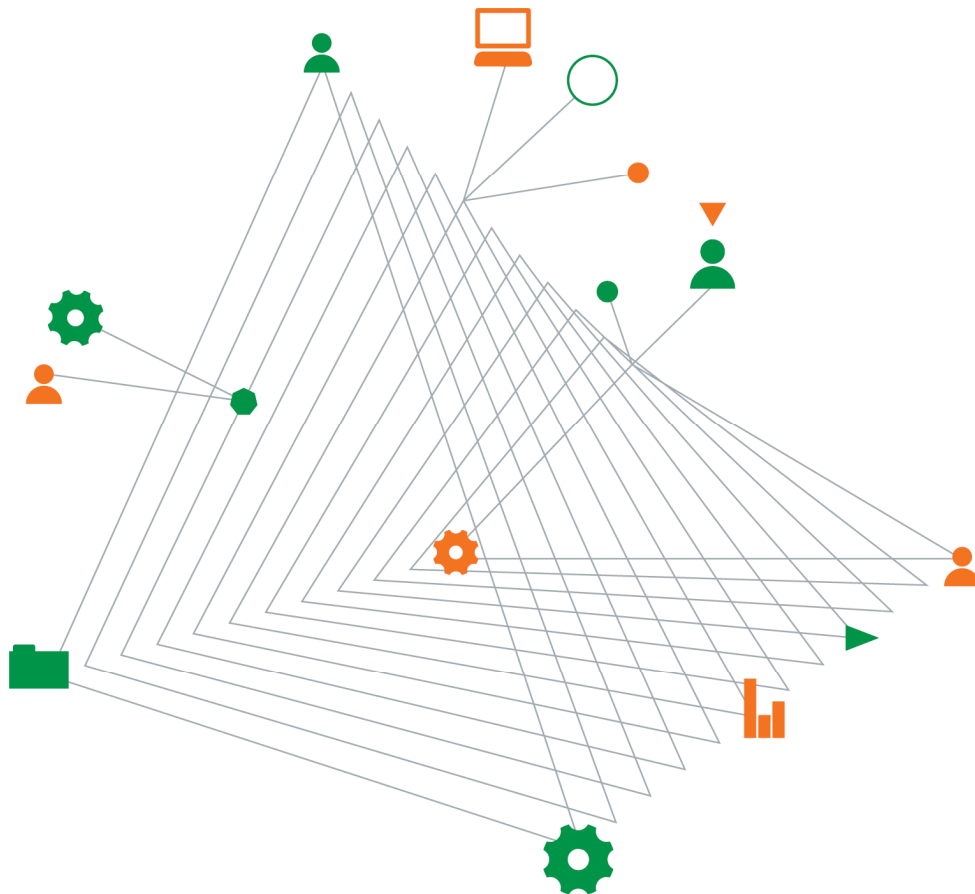


**Western Sydney Parklands Trust**

**Phase 1 Early Works Remediation Action Plan**

Eastern Creek Business Hub

28 July 2015



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comes to life  
when it is  
powered by  
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# Phase 1 Early Works Remediation Action Plan

Prepared for  
Western Sydney Parklands Trust

Prepared by  
Coffey Environments Australia Pty Ltd  
Level 19, Tower B, 799 Pacific Highway  
Chatswood NSW 2067 Australia  
t: +61 2 9406 1206 f: +61 2 9406 1004  
ABN: 65 140 765 902

<b>Project Director</b>	Dr Michael Dunbavan Senior Principal
<b>Project Manager</b>	Colee Quayle Senior Associate

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# Executive summary

Western Sydney Parklands Trust (WSPT) is in the planning phase for the redevelopment of a site known as Eastern Creek Business Hub, located between Rooty Hill Road South and the M7 Motorway, Eastern Creek, NSW. The site occupies approximately 34 hectares and currently is used for grazing with several residences around its perimeter.

Contamination assessments previously identified asbestos contamination, primarily in the form of asbestos cement fragments (fibro), in several unconnected locations on the site but generally correlating with areas previously occupied by structures or uncontrolled fill stockpiles.

A concept remediation action plan (RAP) was issued in April 2013 to address asbestos contamination and support a development application. The Concept RAP was reviewed by a NSW Environment Protection Authority accredited Site Auditor. The proposed development of the site comprised Phase 1 Early Works and subsequent development of four Superlots.

The objective of this RAP is to identify appropriate measures by which the identified asbestos impact, and similar contamination that is currently unidentified, can be remediated and/or adequately managed to provide a low potential risk to human health or the environment so that the site is suitable for the planned land uses. No remediation or management of groundwater was recommended in the Concept RAP because observed groundwater quality indicated no material impact.

Coffey's review of previous investigation results confirmed remediation requirements described in the Concept RAP, allowing for the potential of localised unexpected incidence of contamination. This assessment has been endorsed by the Site Auditor.

Based on the above, areas requiring remediation are those where asbestos impact has been identified or is reasonably expected. Asbestos impact at this site are categorised into high and low likelihood depending on historical activities, which are defined as high likelihood areas being footprints and surroundings of former buildings and stockpiles of uncontrolled fill; and low likelihood areas being the balance of the site area.

