undertakes the site assessment and, where required, all remediation and validation activities to achieve the objectives specified by the owner or developer.

Site Auditor Reviews the Consultant's Work

The site owner or developer commissions the site auditor to review the consultant's work. The auditor prepares a site audit report and a site audit statement at the conclusion of the review, which are given to the owner or developer.

Where the local planning authority or DEC uses its legal powers to require the carrying out of a site audit, the site owner or developer must commission a site auditor accredited under the CLM Act to perform this task. This is known as a 'statutory' audit. The CLM Act requires that an auditor must notify DEC when he or she has been commissioned by anyone other than DEC to perform a statutory site audit. The auditor is also required to furnish the local authority and DEC with a copy of the completed site audit statement.

In some cases, the site owner or developer may wish to have a site audit undertaken although it is not a legal requirement. The audit is termed 'non-statutory'. If their intention is to obtain a site audit statement, they must commission a site auditor accredited under the CLM Act to perform this task. This is because only a site auditor so accredited can issue a site audit statement and they are obliged to issue one at the end of any site audit. For non-statutory audits, the site auditor must give a copy of the site audit report to the local authority or DEC, or both, on request.

As required by the CLM Act, DEC maintains a record of all statutory site audit statements issued in relation to land that is the subject of a regulatory instrument under the CLM Act. Copies are available for public inspection through DEC's website at www.environment.nsw.gov.au. If the local council receives a copy of a site audit statement, it must list the statement on any certificate it issues under section 149 of the *Environmental Planning and Assessment Act 1979* in relation to the land concerned.

Limitations of Your Site Audit Report

The following notes have been added by the Auditor who prepared this report, to highlight some important limitations on the use of this report.

This report has been prepared by C. M. Jewell & Associates Pty Ltd for the use of the client who commissioned it, and relevant government agencies, for the specific purpose described in the report.

Consistently with the objectives of the NSW Site Auditor Scheme, it may be appropriate for others to rely upon this report in some circumstances.

However, the original purpose of this report and the site conditions prevailing at the time the report was prepared – as described in the report – should be considered first.

If you are not the person for whom the report was prepared, or you wish to use it for a different purpose to that for which it was prepared, or site conditions appear to differ from those described in this report, or a significant period of time has elapsed since the report was prepared, then PLEASE CONSULT THE SITE AUDITOR BEFORE RELYING UPON THE REPORT.

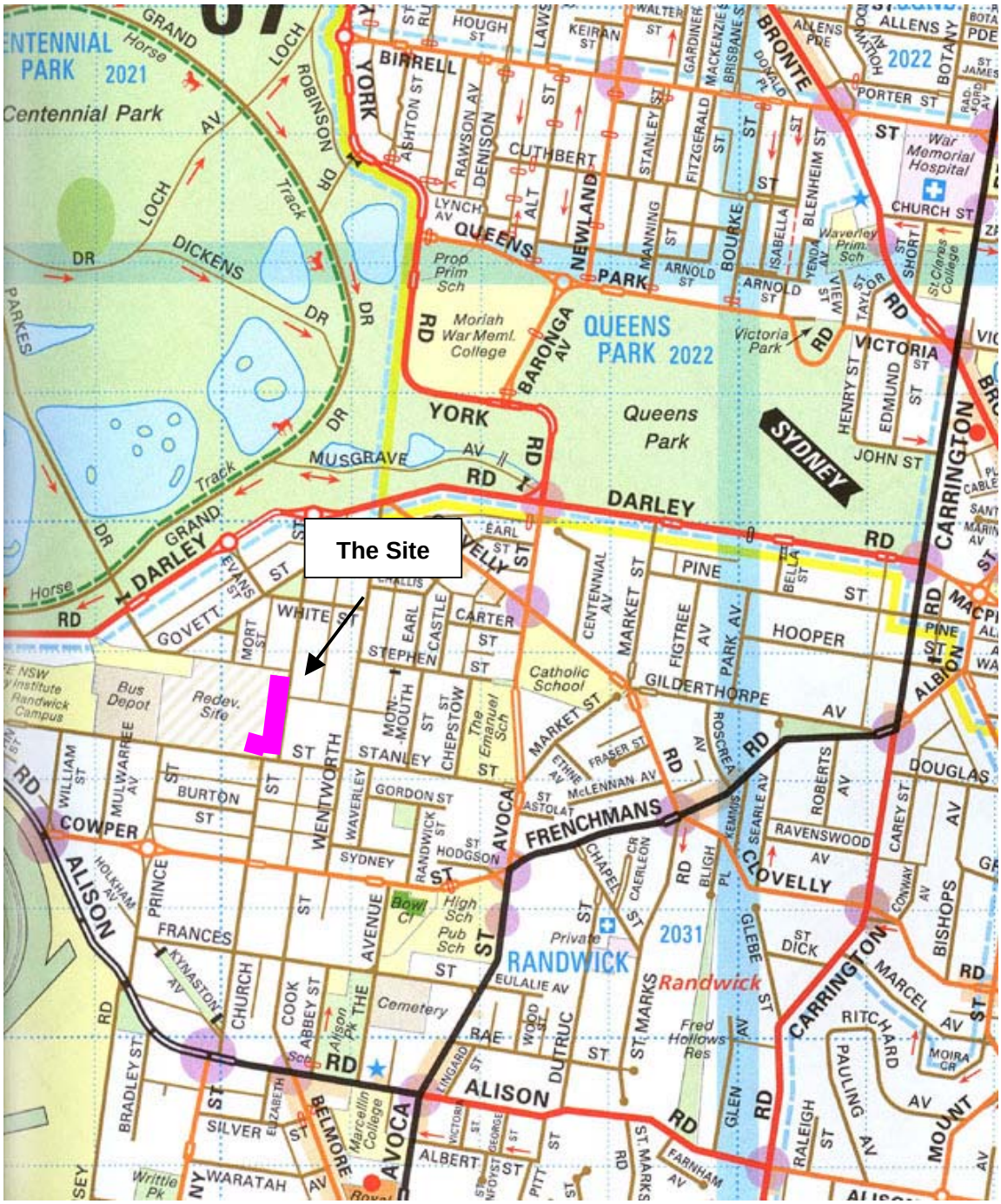
It is also important to recognise that a site audit is primarily a review of work carried out by other companies and individuals.

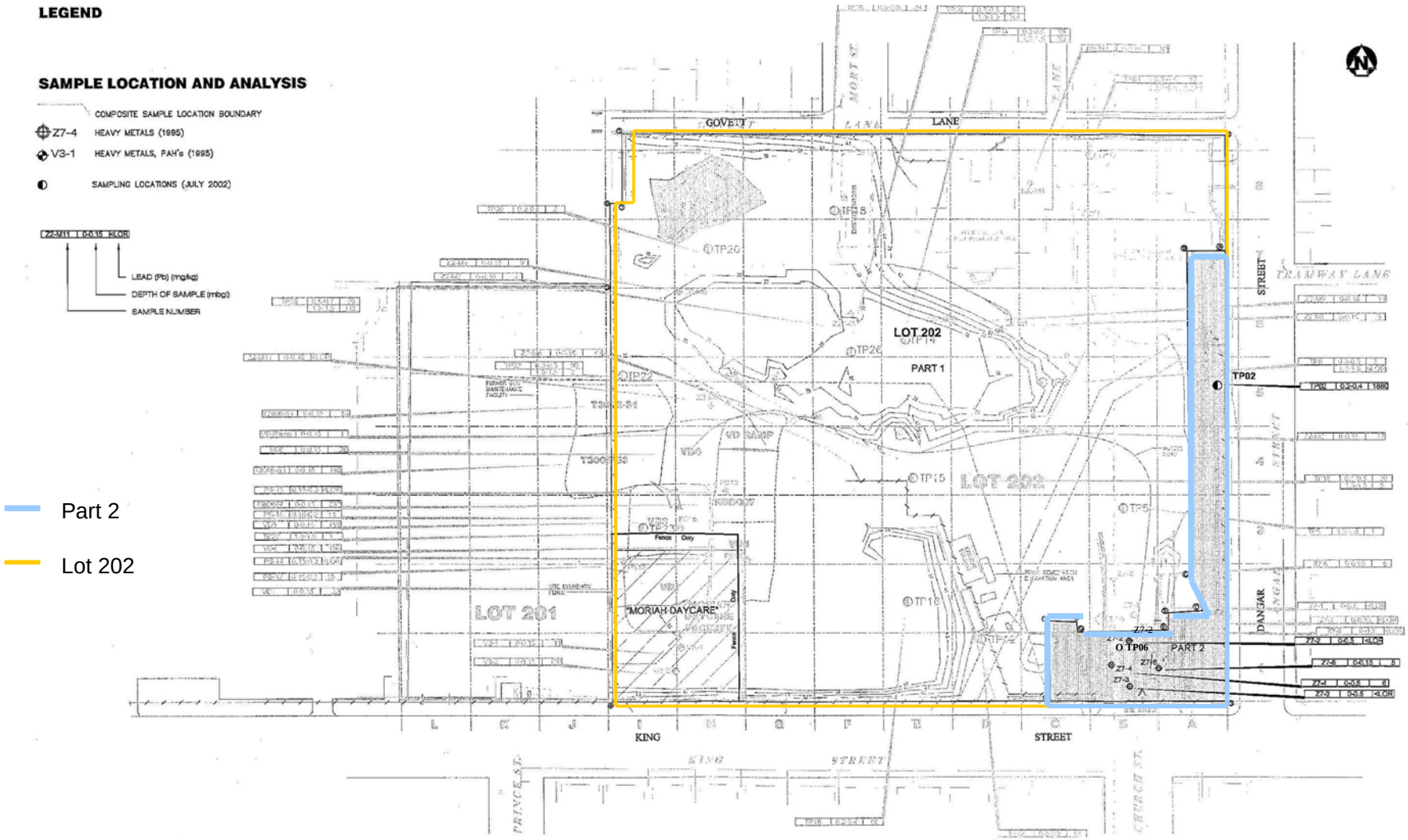
The site auditor has checked data and interpretations, ascertained whether or not appropriate guidelines have been followed, and satisfied himself that the available data are adequate to support the conclusions he has reached.

However, all environmental sampling programs have an inherent degree of uncertainty. Even when sampling fully complies with guidelines, it is possible for areas of contamination to remain undetected, but be revealed by more extensive excavations during site redevelopment. This risk is usually quantified using statistical confidence limits.

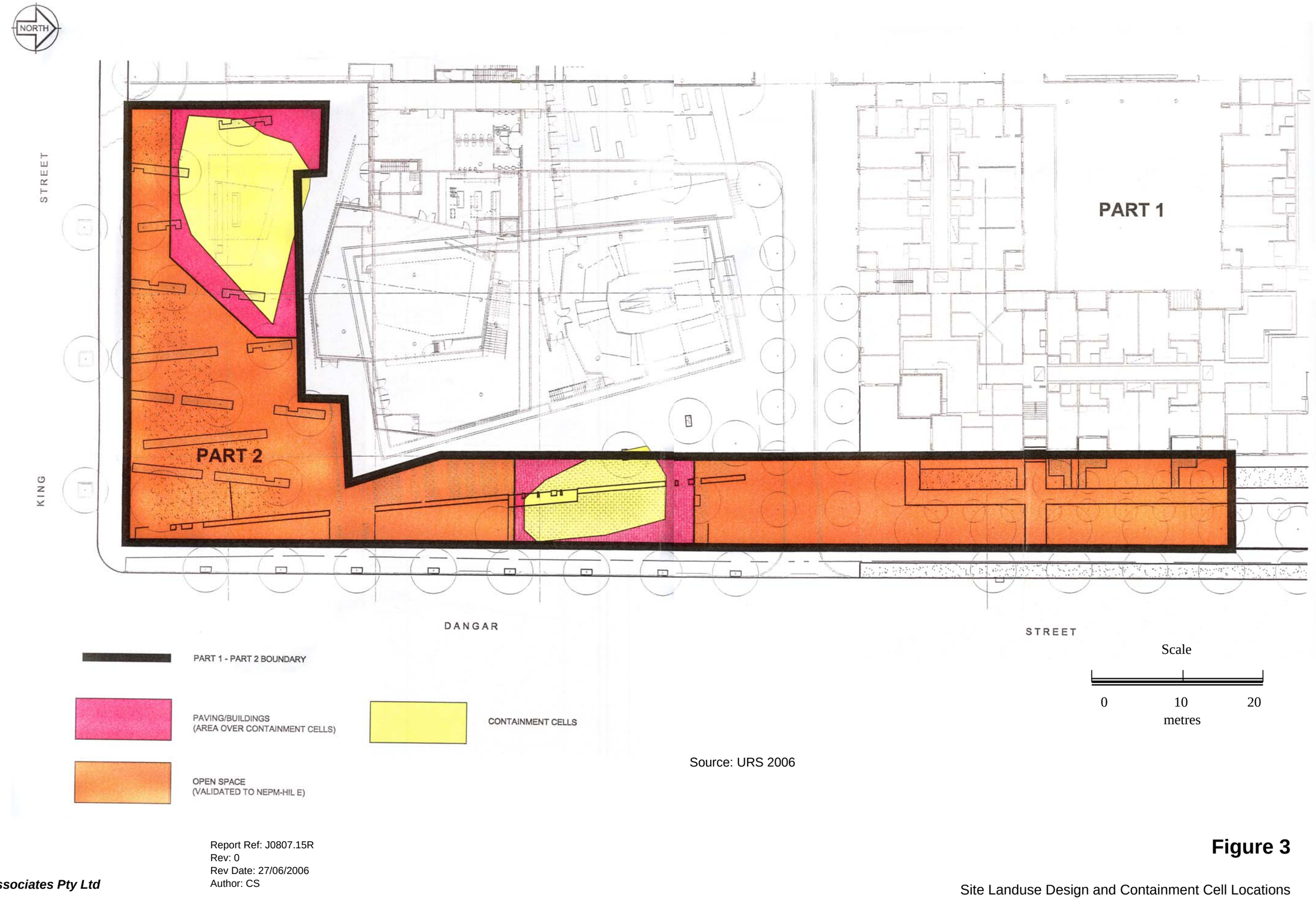
The site audit report identifies data limitations and uncertainties where these are recognised, but users must accept the finite and unavoidable risk that some contamination may remain undetected during even a diligent site assessment and audit process.

If there is a need to copy this report, it must be reproduced in full. No reliance whatsoever should be placed upon partial copies of a site audit report.

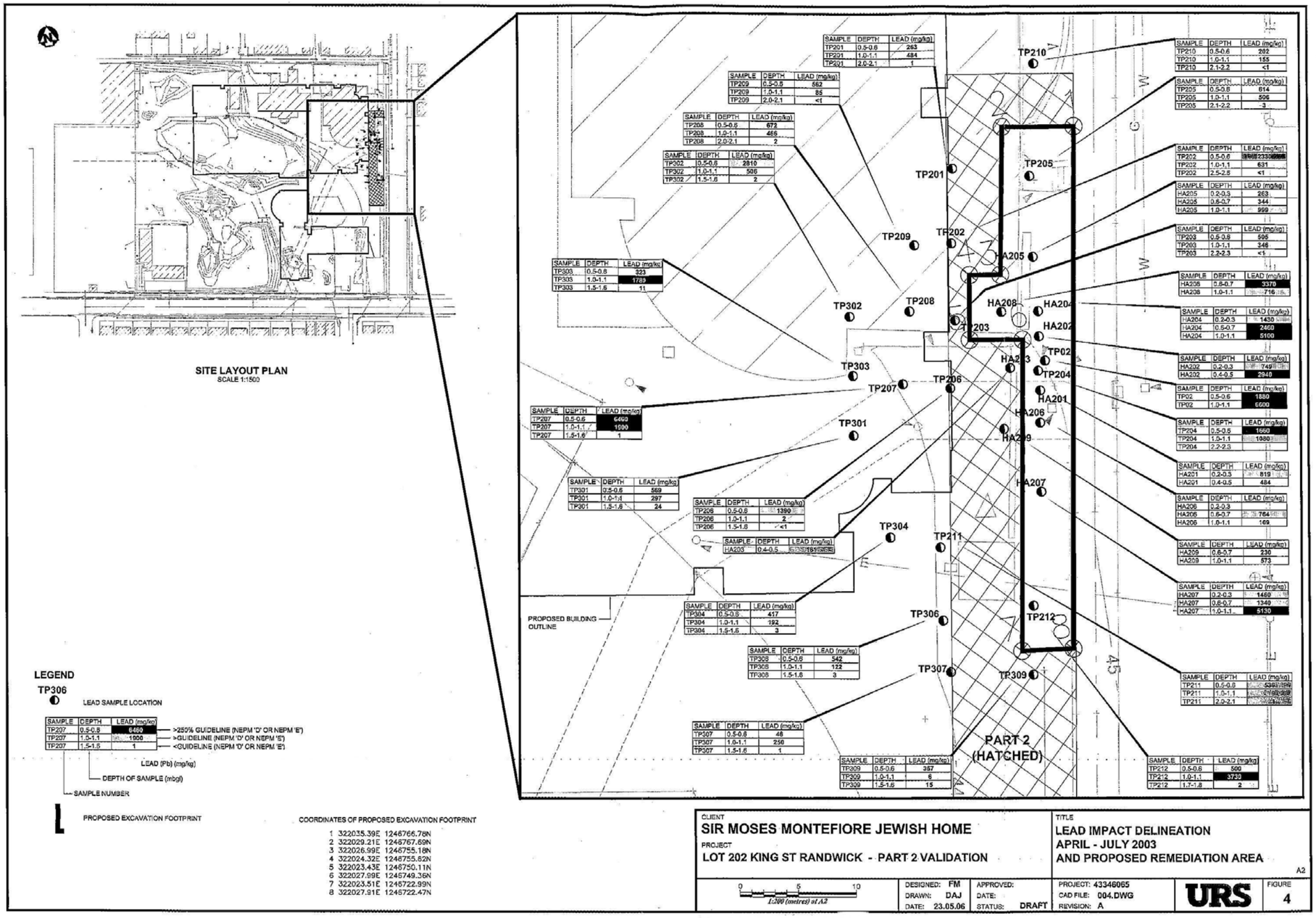

The Site
Redev. Site
Bus Depot
Queens Park
QUEENS PARK 2022
RANDWICK
Centennial Park
CENTENNIAL PARK 2021
Moriah War Meml. College
Prop Prim Sch
Waverley Prim. Sch
War Memorial Hospital
Catholic School
The Emanuel Sch
High Sch
Pub Sch
Private
Cemetery
Fred Hollows Res
Marcellin College
Alison Pk
Bowl Cr
Victoria Park
St Clares College
NSW Institute Randwick Campus
YORK RD
DARLEY RD
ALISON RD
FRENCHMANS RD
COWPER ST
CARRINGTON RD
AVOCA ST
NEWLAND ST
BARONGA AV
MUSGRAVE AV
DICKENS DR
LOCH AV
GRAND Horse Track
ROBINSON DR
PARKES
BIRRELL ST
QUEENS PARK
CHURCH ST
PORTER ST
ALLENS PDE
BRONTE
BOURKE
NEWLAND
CUTHBERT
DENISON
RAWSON AV
ASHTON ST
LYNCH AV
ARNOLD ST
MANNING ST
ISABELLA
BLENHEIM ST
FITZGERALD
STANLEY ST
HOUGH ST
KEIRAN ST
GARDINER
MACKENZIE
BRISBANE ST
DONALD PL
WALTER
LAWS
ALT
VIEW ST
TAYLOR
SHORT
HENRY ST
EDMUND ST
VICTORIA RD
JOHN ST
SYDNEY
CARRINGTON
CABLE PL
SANTA MARIA AV
PINE ST
BELLA ST
MARKET ST
CENTENNIAL AV
FIGTREE AV
PARK AV
HOOPER ST
GILDERTHORPE AV
ALBION
MACPHERSON ST
DOUGLAS
ROBERTS AV
RAVENSWOOD AV
CAREY ST
CLOVELLY
CONWAY AV
BISHOPS
MARCEL AV
RITCHARD AV
PAULING AV
MOIRA CR
MOUNT
RALEIGH ST
GLEBE
ST DICK
ST MARKS
DUTRUC ST
RAE ST
EULALIE AV
WOOD ST
ENGARD ST
ELIZABETH ST
SILVER ST
BRADLEY ST
BELMORE
ALBERT ST
WARATAH AV
PITT ST
FARNHAM AV
GLEN RD
McLENNAN AV
FRASER ST
ETHNE AV
ASTOLAT ST
ROSCREA AV
KEMMIS
SEARLE AV
CHAPEL ST
CAERLEON CR
BLIGH PL
WENTWORTH AV
WAVERLEY
GORDON ST
RANDWICK ST
HODGSON ST
SYDNEY ST
STANLEY ST
CHEPSTOW ST
MONMOUTH ST
CASTLE ST
CARTER ST
STEPHEN ST
EARL ST
WHITE ST
MORT ST
GOVETT ST
EVANS ST
BURTON ST
MULWARREE AV
WILLIAM ST
HOLKHAM AV
PRINCE ST
FRANCES ST
KYNASTON AV
CHURCH ST
COOK ST
ABBEY ST
THE AVENUE
2022
2031
2021