Areas with a high likelihood of asbestos impact will be remediated by excavation to remove ACM and asbestos impacted soil prior to bulk earthworks in the Phase 1 Early Works. Low likelihood areas will be managed through implementation of a site management plan where remediation will be triggered only if asbestos impact is discovered during earthworks. The vertical extent will generally be between the upper 0.1m and 0.15m of the soil profile but will extend down to natural clay.

Previous investigations have indicated heavy metals may pose an unacceptable risk to ecological receptors in designated open space areas. Review of the screening level risk assessment is required in these areas prior to considering remediation, assessing the potential risk these concentrations pose to ecological receptors (if any) in the context of the proposed bulk earthworks.

The bulk earthworks provides an opportunity for isolation of asbestos impacted materials in one or more containment zones which will have a final cover of 3m of fill placed for pad construction. The asbestos impacted material may require mixing with more granular fill to achieve an acceptable geotechnical performance. Remediation areas will be validated after asbestos impacted material is removed. Controls will be placed on storage and transport of asbestos impacted material so that potential for incidental contamination of other areas of the site does not occur.

Coffey concludes that, through implementation of the RAP by a competent contractor with advice from a suitably qualified environmental consultant, the site can be made suitable for its planned use.

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Appendix A – Figures

Appendix B – Data Quality Objectives

## 1. Introduction

Western Sydney Parklands Trust (WSPT) is in the planning phase for the redevelopment of a site known as Eastern Creek Business Hub, located between Rooty Hill Road South and the M7 Motorway, Eastern Creek, NSW. The site location and layout is shown on Figures 1 and 2, respectively.

Contamination assessments previously commissioned by WSPT have identified asbestos contamination, primarily in the form of asbestos cement fragments (fibro), in several unconnected locations on the site but generally correlating with areas previously occupied by structures or uncontrolled fill stockpiles.

A concept remediation action plan (RAP) was issued by Consara in April 2013 to address asbestos contamination and fulfil development consent conditions. The Concept RAP was reviewed by a NSW Environment Protection Authority (EPA) accredited Site Auditor, Mr Andrew Lau of JBS&G. The Concept RAP described development of the site as Phase 1 Early Works and subsequent development of four "Superlots". In June 2013, Consara issued a Phase 1 Early Works RAP, however, this RAP was not reviewed by the Site Auditor.

Since June 2013, the scope of Phase 1 Early Works has been reconsidered and a bulk earthworks plan has been developed. The extent of cut and fill earthworks for preparation of areas amenable to future development creates an opportunity for addressing asbestos impact identified on the site in this phase of early works. The Phase 1 Early Works described in the June 2013 RAP addressed only a small part of the site area, and consequently only a small part of the identified asbestos impact.

The revised strategy is to identify and remediate asbestos impacted areas across the entire development area prior to development of each Superlot. This should allow each Superlot to be released to the market suitable for proposed land use with a Site Audit Statement supporting that conclusion.

WSPT has commissioned Coffey to prepare a replacement RAP for Phase 1 Early Works in which is consistent with the Concept RAP and meets relevant conditions made in the Site Audit Statement from review of the Concept RAP. The Concept RAP will remain the overarching RAP for this site.

The revised strategy was described to the appointed Site Auditor, Andrew Lau from JBS&G during a meeting with WSPT and Coffey held on 18 May 2015. The Site Auditor was, in principle, supportive of the revised strategy. This replacement Phase 1 Early Works RAP will be subject to review and approval by the Site Auditor.

## 2. Concept Remediation Action Plan

The Concept RAP provides an overarching remedial approach for each phase of the site redevelopment, as the development was anticipated to take over 20 years to complete. It is intended that concept detailed remedial approach is tailored to suit specific building and infrastructure designs for each area.

The key requirements outlined in the Concept RAP include:

- Remedial strategy (i.e. removal of asbestos impact through emu pick or excavation with asbestos impacted soil being transferred to designated containment zone or disposed off-site to a licensed landfill).
- Specific RAPs for each phase of development.

- Long term environmental management plans (LTEMP).
- Additional sampling and analysis to demonstrate suitability of land for approved use without requiring an LTEMP.
- Implementation responsibilities for actions and outcomes described in the RAP.
- Site auditor review and approval of relevant documents to support Site Audit Statement.

The Concept RAP provides detail for other items such as previous investigation results, proposed land uses for each Superlot, remedial option review, etc. It is not intended for this Phase 1 Early Works RAP to repeat these elements in full detail but rather provide a concise summary outlining key information pertinent to for the proposed Phase 1 Early Works.

### **3. Objectives and scope of work of the Phase 1 Early Works RAP**

For simplicity, the replacement Phase 1 Early Works RAP will be referred to hereafter as “the RAP”.

The objective of the RAP is to identify appropriate measures by which the site contamination can be remediated and/or adequately managed to provide a low potential risk to human health or the environment so that the site is suitable for the proposed land uses. The method(s) for validating the effectiveness of remediation and management measures are also described in the RAP. The RAP was prepared to be consistent with relevant guidelines endorsed by NSW EPA.

The RAP aims to:

- Set the remediation goals;
- Identify the preferred remedial option;
- Outline the procedures and activities associated with implementation of the preferred remedial option;
- Outline the requirements for the contractor to prepare environmental and occupational health and safety plans for the remediation;
- Provide contingency measures for remediation of conditions on the site which were found not to be amenable to part or all of the preferred remedial option;
- Outline regulatory compliance requirements for the remedial works;
- Provide details of contacts for the period of remediation works; and
- Provide a framework for an environmental management plan for the site during remediation.

The RAP addresses:

- Remediation and management of asbestos impact to soils on the site arising from the use of asbestos containing building materials in historical structures and asbestos impact entrained in uncontrolled fill, typically present as stockpiles above ground;
- Appropriate asbestos management protocols;
- Appropriate unexpected finds procedures; and
- Validation of remediated areas.

Worker health, safety and security during remediation works will be addressed separately in a site-specific safety plan in compliance with relevant NSW work health and safety statutes.

The RAP has been prepared to outline the procedures for remediation and validation of asbestos contamination. It also provides a basis for specifications for remediation and validation work, but is not a specification prepared for use in tender preparation.

## 4. Proposed development

### 4.1. General

The development proposed for the site is primarily for bulky good and large retail businesses. WSPT is also pursuing potential opportunities for age care facility (i.e. independent living units) and/or health services facilities, in the northern part of the site. The proposed development Pads are shown on Figure 3.

Phase 1 Early Works comprises:

- Bulk earthworks to move soil and rock within the site to create large level areas (designated as Pads and shown on Figure 3) for future development of Superlots; and
- Earthworks for construction of roads and stormwater drainage system, shown on Figure 4; and
- Remediation works across the site to address asbestos impact in soil and stockpiled fill materials shown on Figure 2.

Superlots are parts of the site intended for future development for commercial activity or for establishment of residential facilities for retirees. In general, the level surface area of a pad is a future Superlot.

**Table 1: Proposed land uses for development areas**

Development Areas	Proposed land use	Area (ha)	Land use relative to that described in NEPM Schedule B7	Ecological Receptor requiring consideration
Superlot 1 (PAD 1)	Primarily bulky goods and large format retail use. The north-eastern corner is allocated for the retention of existing Cumberland Plain Woodland vegetation	4.76	Commercial / Industrial	No – exposure pathway incomplete
Superlot 2 (PAD 2)	Convenience retail and bulky goods and the south-eastern corner has the potential to be used for an activity/playground for children	5.53	Commercial / Industrial (98.5% of area) Residential A (potentially 1.5% of area)	Potentially 1.5% of area, otherwise exposure pathway incomplete
Superlot 3 (PAD 3)	Bulky goods and self-storage. Or age care facility and/or health services facilities.	7.32	Commercial / Industrial Or Residential B	No – exposure pathway incomplete
Superlot 4 (PAD 4)	Primarily detention basins and revegetated. Fenced and are not expected to be able to be accessed or utilised by the public for any	8.99	Commercial / Industrial Or Residential B	Yes – should area comprise detention basin/vegetation.

Development Areas	Proposed land use	Area (ha)	Land use relative to that described in NEPM Schedule B7	Ecological Receptor requiring consideration
	purpose. Or age care facility and/or health services facilities.			No – for aged care facility/health services facilities
Part 1 DP1103025	Densely vegetated and fenced and are not expected to be able to be accessed or utilised by the public for any purpose.	5.53	Commercial / Industrial	Yes
Infrastructure	Beggs Road, Belmore Road, unnamed internal roads, underground services easements, stormwater drainage and retention.	1.87	Public open space	Yes – remnant Cumberland plain woodlands

## 4.2. Development consent conditions

WSPT submitted a Development Application (SSD 5175 Eastern Creek Business Hub) to the Minister for Planning and Environment which was given consent on 7 January 2015. The Development Consent listed various conditions to be fulfilled as part of the development, and four of these pertained to remediation and management of identified contamination. These relevant conditions are listed in Table 2.

**Table 2: Summary of Relevant Development Consent Conditions**

Reference	Condition
Schedule 2: Conditions to be met in future Development Applications: B10: Contamination	Future development applications for the construction of buildings shall include a Remediation Action Plan addressing the potential contamination of the land including mitigation measures in accordance with SEPP55, where necessary.
Schedule 3: Conditions of Consent for STG1 Subdivision & Early Works: B21: Remediation (PRIOR TO COMMENCEMENT)	Remediation approved as part of this development consent shall be carried out in accordance with the Remediation Action Plan Phase I Early Works for Eastern Creek Business Hub prepared by Consara dated 25 June 2013. A site audit must be carried out by a site auditor prior to the commencement of remediation works.
Schedule 3: Conditions of Consent for STG1 Subdivision & Early Works: C3: Site Remediation (DURING CONSTRUCTION)	The site the subject of the early works is to be remediated in accordance with the Remediation Action Plan Phase I Early Works for Eastern Creek Business Hub prepared by Consara dated 25 June 2013.
Schedule 3: Conditions of Consent for STG1 Subdivision & Early Works: D9: Site Remediation (PRIOR TO ISSUE OF SUBDIVISION CERTIFICATE)	Upon completion of the remediation works on the subject site, the applicant shall submit to the Certifying Authority and council a final salinity management plan, validation report, notice of completion and site audit statement prepared by a site auditor. The Validation Report and site audit statement must verify that the land is suitable for the proposed future uses, should be submitted. Note: The applicant must comply with clauses 17 & 18 of SEPP55 – Remediation of Land. Note: Words and expressions uses in these conditions have the same meaning as in the Contaminated Land Management Act 1997.