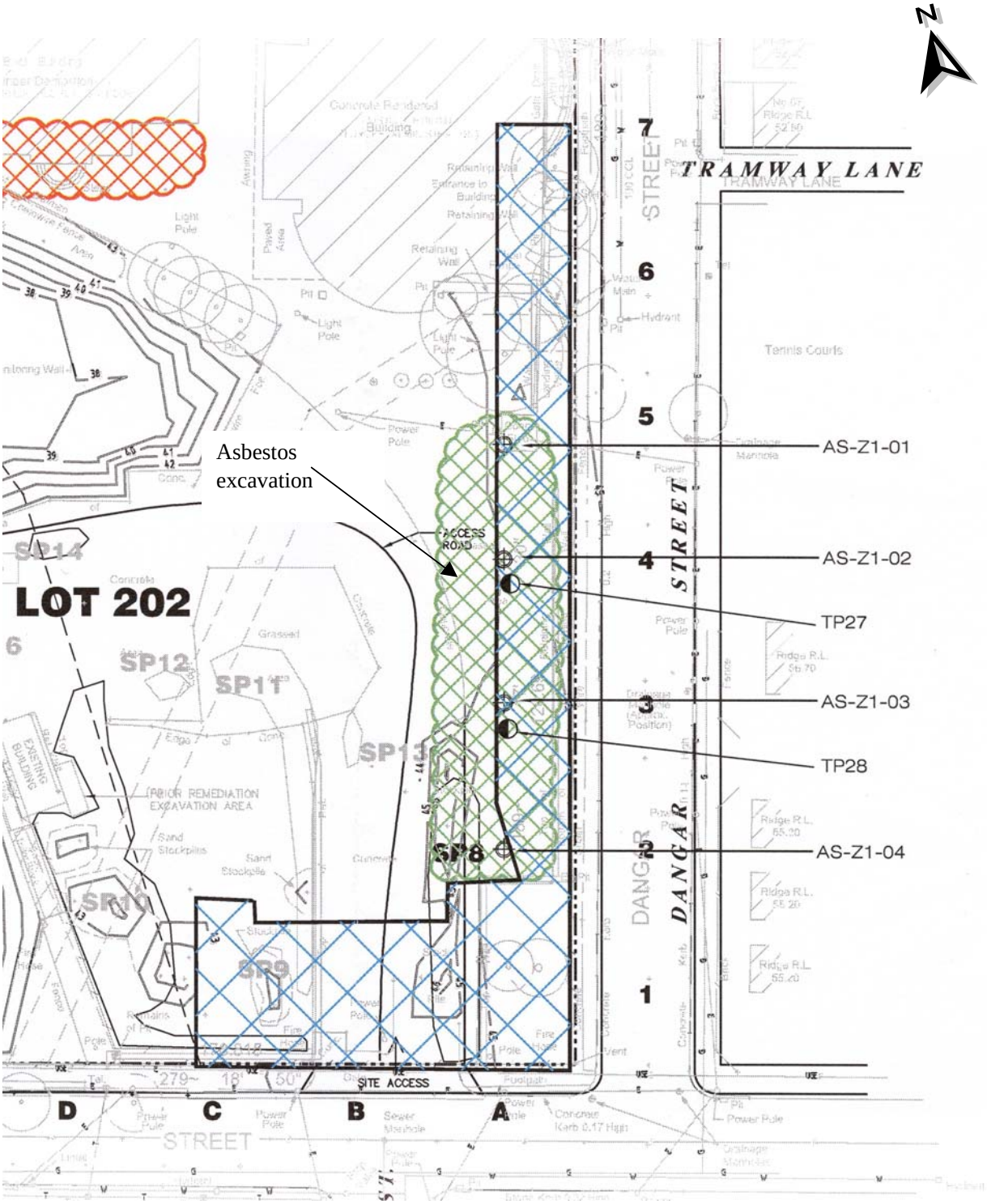


Source: URS, 2006



Source: URS 2006

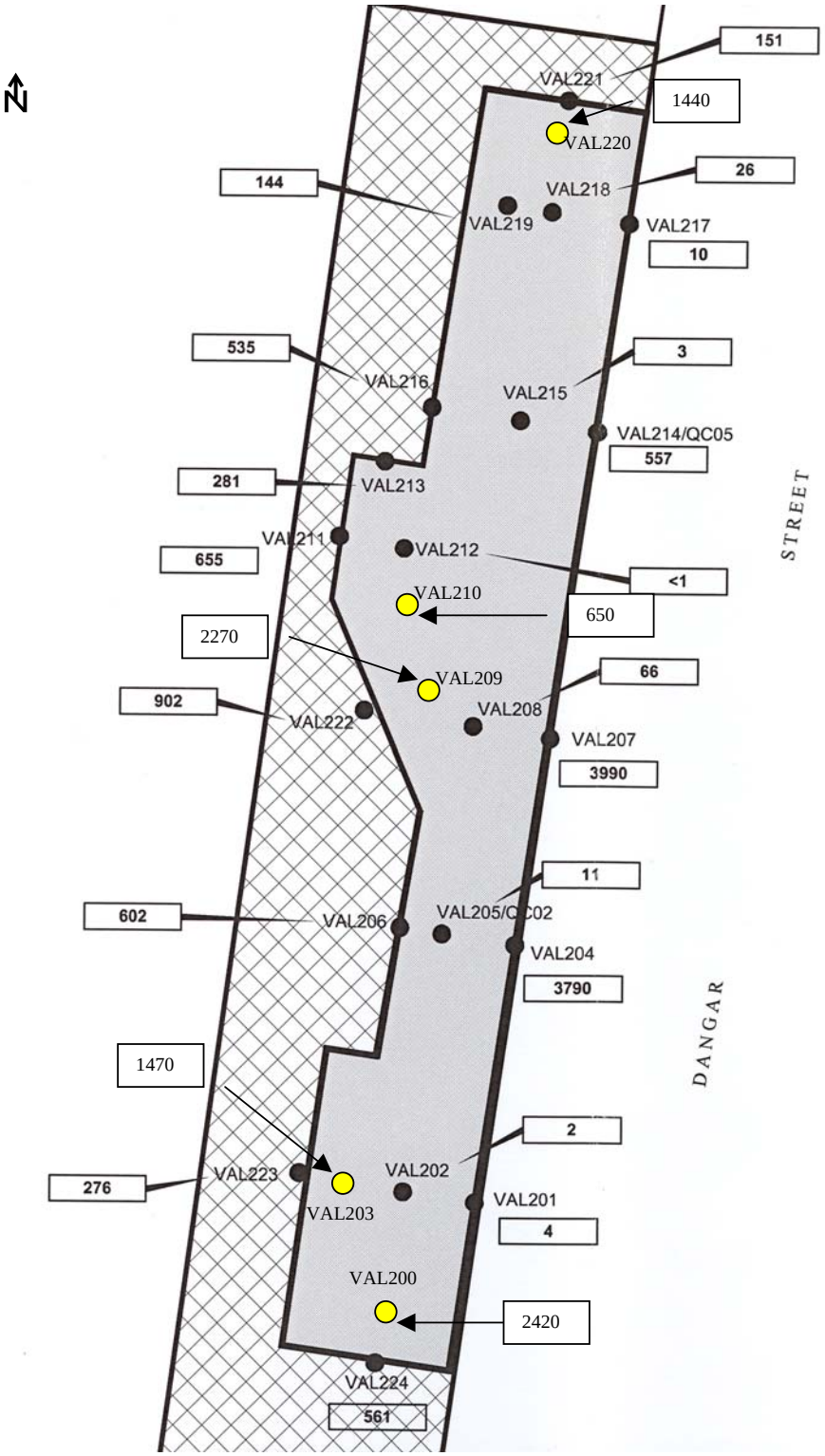

SITE LAYOUT PLAN
SCALE 1:1500
PROPOSED BUILDING OUTLINE
PART 2 (HATCHED)
TP201
TP202
TP203
TP204
TP205
TP206
TP207
TP208
TP209
TP210
TP211
TP212
TP301
TP302
TP303
TP304
TP306
TP307
TP309
HA201
HA202
HA203
HA204
HA205
HA206
HA207
HA208
HA209
LEGEND
TP306
LEAD SAMPLE LOCATION
SAMPLE | DEPTH | LEAD (mg/kg)
TP207 | 0.5-0.6 | 6480
TP207 | 1.0-1.1 | 1900
TP207 | 1.5-1.6 | 1
>250% GUIDELINE (NEPM 'D' OR NEPM 'E')
>GUIDELINE (NEPM 'D' OR NEPM 'E')
<GUIDELINE (NEPM 'D' OR NEPM 'E')
LEAD (Pb) (mg/kg)
DEPTH OF SAMPLE (mbgl)
SAMPLE NUMBER
PROPOSED EXCAVATION FOOTPRINT
COORDINATES OF PROPOSED EXCAVATION FOOTPRINT
1 322035.39E 1246766.78N
2 322029.21E 1246767.69N
3 322026.99E 1246755.18N
4 322024.32E 1246755.62N
5 322023.43E 1246750.11N
6 322027.99E 1246749.36N
7 322023.51E 1246722.99N
8 322027.91E 1246722.47N
CLIENT
SIR MOSES MONTEFIORE JEWISH HOME
PROJECT
LOT 202 KING ST RANDWICK - PART 2 VALIDATION
TITLE
LEAD IMPACT DELINEATION
APRIL - JULY 2003
AND PROPOSED REMEDIATION AREA
A2
0 5 10
1:200 (metres) at A2
DESIGNED: FM
DRAWN: DAJ
DATE: 23.05.06
APPROVED:
DATE:
STATUS: DRAFT
PROJECT: 43346065
CAD FILE: 004.DWG
REVISION: A
URS
FIGURE 4



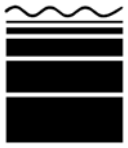
Source: URS, 2006

Figure 5

Sample Locations
Asbestos Validation



Source: URS, 2006



APPENDIX A
Contaminant Groups

Individual Species Making up Contaminant Groups

POLYCYCLIC AROMATIC HYDROCARBONS

Naphthalene
Acenaphthylene
Acenaphthene
Fluorene
Phenanthrene
Anthracene
Fluoranthene
Pyrene
Benz(a)anthracene
Chrysene
Benzo(b) & (k) fluoranthene
Benzo(a)pyrene
Indeno(1,2,3-cd)pyrene
Dibenz(a,h)anthracene
Benzo(g,h,i)perylene

TOTAL PETROLEUM HYDROCARBONS

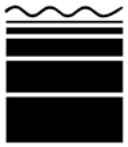
C_6 - C_9 fraction
C_{10} - C_{14} fraction
C_{15} - C_{28} fraction
C_{29} - C_{36} fraction

MONOCYCLIC AROMATIC HYDROCARBONS

Benzene
Toluene
Ethylbenzene
meta- & para-xylene
ortho-xylene
Styrene

HEAVY METALS

Arsenic (As)
Cadmium (Cd)
Chromium (Cr)
Copper (Cu)
Lead (Pb)
Mercury (Hg)
Nickel (Ni)
Zinc (Zn)



APPENDIX B

Communications with the Auditor

(13256)

C. M. Jewell & Associates Pty Ltd
Water and Environmental Management

CMJA

Phone 02 4759 3251 *International* 61 2 4759 3251
Fax 02 4759 3257 *International* 61 2 4759 3257

FAX

Ref:	J0807.18F	**Date:**	18 September 2006
To:	URS	**c.c.**	McLachlan Lister Pty Ltd
Attention:	Lachlan Wood	**Attention:**	Tim Greenaway
Fax no:	8925 5555	**Fax no:**	9310 0952
From:	Chris Jewell	**Total pages including this page:**	2

FAXED

FAXED

Site Audit – 100-120 King Street, Randwick

Lachlan

I refer to your fax of 5 September 2006 and attached changes to the EMP.

I have no objection to any of the changes suggested by Tim.

However, I do suggest that the plan incorporate a requirement for provision of an annual compliance statement to Council. All that is required is a one-sentence letter stating that during the previous 12 months, the site has been managed in accordance with the EMP.

I think that it is important to have some requirement to do something positive in relation to the EMP each year, to ensure that, over time, it is not forgotten by Council or Montefiore.

Please note that this communication has been provided as interim advice only. Where applicable, the information provided is consistent with NSW DEC guidelines and policies. The advice does not constitute a site audit report or site audit statement and does not pre-empt the conclusions, which will be drawn at the end of the audit process. A site audit report and site audit statement will be issued when the audit process has been completed.

For and on behalf of
C. M. JEWELL & ASSOCIATES PTY LTD

CHRIS JEWELL

P.O. Box 10, Wentworth Falls, NSW 2782, Australia
1/13 Kalinda Road, Bullaburra, NSW 2784, Australia
Email postie@cm-jewell.com.au ABN 54 056 283 295

pathways and methods for minimising occupants/worker's exposure to the contaminated fill and/or soils.

1.4 EMP Implementation

It is the intention that the implementation of this EMP will be the responsibility of Montefiore, as the site owner, and should be enforced by Randwick City Council (Council). It is recommended that a Public Positive Covenant under Section 88E of the Conveyancing Act 1919 is made to the Property Title, nominating Randwick Council as the Prescribed Authority. In addition, it is also considered appropriate that Council place a notation on the Planning Certificate for the site under Section 149 (2) of the Environmental Planning and Assessment Act 1979 (EP&A Act). This notation would address the restrictions for intrusive works on the site. Where a development application (DA) is required, Council will also be able to enforce the implementation of the EMP, through the conditions of consent for the DA. Intrusive works conducted on the site shall only be conducted by contractors/individuals who have read and acknowledged understanding of this EMP.

The following table provides a summary of the responsibilities for the implementation and management of the EMP. These responsibilities do not replace any other regulatory responsibilities of the parties in undertaking works at the site.

Table 1 EMP Implementation Responsibilities

Organisation	Responsibilities
Randwick City Council	• Note EMP on appropriate planning instrument. • ~~Implement and authorise updates to site management data as required (eg. from survey plans of excavations, as built drawings).~~ ✓ *Is this needed?*
Montefiore	• Organise revision of Property Title to note that the site is subject to implementation of this EMP. • Nominate a representative of Montefiore to undertake annual inspections of the capping area. Document and report the inspections to the Montefiore Board on an annual basis. • ~~Notify Council of [illegible] which may require implementation of the [illegible]~~ ✓ • ~~If required, obtain approval from Council for contractors and/or consultants undertaking works.~~ ✓ • ~~Confirm to Council that works are being undertaken in accordance with procedures set out in the EMP.~~ *Provide Council with an annual statement of compliance with the EMP.* • Notify Council of any non-conformance with the EMP and corrective actions. • ~~Provide to Council and~~ Maintain survey plans of excavations and as-built drawings. ✓

13120

Re: FW: Montefiore Home Randwick Chris Jewell

From: "Chris Jewell" <chris@cm-jewell.com.au>
To: "Tim Greenaway" <TimG@McLachlanlister.com.au>, <Francene_Mitchell@URSCorp.com>
Date sent: Tue, 22 Aug 2006 23:32:40 +1000
Subject: Re: FW: Montefiore Home Randwick
Send reply to: chris@cm-jewell.com.au
Priority: normal

Tim,

Sorry, this one fell through the cracks.

I suggest a Public Positive Covenant under Section 88E of the Conveyancing Act 1919, nominating Randwick
Council as the Prescribed Authority.

The Covenant can state:

"Due to the presence of contaminated soil beneath some parts of the land, the land shall at all times be managed in
accordance with the site environmental management plan No. XXXXXXXXXX prepared by URS Australia and dated
XXXXXXXXXX, as is required by site audit statement SA XXXXXX issued by Christopher Jewell and dated
XXXXXXXXXXXXX.

The covenant will need to be imposed in the form required by Section 88E (3) or 88E (4) as appropriate.

Chris.

On 22 Aug 2006 at 15:00, Tim Greenaway wrote:

> Chris,
>
> Could you respond to my email below. Thanks,
>
>
>
> Chris,
>
> Further to your fax dated 31 July 2006 regarding the Environmental
> Management Plan, I have checked with Council and they require we place a
> positive covenant on title, refer email below. Do you have some words
> that may be suitable or I will have the Montefiore Home's lawyers
> prepare something for yourself and Council to review?
>
> Regards,
>
>
> Tim Greenaway.
> Executive Manager - Project Delivery
>
> McLachlan Lister Pty Limited
> ASN Building
> Level 1
> 1-5 Hickson Road
> THE ROCKS NSW 2000

C. M. Jewell & Associates Pty Ltd
Water and Environmental Management

12973

CMJA

FAX

Phone *02 4759 3251* *International* *61 2 4759 3251*
Fax *02 4759 3257* *International* *61 2 4759 3257*

Ref:	J0807.17F	**Date:**	31 July 2006
To:	URS	**c.c.**	McLachlan Lister Pty Ltd
Attention:	Fran Mitchell	**Attention:**	Tim Greenaway
Fax no:	8925 5555	**Fax no:**	9310 0952
From:	Chris Jewell	**Total pages including this page:**	1

FAXED

FAXED

Site Audit – 100-120 King Street, Randwick

Fran

I have reviewed your Draft Environmental Management Plan (EMP) and outline below a number of issues to be addressed. The new draft of the EMP should then be submitted to me and to Randwick City Council for comment.

1. As outlined in the DEC's *Guidelines for the NSW Site Auditor Scheme*, 2nd edition (2006) specifically in Section 3.4.6, all EMPs must include an enforcement mechanism. The options for this site, as I see it, are

   a) the placement of a positive covenant on the title, or

   b) a Section 96 application in order to make compliance with the EMP a condition of the existing DA.

   Council must agree to the enforcement mechanism chosen and must also agree to notification of the EMP on any planning certificate issued under Section 149 (2) of the EP&A Act for the site.

2. In Section 4.1 of the draft EMP, more detail is required concerning the maintenance of the concrete capping. Please specify how frequently inspections should be conducted and by whom. Details of the inspections and their findings must be documented; please explain how this should be done.

3. In Section 4.6, please replace the word 'investigation' in the first sentence with 'excavation'.

4. In the EMP's list of references, please note that the correct reference for the Guidelines for the NSW Site Auditor Scheme should read: **NSW DEC 2006**, *Guidelines for the NSW Site Auditor Scheme*, 2nd edition, NSW Department of Environment and Conservation, Sydney NSW.

I have recently viewed the site but will need to conduct a more detailed inspection of the containment areas during a final site inspection, at a date to be arranged.

Please note that this communication has been provided as interim advice only. Where applicable, the information provided is consistent with NSW DEC guidelines and policies. The advice does not constitute a site audit report or site audit statement and does not pre-empt the conclusions, which will be drawn at the end of the audit process. A site audit report and site audit statement will be issued when the audit process has been completed.

For and on behalf of
C. M. JEWELL & ASSOCIATES PTY LTD

CHRIS JEWELL

P.O. Box 10, Wentworth Falls, NSW 2782, Australia
1/13 Kalinda Road, Bullaburra, NSW 2784, Australia
Email postie@cm-jewell.com.au ABN 54 056 283 295

C. M. Jewell & Associates Pty Ltd
Water and Environmental Management

CMJA

Phone 02 4759 3251 *International* 61 2 4759 3251
Fax 02 4759 3257 *International* 61 2 4759 3257

FAX

12751

Ref:	J0807.16F	**Date:**	26 June 2006
To:	URS	**c.c.**	McLachlan Lister Pty Ltd
Attention	Fran Mitchell	**Attention:**	Tim Greenaway
Fax no:	8925 5555	**Fax no:**	9241 ~~1898~~ 7329
From:	Chris Jewell	**Total pages including this page:**	2 ~~1~~ 2

FAXED

FAXED

Site Audit – King Street, Randwick

I have reviewed your report Remediation Validation, Part 2 Area, Lot 202 King Street Randwick against the mandatory requirements of the *Guidelines for the NSW Site Auditor Scheme* 2nd edition (2006).

Attached is the relevant checklist section that assesses compliance with the guidelines. The field and laboratory QA/QC section of the checklist is not able to be completed due to the required information outlined below.

The report indicates that work was substantially conducted as outlined in the RAP and as previously agreed. While you may comment on any identified non-compliance and partial compliance items listed, the issues that require clarification areas follows.

1. It appears that duplicate identifications have been repeated over time, which makes checking difficult eg. QC 05 is tabulated as a duplicate for VAL214 (2/10/03) however it is not in the laboratory report of that date and a laboratory report has a QC05 dated 23/7/03. In addition you have not tabulated the primary and duplicate samples concentrations or RPD's. Could you please do this for the delineation data set (Table 1) and the validation data set (Tables 2a and 2b)?
2. Table 3 lists two TP02-1.0-1.1 samples (with different dates) both with the same two duplicates – QC10 and QC11, neither of which are listed as a inter laboratory duplicate. In addition it appears somewhat coincidental that these samples also have exactly the same concentration.
3. You have stated that a rinsate blank was identified 'QC03' and a field blank as'QC04', yet you have also listed these as duplicates. Could you please supply information on blanks used i.e. tabulate the analytical results?
4. According to your validation data (Table 2b) TP206 samples and two out of three samples from TP202 (one isn't?) and are boundary samples, yet TP01 and TP307 also appear to be located on the boundary.
6. It isn't clear as to why samples VAL 200, 203, 209, 210 and 220 are tabulated in Table 3 rather than the excavation validation data. Neither is there reference to these samples within the report nor on a figure.
7. There is no mention of the current status of the excavation, i.e was it reinstated?

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1/13 Kalinda Road, Bullaburra, NSW 2784, Australia
Email postie@cm-jewell.com.au
ABN 54 056 283 295

8. Could you please clarify whether the day care centre is still present within the southern western portion of the property?

Please respond to Caitlin Spiller in the first instance.