These conditions were based on initial remediation strategy outlined in the Concept RAP and Phase 1 Early Works RAP (Consara, 2013a and 2013b). The revised remedial strategy differs from the approach set out in the Phase 1 Early Works RAP (Consara, 2013b) but remains consistent with the Concept RAP. The revised remedial strategy has been developed to meet the consent conditions listed in Table 2.

## 5. Site details and previous contamination assessment

### 5.1. Previous contamination reports and plans

Coffey reviewed the following environmental reports and RAPs for this site:

- Douglas Partners Pty Ltd (2009) Proposed Redevelopment Parcel 2.4, Western Sydney Parklands Rooty Hill Road South, Doonside, NSW (Report Ref: 71065.02, November 2009).
- CDM Smith Australia Pty Ltd (2012) Sampling, Analytical and Quality Plan, Eastern Creek Business Hub, Rooty Hill Road South, Rooty Hill NSW (Report Ref: S12388.01\_SAQP\_17Aug12, dated 17 August 2012).
- CDM Smith Australia Pty Ltd (2013) Eastern Creek Business Hub Environmental Site Assessment, Rooty Hill Road South, Rooty Hill, NSW (Report Ref: MN - S12388 01\_ECBH ESA (Draft 1.2f) 11Feb2013 - Clean.docx, dated 13 February 2013).
- Consara Pty Ltd (2013a) Concept RAP for Eastern Creek Business Hub, Rooty Hill Road South, Rooty Hill, NSW (Report Ref: C121009\_CRAP\_08Apr13.docx, dated 8 April 2013).
- Consara Pty Ltd (2013b) RAP Phase 1 Early Works for Eastern Creek Business Hub Rooty Hill Road South, Rooty Hill, NSW (Report Ref: C121009\_P1RAP\_25Jun13.docx, dated 25 June 2013).
- E3 Consulting Australia Pty Ltd (2012) Advice Relating to the Contamination Status of Soil and Groundwater, Formerly Precinct 2.4 of Western Sydney Parklands (Letter Ref: S12388.01, dated 2 May 2012).
- JBS Environmental Pty Ltd (2013) Site Audit Report for Eastern Creek Business Hub Rooty Hill Road South, Rooty Hill, NSW (Report Ref: JBS42270-53571, dated April 2013).

Relevant information from these reports has been summarised in the following sections.

### 5.2. Site identification

Site identification details and surrounding land uses are summarised in **Table 3**. The site layout and surrounding areas are shown on Figures 1 and 2.

**Table 3: Site Identification Details**

<b>Address:</b>	Rooty Hill Road South, Eastern Creek, NSW.
<b>Title identifier:</b>	<ul style="list-style-type: none"> <li>• Part Lot 1 DP1103025</li> <li>• Lot 100 DP882326</li> <li>• Lot 2 &amp; 3 Section A DP8681</li> <li>• Lot 3 to Lot 5 Section B DP8681</li> <li>• Lot 1 DP135665</li> <li>• Lots 1 &amp; 13 Section B DP 8681</li> <li>• Lots 1 to 10 DP830836</li> <li>• Lots 2 &amp; 3 DP1041487</li> <li>• Lot A DP358346</li> <li>• Lot 1, Lots 3 &amp; 8 DP31130</li> <li>• Lots 11, 12 and 14 DP882325</li> <li>• Lots 1 &amp; 2 DP1069269</li> <li>• Lot 14 DP1051904</li> <li>• Lots 11, 12 and 50 DP1041487</li> <li>• Beggs Road (southern half) – Public Crown Subdivision Land</li> <li>• Beggs Road (northern half) – Road being the residue of Land in Certificate of Title Volume 826 Folio 243</li> <li>• Belmore Road from intersection with Beggs Road to its intersection with Great Western Hwy (western half) – Road being the residue of Land in Certificate of Title Volume 826 Folio 243</li> <li>• Belmore Road from intersection with Beggs Road to its intersection with Great Western Hwy (eastern half) – Public Crown Subdivision Road.</li> <li>• Belmore Road from its intersection with Beggs Road to its extent to north-east (western half) – Road being the Residue of Land in Certificate of Title Volume 147 Folio 41.</li> <li>• Belmore Road from its intersection with Beggs Road to its extent to north-east (eastern half) – Public Crown Reserved Road Easement for Gas Pipeline – Easement for Pipeline (Vide Q916928).</li> </ul>
<b>Area:</b>	34ha
<b>Dimensions (approx.):</b>	Approximately triangular: 770m (along Rooty Hill South Road) by 600m (along Church Street)
<b>Local government area:</b>	Blacktown City Council
<b>Current land use:</b>	Predominantly grazing land and some residential. Historically market gardens in the part near the intersection of Church Street and Root Hill Road South.
<b>Future land use:</b>	Bulky good and large retail businesses and nature reserve (Refer to Section 4.1)
<b>Adjoining land uses:</b>	<ul style="list-style-type: none"> <li>• <b>Northwest:</b> Church Street and Morreau Reserve beyond</li> <li>• <b>East:</b> Western Motorway M7 and undeveloped grazing land beyond the Motorway</li> <li>• <b>South:</b> Great Western Highway and undeveloped land beyond highway.</li> <li>• <b>West:</b> Rooty Hill Road South and residential properties beyond</li> </ul>
<b>Site coordinates:</b>	301364E; 6259204N (based on the southwestern corner of site at the intersection of Rooty Hill Road South and Great Western Highway).

## 5.3. Topography, drainage, geology and hydrogeology

Table 4: Topography, drainage, geology and hydrogeology

<b>Elevation (based on survey):</b>	Between 38m in the east and 53m AHD in the northwest
<b>General slope direction:</b>	Down towards the east
<b>Closest surface water body:</b>	Eastern Creek. Located about 390m east of the site's eastern boundary.
<b>Drainage:</b>	Several excavated unlined open channels which are directed to two culverts beneath the M7 Motorway and surface runoff following topography.
<b>Regional geology:</b>	Bringelly Shale
<b>Soil Landscape:</b>	Blacktown, residual soil
<b>Site specific soil and rock:</b>  (Based on DP, 2009 due to logs not legible in CDM Smith 2013 report)	<ul style="list-style-type: none"> <li>• <b>Fill (localised):</b> Silty clayey sand, dark brown, grey, fragments of glass, concrete, ACM, timber, bricks, etc. Some locations ash and slag were encountered.</li> <li>• <b>Topsoil:</b> Silty clay, dark brown, rootlets.</li> <li>• <b>Residual soil:</b> Silty and gravelly clay</li> <li>• <b>Weathered rock:</b> Shale, siltstone and sandstone</li> </ul>
<b>Groundwater bores:</b>	None registered within 500m of site.
<b>Onsite monitoring wells (installation depth bgs):</b>	12 onsite wells installed to depths between 7m and 10m bgs, screened within weathered shale.
<b>Depth to groundwater: (Consara, 2013)</b>	1m to 3.2m below ground surface.
<b>Groundwater elevation: (Consara, 2013)</b>	35.97m to 41.54m AHD
<b>Inferred groundwater flow direction (CDM Smith, 2013):</b>	North to northeast

## 5.4. Summary of previous investigation results

The Concept RAP identified two contamination assessments undertaken at the site. These investigations identified three main areas of environmental concern (AECs), which included former market gardens, uncontrolled fill stockpiles/fly tipping and former/current structures. The associated contaminants of potential concern (COPCs) included petroleum hydrocarbons, pesticides, heavy metals, PCBs and asbestos.

Collectively, DP (2009) and CDM Smith (2013) used 394 soil/material sampling locations to target these AECs, and samples from 220 of these locations were tested for asbestos in soil and/or fibro fragments. The CDM Smith (2013) investigation also included groundwater assessment. The investigations identified asbestos mostly in the form of ACM fragments, which were found on the ground surface and within various stockpiles across the site. Asbestos fibres (non respirable) were identified in two samples, TP21X and SP9L1. Typically the asbestos impact was within the upper 0.05m of the soil profile. Asbestos impact within the upper 0.15m of soil occurred at location TP22L2. The locations of identified asbestos impact are shown on figures prepared by DP and CDM Smith, which have been reproduced in Appendix A of the RAP.

Coffey considers that asbestos impact in soil at the site correlated with locations of former structures and stockpiles of uncontrolled fill which are shown in Figure 2. Fly tipping at locations with easy vehicle access has happened over the years and therefore, isolated occurrences of asbestos may be

encountered at such locations. The main limitation acknowledged in both investigations was the presence of long grass which may obscure the observation of ACM across the site.

Uncontrolled fill stockpiles comprise soil and building waste (e.g. concrete, timber, brick, etc). The majority of stockpiles are located in the southern end of the site. According to the Douglas Partners report, an additional five stockpiles and/or earth mounds are located in Pad 2.

Concentrations of manganese, copper, lead and/or zinc potentially above background levels for the site were reported by Douglas Partners (2009) and CDM Smith(2013) but concentrations were below adopted human health assessment criteria for the RAP (i.e. HIL B and/or HIL D). At some locations heavy metals exceeded Interim Urban values for Environmental Investigation Levels (EILs) (Table 5-A, Schedule B (1) - Guideline on Investigation Levels for Soil and Groundwater in NEP (Assessment of Site Contamination) Measure, NEPC 1999). These exceeding concentrations will not pose an unacceptable risk to ecological receptors where the exposure pathway is incomplete (Refer to **Table 1**). However, areas of the site that will remain undeveloped, for example, adjacent to Pad 4 and along the eastern edge of the bulk earthworks area; an exposure pathway exists.

Other contaminants of potential concern including petroleum hydrocarbons, polycyclic aromatic hydrocarbons (PAHs), pesticides and polychlorinated biphenyls (PCBs) were reported at low concentrations, which are considered not to pose an unacceptable risk to human health or to the environment.