Please note that this communication has been provided as interim advice only. Where applicable, the information provided is consistent with NSW DEC guidelines and policies. The advice does not constitute a site audit report or site audit statement and does not pre-empt the conclusions which will be drawn at the end of the audit process. A site audit report and site audit statement will be issued when the audit process has been completed.

For and on behalf of
C. M. JEWELL & ASSOCIATES PTY LTD

CHRIS JEWELL

URS

DOCUMENT CONTROL		
Control No:	10127	
Date received:	10.9.03	
Job No:	0807	
Routing:	CMJ	✓
	PLE	✓

9 September 2003
Project No. 51072-001

CM Jewell & Associates
PO Box 10
Wentworth Falls
NSW 2782

Attention: Chris Jewell
NSW EPA accredited Site Auditor

Dear Chris,

Subject: Proposed RAP Modification – Lot 202 King St - RCC Conditional Approval

Please find enclosed Randwick City Council's conditional approval of the RAP Modification (URS, 26 August 2003).

In relation to the conditions listed by Randwick City Council (RCC), the following is noted for your information:

- The Site Management Plan (SMP) will be prepared as part of the documentation presented to yourself for review and approval.
- An appropriate Covenant will be placed on the title to the satisfaction of RCC.
- The SAS is to include appropriate conditions regarding the SMP and the Covenant, with the concurrence from RCC.

In addition and in response to the 3rd condition noted by RCC, URS considers that the validation of the remediation methodology (i.e. cap and contain) will be documented in the Part 2 Validation Report, rather than in the SMP. The SMP will include details on the construction of the containment area for the purpose of recording these details should disturbance of the area be necessary in the future.

Details of the remediation planning for the selected Option C, have been previously summarised in the RAP Modification (URS, 26 August 2003) and include:

- Excavation of material which exceeds the NEPM 'E' Guideline Level from the open space areas of the Part 2 area and replace this material beneath the building or paving footprints.

URS Australia Pty Ltd (ABN 46 000 691 690)
Level 3, 116 Miller Street
North Sydney, NSW 2060 Australia
Tel: 61 2 8925 5500
Fax: 61 2 8925 5555

- The building or paving would provide a physical barrier to prevent access to the impacted material. No material would be disposed off-site under this option.
- This approach would most likely result in the loss of the trees within the remediation area, and would require prior Council approval to allow for the trees to be removed.
- The containment area for the excavated material beneath the building or paving footprint will not meet the NEPM 'D' Guideline Level and a conditional SAS would be anticipated for this area. A SMP would be required to appropriately manage the contaminated material beneath the buildings or paving and a notation on the property title would be enacted.
- The material to be replaced under either paving or building foundations has been assessed to be suitable in that the material will be replaced above the water table. Groundwater level monitoring has been recently undertaken by Jeffrey & Katauskas (J&K). The J&K reports (4 August 2003 and 18 July 2003) indicate that the standing groundwater level in the north east of the site is approximately 38m AHD, although it is noted that a fluctuation of 1 m-2 m in level is possible in the Botany Basin. Assuming a 2m rise, it is proposed that materials will be placed above 40m AHD.
- The impacted soil materials will be underlain and overlain by a clearly visible geofabric marker layer. In the areas where paving is proposed, a 100mm sand cover will be placed to overly the geofabric and subsequently a blinding layer of concrete prior to the interlocking paving bricks. It is anticipated that the paving will be of low permeability, given the placement of the blinding concrete layer. In the areas where material is retained under a building slab, a similar placement methodology will be implemented including marking of the impacted materials with a high visibility geofabric marker layer, placement of a 100 mm sand cover layer, followed by a blinding concrete layer and then concrete slab construction.
- A SMP will be prepared to detail the protocols which will be implemented to restrict access to the impacted material. The SMP will include procedures for the maintenance and inspection of the containment.

In summary, URS consider that the "cap & contain" method of managing the contamination on-site will:

- Adequately contain the contaminated material by the construction of the containment area as described above;
- Restrict unreasonable interference with the contaminated material as the material will be generally inaccessible beneath the paving slab. In addition, the SMP will provide protocols for the restriction of excavations and the maintenance and inspection of the capping;

URS

- Prevent potential leaching of the contaminants to the underlying groundwater table as the contaminated material will be placed above the estimated groundwater level and beneath low permeability paving

Further to your e-mail dated 28 August 2003, could you please indicate if the proposed "cap & contain" remediation methodology and associated SMP is appropriate to ensure that the contaminated material will not be unreasonably interfered with or migrate with respect to groundwater.

McLachlan Lister/Montefiore would like to proceed with the works as a matter of priority such that the remediation works are completed prior to intensive construction activities being undertaken on the Part 1 land parcel of Lot 202.

Yours sincerely,
URS AUSTRALIA PTY LTD

Fran Mitchell
Associate Engineer

Martin Howell
Senior Principal

Enclosures:
- RCC, 5 September 2003, Amendment of Remediation Action Plan

cc: Tim Greenaway
McLachlan Lister

Our Ref: C/0563/2003, P/000869

5 September 2003

McLachlan Lister Pty Ltd
68 Gloucester Street
The Rocks NSW 2000

Attention: Tim Greenaway

Dear Tim

Re: Sir Moses Montefiore Jewish Home
100 - 120 King Street, Randwick
Amendment Of Remediation Action Plan

Thank you for your recent correspondence in relation to the amendment of the Remediation Action Plan (RAP) for the Sir Moses Montefiore Jewish Home located at King Street, Randwick.

The information has been reviewed and no objection is raised to accepting the amended RAP, subject to the following conditions:

- Conditions of Council consent No. 02/00551/G1 approved on 22 October 2002 being adhered to.
- A Site Management Plan (SMP) being prepared in accordance with the site auditors specifications, obtain the approval of the site auditor and the Council prior to the implementation of the site management plan.
- It is to be clearly demonstrated in the SMP that the "cap and contain" method of managing the contamination onsite will contain the contaminated material and ensure it will not be unreasonably interfered with or migrated (in particular by groundwater), to the satisfaction of the auditor.
- It is to be clearly identified in the SMP what and where the contaminated material is located.
- The approved site management plan be implemented prior to the occupation of the site.
- An appropriate covenant be place on the title to the satisfaction of Council.
- Appropriate conditions regarding the SMP and the Covenant on the land title are to be included on the Site Audit Statement accordingly, with the concurrence from Council.

Should you require any further details, please do not hesitate to contact Ms Joanne Brown, Senior Environmental Health Officer, on 9399 during business hours Monday to Friday.

Yours faithfully

Roman Wereszczynski
Manager Building Certification Services

Per.....
Joanne Brown
Senior Environmental Health Officer
G:\TOWN\WP\TLET\Tlet2003\100KingStJB9-5-ss.doc

Jennifer Tully

8765

Date sent: **Thu, 11 Sep 2003 00:18:07 +1000**
From: **Chris Jewell <cm_jewell@hotmail.com>**
Subject: **Re: Montefiore, King Street, Randwick RAP Modification**
To: **Francene_Mitchell@URSCorp.com**
Copies to: **Jenny@cm-jewell.com.au**
Send reply to: **Chris Jewell <chris@cm-jewell.com.au>**
Organization: **C.M.Jewell & Associates Pty Ltd**

Dear Fran,

Further to your letter of 9th September, our meeting last week and my previous email (28th August), I confirm that the proposed approach to containment of lead contaminated soils and associated SMP will be satisfactory, and that groundwater-related issues have been adequately considered.

Chris.

----- Original Message -----
From: <Francene_Mitchell@URSCorp.com>
To: <Chris@cm-jewell.com.au>
Sent: Tuesday, September 09, 2003 4:59 PM
Subject: RAP Modification - RCC response

>
>
> Francene Mitchell
> Associate Engineer
> URS Australia Pty Ltd
> Phone: +61 (02) 8925 5500 Fax: +61 (02) 8925 5555 Direct
> Dial: +61 (02) 8925 5712
> 116 Miller St, North Sydney 2060
>
> This e-mail together with any attachments is confidential and may be the
> subject of legal privilege. If you are not the intended recipient please
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Contact No:	10142
Date received:	9.9.03
Job No:	0807
Routing:	CMJ

>
>
>
>
>
> ----- Forwarded by Francene Mitchell/Sydney/URSCorp on 09-09-03 05:01 PM
> -----
>
> Francene Mitchell
> To:
Chris@cm-jewell.com.au
> 09-09-03 03:43 PM cc:
tim@mclachlanlister.com, Martin Howell/Sydney/URSCorp@URSCorp
> Subject: RAP
Modification - RCC response
>
>
>
>
> Chris,
>
> Randwick City Council (RCC) have responded to URS' RAP Modification
> regarding the proposed lead remediation works in Part 2 of the Lot 202
King
> St site.
>
> Please find attached the RCC conditional approval (5 September 2003).
>
> In response to the RCC conditional approval, URS has drafted the attached
> letter to yourself to clarify the proposed remediation methodology of the
> containment area and its associated integrity.
>
> Can you please review the URS letter and provide comment in relation to
the
> RCC condition.
>
> Regards,
> Fran
>
> (See attached file: URS 9 September 2003 re conditional approval.pdf)(See
> attached file: RCC response 5 September 2003.pdf)
>

C. M. Jewell & Associates Pty Ltd
Water and Environmental Management
A.B.N. 54 056 283 295

fax transmission

P.O. Box 10, Wentworth Falls, NSW 2782, Australia
1/13 Kalinda Road, Bullaburra, NSW 2784, Australia

Phone (02) 4759 3251 **Email postie@cm-jewell.com.au** **Fax (02) 4759 3257**
(International +61 247 59 3251) **(International +61 247 59 3257)**

7952

Ref: J0807.7	Date: 20 December 2002	Time: 12:50
To: McLachlan Lister Pty Ltd		c.c. URS Australia Pty Limited
Attention: Tim Greenaway		Attention: Fran Mitchell
Fax No: 9241 1898	From: Chris Jewell	Fax No: 8925 5555
Original to follow: No		Total pages including cover: 1

FAXED

FAXED

Subject:

Dear Tim and Fran,

Further to our site meeting and inspection yesterday, I am satisfied that URS and Hibbs Associates have effectively managed the asbestos issues on the site, and subject to Hibbs' clearance certificate for asbestos and the results of URS's validation sampling, I would consider that the asbestos has effectively been remediated.

With regard to future management during my absence over the following few months, we agreed the following:

1. McLachlan Lister/URS will keep me informed of progress on the site by email. Emails will be copied to Fiona Keserue-Ponte at this office.
2. Fiona will visit the site on 1 or 2 occasions during remedial works, the preferable times for her to visit would be when there is maximum exposure of the site following completion of demolition and pavement removal and, secondly, when remediation is nearly complete, the later may coincide with my return during the last 2 weeks of February and if that is the case I will carry out a further site visit myself.

I wish you and your families and all at URS a happy Christmas and a peaceful new year.

For and on behalf of
C. M. JEWELL & ASSOCIATES PTY LTD

CHRIS JEWELL

Administrative Centre
30 Frances St
Randwick 2031
Tel: 02 9399 0999
Fax: 02 9319 1510
general.manager@randwick.nsw.gov.au

RANDWICK CITY COUNCIL
a sense of community

INCORPORATED
AS A MUNICIPALITY
22 FEBRUARY 1859
PROCLAIMED AS
A CITY 1 JULY 1990

ABN: 77 362 844 121

JBA/G P/000869
(Contact Officer: Joanne Brown – 9399 0879)

20 December 2002

DOCUMENT CONTROL		
Control No:	9245	
Date received:	24-12-02	
Job No:	0807	
Routing:	CMJ	
	FILE	

McLachlan Lister Pty Ltd
68 Gloucester Street
THE ROCKS NSW 2000

Attention: Tim Greenaway

Dear Mr Greenaway

Re: 100 – 120 King Street, Randwick

Reference is made to the Remediation Action Plan submitted to Council on 2 December 2002, together with a letter by C M Jewell & Associates Pty Ltd dated 27 November 2002.

Following discussions with the site auditor you are advised of the following:

- The land where buildings will be located (minimal direct access to soil) are to be remediated to NEHF D Criteria
- The recreational gardens, and unpaved open space areas are to be remediated to NEHF E Criteria
- The Statutory Site Audit Statement (SAS) and Summary Site issued Audit Report (SSAR) issued to Council shall be unconditional, in that it requires no further monitoring, ongoing review or remedial actions, beyond the stage of issuing the Construction Certificate, and shall cover both land and groundwater. The SAS should clearly state, the remediated land is at an asbestos free level or to a level where no unacceptable health risk remains.

Should you require further details or information please contact our Senior Environmental Health Officer, Joanne Brown, on 9399 0879 during business hours.

Yours faithfully,

Roman Wereszczynski
Manager, Environmental Health and Building Services

Per: .....
Joanne Brown
Senior Environmental Health Officer

Cc C M Jewell & Associates Pty Ltd
PO Box 10
WENTWORTH FALLS NSW 2782

Fran Mitchell
URS Australia Pty Ltd
Level 3, 116 Miller Street
NORTH SYDNEY NSW 2060

G:\TOWN\WP\TLET\Tlet2002\JB12-20.1V.doc

C.M. Jewell & Associates Pty Ltd

A.C.N. 056 283 295 A.B.N. 54 056 283 295

Water and Environmental Management

1/13 Kalinda Road, Bullaburra, NSW 2784, Australia
P.O. Box 10, Wentworth Falls, NSW 2782
Phone: (02) 4759 3251 Fax: (02) 4759 3257
Email: postie@cm-jewell.com.au

My Ref: J0807.6 CMJ:na
27 November 2002

McLachlan Lister Pty Limited
68 Gloucester Street
THE ROCKS NSW 2000

FAXED 7837

Attention: Mr Tim Greenaway

Dear Tim,

RE: Remedial Action Plan – Sir Moses Montefiore Jewish Home

As the NSW EPA accredited site auditor appointed for the site, I have reviewed the final remedial action plan (RAP) (26 November 2002) prepared by URS Australia in respect of the Sir Moses Montefiore Jewish Home development in Randwick.

I have previously reviewed a draft of the RAP; my comments on the draft have been incorporated into the final document.

The RAP generally complies with the recommendations of the EPA *Guidelines for Consultants Reporting on Contaminated Sites* and with Australian Industry practice. I consider that it also meets the site-specific requirements of this project and forms an appropriate basis for site remediation.

I consider that if the site is remediated and validated in accordance with the RAP, it should then be suitable for the proposed use (residential with minimal opportunity for soil access) and I should be able to issue a site audit statement to that effect.

For and on behalf of
C. M. JEWELL & ASSOCIATES PTY LTD

CHRIS JEWELL

cc: Fran Mitchell, URS Australia Pty Ltd

C.M. Jewell & Associates Pty Ltd

A.C.N. 056 283 295 A.B.N. 54 056 283 295

Water and Environmental Management

1/13 Kalinda Road, Bullaburra, NSW 2784, Australia
P.O. Box 10, Wentworth Falls, NSW 2782
Phone: (02) 4759 3251 Fax: (02) 4759 3257
Email: postie@cm-jewell.com.au

My Ref: J0807.5
21 November 2002

CMJ:mp

McLachlan Lister Pty Limited
68 Gloucester Street
THE ROCKS NSW 2000

FAXED 9787

Attention: Mr Tim Greenaway

Dear Tim,

RE: Remedial Action Plan – Sir Moses Montefiore Jewish Home

As the NSW EPA accredited site auditor appointed for the site, I have reviewed the draft remedial action plan (RAP) (6 November 2002) prepared by URS Australia in respect of the Sir Moses Montefiore Jewish Home development in Randwick.

The RAP generally complies with the recommendations of the EPA *Guidelines for Consultants Reporting on Contaminated Sites* and with Australian Industry practice. I consider that it also meets the site-specific requirements of this project and forms an appropriate basis for site remediation.

I have the following comments on three specific aspects of the RAP.

Section 3.4.2 Page 3-12 and corresponding part of Section 3.5, Page 3-14

1. Excavation below the water table in the sands present below this part of the site is likely to encounter stability problems unless some dewatering is carried out. Measures for dealing with this issue should be detailed in the RAP. In particular, it may prove difficult to collect the validation samples specified in Section 3-5.
2.
3. I think the word 'months' has been omitted from line 3 of the last paragraph of Section 3.4.2.

   Section 3.4.4 Page 3-13

   Paragraph numbered 3.

   A visual inspection of the entire surface should also be included.

Section 3.6 Page 3-14

3. The reference to 'No more than 20,000 T of soils classified as Inert Waste ...' relates to the "Waste Facilities" heading of Schedule 1 of the Protection of the Environment (Operations) Act 1997. The exemption given under part (f) (iii) of this section does not apply to this site because it is caught by the following part (g) as the development is classed as residential.

   Thus only VENM can be used.

Page 3-15

4. Sampling at a rate of 1 sample per 1000 cubic metres is inadequate – the rate should be 1 per 100 to 1 per 250 cubic metres, depending upon the volume imported from one source.

For and on behalf of
C. M. JEWELL & ASSOCIATES PTY LTD

CHRIS JEWELL

c.c. Fran Mitchell, URS Australia Pty Ltd

C. M. Jewell & Associates Pty Ltd
Water and Environmental Management
A.B.N. 54 056 283 295

fax transmission

FAXED 7006

P.O. Box 10, Wentworth Falls, NSW 2782, Australia
1/13 Kalinda Road, Bullaburra, NSW 2784, Australia

Phone (02) 4759 3251 **Email postie@cm-jewell.com.au** **Fax (02) 4759 3257**
(International +61 247 59 3251) **(International +61 247 59 3257)**

Ref: J0807.2	Date: 26 June 2002	Time: 12:02
To: URS		c.c. McLachlan Lister
Attention: Fran Mitchell		Attention: Simon Magri
Fax No. 8925 5555	From: Chris Jewell	Fax No. 9241 1898
Original to follow: No		Total pages including cover: 1

Subject: **Supplementary Sampling and Analytical Plan, Lot 202 King Street, Randwick**

Fran,

Further to our telephone conversation today, I confirm that I have reviewed your supplementary sampling and analytical plan and am generally happy with the approach that you have proposed.

There are two areas where some modification is appropriate. These are:

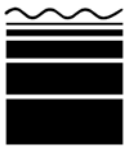
1) Comparability of data sets. Unless you are sure that you can demonstrate consistency of sampling and analytical methodology, allowing the original and supplementary data sets to be combined, then it would be worthwhile including some overlap sampling to allow a direct comparison.

2) Asbestos. I would like you to follow the approach to asbestos assessment outlined in the ACLCA Code of Practice (February 2002 draft), taking into account the comments in enHealth's review of that document. I note that you intend to sample from test pits, and concur with that approach. I would like to see your sampling program supplemented, and placed in context, by a walk-over inspection of the whole site by an asbestos specialist.

I don't think that either of these suggestions will result in significant extra costs or delays, and should help ensure that we end up with a validation data set with which we are all comfortable.