Results of the groundwater assessment reported in CDM (2013) indicated no detectable heavy metals, except for manganese, nickel and zinc, and no detectable organic compounds for the adopted COPCs. Coffey considers that the presence of manganese, nickel and zinc is attributable to natural occurrence of those elements in shale bedrock, which is the water-bearing zone beneath the site.

## 6. Areas requiring remediation or management

The Concept RAP stated that the requirement for remediation and/or management to make the site suitable for the proposed development needs to address:

- Presence of asbestos, in both bonded and friable forms identified on surface soils and in uncontrolled stockpiled materials; and
- Potential presence of asbestos in bonded form on surface soils in areas of historical activity.

No remediation or management of groundwater was recommended in the Concept RAP because observed groundwater quality indicated that groundwater quality is not materially impacted.

Coffey's review of previous investigation results confirmed remediation requirements described in the Concept RAP, allowing for the potential of localised unexpected incidence of contamination. This assessment has been endorsed by the Site Auditor.

Based on the above, areas requiring remediation are those where asbestos impact has been identified or is reasonably expected. Asbestos impact at this site are categorised into high and low likelihood depending on historical activities, which are defined as:

- High likelihood areas – these areas are shown on Figure 2:
  - In the vicinity of former and current structures where ACM has been used in construction.
  - Stockpiles of uncontrolled fill.
  - Fly tipping.

- Low likelihood areas:
  - The remainder of the site where activities have not involved the use or illegal placement of ACM.

Areas with a high likelihood of asbestos impact will be remediated by way of excavation, removing ACM and asbestos impacted soil prior to bulk earthworks in the Phase 1 Early Works. Low likelihood areas will be managed through implementation of a site management plan where remediation will be triggered only if asbestos impact is discovered during earthworks.

Previous investigations have indicated heavy metals may pose an unacceptable risk to ecological receptors in designated open space areas. Review of the screening level risk assessment is required in these areas prior to considering remediation, assessing the potential risk these concentrations pose to ecological receptors (if any) in the context of the proposed bulk earthworks. Coffey notes that the land form on the western half of the site will be substantially modified as a result of bulk earth works and that available information on heavy metals in soils may not be relevant to the validation process.

## **7. Remediation plan**

### **7.1. Remediation goals**

The broad remediation goal is to remediate/manage the contamination at the site to a level where there is a low risk of adverse impact to human health or the environment and the site is made suitable for the proposed land uses in accordance with relevant legislation and guidelines, taking into consideration the protection of the broader community and environment.

### **7.2. Remediation options**

#### **7.2.1. Remediation hierarchy**

DEC, 2006 provides a preferred hierarchy of options for site clean-up and/or management, which represents NSW EPA current policy. The hierarchy is outlined in order of preference as:

- On-site treatment of the contamination so that it is destroyed and the associated risk is reduced to an acceptable level;
- Off-site treatment of excavated soil, so that the contamination is destroyed or the associated risk is reduced to an acceptable level, after which the soil is returned to the site.

If the above is not practicable:

- Removal of contaminated material to an approved facility, followed, where necessary, by replacement with appropriate material;
- Consolidation and isolation of the soil on site by containment with a properly designed barrier.

Where the assessment indicates remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy can be considered.

## 7.2.2. Preferred remediation option

Five remediation options were considered and discussed in the Concept RAP which are:

- *For areas of the Site which contain significant volumes of asbestos contaminated materials, excavation or removal by other means (such as emu picking) of contaminated materials, and their transfer and placement to designated containment areas for consolidation and containment and long-term management;*
- *For areas of the Site in which only small or minor volumes of asbestos contaminated materials are present or where [unacceptable] chemical contamination of soils is identified to be present, these materials will be removed for disposal off-site to a landfill appropriately licenced to accept these materials;*
- *For large areas of the Site to be used for parks/open space/recreational uses that will be fenced and not accessible for use by the public and in which no asbestos contamination has been identified but where there may be a likelihood of contamination being identified in the future no remediation will be undertaken but as a precautionary measure to protect future users and to ensure suitability of these areas for the proposed use a long-term management plan will be required; and*
- *For areas of the Site in which no contamination has been identified and for which an appropriate sampling and analytical density has been demonstrated to have been conducted no remediation or long-term management will be required in order for these areas to be suitable.”*

The remedial strategy in the RAP for Phase 1 Early Works is consistent with this preferred remediation option.

## 8. Remedial activities

The following sections outline the remediation work that will be required within the site based on currently available information provided by WSPT and from previous investigations. The proposed sequence for remediation activities is as follows:

1. Work plans, licensing and permits for asbestos handling and/or removal;
2. Notifications to regulatory authorities and the surrounding community;
3. Site establishment;
4. Ground preparation prior to remediation;
5. Preparation of asbestos containment zone;
6. Remediation and validation of asbestos impacted areas;
7. Isolation of asbestos containment zone; and
8. Documenting remediation activities in a validation report.

The standard environmental control and mitigation measures required for bulk earthworks would also need to be in place for the remediation work, including those described in the development consent conditions. Information on controls and mitigation measures are discussed in Section 10.6.

Unless otherwise identified, activities discussed below will be the responsibility of the contractor or its representative.