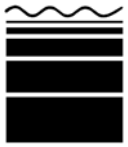
For and on behalf of
C. M. JEWELL & ASSOCIATES PTY LTD

CHRIS JEWELL



APPENDIX C

Information Relied Upon by the Auditor



APPENDIX C1

Summary of Laboratory Results

Soil Analytical Results - Lead Impact Delineation Results
Lot 202 - Part 2 Validation

Sample ID	Sample Date	Primary Laboratory	Primary Batch No	Lead (mg/kg)	QC Sample ID	QC Sample Type	Secondary QC Batch No	QC concentration Lead (mg/kg)	RPD (%)
Z7-2	1995	Enviromet	9505153	<5					
Z7-3	1995	Enviromet	9505153	<5					
Z7-4	1995	Enviromet	9505153	6					
Z7-8	1995	Enviromet	9505153	5					
TP02_0.2-0.4	24/07/2002	ALS	ES34741	1880	DUP02	field duplicate	ALS - ES 34736	2	200
HA201_0.2-0.3	30/04/2003	ALS	ES39497	819					
HA201_0.4-0.5	30/04/2003	ALS	ES39497	484					
HA202_0.2-0.3	30/04/2003	ALS	ES39497	749					
HA202_0.4-0.5	30/04/2003	ALS	ES39497	2940					
HA203_0.4-0.5	30/04/2003	ALS	ES39497	181					
HA204_0.2-0.3	11/07/2003	ALS	ES41010	1430					
HA204_0.6-0.7	11/07/2003	ALS	ES41010	2460					
HA204_1.0-1.1	11/07/2003	ALS	ES41010	5100					
HA205_0.2-0.3	11/07/2003	ALS	ES41010	263					
HA205_0.6-0.7	11/07/2003	ALS	ES41010	344					
HA205_1.0-1.1	11/07/2003	ALS	ES41010	999					
HA206_0.2-0.3	11/07/2003	ALS	ES41010	430					
HA206_0.6-0.7	11/07/2003	ALS	ES41010	764	QC12	field duplicate	ALS -ES41010	749	~~0.005~~ 2
HA206_1.0-1.1	11/07/2003	ALS	ES41010	169					
HA207_0.2-0.3	11/07/2003	ALS	ES41010	1460					
HA207_0.6-0.7	11/07/2003	ALS	ES41010	1340					
HA207_1.0-1.1	11/07/2003	ALS	ES41010	5130					
HA208_0.6-0.7	11/07/2003	ALS	ES41010	3370					
HA208_1.0-1.1	11/07/2003	ALS	ES41010	716					
HA209_0.6-0.7	11/07/2003	ALS	ES41010	230					
HA209_1.0-1.1	11/07/2003	ALS	ES41010	573					
TP02_1.0-1.1	11/07/2003	ALS	ES41010	6600	QC10 / QC11	field duplicate /triplicate	ALS -ES41010	5960 / 7090	7.2 - 10.2%
TP201_0.5-0.6	23/07/2003	ALS	ES41189	263					
TP201_1.0-1.1	23/07/2003	ALS	ES41189	484					
TP201_2.0-2.1	23/07/2003	ALS	ES41189	1					
TP202_0.5-0.6	23/07/2003	ALS	ES41189	2330					
TP202_1.0-1.1	23/07/2003	ALS	ES41189	631					
TP202_2.5-2.6	23/07/2003	ALS	ES41189	<1					
TP203_0.5-0.6	23/07/2003	ALS	ES41189	505					
TP203_1.0-1.1	23/07/2003	ALS	ES41189	346					
TP203_2.2-2.3	23/07/2003	ALS	ES41189	<1					
TP204_0.5-0.6	23/07/2003	ALS	ES41189	1660					
TP204_1.0-1.1	23/07/2003	ALS	ES41189	1080					
TP204_2.2-2.3	23/07/2003	ALS	ES41189	8					
TP205_0.5-0.6	23/07/2003	ALS	ES41189	614					
TP205_1.0-1.1	23/07/2003	ALS	ES41189	495	QC01	field duplicate	ALS - ES 41189	506	0.022 2
TP205_2.2-2.3	23/07/2003	ALS	ES41189	3					
TP206_0.5-0.6	23/07/2003	ALS	ES41189	1390					
TP206_1.0-1.1	23/07/2003	ALS	ES41189	2					
TP206_2.0-2.1	23/07/2003	ALS	ES41189	<1					
TP212_0.5-0.6	23/07/2003	ALS	ES41189	500					
TP212_1.0-1.1	23/07/2003	ALS	ES41189	3730					
TP212_1.7-1.8	23/07/2003	ALS	ES41189	2					
TP309_0.5-0.6	31/07/2003	ALS	ES41346	357					
TP309_1.0-1.1	31/07/2003	ALS	ES41346	6					
TP309_1.5-1.6	31/07/2003	ALS	ES41346	15					
				1200	NEPM HIL "D"				
				600	NEPM HIL "E"				

1200	Exceeds NEPM HIL "D" - Investigation levels for land use with minimum opportunity for access to soil
600	Exceeds NEPM HIL "E" - Investigation levels for land use as open space

Table 2a (Rev 1 - 12 July 06)
Soil Analytical Results - Lead Remediation Excavation Validation
Lot 202 - Part 2 Validation

Sample ID	Sample Date	Primary Laboratory	Primary Batch No	Primary Lead Concentration (mg/kg)	QC Sample ID	QC Sample Type	Secondary QC Batch No	QC concentration Lead (mg/kg)	RPD (%)	Comments
Excavation Validation Samples				1	LOR					
VAL202	31/09/2003	ALS	ES42626	2						Excavation Validation
VAL205	31/09/2003	ALS	ES42626	11	QC02	field duplicate	ALS-ES42626	14	24	Excavation Validation
VAL206	31/09/2003	ALS	ES42626	602	QC01	field duplicate	ALS-ES42626	638	5.8	Excavation Validation
VAL208	31/09/2003	ALS	ES42626	66						Excavation Validation
VAL211	1/10/2003	ALS	ES42645	655						Excavation Validation
VAL212	1/10/2003	ALS	ES42645	<1						Excavation Validation
VAL213	1/10/2003	ALS	ES42645	281						Excavation Validation
VAL215	1/10/2003	ALS	ES42645	3						Excavation Validation
VAL216	1/10/2003	ALS	ES42645	535						Excavation Validation
VAL218	2/10/2003	ALS	ES42668	26						Excavation Validation
VAL219	2/10/2003	ALS	ES42668	144	QC06	field duplicate	ALS - ES42668	139	3.5	Excavation Validation
VAL221	9/10/2003	ALS	ES42743	151						Excavation Validation
VAL222	9/10/2003	ALS	ES42743	902						Excavation Validation
VAL223	9/10/2003	ALS	ES42743	276						Excavation Validation
VAL224	9/10/2003	ALS	ES42743	561						Excavation Validation
VAL201	31/09/03	ALS	ES42626	4						Eastern property boundary
VAL204	31/09/03	ALS	ES42626	3790						Eastern property boundary
VAL207	31/09/03	ALS	ES42626	3990						Eastern property boundary
VAL214	1/10/2003	ALS	ES42645	557	QC05	field duplicate	Amdel - 3E3626	96	142	Eastern property boundary
VAL217	2/10/2003	ALS	ES42668	10						Eastern property boundary
				600	HIL "E"					

600 Exceeds NEPM HIL "E" - Investigation levels for land use as open space

Table 2b (Rev 1 - 12 July 06)
Soil Analytical Results - Part 2 Lead Validation
Lot 202 - Part 2 Validation

Sample ID	Sample Date	Primary Laboratory	Primary Batch No	Primary Lead Concentration (mg/kg)	QC Sample ID	QC Sample Type	Secondary QC Batch No	QC concentration Lead (mg/kg)	RPD (%)	Comment
				1	<-LOR (mg/kg)					
Z7-2	1995	Enviromet	9505153	<5						Previous Investigation
Z7-3	1995	Enviromet	9505153	<5						Previous Investigation
Z7-4	1995	Enviromet	9505153	6						Previous Investigation
Z7-8	1995	Enviromet	9505153	5						Previous Investigation
HA209_0.6-0.7	11/07/2003	ALS	ES41010	230						Delineation Investigation
HA209_1.0-1.1	11/07/2003	ALS	ES41010	573						Delineation Investigation
TP201_0.5-0.6	23/07/2003	ALS	ES41189	263						Delineation Investigation
TP201_1.0-1.1	23/07/2003	ALS	ES41189	484						Delineation Investigation
TP201_2.0-2.1	23/07/2003	ALS	ES41189	1						Delineation Investigation
TP203_0.5-0.6	23/07/2003	ALS	ES41189	505						Delineation Investigation
TP203_1.0-1.1	23/07/2003	ALS	ES41189	346						Delineation Investigation
TP203_2.2-2.3	23/07/2003	ALS	ES41189	<1						Delineation Investigation
TP309_0.5-0.6	31/07/2003	ALS	ES41346	357						Delineation Investigation
TP309_1.0-1.1	31/07/2003	ALS	ES41346	6						Delineation Investigation
TP309_1.5-1.6	31/07/2003	ALS	ES41346	15						Delineation Investigation
VAL202	31/09/2003	ALS	ES42626	2						Excavation Validation
VAL205	31/09/2003	ALS	ES42626	11	QC02	field duplicate	ALS - ES42626	14	24	Excavation Validation
VAL206	31/09/2003	ALS	ES42626	602	QC01	field duplicate	ALS - ES42626	638	5.8	Excavation Validation
VAL208	31/09/2003	ALS	ES42626	66						Excavation Validation
VAL211	1/10/2003	ALS	ES42645	655						Excavation Validation
VAL212	1/10/2003	ALS	ES42645	<1						Excavation Validation
VAL213	1/10/2003	ALS	ES42645	281						Excavation Validation
VAL215	1/10/2003	ALS	ES42645	3						Excavation Validation
VAL216	1/10/2003	ALS	ES42645	535						Excavation Validation
VAL218	2/10/2003	ALS	ES42668	26						Excavation Validation
VAL219	2/10/2003	ALS	ES42668	144	QC06	field duplicate	ALS - ES42668	139	3.5	Excavation Validation
VAL221	9/10/2003	ALS	ES42743	151						Excavation Validation
VAL222	9/10/2003	ALS	ES42743	902						Excavation Validation
VAL223	9/10/2003	ALS	ES42743	276						Excavation Validation
VAL224	9/10/2003	ALS	ES42743	561						Excavation Validation
TP201_0.5-0.6	23/07/2003	ALS	ES41189	263						Western Part 2 boundary
TP201_1.0-1.1	23/07/2003	ALS	ES41189	484						Western Part 2 boundary
TP201_2.0-2.1	23/07/2003	ALS	ES41189	1						Western Part 2 boundary
TP202_0.5-0.6	23/07/2003	ALS	ES41189	2330						Western Part 2 boundary
TP202_1.0-1.1	23/07/2003	ALS	ES41189	631						Western Part 2 boundary
TP202_2.5-2.6	23/07/2003	ALS	ES41189	<1						Western Part 2 boundary
TP206_0.5-0.6	23/07/2003	ALS	ES41189	1390						Western Part 2 boundary
TP206_1.0-1.1	23/07/2003	ALS	ES41189	2						Western Part 2 boundary
TP206_2.0-2.1	23/07/2003	ALS	ES41189	<1						Western Part 2 boundary
TP307_1.0-1.1	31/07/2003	ALS	ES41346	250						Western Part 2 boundary
TP307_1.5-1.6	31/07/2003	ALS	ES41346	5	QC31/ QC32	Dup/Trip		3.5		Western Part 2 boundary
VAL201	31/09/2003	ALS	ES42626	4						Eastern property boundary
VAL204	31/09/2003	ALS	ES42626	3790						Eastern property boundary
VAL207	31/09/2003	ALS	ES42626	3990						Eastern property boundary
VAL214	1/10/2003	ALS	ES42645	557	QC05	field duplicate	Amdel - 3E3626	96	142	Eastern property boundary
VAL217	2/10/2003	ALS	ES42668	10						Eastern property boundary

600 Exceeds NEPM HIL "E" - Investigation levels for land use as open space

Table 3 (Rev 1 - 12 July 06)
Soil Analytical Results - Lead Containment Cell Characterisation Results
Lot 202 - Part 2 Validation

Sample ID	Sample Date	Laboratory	Batch No	QC Sample ID	Lead (mg/kg)
				LOR->	1
TP02_0.2-0.4	24/07/2002	ALS	ES34741	DUP02	1880
HA201_0.2-0.3	30/04/2003	ALS	ES39497		819
HA201_0.4-0.5	30/04/2003	ALS	ES39497		484
HA202_0.2-0.3	30/04/2003	ALS	ES39497		749
HA202_0.4-0.5	30/04/2003	ALS	ES39497		2940
HA203_0.4-0.5	30/04/2003	ALS	ES39497		181
HA204_0.2-0.3	11/07/2003	ALS	ES41010		1430
HA204_0.6-0.7	11/07/2003	ALS	ES41010		2460
HA204_1.0-1.1	11/07/2003	ALS	ES41010		5100
HA205_0.2-0.3	11/07/2003	ALS	ES41010		263
HA205_0.6-0.7	11/07/2003	ALS	ES41010		344
HA205_1.0-1.1	11/07/2003	ALS	ES41010		999
HA206_0.2-0.3	11/07/2003	ALS	ES41010		430
HA206_0.6-0.7	11/07/2003	ALS	ES41010	QC12	764
HA206_1.0-1.1	11/07/2003	ALS	ES41010		169
HA207_0.2-0.3	11/07/2003	ALS	ES41010		1460
HA207_0.6-0.7	11/07/2003	ALS	ES41010		1340
HA207_1.0-1.1	11/07/2003	ALS	ES41010		5130
HA208_0.6-0.7	11/07/2003	ALS	ES41010		3370
HA208_1.0-1.1	11/07/2003	ALS	ES41010		716
TP02_1.0-1.1	11/07/2003	ALS	ES41010	QC10 / QC11	6600
TP204_0.5-0.6	23/07/2003	ALS	ES41189		1660
TP204_1.0-1.1	23/07/2003	ALS	ES41189		1080
TP204_2.2-2.3	23/07/2003	ALS	ES41189		8
TP205_0.5-0.6	23/07/2003	ALS	ES41189		614
TP205_1.0-1.1	23/07/2003	ALS	ES41189	QC01	506
TP205_2.2-2.3	23/07/2003	ALS	ES41189		3
TP207_0.5-0.6 *1	23/07/2003	ALS	ES41189	QC02/QC03	6460
TP207_1.0-1.1 *1	23/07/2003	ALS	ES41189		1900
TP207_1.5-1.6 *1	23/07/2003	ALS	ES41189		1
TP212_0.5-0.6	23/07/2003	ALS	ES41189		500
TP212_1.0-1.1	23/07/2003	ALS	ES41189		3730
TP212_1.7-1.8	23/07/2003	ALS	ES41189		2
VAL200	31/09/2003	ALS	ES42626		2420
VAL203	31/09/2003	ALS	ES42626		1470
VAL209	31/09/2003	ALS	ES42626		2270
VAL210	1/10/2003	ALS	ES42645		650
VAL220	2/10/2003	ALS	ES42668		1440
LSP-03 *2	12/08/2003	ALS	ES41573		13
LSP-04 *2	12/08/2003	ALS	ES41573		2200

Notes:

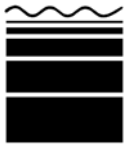
1200	Exceeds NEPM HIL "D" - Investigation levels for land use with minimum opportunity for access to soil
600	Exceeds NEPM HIL "E" - Investigation levels for land use as open space
*1	Material from TP207 (located in Part 1) was excavated and relocated to the containment cells located in Part 2.
*2	Stockpile LSP was generated from excavations completed in Part 1 and was relocated to the containment cells located in Part 2.

Prepared By:NDS
Checked By: BG

Table 4
Soil Analytical Results - Part 2 Asbestos Validation
Lot 202 - Part 2 Validation

Sample ID	Sample Date	Laboratory	Batch No	QC Sample ID	Sample Description	Asbestos Result
TP27_0.3-0.5	23/07/2002	ASET	ES34741		Mixture of sand, stones, fragments of bitumen and debris	ND
TP28_0.3-0.5	24/07/2002	ASET	ES34741		Mixture of sandy soil, stones, plant matter, fragments of plaster, brick and bitumen and debris	ND
AS-Z1-01	7/01/2003	ASET	ES37609		Mixture of sand, stones and debris	ND
AS-Z1-02	7/01/2003	ASET	ES37609		Mixture of sand, stone, plant matter and debris	ND
AS-Z1-03	7/01/2003	ASET	ES37609	DUP01	Mixture of sand, stones and debris	ND
AS-Z1-04	7/01/2003	ASET	ES37609		Mixture of sand, stones and debris	ND

ND Not Detected



APPENDIX D
Data Quality Objectives

7.0 DATA QUALITY OBJECTIVES CHECKLIST

The Guidelines for the NSW Site Auditor Scheme (2nd edition, April 2006) state that site auditors must check that a consultant has properly addressed and adopted Data Quality Objectives (DQOs) for the investigation or validation program (as outlined in the checklist below), and that the consultant's report includes the following:

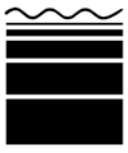
- *a statement of pre-determined DQOs for field and laboratory procedures, including quantitative DQOs;*
- *a plan to achieve pre-determined DQOs; and*
- *procedures to be undertaken if the data do not meet the expected DQOs.*

Title of Report: Remediation Validation Report - Part 2 Area **Report Number:** J0807

DQO Steps and Outputs	C = Compliance P = Partial Compliance N = Non-Compliance NR = Not Relevant	Comments *(comment always required for P and NR)*
The timing for the various stages of the project must be clearly understood by all parties prior to commencing any work on the project. The DQO process must be commenced before any investigative work begins on the project	C	
Step 1: State the problem		
Has a concise description of the problem been provided?	C	
Has a list of the planning team members and a decision maker been identified?	N	
Is there a summary of available resources and relevant deadlines for the study?	N	
Has a conceptual model of the site based on information prior to the commencement of the investigation/validation been provided?	C	
Step 2: Identify the decisions		
Has a decision statement that links the principal study question to actions that will solve the problem been provided?	C	
Step 3: Identify inputs to decision		
Has a list of informational inputs needed to resolve the decision statement been developed?	C	Reference to information and methodology provided in RAP
Has a list of environmental variables or characteristics to be measured been provided?	P	" "
Is the information required to allow informed decisions to be made to address the decision statements provided?	P	" "
Have the media (fill, soil, groundwater) to be investigation/validated been identified?	P	" "
Have the criteria for each medium been identified and provided?	P	Elsewhere in report
Are the analytical methods required for chemicals of concern relative to the site criteria identified?	P	Elsewhere in report

7.0 DATA QUALITY OBJECTIVES CHECKLIST

DQO Steps and Outputs	C = Compliance P = Partial Compliance N = Non-Compliance NR = Not Relevant	Comments *(comment always required for P and NR)*
Have defined concentrations for field screening (and a response if reached) been identified ?	NR	Field screening was not conducted
Has any other information required to make decisions been provided?	No	
Step 4: Define the study boundaries		
Has a detailed description of the spatial and temporal boundaries of the problem been provided?	C	
Have any practical constraints that may interfere with the study been identified?	C	
Step 5: Develop a decision rule		
Have acceptable limits for; chemicals of concern detected in field blanks, recoveries of laboratory spike additions, and RPDs of matrix spike and matrix spike duplicates, been defined?	P	Provided in QA/QC appendix
Have the statistical parameters of interest that characterise the population been identified (eg 95% UCL)?	C	
Has a statement that the criteria exceed the laboratory reporting limits been provided?	N	
Have any contingency measures been developed and provided?	No	
Step 6: Specify limits on decision errors		
Have decision error rates based on a consideration of the consequences of making an incorrect decision been provided and justified?	N	
Step 7: Optimise the design for obtaining data		
Was data collection optimised?	C	
Was a sampling analytical and quality plan (SAQP) developed and provided?	N	
Does the consultant's site assessment report include a QA/QC narrative describing all information relevant to the site assessment ?	C	



APPENDIX E

Quality Assurance/Quality Control

8.0 REPORTING OF FIELD & LABORATORY QUALITY ASSURANCE AND QUALITY CONTROL

Report Number: J0807 **Site Address:** Remediation Validation Report - Part 2 Area

*This section is based on Appendix V of the Guidelines for the NSW Site Auditor Scheme (2006). It contains the essential issues **'which must be included in the quality assurance program'** conducted by a contaminated site consultant during site assessment and remediation processes.*

Item	C = Compliance P = Partial Compliance N = Non-compliance NR = Not Relevant	Comments *(comment always required for P and NR)*
FIELD		
SAMPLING STRATEGY		
Does the consultant's sampling program include assessment of all relevant environmental media, including:		
Soil	**C**	
Dust	**NR**	Not relevant to site or validation
Surface water	**NR**	Not relevant to site or validation
Groundwater	**NR**	Not relevant to site or validation
Air	**C**	Asbestos fibre air monitoring
Sediments	**NR**	Not relevant to site or validation
Biota	**NR**	Not relevant to site or validation
Is the sampling strategy clearly defined and justified on the basis of project objectives, site conditions and history?	**C**	
Sampling strategy is: Systematic ✓ Random ☐ Stratified ☐ Judgemental ☐ Combination ☐		
Was the sampling strategy appropriate for the conditions at the site and the nature of the contamination ?	C	
Is the rationale for the strategy described in the consultant's report ?	**P**	Grid sampling for an excavation is Standard validation strategy
Does the rationale include:		
Sampling pattern	**P**	As above
Sampling density	**P**	Density provided without rationale
Estimated size of residual hotspots that may remain undetected	**C**	Elsewhere in report
Sampling depths	**NR**	Not necessary for base and walls
Analytes	**P**	Provided without rationale
Analytical methods	**N**	
Were all samples analysed for all analytes of concern?	**N**	
Justification of decisions concerning samples to be analysed and samples not to be analysed	**C**	
Does the number of sample locations comply with EPA sampling design guidelines?	**C**	No assessment against EPA guidelines – excavation sampling ;10 x 10 grid – lead and 20 metres apart – asbestos
Are divergences from guidelines adequately justified?	**NR**	No relevant to validation sampling
Is overall coverage of site adequate?	**NR**	Only excavations required validation
Are the sampling locations shown on a	**C**	Not scaled

8.0 REPORTING OF FIELD & LABORATORY QUALITY ASSURANCE AND QUALITY CONTROL

Item	C = Compliance P = Partial Compliance N = Non-compliance NR = Not Relevant	Comments *(comment always required for P and NR)*
scaled site sampling plan ?		
Are sample depths stated?	**P**	Investigation sample depths were and validation sample depths were not
Are borehole/test pit logs provided?	**C**	For BHs where samples are used for validation data set.
Was sampling investigation depth sufficient?	**C**	
Was fill material adequately investigated?	**C**	
Was number of depth samples sufficient to give adequate coverage of profile?	**C**	
Are sample collection, handling and transportation procedures documented and appropriate to meet the project DQOs?	**C**	As an appendix
Was sampling representative of site conditions, based on the selection of appropriate number of sampling points and of samples from each relevant strata and material types stated in a site sampling plan to meet the project DQOs ?	**C**	
SAMPLING METHODS		
Are sampling procedures adequately described?	**C**	
Are sampling procedures adequate and appropriate for the site?	**C**	
Was composite sampling used?	**No**	
Were composite samples laterally adjacent?	**-**	
Were composites from the same depth interval?	**-**	
Were samples for analysis for volatile analytes composited?	**-**	
Adequate description of investigation / Validation methods?	**C**	
Sampling equipment description (including drilling plant)	**N**	
Has an assessment of the reliability of field procedures been undertaken by the consultant by using the Data Quality Indicators (DQI) (precision, accuracy, representativeness, completeness and comparability).	**N**	No assessment conducted, the following provides an indication if the required information was provided elsewhere in the report.
Representativeness		
Were the appropriate media sampled according to SAQP [in this case RAP]?	**C**	
Have all media identified in SAQP [in this case RAP] been sampled?	**C**	
Precision		

8.0 REPORTING OF FIELD & LABORATORY QUALITY ASSURANCE AND QUALITY CONTROL

Item	C = Compliance P = Partial Compliance N = Non-compliance NR = Not Relevant	Comments *(comment always required for P and NR)*
Are SOPs appropriate and complied with?	C	
Accuracy (bias)		
Are SOPs appropriate and complied with?	C	
Completeness		
Have all critical locations been sampled?	C	
Have all required samples been collected (from grid and at depth)?	C	
Are SOPs appropriate?	C	
Are SOPs complied with?	C	
Was an experienced sampler used on each occasion?	C	
Is the documentation correct?	C	
Comparability		
Have the same SOPs been used on each occasion?	**Unknown**	Not stated
Have comparisons been made regarding climatic conditions (temperature, rainfall, wind, etc)	N	
Were the applicability and limitations of field methodology discussed appropriately in the consultant's report?	N	
Has the consultant ensured adequate calibration of instruments?	N	Air monitoring conducted by Sub contractor.
[DEC] Has the consultant's report adequately assessed the significance of the results of field screening methods compared with the results of laboratory analyses, for example that the results reported for field screening using a photo-ionisation detector are compatible with the results reported by the laboratory for volatile organic compounds?	N	
[CMJ] Have the results of screening methods and laboratory analyses been compared and discussed (including an explanation of non-compatibility)?	N	
[CMJ] Where not compatible, has the consultant's report adequately explained this?	NR	All air and soil samples were non detect
Are the applicability and limitations of any screening methodology used by the laboratory appropriately discussed in the consultant's report?	NR	
Is screening method performance known and expressed as a multiple of specific analytical method performance?	N	
FIELD QA/QC		
Has a field QA/QC plan been included in	C	

8.0 REPORTING OF FIELD & LABORATORY QUALITY ASSURANCE AND QUALITY CONTROL

Item	C = Compliance P = Partial Compliance N = Non-compliance NR = Not Relevant	Comments *(comment always required for P and NR)*
the consultant's report?		
Does the report include details of the sampling team ?	N	
Does the report include details of sampling method(s), including the actual methods employed for obtaining samples, sample devices and equipment, type(s) of sample containers and seal used, order and degree of filling, preservation, labelling, logging, custody?	C	
Does the report include details of evidence of appropriate decontamination procedures carried out between sampling events?	C	
Does the report include details of logs for each sample collected showing time, location, initials of sampler, duplicate locations, duplicate type, chemical analyses to be performed, site observations and weather conditions?	N	
Does the report include details of chain-of-custody documentation fully identifying for each sample:		
Name of sampler	C	initials
Nature of sample	C	
Collection date	C	
Analyses to be performed	C	
Sample preservation method	C	
Departure time from the site	N	
Dispatch courier(s)	NR	Were relinquished by URS
Condition of samples at dispatch	N	
Does the report include details of sample splitting techniques ?	C	
Does the report include details of a statement of duplicate frequency for intra-laboratory and inter-laboratory duplicate samples and duplicate sample results ?	C	
Does the report include details of background sample results	N	
Does the plan include details of rinsate sample results ?	C	Provided upon request from Auditor
Does the report include details of laboratory-prepared trip spike results for volatile analytes ?	NR	Not used
Does the report include details of trip blank results ?	C	Provided upon request from Auditor
Does the report include details of field instrument calibrations on-site (when	NR	No field screening was conducted by URS

8.0 REPORTING OF FIELD & LABORATORY QUALITY ASSURANCE AND QUALITY CONTROL

Item	C = Compliance P = Partial Compliance N = Non-compliance NR = Not Relevant	Comments *(comment always required for P and NR)*
used)?		
Does the consultant's field QA/QC program include replicate samples split in the field and submitted to two separate laboratories in accordance with the requirements of the National Environment Protection (Assessment of Site Contamination) Measure 1999 ?	C	
LABORATORY		
METHODS AND REPORTING LIMITS		
Has an assessment of the reliability of analytical results has been undertaken by the consultant by using the Data Quality Indicators (DQI) (precision, accuracy, representativeness, completeness and comparability).	N	As an assessment of laboratory results and QC tests were not conducted in the form of DQIs, the following is a review of whether an assessment was provided in another form.
Representativeness		
Have all samples been analysed according to SAQP?	C	
Precision		
Analysis of:		
Field Intra-laboratory and inter-laboratory duplicates with RPDs	C	
Laboratory-prepared volatile trip spikes	NR	Not used – volatile contaminants were not of concern for validation.
Accuracy (bias)		
Analysis of:		
Field blanks	C	
Rinsate blanks	C	
Reagent blanks	NR	Not conducted
Method blanks	C	
Matrix spikes	C	
Lab duplicates	C	
Matrix spike duplicates	C	
Surrogate spikes	NR	Not relevant for inorganics
Reference materials (CRM)	NR	Not conducted
Laboratory control samples	C	
Completeness		
Have all critical samples been analysed according to the SAQP [RAP]?	C	
Have all analytes been analysed according to the SAQP?	NR	No SAQP provided
Have appropriate methods and PQLs been used?	C	
Is sample documentation complete?	N	
Have sample holding times been	C	

8.0 REPORTING OF FIELD & LABORATORY QUALITY ASSURANCE AND QUALITY CONTROL

Item	C = Compliance P = Partial Compliance N = Non-compliance NR = Not Relevant	Comments *(comment always required for P and NR)*
complied with?		
Comparability		
Have the same analytical methods been used (including extraction and clean-up)?	**P**	Only methods confirmed
Sample PQLs (justify/quantify if different)	**C**	PQLs the same
Same laboratories (justify/quantify if different)	**C**	Different labs used for primary and inter dup. analysis
Same units (justify/quantify if different)	**C**	
Are the analytical methods used for site validation of appropriate precision and accuracy ?	**N**	Unknown
Are the sensitivity and selectivity of the analytical methods appropriate for the assessment of the risk?	**N**	Unknown
Do the precision and accuracy criteria set out in the consultant's QA/QC plan, for a given method and matrix, meet the performance expected of the reference method?	**N**	
Has the consultant included in their reports written documentation on quality of data supplied by the analytical laboratory which meets the objectives of the testing laboratory's quality plan for at least 95% of test results?	**N**	
CONSULTANTS REVIEW OF LABORATORY QA/QC DATA		
Does the consultant's report(s) include the following in its review of the laboratory data:		
Names of the accredited laboratories used and relevant details of their accreditation for each analytical method.	**P**	No method accreditation verification
A statement that laboratories were accredited for all analyses by the National Association of Testing Authorities (NATA) or an equivalent (government-endorsed provider of accreditation for laboratories).	**N**	
A statement that sample analyses use appropriate methodologies for each potential contaminant in the matrix.	**N**	
A statement that Practical Quantitation Limits are appropriate for the chemicals of concern for use in the assessment of risk.	**N**	
Has a laboratory QA/QC report been provided (by the lab) with the following information:		
A copy of signed chain-of-custody forms acknowledging receipt date and time, conditions of samples on receipt and	**C**	

8.0 REPORTING OF FIELD & LABORATORY QUALITY ASSURANCE AND QUALITY CONTROL

Item	C = Compliance P = Partial Compliance N = Non-compliance NR = Not Relevant	Comments *(comment always required for P and NR)*
identity of samples included in shipments.		
Record of holding times and a comparison with method specifications.	**P**	No comparison with method specifications
Analytical methods used.	**C**	
Laboratory accreditation for analytical methods used.	**C**	
Laboratory performance in inter-laboratory trials for the analytical methods used, where available.	**N**	
Acceptance limit(s) for each QC test, such as duplicate relative percentage differences (RPDs) and recoveries for laboratory quality control analyses.	**C**	
Where used, the origin of certified reference material (CRM), its batch number and the concentrations of the chemicals of potential concern.	**NR**	Not used
Results for blind duplicate samples collected from the field.	**C**	
Description of surrogates and spikes used	**C**	
Per cent recoveries of spikes and surrogates	**C**	
Instrument detection limit	**N**	
Method detection limits	**N**	
Matrix or practical quantification limits	**C**	
Standard solution results	**N**	
Reference (CRM) sample results	**N**	
Daily check sample results	**N**	
Laboratory (reagent/method) blank results	**C**	
Laboratory standard charts	**N**	
The laboratory specifying compliance with the requirements of the NEPM and equivalence with the reference method or non-standard methods.	**N**	
QA/QC Documentation		
Does the consultant's site assessment report address all the QA/QC checklist items in the Guidelines for Consultants Reporting on Contaminated Sites (EPA 1997) related to field quality assurance and quality control, laboratory QA/QC and data evaluation QA/QC reporting?	**C**	Substantially
Does the consultant's site assessment report include:		
QC results relevant to the sample analysis.	**C**	
For each sample, the highest	**N**	

8.0 REPORTING OF FIELD & LABORATORY QUALITY ASSURANCE AND QUALITY CONTROL

Item	C = Compliance P = Partial Compliance N = Non-compliance NR = Not Relevant	Comments *(comment always required for P and NR)*
measurement result wherever replicate measurements are taken (or all measurement results for each sample).		
Results for all data tabulated separately according to each type of soil, fill materials, groundwaters, surface waters and sediments, with appropriate statistical analysis according to the National Environmental Protection (Assessment of Site Contamination) Measure 1999 requirements.	N	

9.0 AUDITOR'S REVIEW OF FIELD & LABORATORY QUALITY ASSURANCE AND QUALITY CONTROL

Is a QA/QC narrative that substantially complies with DEC (2006) and EPA (1997) guidelines included in the report?	Yes	No
	✓	

9.1 Field Work and Methods

Sample Collection

Number of samples collected: Soil: 80 (51 - Delineation (Table 1), + 25 - lead excavation (table 2a + excavated val. samples) + 4 – asbestos excavation) Water: 0

Number of days of sampling: Soil: numerous Water: NA

Number and type of QA/QC samples collected:	SOIL			WATER		
	No.	Frequency	Criterion	No.	Frequency	Criterion
Inter Laboratory Duplicates	9	<1/10	1/10			
Intra Laboratory Duplicates	2	1/40				
Trip Blanks	1	1/76	Not stated		NA	
Wash Blanks	1	1/76	Not stated			
Other – Trip Spike	0					

Field duplicates	Control Limits		Yes	No
a. Were an adequate number of field duplicates collected?			✓	
b. Were RPDs within control limits?	Min	Max		✓
		±40%		

Comments: Two significant exceedances were recorded for duplicates (lead) one of 200% and one of 142%. The sample location with the 200% RPD was later re-sampled - including a duplicate and a triplicate - which all recorded high concentrations.

These RPDs were attributed to sample heterogeneity.

Trip blanks	Yes	No
a. Were an adequate number of trip blanks collected?		✓
b. Were the trip blanks free of contaminants? *(If no, comment whether the contaminants present are also detected in the samples and whether they are common laboratory chemicals.)*	✓	

Comments:

Wash blanks	Yes	No
a. Were an adequate number of wash blanks collected?		✓
b. Were the wash blanks free of contaminants? *(If no, comment whether the contaminants present were also detected in the samples and whether they are common laboratory chemicals.)* **Comments:**	✓	
Overview: Was field QA/QC satisfactory? Comment as necessary.	✓	

Comments: While insufficient intra laboratory duplicates, wash blanks and trip blanks were prepared/collected, the Auditor considers the overall sampling QA/QC to be adequate.

9.0 AUDITOR'S REVIEW OF FIELD & LABORATORY QUALITY ASSURANCE AND QUALITY CONTROL

9.2 Sample Handling

a. Are COC forms provided and complete?	✓	
b. Were sample receipts provided?	✓	
c. Did they indicate - proper custody between the field and the laboratory?		
d. - adequate sample preservation and condition?	✓	
e. - that the sample holding times were met?	✓	

Comments:

9.3 Laboratory

9.3.1 Methods and Reporting Limits

	Yes	No
1.Was a NATA-registered laboratory used?	✓	
2.Did reports have the NATA seal and a signature?	✓	
3. Were laboratory methods identified?	✓	
4. Did the laboratory perform the requested tests?	✓	
5.Were PQLs/MDLs/LORs for each analyte/matrix combination given?	✓	
6.Are any non-standard/non NATA endorsed methods justified?	NA	
7.Were the reporting limits (LOR) satisfactory?	✓	
8.Were the appropriate test procedures followed?	✓	

Comments:

9.3.2. Internal Quality Control Procedures

Type and number of QA/QC	SOIL		
	No.	Frequency	Criterion
Method Blanks/Reagent Blanks	16	<1/20	1/10
Matrix Spikes/Matrix Spike Duplicates	14	<1/20	1/20
Laboratory Control Samples/ Certified Reference Material Analysis	17 1	<1/20	1/20
Laboratory Duplicates	9	<1/10	1/10
Surrogates	1/Org	1/Organic sample	1/Organic sample

	Control Limits		Yes	No (Comment Below)
	Min	Max		
2. Were the method/reagent blanks free of contamination?	<PQL		✓	
3. Were the spike recoveries within control limits?	70%	130%	✓	
4. Were the RPD's of the laboratory duplicates within control limits?	-30%	+30%	✓	
5. Were the surrogate recoveries within control limits?	70%	130%	✓	
6. Were the origin and batch number of certified reference			✓	
7. Were the Laboratory Control samples within limits?	70%	130%	✓	
8. Are all QC results provided?			✓	
9. Was the overall standard of Laboratory QA/QC adequate?				

Comments:

9.0 AUDITOR'S REVIEW OF FIELD & LABORATORY QUALITY ASSURANCE AND QUALITY CONTROL

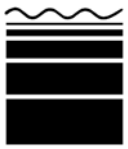
9.4 DATA USABILITY

Are the field and laboratory analytical data provided of adequate quality for the purpose of this audit?

Yes	No.
✓	

Comment further as necessary.

Auditor Date

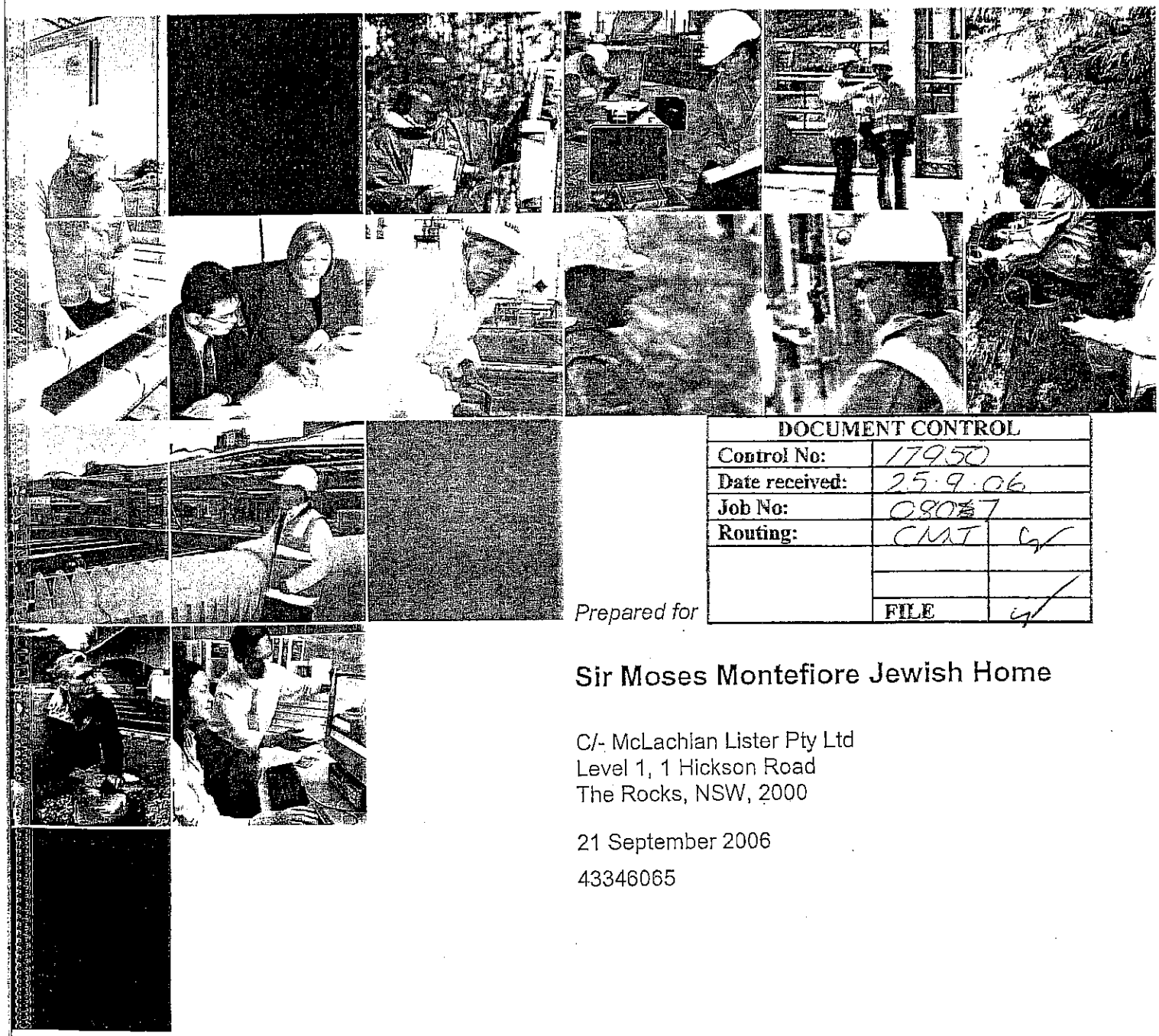


APPENDIX F

Environmental Management Plan

FINAL REPORT

Environmental Management Plan
Part 2, Lot 202
King Street, Randwick



DOCUMENT CONTROL		
Control No:	17950	
Date received:	25.9.06	
Job No:	C8087	
Routing:	CMT	GF
	FILE	GF

Prepared for

Sir Moses Montefiore Jewish Home

C/- McLachlan Lister Pty Ltd
Level 1, 1 Hickson Road
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21 September 2006

43346065

URS

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Date: **21 September 2006**
Reference: 43346065
Status: Final

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1.1 Introduction

This Environmental Management Plan (EMP) has been prepared by URS Australia Pty Ltd (URS) on behalf of Sir Moses Montefiore Jewish Home (Montefiore) for the redevelopment of Part 2 of Lot 202 King St, Randwick (the site). URS has received instruction in the completion of the project from McLachlan Lister Pty Ltd (McLL) who was engaged by Montefiore to Project Manage the redevelopment works.

This EMP has been prepared to manage the potential risks to human health and the environment posed by lead impacted fill materials, which remain in-situ at the site following the completion of remediation works.

This EMP is strictly for use while the proposed site surface structures and land use remain unchanged. Upon the disturbance or removal of the surface structures, further remediation works may be required. Use of the site for purposes other than those stated would require assessment of the risks associated with those purposes, and may require management measures additional to those described in this EMP.

1.2 EMP Objective

The objective of the EMP is to provide a framework for the management of contaminated materials that have been retained on the site following the completion of remediation and validation works.

It is envisaged that the EMP will be referenced during proposed future activities undertaken on the site that are likely to expose residual impacted materials. Montefiore as the owner of the site will be responsible for implementing and administering the EMP.

1.3 EMP Scope

The scope of this EMP includes:

- Site description, including environmental setting and structures on the site;
- Summary of the site history and a background of previous environmental investigations at the site;
- Summary of identified soil contamination on the site;
- Summary of remediation works that have been completed at the site; and
- The development of procedures and protocols for the management of contaminated soils, which may be encountered during future intrusive works at the site. These include procedures for current and future site occupants/workers to ensure contact with the contaminated fill and/or soils during maintenance of the site is in accordance with suitable occupational, health and safety (OH&S) and environmental controls. This will include the identification of potential occupant/worker exposure

pathways and methods for minimising occupants/worker's exposure to the contaminated fill and/or soils.

1.4 EMP Implementation

It is the intention that the implementation of this EMP will be the responsibility of Montefiore, as the site owner, and should be enforced by Randwick City Council (Council). It is recommended that a Public Positive Covenant under Section 88E of the Conveyancing Act 1919 is made to the Property Title, nominating Randwick Council as the Prescribed Authority. In addition, it is also considered appropriate that Council place a notation on the Planning Certificate for the site under Section 149 (2) of the Environmental Planning and Assessment Act 1979 (EP&A Act). This notation would address the restrictions for intrusive works on the site. Where a development application (DA) is required, Council will also be able to enforce the implementation of the EMP, through the conditions of consent for the DA. Intrusive works conducted on the site shall only be conducted by contractors/individuals who have read and acknowledged understanding of this EMP.

The following table provides a summary of the responsibilities for the implementation and management of the EMP. These responsibilities do not replace any other regulatory responsibilities of the parties in undertaking works at the site.

Table 1 EMP Implementation Responsibilities

Organisation	Responsibilities
Randwick City Council	• Note EMP on appropriate planning instrument.
Montefiore	• Organise revision of Property Title to note that the site is subject to implementation of this EMP. • Nominate a representative of Montefiore to undertake annual inspections of the capping area. Document and report the inspections to the Montefiore Board on an annual basis. • Notify Council of any non-conformance with the EMP and corrective actions. • Maintain survey plans of excavations and as-built drawings. • Provide Council with an annual statement of compliance with the EMP.