## 8.1. Planning documents and asbestos licensing

A construction and environmental management plan (CEMP) must be prepared as part of construction activities. The CEMP is expected to provide control measures for managing environmental aspects associated with the Phase 1 Early Works. The CEMP will need to make reference to environmental control measures associated with remediation. If remediation works are performed by a sub-contractor, then a CEMP specific to remediation works must be prepared and implemented.

The majority of asbestos identified onsite is bonded, meaning a Class B licensed asbestos removal contractor is appropriate to supervise this work, and is responsible for preparing an Asbestos Removal Control Plan.

Friable asbestos, as free asbestos fibres in soil, was identified in two areas of the site, at sample locations TP21X and SP9L1. Removal of soil impacted by friable asbestos must be supervised by a Class A licensed asbestos removal contractor. The Class A contractor is responsible for:

- Preparation of an Asbestos Management Plan (AMP);
- Preparation of an Asbestos Removal Control Plan (based on AMP requirements);
- Lodging a "Friable Works Permit" with WorkCover NSW (refer to Section 8.2.2);
- Supervision of all work involving friable asbestos removal.

## 8.2. Notifications to regulatory authorities

The follow sections describe relevant notifications under NSW regulations.

### 8.2.1. Notification to State Planning Authority

State Environmental Planning Policy No 55 - Remediation of Land under the Environmental Planning and Assessment Act 1979 (EP&A Act) applies to works involving remediation or management of contaminated land in NSW. Remediation can be Category 1 requiring consent of the relevant planning authority or Category 2 not requiring consent.

The remediation of asbestos impacted areas is a part of the redevelopment of the site which has planning approval as a State Significant Development under SSD 5175 Eastern Creek Business Hub (as discussed in Section 4.2).

The Certifying Authority will be advised of the change in extent of Phase 1 Early Works through a formal request under Section 96 of the EP&A Act for amendment of Notice of determination and the RAP will be submitted in support of that application. A Remediation and Validation Report and Notice of Completion will be prepared on completion of remediation works and will be submitted to the Certifying Authority and to Blacktown City Council in partial fulfilment of Consent Condition D9 (listed in Table 2, Section 4.2). This submission is also consistent with SEPP 55 Planning Guidelines.

### 8.2.2. Notification to NSW WorkCover

#### **Bonded – notification to WorkCover NOT required**

As previously discussed, the majority of asbestos identified at the site is in a bonded form and can be removed by a Class B licensed asbestos removalist. WorkCover does not require notification for Class B asbestos removal works.

If degraded fragments of ACM are encountered during site works, these fragments will be handled as friable asbestos. Associated asbestos removal works would need to be continued by a Class A asbestos removalist rather than a Class B.

#### **Friable – notification to WorkCover IS required**

Free asbestos fibres were identified in samples TP21X which was collected the nature reserve in the northeastern portion of the site and SP9L1 which is on the northern edge of the stockpiles of uncontrolled fill. These two locations are shown and labelled on Figure 2. Asbestos removal works undertaken in this area must be supervised by a Class A licensed asbestos removalist. The Class A asbestos removalist must notify WorkCover 7 days prior to removal works being undertaken.

### **8.2.3. Transportation of waste**

At this stage, excavated soil and fill generated from remediation activities will be transferred within the boundaries of the site to the designated containment zone. Under NSW EPA current policy, waste regulations are not triggered and no notifications under those regulations will be required. The containment zone is in the eastern half of Pad 3, as shown on Figure 3. The waste placement area is further discussed in Section 8.5.

In the unlikely event offsite waste disposal of contaminated soil is required; the material must be classified and transported to an appropriately licensed waste facility. Approval from a licensed disposal facility will be obtained prior to removal of contaminated soil from the site. The approval must be writing from the receiver and will be included in the validation report. All material leaving the site must be tracked and documented. Handling and transporting asbestos waste should be described in the AMP.

Any waste leaving the site that classified as “restricted solid waste” or “asbestos waste” will need to be transported by an appropriately licensed contractor.

Any excess water (e.g. accumulated rainwater or groundwater in excavations) will be reused onsite for dust suppression.

### **8.3. Site establishment**

Permanent and/or temporary fencing will be erected and maintained to designate remediation zones thereby restricting access to unauthorised personnel.

The remediation contractor prior to commencement of works will nominate and establish (as appropriate):

- Temporary stockpiling areas along with sediment and erosion control structures;
- Equipment and truck decontamination areas (i.e. wash down bays);
- Truck load out areas relative to excavation activity.

### **8.4. Ground preparation prior to remediation**

Asbestos impact has been identified at isolated locations within the upper 0.15m of the soil profile which comprises topsoil, grass and the root zone for grass cover. The grass is long in some areas of the site and for remediation to be effective will need to be removed. In consultation with WSPT, the following approach to ground preparation is proposed:

- Slash grass across the entire site, so that cut grass is removed allowing observations to be made of the ground surface.
- In addition to slashing and removing grass, areas where there is a high likelihood of asbestos occurrence, remaining vegetation will be sprayed with a non-persistent herbicide. Once the vegetation has died and dried, a mechanical rake will be used to remove residual organic matter. Some soil disturbance may occur but will be minimised to the extent practicable. Inspection of the raked ground and removed dry vegetation for potential bonded ACM will occur during the raking process.