2.1 Site Location and Setting

The site is located at the corner of King Street and Dangar Street, Randwick, NSW and is known as Part 2 of Lot 202 in Deposited Plan (DP) 879576. The site location is shown in **Figure 1**. Lot 202 was divided into Part 1 and Part 2 for the purposes of remediation and validation in order to allow for the adoption of a staged approach to the development of the aged care facility. Part 1 was previously remediated and validated in 2003 (URS, 2003). The site is within the Local Government Area of Randwick.

The site occupies approximately 2293 m^2 in the south-east corner and much of the eastern boundary of Lot 202. The site is currently vacant, however further development is proposed as part of the construction of the aged care facility across Lot 202. The proposed development will include some portions of open space,, including soft landscaping and paved areas. Concrete slabs will also be constructed above the lead impacted materials that have been placed within the containment cells. The proposed future site layout and land use are shown in **Figure 2**.

2.2 Site History

A detailed site historical study was conducted by Doring (1990). The historical data provided in the Doring study indicated that the eastern portion of the original depot, including both Lots 201 and 202, was used for tram and bus mechanical maintenance. Lot 201 is located directly to the west of Lot 202. The study indicated that the area initially commenced operations as a tramway workshop and depot in 1881. The bus depot was operated by the NSW State Transit Authority (STA).

Lots 201 and 202 were divested by the STA in 1998. Sir Moses Montefiore Jewish Home (Montefiore) purchased Lot 202 in 1998. At the time of acquisition, the Site was vacant following partial demolition works and a number of derelict buildings remained on the Site.

2.3 Environmental Setting

2.3.1 Site Topography & Description

Prior to the remediation works on Part 1, the ground gently sloped in a general westerly direction across Lot 202. During occupancy of the site by STA, a constructed cutting was located in the eastern third of Lot 202 to improve the access for the bus depot operations. This cutting was reinforced by the placement of a concrete retaining wall, which effectively divided the Site into a higher eastern section and a lower western section.

Prior to the 2002/2003 demolition conducted by Montefiore as part of the site preparation works, four brick buildings remained on Lot 202, mostly located in the north east corner and concrete slabs covered some areas. A program of demolition and bulk earthworks was conducted as part of the overall program

involving the Part 1 remediation works. The site levels now reflect the required development levels as indicated in the earthworks design drawing provided with Appendix A.

2.3.2 Geology

Across most of Lot 202, investigations indicated a layer of fill, resulting from previous Site activities. This fill varies in depth from 100mm to up to several metres. The fill is generally sandy and similar to the underlying natural material.

Beneath the fill, the Site and surrounding area is underlain by unconsolidated sand deposits of Quaternary age. These sands form part of the Botany Basin deposits. On a regional level the depth of these unconsolidated deposits vary greatly in thickness.

The region is underlain by bedrock units of the Hawkesbury Sandstone Formation (1:250 000 Geological Series Sheet S1 56-5, Sydney). The Hawkesbury Sandstone Formation is dominated by medium to coarse grained quartz with very minor shale and laminate lenses.

2.3.3 Hydrogeology & Hydrology

The Botany Sands, which underlie the site, contain a system of unconfined and semi-confined aquifers that are referred to as the Botany Aquifer. Water in this aquifer is utilised for irrigation in the region. Water in the region flows in a south westerly direction (westerly locally) and the nearest receptors of this water are irrigation wells which are located at the Randwick Racecourse.

2.4 Previous Environmental Investigations

The Former Randwick bus depot has been the subject of several site contamination investigations conducted between 1991 and 1995 by both Sinclair Knight Partners (SKP) and Dames & Moore (D&M) as outlined below:

- Sinclair Knight Partners (SKP, 1991) Preliminary Geotechnical and Environmental Investigation of the State Transit Authority's Randwick Bus Depot;
- Dames & Moore (D&M, 1991) Feasibility/Design Study for a Site Remediation Program at the Randwick Bus Depot;
- D&M (1992) EPA Compliance Report, Site Remediation Program: Phase I, Randwick Bus Depot;
- D&M (1994) EPA Compliance Report, Initial Site Validation Program, Randwick Bus Depot; and
- D&M (1995) EPA Compliance Report, Final Site Validation Program, Randwick Bus Depot.

Demolition works were completed by STA in 1997 to allow for subdivision of the depot property into Lots 201 and 202. The 1997 demolition work allowed access to remaining parts of the Site for further

validation assessment, which had not been validated in 1995. This second assessment (D&M (1998) EPA Compliance Report Post Demolition Site Validation Program Lot 202 King and Dangar Streets Randwick) was completed during 1998.

URS were engaged by Montefiore to conduct further remediation, validation and reinstatement works on the site during 2003. These works are summarised in Section 2.5.

2.4.1 Identified Contaminants of Concern

In the D&M reports from 1994-1998, the various contaminants investigated at Lot 202 have included volatile halogenated compounds (VHCs), cyanide, sulphates, phenols, organochlorine and organophosphate pesticides (OC/OPs), PCBs, metals (including cadmium, chromium, copper, nickel, lead, zinc and mercury), arsenic, total petroleum hydrocarbons (TPH), monocyclic aromatic hydrocarbons (MAHs including benzene, toluene, ethylene and xylene (BTEX)), and polynuclear aromatic hydrocarbons (PAHs). These were selected based on site history including bus and tram operations and maintenance.

The contaminants of concern for the Lot 202 ESA (URS, 5 December 2002) were selected as follows: heavy metals from paint residues and fill materials; TPH/BTEX from bus operations such as refuelling and fuel storage on site; PAHs from fill encountered throughout the Site; and asbestos from demolition activities.

Analytes such as VHCs, OC/OPs, cyanide, sulphates and phenols were not considered to be contaminants of concern as previous results for these analytes were either below detection limits or below the relevant guidelines.

Based on the investigation results, the main contaminants of concern specific to the Part 2 remediation works were lead and asbestos..

2.5 Summary of Remediation Works

2.5.1 Asbestos Remediation

Manual collection of asbestos containing materials (ACM) from identified locations was undertaken under the supervision of Hibbs & Associates Pty Ltd (Hibbs). The manual collection of the ACM was undertaken by placing the fragments in 200-micron thick polythene bags or were wrapped in polythene sheeting and placed in trucks or waste bins for off-Site disposal to a licensed landfill facility.

Excavation of demolition fill materials containing ACM was completed to a depth of between 300 mm and 1.0 m along the eastern boundary adjacent to Danger Street. The volume excavated was approximately 600 m^3. The excavation continued to below the fill materials and was terminated on the natural Botany sands.

Following the excavation of asbestos fill materials, Hibbs completed a detailed visual inspection and verified the successful removal of ACM. URS conducted surface soil sampling on a 20 m by 20 m sampling grid on the base of the excavation footprint and submitted the soil samples for laboratory examination of asbestos fibres. No asbestos fibres were identified by the laboratory in the soil samples submitted.

2.5.2 Preparation of Containment Cells

Prior to the commencement of remediation works within the lead impacted area, two containment cells were prepared to contain the lead impacted fill material. Preparation of the containment cell areas was completed by lining the excavation with a geofabric marker layer for easy identification in the future.. Refer **Appendix B** for photographic plates of the cell under construction. Following placement of lead impacted material in the cells, another layer of the geofabric marker layer was used to mark the top of the containment cell.

The cells were located in the south western corner and eastern side of the site (refer **Figure 2**). The cell locations were recorded by survey (attached as **Appendix C**). The cells were strategically located in areas proposed for building footprints or for paving, thus minimising opportunity for uncontrolled access to contaminated soil. The impacted material was placed at an elevation above the zone of measured groundwater influence. Groundwater level monitoring was completed by Jeffery and Katauskas (J&K). The J&K letter reports (4 August 2003 and 18 July 2003) indicated that the standing groundwater level in the south-east of Lot 202 was approximately 38 m AHD, although it is noted that a 1-2 m fluctuation in level is possible in the Botany Basin. The impacted materials were placed above 40 m AHD to allow for possible fluctuations in the groundwater level.

2.5.3 Lead Remediation Excavation

The impacted fill material was excavated and loaded directly from the bucket of the excavator to the bucket of the front-end loader, which then transported it directly to one of the containment cells. A water cart was present throughout the excavation and loading processes, to provide a fine spray of water to control the generation of dust, which may have contained elevated concentrations of lead.

Validation sampling was undertaken of the excavation to verify that all lead impacted material had been removed. Where a validation sample indicated that concentrations of lead in the fill materials exceeded the adopted site remediation guideline level further excavation was undertaken to remove this material.

The final excavation was generally rectangular in shape, with some protrusions due to the "chasing" of contamination within the excavation (**Figure 3**). The excavation was approximately 49 m in length, with a maximum width of 9 m. The depth of the excavation, which was extended to encounter the natural Botany sands, ranged from approximately 0.9 m to 1.3 m. Survey data defining the location of the remediation excavation has been included in **Appendix C.**

All material excavated from the lead impacted area was retained on Site, in the containment cells. The analytical results for the samples taken to characterise the impacted material placed in the containment cells is presented in **Table** 3.

2.5.4 Lead Impacted Validation Sampling

The base of the excavation in the lead impacted area was sampled on an approximate 10 m by 10 m grid. Samples were also collected from the walls of the excavation, where the grid lines intersected the walls. All samples collected were analysed for total lead concentrations. The analytical results for the excavation validation and characterisation samples are presented in **Table 4**.

URS validated all final excavation surfaces in accordance with the RAP modification (URS, 26 August 2003).

2.5.5 Site Surface Cover

A series of development works associated with the construction of the aged care facility are proposed for the site, including construction of paved landscaping, installation of footpaths and grassed areas and placement of garden beds. In the areas immediately above the containment cells, concrete slabs will be placed to restrict access to the material contained within the cells. The concrete slabs will provide a physical barrier to prevent inadvertent contact between users of the site and the impacted materials.

The slabs consist of 120 mm thick reinforced concrete. It is understood that these slabs will eventually be paved on completion of the landscaping works in Part 2.

The proposed future site layout, including the locations of the concrete slabs and containment cells, is shown in **Figure 2**. No soft landscaping with access to soil is expected in the areas directly above the containment cells.

This section provides summary information on the physical form and some of the health risk considerations for the chemical substances that may be present in the residual soil / fill materials which remain on site in the containment cells.

3.1 Nature of Contaminants

The main chemical of concern for the site is lead. The primary potential exposure routes for lead are inhalation of contaminated dusts or ingestion of contaminated soils.

3.2 Identification of Contamination

The investigations and remediation works undertaken at the site have indicated that the potentially contaminated residual fill and soil materials that remain in-situ may generally be identified by the presence of sandy fill.

3.2.1 Exposure Pathways

Workers involved in disturbing potentially contaminated fill / soil material could be exposed to the chemicals of concern by:

- Respiration/inhalation of dust generated from fill/soil materials;
- Ingestion of airborne fill/soil materials through poor hygiene practices (i.e. eating or drinking during work activities, not washing hands before eating, etc.); and
- Possible secondary exposure from potentially contaminated equipment and clothing.

Planning of intrusive works involving exposure and/or disturbance of potentially contaminated fill / soil materials and implementation of appropriate health and safety measures will minimise the potential for worker contact with potentially impacted materials through the above listed exposure pathways.

3.3 Location of Contaminated Materials

Based on the analytical results of the characterisation samples collected during the remediation validation works, some residual impacted materials remain in-situ along :

- the northern portion of the eastern boundary of the site; and
- the middle section of the western boundary of the site.

The locations of the characterisation samples that exceeded the adopted remediation guideline levels are shown in **Figure 3**. Additionally impacted materials have been placed within the containment cells located on the western boundary of the site.

The locations of the containment cells are shown in **Figure 2**.

This section describes the processes that should be considered prior to undertaking any intrusive site works in the vicinity of the containment cells. It addresses scenarios where minor intrusive works may be required in the vicinity of the containment cells such as for installation or repair of underground services or for landscaping works. It also includes recommendations on the ongoing maintenance and monitoring of the concrete cap located above the containment cells.

It does not address more substantial intrusive works, which may be required for construction activities. Where demolition/construction works are required, these works will be undertaken in accordance with the conditions of a Development Consent issued by Randwick City Council.

All works should be undertaken in accordance with current regulatory requirements. A summary of the main legislation, planning instruments and guidelines that relate to the management of contaminated land in NSW at the time of preparation of the EMP is provided in **Appendix D**.

The advice of suitably qualified environmental consultant and/or Council should be sought where there is any uncertainty as to the regulatory requirements.

4.1 Maintenance of the Concrete Capping

Periodic inspections of the containment cells should be undertaken to ensure that the integrity of the capping is maintained. It is anticipated that this inspection would take place once every 12 months.

During the proposed construction works for the development of the site care should be taken to ensure that the works do not result in any damage to the capping slabs. If damage or deterioration does occur the slabs should be repaired to meet the original specifications.

Until completion of construction works on site, it is anticipated that the concrete capping may either be exposed at the surface or alternatively, buried underneath soft landscaping.

If exposed, it will be directly inspected by the designated Montefiore representative.

If buried beneath soft landscaping, the nominated Montefiore representative will inspect that the ground in this area has not been disturbed.

Inspections shall involve recording the condition of the capping areas by making observations of the appearance of cracks, subsidence or unauthorised excavations. Photographic evidence will be documented for each inspection. Findings of the inspections will be communicated to the Montefiore Board on an annual basis.

In the long term, the concrete capping will be below hard landscaping.

4.2 Intrusive Site Works - Preliminaries

Prior to exposing and/or disturbing site fill materials in the vicinity of the containment cells by intrusive excavation works, the following activities should be carried out and implemented:

- Scope detail of proposed works so as to minimise the requirement to expose and/or excavate site fill /soil materials;
- Ensure workers are aware of the potential for contaminated fill / soil materials on site;
- Preparation of a health, safety and environmental plan and safe work method statements to address the proposed activities/works, including the provision of personal protective equipment and environmental controls to minimise potential for exposure; and
- Preparation of a methodology for managing excavated materials (eg waste disposal requirements).

Should the works involve substantial excavation, the advice of Council and /or a suitably qualified environmental consultant should be sought.

4.3 Intrusive Site Works - Earthworks

During excavation works, care should be taken to separate the fill/soil materials that are suspected to be contaminated. Decontamination of equipment that has been in contact with contaminated materials may be required.

Excess spoil generated from intrusive works that is either contaminated or cannot be reinstated within the original excavation area should be assessed for off-site disposal in accordance with NSW DEC requirements. This may require the materials to be assessed, classified and disposed off-site in accordance with the NSW DEC's *Environmental Guidelines: Assessment, Classification & Management of Liquid & Non-Liquid Wastes* (2004) (the 'Waste Guidelines'). This may require collection of samples for laboratory analysis by a suitably qualified environmental consultant. The responsibility for ensuring such material has been assessed and disposed correctly, in accordance with current regulations and guidelines, remains with Montefiore as the site owner.

4.4 Reinstatement

Following completion of intrusive excavations, the excavation shall be backfilled with excavated materials or with virgin excavated natural materials (VENM) sourced from off-site.

If removal of part of the concrete capping is required to undertake the intrusive works, this should be reinstated in accordance with the original specifications in order to maintain the integrity of cap and prevent access to the impacted materials.

4.4.1 Environmental Controls

Intrusive excavations should be appropriately managed such that there are no off-site impacts associated with contaminated stormwater, which may come into contact with contaminated soil. In addition surface

water should be appropriately managed such that the health and safety considerations of handling potentially contaminated water are considered.

If required, provisions for temporary storage of excess spoil in an environmentally responsible manner prior to disposal must be arranged. This may include:

- Placement of material on a sealed or plastic lined surface with appropriate environmental controls including control of sediment (eg silt fences, bunds) and dust (eg covering surfaces and/or wetting of material); or
- Placement in suitably labelled secure drums/skip bins.

Surface water shall generally be controlled and prevented from being impacted by contaminated soils, by intercepting and re-directing runoff in a controlled manner by any appropriate means, including but not limited to the use of temporary bunds, diversion drains, ditches, straw bales and siltation fences.

Groundwater is not expected to be encountered during intrusive excavations as it is expected to be at a depth of approximately 38 m AHD, however if encountered it should be assessed, removed and disposed of in accordance with relevant regulatory requirements.

All relevant approvals, including but not limited to Trade Waste Agreements, waste facility disposal approvals etc, should be obtained prior to disposal of materials.

4.5 Health and Safety

An Occupational Health,Safety and Environment Plan (HSEP) should be prepared by the party conducting intrusive works on site. This would be expected to cover all aspects of the management of health and safety issues associated with the works to be undertaken.

Some of the main issues that require consideration during the preparation of the plan include, but are not limited to:

- Nature of the work being undertaken;
- Hazards associated with the task including potential chemicals of concern;
- Control measures which may include managing potential human and environmental exposure to the chemicals of concern;
- Personal protective equipment;
- Approvals and guidelines; and
- Work methods.

4.6 Reporting Intrusive Site Works Activities

The following documentation should be maintained during intrusive excavation works:

- Daily logs documenting the location and quantities of materials excavated, the amount reinstated and the amount removed for off-site disposal and/or treatment;
- Records of the assessment and classification of materials and all relevant approvals and dockets for off-site disposal and/or treatment;
- Documentation relating to the volumes and source of reinstatement materials including, where required, relevant documentation relating to the verification of virgin excavated natural material (VENM) used for backfill;
- Details, including testing where required, of compaction of backfill; and
- Details of reinstatement of surface cover.

This information should be incorporated by Montefiore into the EMP for future site management.

4.7 Contingency and Emergency Response Planning

Conditions encountered during the intrusive works on site are uncertain. Should unexpected conditions occur at the site, the contingency and emergency measures listed in **Table 2** should be followed.

Table 2. Contingency Planning

ANTICIPATED PROBLEM	CORRECTIVE ACTION
Excessive Dust	Use water sprays, or cease dust-generating activities until better dust control can be achieved.
Suspected Asbestos Containing Materials Encountered	Stop works. Handle and dispose in accordance with WorkCover requirements by appropriately licensed contractor. Controlled wetting and/or covering may be employed to reduce asbestos dust emission by suitably trained personnel.
Release of fuel/oil from equipment	Remove source, use absorbent booms to remove oil, make any repairs as required.
Excessive Odour	Reduce the area of contamination exposed by covering the excavation face, or application of odour suppressing agents or cease work until better odour control can be achieved. Reschedule the work program to take into account prevailing wind conditions.

ANTICIPATED PROBLEM	CORRECTIVE ACTION
Potentially Contaminated Fill / Soil Encountered	Undertake works in accordance with Health, Safety and Environment Plan (HSEP). Replace materials following completion of works or dispose off site If previously unidentified conditions are encountered assessment and classification by a suitably qualified environmental consultant may be required.
Oily materials	If oily materials are encountered, the workers should cease work immediately and await direction from the site supervisor or a suitably qualified environmental consultant as to the appropriate course of action.
Contaminated Water Encountered	Contain water and following assessment, as necessary, on site treatment and/or off site treatment or disposal to a suitably licensed facility or disposal to stormwater/sewer in accordance with relevant regulatory requirement The advice of a suitably qualified environmental consultant may be required
Emergency Maintenance Works Required	Ensure that no direct contact is made with the soil and that no dust is generated during works. Notify Montefiore and Council of situation as soon as possible.

If conditions encountered differ from those anticipated the site owner should be notified. Occurrence of excessive odours or worker discomfort should be immediately reported and works discontinued.

References

- ANZECC/ARMANC 2000, *Australian Water Quality Guidelines for the protection of Aquatic Ecosystems*
- Dames & Moore, EPA Compliance Report, Initial Site Validation Program, Randwick Bus Depot for State Transit Authority (22 July 1994).
- Dames & Moore, EPA Compliance Report (Volumes 1 and 2) Final Site Validation Program, Randwick Bus Depot for State Transit Authority (4 July 1995, Revision 3).
- Doring, C. 1990. History of the Former Randwick Tramway Workshops. Volumes 1 and 2. Prepared for the Urban Transit Authority of NSW and The Heritage Council of NSW and The Heritage Council of NSW.
- Jeffrey & Katauskas Pty Ltd, Groundwater Investigation letter reports, 18 July 2003 and 4 August 2003;
- National Environmental Protection Council Service Corporation, December 1999, *National Environmental Protection (Assessment of Site Contamination) Measure* (NEPM)
- NSW DEC 2004, *Environmental Guidelines : Assessment, Classification & Management of Non-Liquid and Liquid Wastes*
- NSW EPA 1994, *Contaminated Sites: Guidelines for Assessing Service Station Sites*
- NSW EPA 1995, *Contaminated Sites: Sampling Design Guidelines*
- NSW EPA 1997, *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites*
- NSW DEC 2006, *Guidelines for the NSW Site Auditor Scheme, 2nd edition.*
- URS, 5 December 2002, *Data Assessment Report, Lot 202 King St, Randwick* (Final Report)
- URS, 7 February 2003, *Remediation Action Plan, Lot 202 King St, Randwick* (Final)
- URS, 26 August 2003, *RAP Modification – Proposed Lead Remediation* (letter)
- URS, 18 September 2003. "Remediation Validation, Part 1 Area – Lot 202 King Street, Randwick," No: 51072-001-558.
- US EPA Contract Laboratory Program 1999 *National Functional Guidelines for inorganic Data Review,* Office of Emergency and Remedial Response, US EPA
- US EPA Contract Laboratory Program 2001 *National Functional Guidelines for Organic Data Review,* Office of Emergency and Remedial Response, US EPA

Limitations

SECTION 6

URS Australia Pty Ltd (URS) has prepared this report for the use of Montefiore in accordance with the usual care and thoroughness of the consulting profession. It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report. It is prepared in accordance with the scope of work and for the purpose outlined in the Proposal dated 5 June 2006.

The methodology adopted and sources of information used by URS are outlined in this report. URS has made no independent verification of this information beyond the agreed scope of works and URS assumes no responsibility for any inaccuracies or omissions. No indications were found during our investigations that information contained in this report as provided to URS was false.

This report was prepared between June and September 2006 and is based on the conditions encountered and information reviewed at the time of preparation. URS disclaims responsibility for any changes that may have occurred after this time.

This report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties. This report does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners.

Tables

Table 3
Soil Analytical Results - Lead Containment Cell Characterisation Results
Lot 202 - Part 2 Validation

Sample ID	Sample Date	Laboratory	Batch No	QC Sample ID	Lead (mg/kg)
				LOR	1
TP02_0.2-0.4	24/07/2002	ALS	ES34741	DUP02	1880
TP02_1.0-1.1	24/07/2002	ALS	ES41010	QC10 / QC11	6600
HA201_0.2-0.3	30/04/2003	ALS	ES39497		819
HA201_0.4-0.5	30/04/2003	ALS	ES39497		484
HA202_0.2-0.3	30/04/2003	ALS	ES39497		749
HA202_0.4-0.5	30/04/2003	ALS	ES39497		2940
HA203_0.4-0.5	30/04/2003	ALS	ES39497		181
HA204_0.2-0.3	11/07/2003	ALS	ES41010		1430
HA204_0.6-0.7	11/07/2003	ALS	ES41010		2460
HA204_1.0-1.1	11/07/2003	ALS	ES41010		5100
HA205_0.2-0.3	11/07/2003	ALS	ES41010		263
HA205_0.6-0.7	11/07/2003	ALS	ES41010		344
HA205_1.0-1.1	11/07/2003	ALS	ES41010		999
HA206_0.2-0.3	11/07/2003	ALS	ES41010		430
HA206_0.6-0.7	11/07/2003	ALS	ES41010	QC12	764
HA206_1.0-1.1	11/07/2003	ALS	ES41010		169
HA207_0.2-0.3	11/07/2003	ALS	ES41010		1460
HA207_0.6-0.7	11/07/2003	ALS	ES41010		1340
HA207_1.0-1.1	11/07/2003	ALS	ES41010		5130
HA208_0.6-0.7	11/07/2003	ALS	ES41010		3370
HA208_1.0-1.1	11/07/2003	ALS	ES41010		716
TP02_1.0-1.1	11/07/2003	ALS	ES41010	QC10 / QC11	6600
TP204_0.5-0.6	23/07/2003	ALS	ES41189		1660
TP204_1.0-1.1	23/07/2003	ALS	ES41189		1080
TP204_2.2-2.3	23/07/2003	ALS	ES41189		8
TP205_0.5-0.6	23/07/2003	ALS	ES41189		614
TP205_1.0-1.1	23/07/2003	ALS	ES41189	QC01	506
TP205_2.2-2.3	23/07/2003	ALS	ES41189		3
TP207_0.5-0.6 *1	23/07/2003	ALS	ES41189	QC02/QC03	6460
TP207_1.0-1.1 *1	23/07/2003	ALS	ES41189		1900
TP207_1.5-1.6 *1	23/07/2003	ALS	ES41189		1
TP212_0.5-0.6	23/07/2003	ALS	ES41189		500
TP212_1.0-1.1	23/07/2003	ALS	ES41189		3730
TP212_1.7-1.8	23/07/2003	ALS	ES41189		2
VAL200	31/09/2003	ALS	ES42626		2420
VAL203	31/09/2003	ALS	ES42626		1470
VAL209	31/09/2003	ALS	ES42626		2270
VAL210	1/10/2003	ALS	ES42645		650
VAL220	2/10/2003	ALS	ES42668		1440
LSP-03 *2	12/08/2003	ALS	ES41573		13
LSP-04 *2	12/08/2003	ALS	ES41573		2200

Notes:

*1 Material from TP207 (located in Part 1) was excavated and relocated to the containment cells located in Part 2.

*2 Stockpile LSP was generated from excavations completed in Part 1 and was relocated to the containment cells located in Part 2.

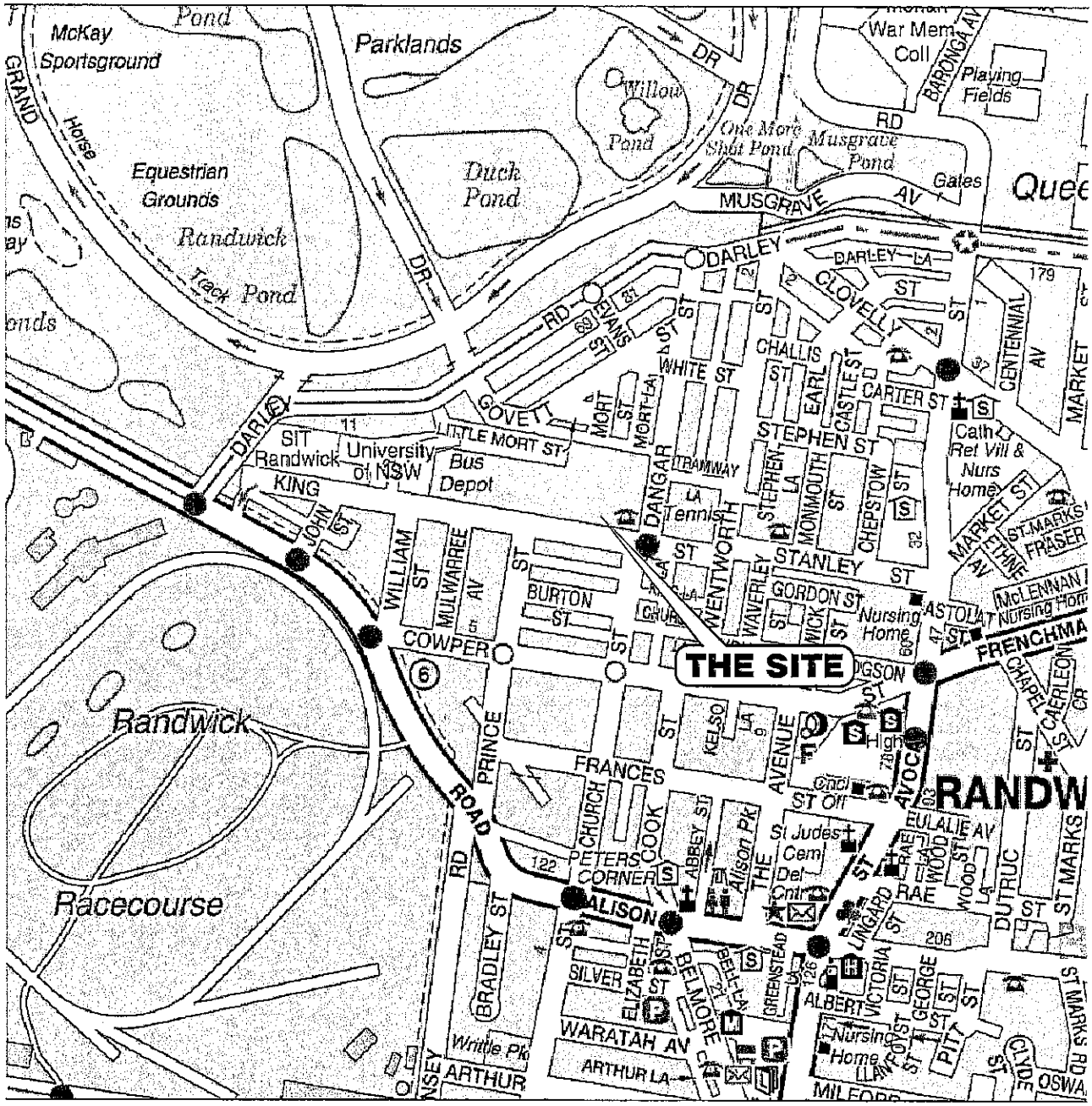
Prepared By:NDS
Checked By: BG

Table 4
Soil Analytical Results - Part 2 Lead Validation
Lot 202 - Part 2 Validation

Sample ID	Sample Date	Laboratory	Batch No	QC Sample ID	Lead (mg/kg)	Comment
				LOR	1	
Z7-2	1995	Enviromet	9505153		<5	Previous Investigation
Z7-3	1995	Enviromet	9505153		<5	Previous Investigation
Z7-4	1995	Enviromet	9505153		6	Previous Investigation
Z7-8	1995	Enviromet	9505153		5	Previous Investigation
HA209_0.6-0.7	11/07/2003	ALS	ES41010		230	Delineation Investigation
HA209_1.0-1.1	11/07/2003	ALS	ES41010		573	Delineation Investigation
TP201_0.5-0.6	23/07/2003	ALS	ES41189		263	Delineation Investigation
TP201_1.0-1.1	23/07/2003	ALS	ES41189		484	Delineation Investigation
TP201_2.0-2.1	23/07/2003	ALS	ES41189		1	Delineation Investigation
TP202_2.5-2.6	23/07/2003	ALS	ES41189		<1	Delineation Investigation
TP203_0.5-0.6	23/07/2003	ALS	ES41189		505	Delineation Investigation
TP203_1.0-1.1	23/07/2003	ALS	ES41189		346	Delineation Investigation
TP203_2.2-2.3	23/07/2003	ALS	ES41189		<1	Delineation Investigation
TP309_0.5-0.6	31/07/2003	ALS	ES41346		357	Delineation Investigation
TP309_1.0-1.1	31/07/2003	ALS	ES41346		6	Delineation Investigation
TP309_1.5-1.6	31/07/2003	ALS	ES41346		15	Delineation Investigation
VAL202	31/09/2003	ALS	ES42626		2	Excavation Validation
VAL205	31/09/2003	ALS	ES42626	QC02	11	Excavation Validation
VAL206	31/09/2003	ALS	ES42626	QC01	602	Excavation Validation
VAL208	31/09/2003	ALS	ES42626		66	Excavation Validation
VAL211	1/10/2003	ALS	ES42645		655	Excavation Validation
VAL212	1/10/2003	ALS	ES42645		<1	Excavation Validation
VAL213	1/10/2003	ALS	ES42645		281	Excavation Validation
VAL215	1/10/2003	ALS	ES42645		3	Excavation Validation
VAL216	1/10/2003	ALS	ES42645		535	Excavation Validation
VAL218	2/10/2003	ALS	ES42668		26	Excavation Validation
VAL219	2/10/2003	ALS	ES42668	QC06	144	Excavation Validation
VAL221	9/10/2003	ALS	ES42743		151	Excavation Validation
VAL222	9/10/2003	ALS	ES42743		902	Excavation Validation
VAL223	9/10/2003	ALS	ES42743		276	Excavation Validation
VAL224	9/10/2003	ALS	ES42743		561	Excavation Validation
Boundary Characterisation						
TP202_0.5-0.6	23/07/2003	ALS	ES41189		2330	Boundary Characterisation (West)
TP202_1.0-1.1	23/07/2003	ALS	ES41189		631	Boundary Characterisation (West)
TP206_0.5-0.6	23/07/2003	ALS	ES41189		1390	Boundary Characterisation (West)
TP206_1.0-1.1	23/07/2003	ALS	ES41189		2	Boundary Characterisation (West)
TP206_2.0-2.1	23/07/2003	ALS	ES41189		<1	Boundary Characterisation (West)
VAL201	31/09/2003	ALS	ES42626		4	Boundary Characterisation (East)
VAL204	31/09/2003	ALS	ES42626		3790	Boundary Characterisation (East)
VAL207	31/09/2003	ALS	ES42626		3990	Boundary Characterisation (East)
VAL214	1/10/2003	ALS	ES42645	QC05	557	Boundary Characterisation (East)
VAL217	2/10/2003	ALS	ES42668		10	Boundary Characterisation (East)
				NEPM HIL "E"	600	

600 Exceeds NEPM HIL "E" - Investigation levels for land use as open space

Figures



Client: SIR MOSES MONTEFIORE JEWISH HOME	Project: LOT 202 KING ST RANDWICK PART 2 ENVIRONMENTAL MANAGEMENT PLAN		Title: SITE LOCATION
URS	Drawn: DAJ	Approved: LW	Date: 31.05.06
	Job No.: 43346065 (EMP)	File No.: 001.dwg	Figure: 1
			Rev. A
			A4

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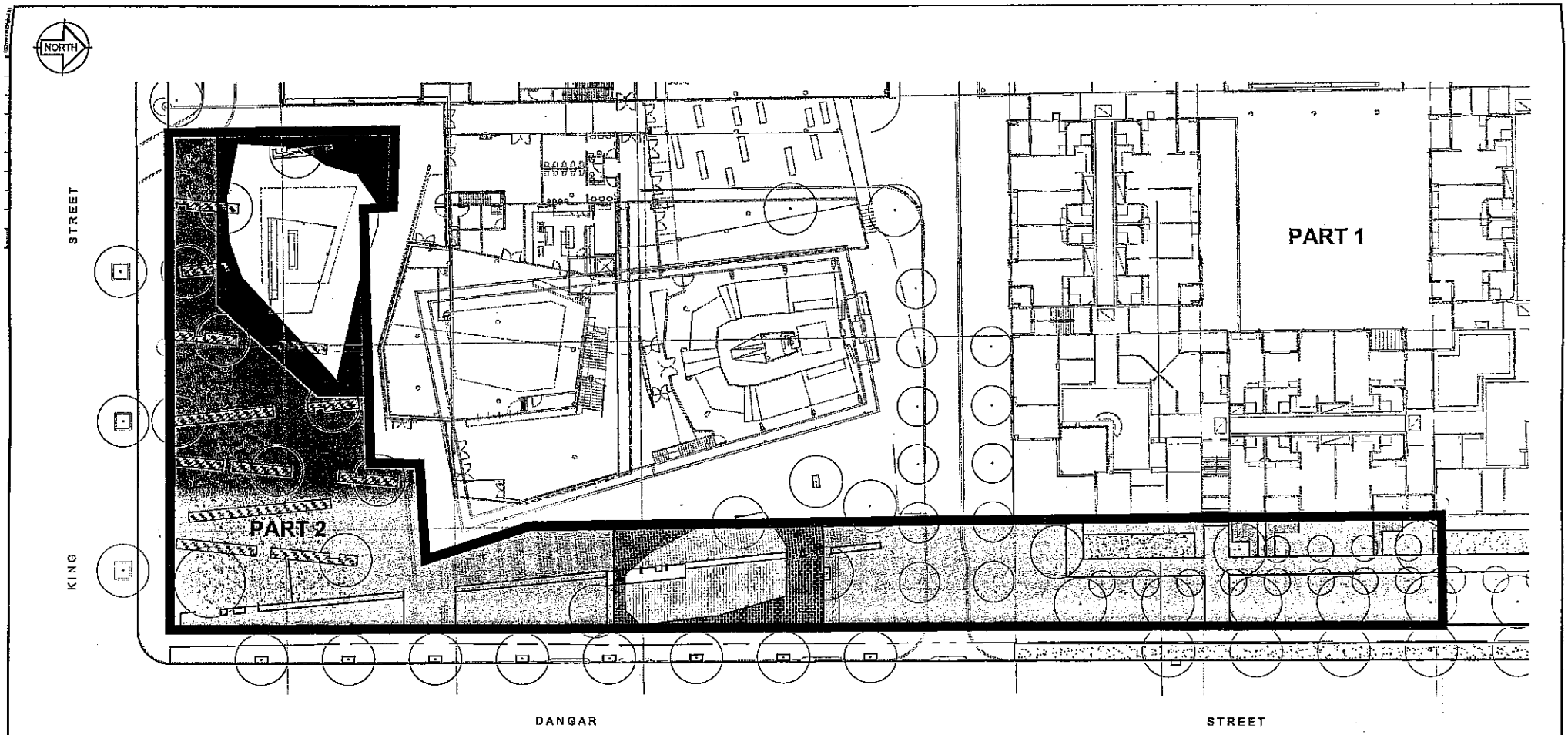

PART 1 - PART 2 BOUNDARY

PAVING/BUILDINGS
(AREA OVER CONTAINMENT CELLS)

CONTAINMENT CELLS

OPEN SPACE
(VALIDATED TO NEPM-HIL E)

4 0 4 8 12 16 20m
1 : 200

Rev	Date	By	App	Amendment Details
A	31.05.06	DAJ	LW	DRAFT ISSUE

Design	LW	31.05.06
Drawn	DAJ	31.05.06
Design Check		
Drafting Check		
Final Approval		
Admin	Datum	

URS
LEVEL 3, 116 MILLER STREET,
NORTH SYDNEY, N.S.W. 2060
TEL: (02) 8925 5500
FAX: (02) 8925 5555

Client: SIR MOSES MONTEFIORE JEWISH HOME

Project: LOT 202 KING STREET RANDWICK
PART 2 ENVIRONMENT
MANAGEMENT PLAN

Drawing Title: PART 2 CONTAINMENT CELLS

Project No.: 43346065 (EMP)

Drawing No.: FIGURE 2

Status: DRAFT

Scale (A1): AS SHOWN

Rev: A

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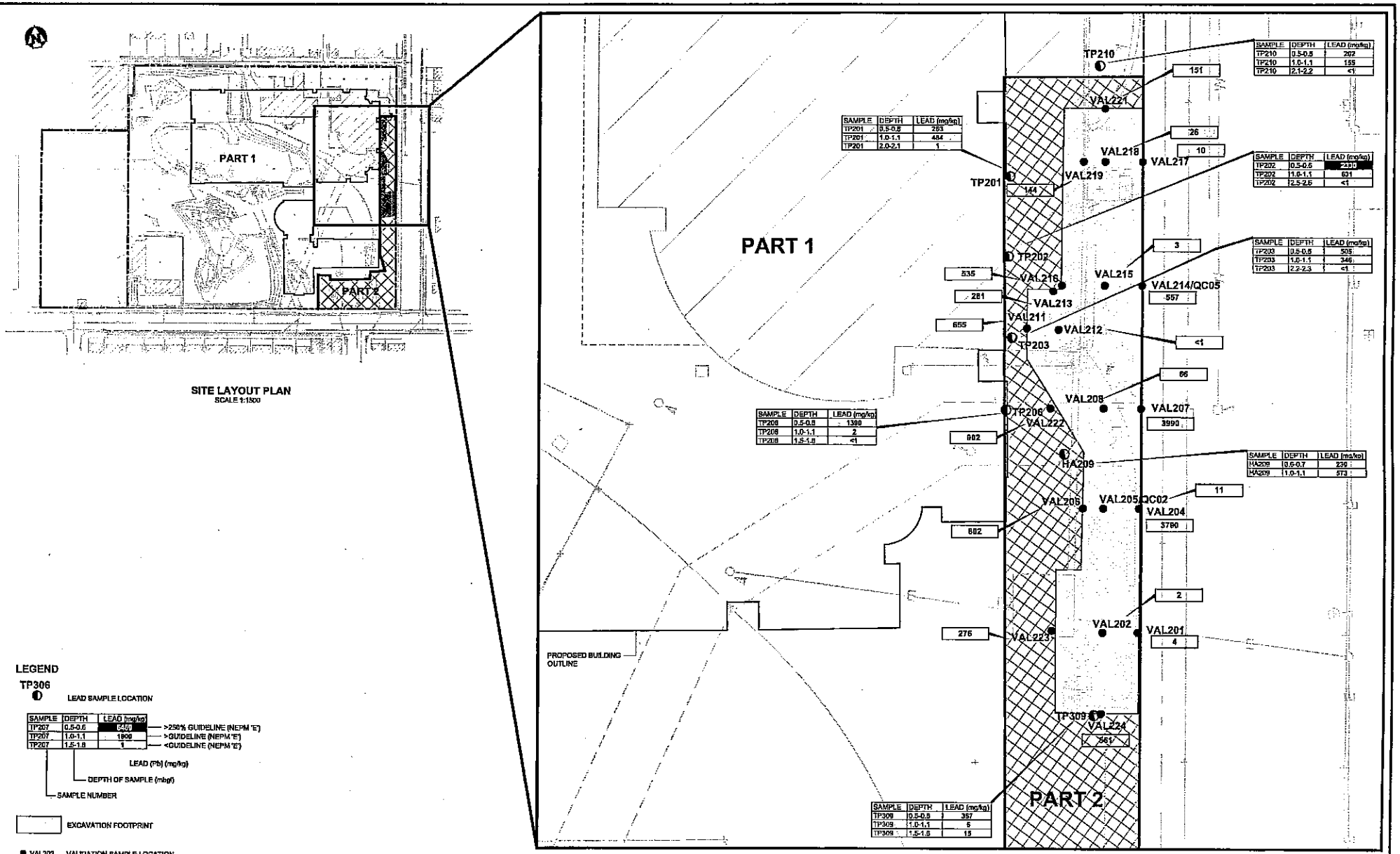


NOTES: (1) SURVEY OF PART 2 BOUNDARY PROVIDED BY PROUST & GARDNER, REF. 19997/DET/R, SEPT. 2003

(2) SAMPLE LOCATIONS AND EXCAVATION FOOTPRINT ARE NOT BASED ON SURVEY, REFER TO REPORT APPENDIX FOR SURVEY DATA.

CLIENT
SIR MOSES MONTEFIORE JEWISH HOME

PROJECT
LOT 202 KING ST RANDWICK - PART 2 ENVIRONMENTAL MANAGEMENT PLAN

TITLE
PART 2 LEAD VALIDATION RESULTS

A2

0 5 10
1:200 (metres) at A3

DESIGNED: LW
DRAWN: DAJ
DATE: 31.05.06

APPROVED:
DATE:
STATUS: DRAFT

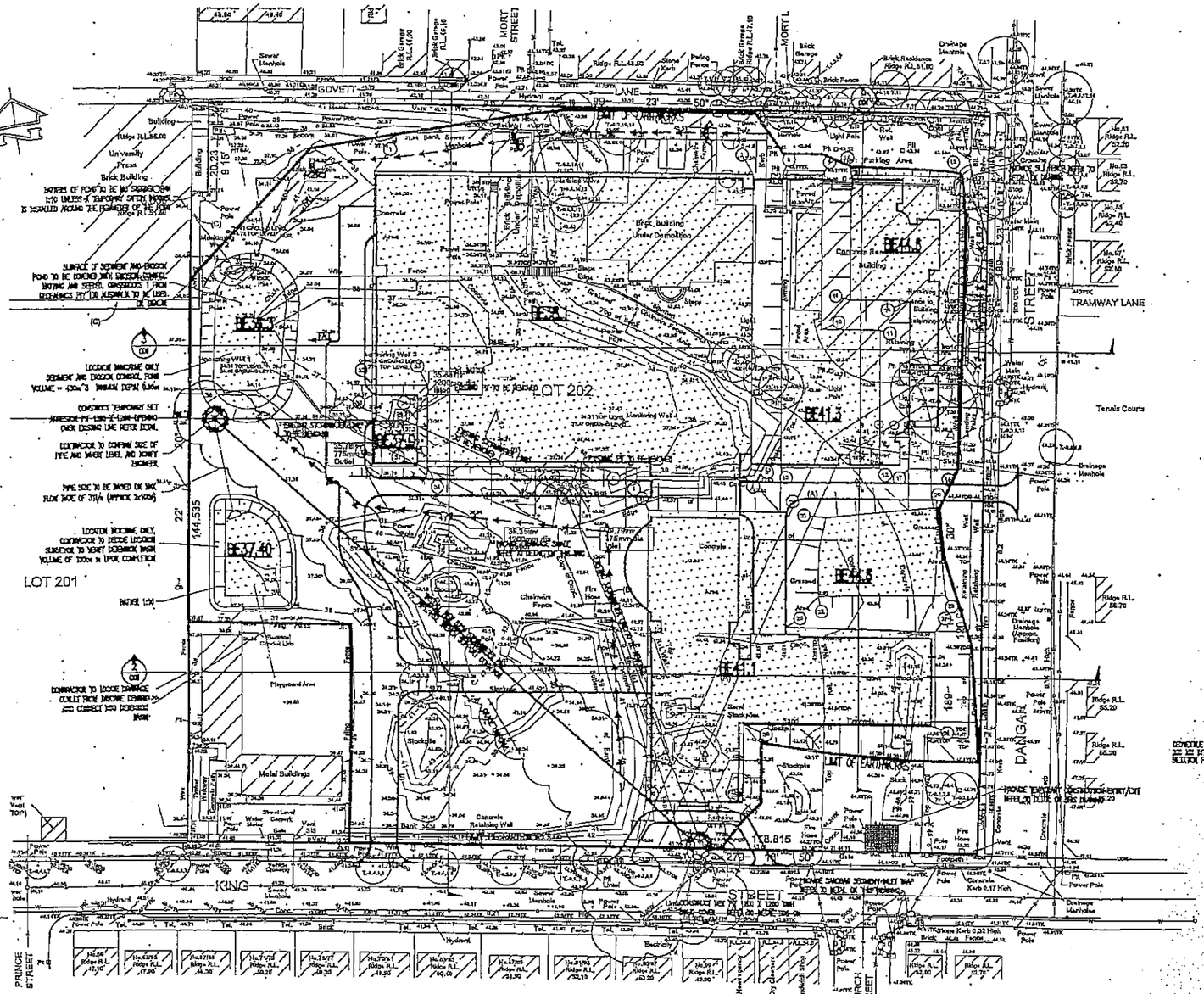
PROJECT: 43346065 (EMP)
CAD FILE: 002.DWG
REVISION: A

URS

FIGURE 3

J:\JOBS\43346065\EMP\CAD\WORKING\43346065 (EMP)-003.dwg, 8/06/2006 11:19:23 AM

Appendix A
Bulk Earthworks Design Drawing



BULK EARTHWORKS AND SEDIMENT EROSION CONTROL PLAN
SCALE 1:200

CROSS SECTION OF SILT ARRESTOR PIT
SCALE NTS

SEDIMENT FENCE

GEOTEXTILE FILTER PIT SURROUND
NTS

SILTATION FENCE DETAIL
SCALE 1:20

SANDBAG KERB INLET SEDIMENT TRAP
NTS

SANDBAG SEDIMENT INLET TRAP – TYPE A
NOT TO SCALE

NOTES
1. SWALE TO HAVE A MINIMUM GRADIENT OF 1% AND A MAXIMUM GRADIENT OF 5%.
2. RUNOFF FROM SWALE TO BE DIRECTED TO SUITABLE SEDIMENT FILTER OR SEDIMENT TRAP.

TYPICAL SECTION GRASS DRAINAGE SWALE
SCALE 1:50

STRAW BALE SEDIMENT FILTER
NTS
NOTE: STAKE TO BE EITHER TIMBER STAR OR 50 x 50 HARDWOOD

TEMPORARY CONSTRUCTION EXIT
NOT TO SCALE

SETOUT TABLE		
POINT	EASTING	NORTHING
1	321903.15	1246811.78
2	321986.61	1246798.87
3	321976.60	1246734.17
4	321975.31	1246732.35
5	321950.60	1246735.17
6	321950.91	1246738.15
7	321892.87	1246747.08
8	321993.03	1246797.88
9	322001.93	1246795.50
10	321995.67	1246762.51
11	322010.01	1246760.44
12	322005.33	1246730.20
13	321989.09	1246733.58
14	322008.45	1246795.49
15	322032.69	1246791.64
16	322022.77	1246727.57
17	322011.85	1246729.19
18	322017.54	1246765.96
19	322004.20	1246768.02
20	322016.91	1246719.76
21	321991.70	1246721.05
22	321987.38	1246703.83
23	322015.09	1246699.91
24	322012.58	1246692.22
25	321979.11	1246698.04
26	321983.14	1246723.55
27	321952.40	1246728.30
28	321941.94	1246664.26
29	321963.82	1246660.87
30	321966.48	1246678.05
31	322009.35	1246671.42
32	321895.64	1246764.96
33	321907.53	1246763.14
34	321904.76	1246745.24
35	321895.30	1246762.81
36	321905.02	1246761.31
37	321902.59	1246745.58

EROSION AND SEDIMENT CONTROL N

1. All work shall be generally carried out in acco
   (A) Local authority requirements,
   (B) EPA – Pollution control manual for urba
   (C) Department of conservation and land ma "Urban Erosion & Sediment Control".
2. Erosion and sediment control drawings and n the whole of the works. Should the Contracto then the design may require to be modified. details may require to be approved by the re The erosion and sediment control plan shall b adopted to meet the varying situations as wo
3. Maintain all erosion and sediment control devi of the superintendent and the local authority.
4. When stormwater pits are constructed prevent the pits unless silt fences are erected around
5. Minimise the area of site being disturbed at a
6. Protect all stockpiles of materials from scour stockpile loose material in roadways, near drai watercourses.
7. All soil and water control measures are to be the end of each working day, and modified to conditions.
8. Control water from upstream of the site such enter the disturbed site.
9. All construction vehicles shall enter and exit th temporary construction entry/exit.
10. All vehicles leaving the site shall be cleaned an leaving.
11. Maintain all stormwater pipes and pits clear of sediment. Inspect stormwater system and clea storm event.
12. Clean out all erosion and sediment control devi storm event.

Sequence Of Works

1. Prior to commencement of excavation the follo management devices must be installed.
1.1. Construct silt fences below the site and across runoff sites.
1.2. Construct temporary construction entry/exit an suitable control systems.
1.3. Construct measures to divert upstream flows in stormwater system.
1.4. Construct sedimentation traps/basin including o overflows
1.5. Construct turf lined swales.
1.6. Provide sandbag sediment traps upstream of e
2. Construct geotextile filter pit surround around al as they are constructed.
3. On completion of pavement provide sand bag ke traps around pits.
4. Provide and maintain a strip of turf on both sid after the construction of kerbs.

BULK EARTHWORKS NOTES

1. All bulk earthworks setout from grid lines U.N.O.
2. All batters at a slope of 2(H) : 1(V) U.N.O.
3. Excavated material may be used as structural fil
   (i) it complies with the specification requireme
   (ii) the placement moisture content complies wi Consultants requirements, and allows filling proofrolled in accordance with the specificat necessary the Contractor must moisture co excavated material to meet these requireme
4. Compact fill areas and subgrade to not less than

Location	Standard d (AS 1289
Under building slabs on ground:	98
Under roads and carparks:	9
Landscaped areas:	9

5. Before placing fill, proof roll exposed subgrade wit minimum roller to test subgrade and then remove (areas with more than 3mm movement under roll Soft spots to be replaced with select fill U.N.
6. Contractor shall place safety barriers around exca accordance with relevant safety regulations.
7. Refer to Geotechnical Report prepared by – Jeffery and Katauskas Pty Ltd. Ref: 17167S2rpt,22-oct-02

BULK EARTHWORKS LEGEND

┬┬┬┬┬	Batter
	Bulk Earthworks Step [Step from low side to
	Bulk earthworks spot le
	Bulk earthworks contour
BE 22.00	Bulk earthworks platform

EROSION AND SEDIMENT CONTROL LEGE

┬┬┬┬┬	Batter
—X——X—	Siltation fence
▤	Stormwater pit with Geotextile filter surround
	Hay bale barriers
	Sandbag sediment trap
	Catch drain
	Swale drain
	Limit of earthworks

K	CATCH DRAIN REPLACED WITH PIPE	GT
B	FOR CONSTRUCTION	GT
A1	LEVELS CHANGED	GT.
A	ISSUE FOR TENDER	PY
No.	AMENDMENT	DNG

PROJECT
SIR MOSES MONTEFIORE JEW
HOMES RESIDENTIAL AGED C
FACILITY

SHEET SUBJECT
BULK EARTHWORKS,
SEDIMENT AND EROSION
CONTROL PLAN

Architect
FLOWER AND SAMIOS ARCHIT

TAYLOR THOMSON WH
PTY. LTD. Incorporated in N.S.W. A.C.N.
CONSULTING, STRUCTURAL & CIVIL EN
48 CHANDOS STREET ST.LEONARDS NSW
PHONE 9439 7288 FAX 9439 3146

SCALE
AS SHOWN

JOB No.
01147

TO BE READ IN CONJUNCTION WITH
TREE PROTECTION AND REMOVAL
DRAWING LA_MR_001 & 002

FOR CONSTRUCTION

WORKS ON SITE SHOULD NOT
COMMENCE UNTIL ALL REMEDIAL
CONTAMINATION WORKS ARE COMPLETED
IN ACCORDANCE WITH ENVIRONMENTAL

Appendix B
Plates of Containment Cell

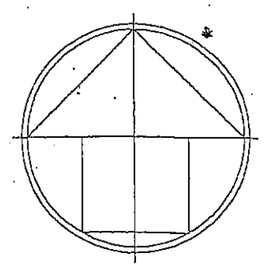
Plate 1: Lining the cell

Plate 2: Placing material into Containment Cell

URS

Appendix C
Registered Survey Drawings

11-017/5940



GOVETT LANE

STREET

LOT 202

PART 1

PART 2

DANGAR STREET

KING STREET

Fence Only

Fence Only

"Moriah Daycare"

SIGNED:

GLENN R. BEASLEY
REGISTERED SURVEYOR
IDENTIFICATION No. 446

TABLE OF CO-ORDS		
POINT	EASTING	NORTHING
1	337058.68	6246924.26
2	337231.98	6246899.03
3	337208.58	6246736.20
4	337031.60	6246761.69
5	337048.90	6246880.90
6	337052.30	6246904.73
7	337055.82	6246904.23
A	337227.21	6246865.86
B	337216.19	6246867.35
C	337203.50	6246774.42
D	337205.32	6246763.29
E	337195.38	6246764.10
F	337194.56	6246759.12
G	337168.24	6246762.24
H	337168.49	6246765.29
I	337160.55	6246766.68
J	337157.40	6246743.54

ISSUE	DATE	AMENDMENT	DRAWN	CHKD
C	5/2003	'STAGE' REPLACED WITH 'PART'	G.B.	
B	5/2003	CO-ORDINATE ADJUSTMENT.	G.O.	
A	5/2003	ORIGINAL ISSUE	G.O.	

NOTES:
1.) NO BOUNDARY SURVEY HAS BEEN MADE.
2.) CO-ORDS IN TABLE ARE ON M.G.A. CO-ORDINATE SYSTEM.

SCALE :- 1:1000	DATUM :- N/A
DATE :- SEPT. 2003	DRAWN :- G.O.
JOB No. :- 19987	APPROVED
CLIENT :- SIR MOSES MONTEFIORE JEWISH HOME	
Plotted : 01/09/2003 14:10	

PREPARED BY:
PROUST & GARDNER
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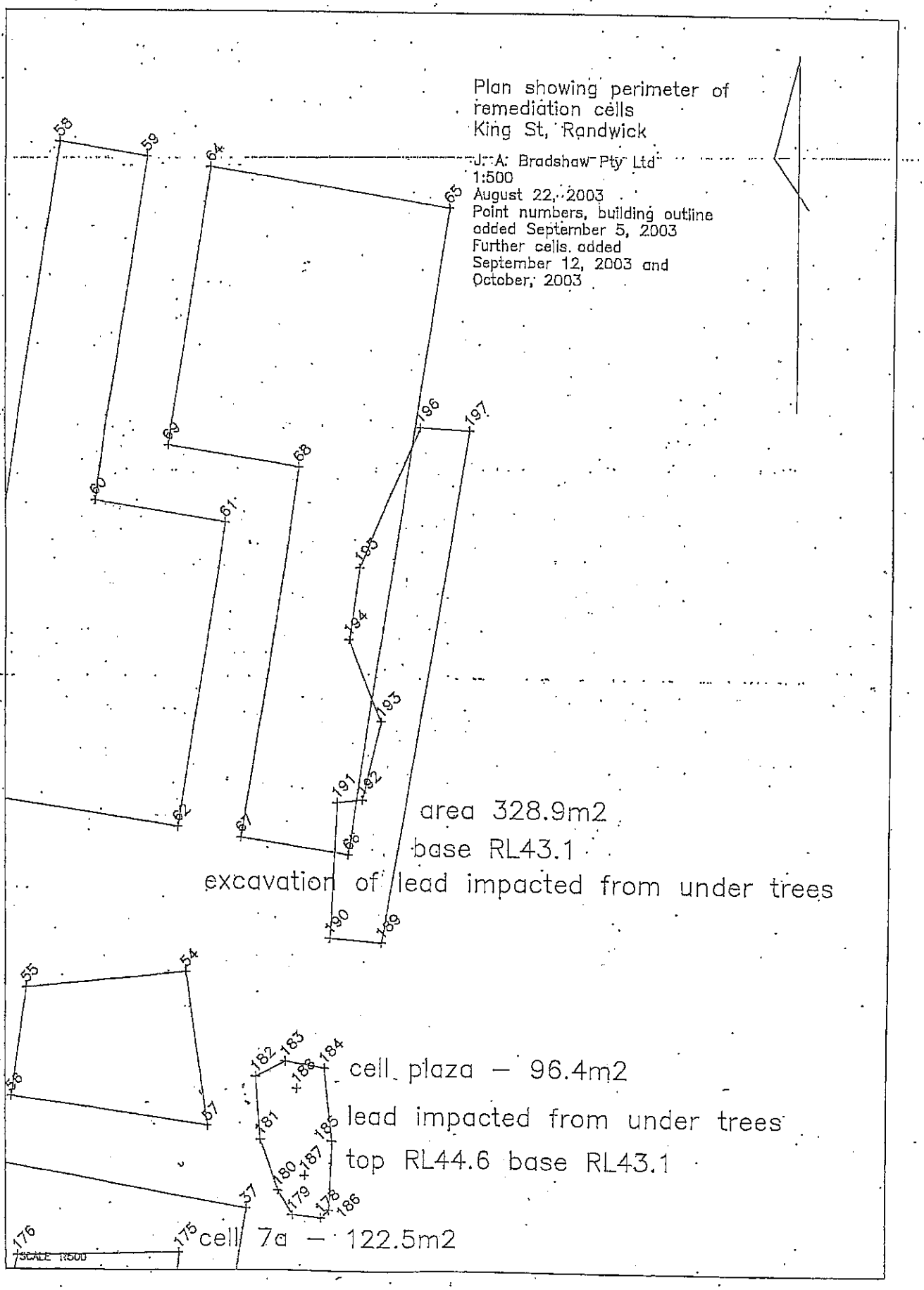
COUNCIL OF RANDWICK

REMEDIATION BOUNDARY
SHOWN AS STAGE 1 & STAGE 2
WITHIN LOT 202 D.P.879576
CORNER OF
KING STREET & DANGAR STREET


Plan showing perimeter of remediation cells
King St, Randwick
J. A. Bradshaw Pty Ltd
1:500
August 22, 2003
Point numbers, building outline added September 5, 2003
Further cells added September 12, 2003 and October, 2003
area 328.9m2
base RL43.1
excavation of lead impacted from under trees
cell plaza — 96.4m2
lead impacted from under trees
top RL44.6 base RL43.1
cell 7a — 122.5m2
SCALE 1:500

J. A. BRADSHAW
CIVIL CONTRACTING
Pty Ltd
ABN 33 106 837 736

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CIVILCAD 5 Job 03030 Date 19/02/04
File C:\CCAD5\TEMP\03030.OUT

Job details 09/04/03 KING STREET RANDWICK

Number	Easting	Northing	RL	
178	322020.26	1246691.24	44.300	
179	322017.32	1246691.57	44.395	
180	322015.83	1246694.05	44.340	
181	322014.00	1246699.18	44.230	
182	322013.52	1246705.46	44.161	
183	322016.52	1246706.99	44.181	
184	322020.55	1246706.31	44.400	
185	322021.33	1246699.06	44.400	
186	322021.04	1246692.05	44.281	
187	322018.62	1246695.58	44.450	
188	322017.73	1246704.31	44.220	
189	322026.34	1246718.83	44.600	
190	322020.99	1246719.22	44.530	
191	322021.61	1246732.76	44.600	
192	322024.24	1246733.03	44.450	
193	322026.18	1246740.87	44.700	
194	322022.68	1246748.97	44.600	
195	322023.75	1246756.07	44.600	
196	322029.90	1246769.95	44.556	
197	322034.88	1246769.64	45.160	

Appendix D
Legislation and Guidelines

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The Acts and guidelines listed below are current at the time of reporting.

Contaminated Land Management Act 1997 (CLM Act): contains a comprehensive legislative regime for the identification, assessment and management of contaminated sites.

Contaminated Land Management Regulation 1998 (CLM Regulation) contains minor matters incidental to the operation of the CLM Act such as; EPA rates of recovery and the EPA notification form.

State Environmental Planning Policy No 55 Remediation of Land (SEPP 55) provides a framework for planning decisions relating to the remediation of contaminated land in NSW.

Managing Land Contamination – Planning Guidelines Prepared by the Planning NSW and Department of Environment and Conservation (DEC) in conjunction with SEPP 55 provides guidance for planning authorities in NSW to make decisions in relation to contaminated land.

Guidelines on Significant Risk of Harm from Contaminated Land and the Duty to Report (the Significant Risk Guidelines) provides guidance to stakeholders and the general public on the processes the EPA uses to assess risk as well as the duty to report when contamination presents a significant risk of harm to human health or the environment as defined in the CLM Act.

Protection of the Environment Operations Act 1997 grants the DEC a number of powers in which to regulate and licence pollution.

Local Government Act 1993 Section 124 empowers local councils to order owners, occupiers and other persons conducting activities on land to 'not conduct' or 'cease conducting' an activity if it constitutes or is likely to constitute a life threatening hazard or threat to public health or safety.

Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000 Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand (ANZECC and ARMCANZ). This document provides a summary of the water quality guidelines designed to protect and manage the environmental values supported by water resources and gives advice on designing and implementing water quality monitoring and assessment programs.

National Environmental Protection (Assessment of Site Contamination) Measure 1999, National Environmental Protection Council (NEPC, 1999) establishes a nationally consistent approach to the assessment of site contamination to provide protection to human health and the environment.

NSW EPA (now incorporated within the Department of Environment and Conservation (DEC)) Guidelines provide assistance for landowners, developers, site auditors or the general public, in interpreting various aspects, obligations and duties associated with the contamination investigation and remediation process. Some of the main guidelines that relate to contaminated sites include:

- Contaminated Sites: Guidelines for Assessing Service Station Sites (1994);
- Contaminated Sites: Sampling Design Guidelines (1995);

Appendix D
Legislation and Guidelines

- Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites (1997);
- Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (2006); and
- Environmental Guidelines: Assessment, Classification & Management of Liquid & Non-liquid Wastes (2004)

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