## 8.5. Preparation of asbestos containment zone

The asbestos containment zone is located at the base of the deepest fill area on the eastern edge of Pad 3, thus requiring little preparation with respect to earthworks. Based on current 'cut to fill' volumes, it is estimated that there is sufficient volume in fill areas to accommodate asbestos impacted material and achieve a minimum of 3m cover above the containment zone. This is summarised in **Table 5** together with a preliminary conservative estimate of volume of asbestos impacted material. Coffey estimates generation of 3,250m<sup>3</sup> of asbestos impacted material with available capacity of approximately 2,900m<sup>3</sup> in the containment zone. A proportion of the available volume may be required for engineered fill to be placed above potentially geotechnical unsuitable (i.e. asbestos impacted) material, however, this feature may be able to be designed into the 3m cover layer. A design for engineered fill to ensure acceptable structural performance of Pad 3 will be provided by a geotechnical engineer.

**Table 5: Estimated Asbestos Impact and Containment Zone**

Item	Area	Thickness	Volume
Containment Zone (no additional excavation)	200m north-south 50m east-west	1m at eastern edge, tapering to nil at eastern edge	2,900m <sup>3</sup> (refer to Figure 3)
Stockpiles at southern end of site	5,000m <sup>2</sup>	1.5m average	7,500 m <sup>3</sup> Allow 10% asbestos impact
Aggregate area surrounding former structures	2.5 hectares	0.1m	2,500 m <sup>3</sup>

WSPT has indicated that if the actual volume of asbestos impacted material exceeds the initial containment zone capacity, then the natural material at the base of the containment zone will be excavated to provide additional capacity to ensure that asbestos impacted material has a minimum cover of 3m.

## 8.6. Remediation and management of asbestos impacted areas

### 8.6.1. Excavation

As previously discussed, asbestos impacted material will be excavated; and minor occurrences (i.e. a few ACM fragments) will be removed via emu picking. The lateral extent and estimated volumes will be largely governed by former building footprints, historical demolition practices and distribution of fly tipping occurrences. The extent of impacted areas will be confirmed by observations made during

excavation works. Observations and excavations will radiate out from the known point source of the asbestos contamination, for example the footprint of a former structure. The excavation area will include any location where bonded ACM was observed during removal of dried vegetation. The vertical extent will generally be between the upper 0.1m and 0.15m of the soil profile but will extend down to natural clay to reduce the need of validation soil sampling.

Because identified asbestos impact occupies relatively large areas, excavation should be undertaken using a grader (or similar). An excavator can then be used to load excavated material into waiting trucks for transfer to fill area.

A qualified environmental practitioner will be present on site to guide the excavation of potentially contaminated soils. The excavations will be extended until visually no evidence of asbestos impact is observed. Excavations will then be validated to confirm asbestos impact has been effectively removed. This is further discussed in Section 10.3. The excavated area will cordoned off from surrounding site works until an asbestos clearance is given.

### **8.6.2. Existing stockpiles**

There are numerous stockpiles located across the site of varying compositions and sizes. However, the majority of stockpiles are located in the southern portion of the site. These stockpiles comprise mostly soil however some contain building rubble, such as bricks, concrete, etc. The Concept RAP indicates that the stockpiles in the southern portion of the site have been surveyed however an estimated volume was not provided.

The management of these stockpiles could include:

- Option 1: Screening of stockpiles for recovery of recyclable waste, assessing soil component for reuse or classify offsite disposal as appropriate; or
- Option 2: Transfer and place into fill area.

Option 1 may not be commercially viable if stockpiles are:

- Heterogeneous, meaning a higher frequency of sampling and testing will be required to assess the material. There are no guarantees that with additional assessment of this material that it will be suitable for re-use onsite; and/or
- The amount of recoverable recyclable materials (e.g. bricks and concrete) is relatively small for the time spent in screening for ACM fragments.

If Option 2 is adopted, stockpiled material will be into waiting trucks for transfer to fill area. The ground surface below the stockpile will also be scrapped and placed into the truck. The area will be validated as described in Section 8.6.1.

The more appropriate option for WSPT can be canvassed after the area is cleared of vegetation to allow inspection of stockpiled materials and a cost benefit analysis for Option 1 has been undertaken.

### **8.6.3. Unidentified areas of asbestos**

Depending on the nature and size of the asbestos find, the removal process could be surface removal of fragments (e.g. emu pick) through to excavation as described in Section 8.6.1.

#### **8.6.4. Tracking of excavated and stockpiled materials**

The management and tracking of excavated materials will be recorded on a site diagram and daily logs by the remediation contractor and stored in the site office. The daily site log should record the area in which work was conducted for that day, general description of the works completed, movement of materials within the site, movement of materials off-site (if required), etc. The site diagram will record the source location of excavated material.

#### **8.7. Filling of asbestos containment zone**

In preparing a site for bulk earthworks, geotechnically unsuitable materials are removed to eliminate a source of inadequate structural support for surface structures, such as buildings or pavements. Unsuitable materials typically cause differential settlement or cannot be adequately compacted to a nominated density. These materials can include topsoil, vegetation, loose saturated soils, etc.

Because asbestos occurrence is within geotechnically unsuitable materials (typically topsoil with grass), additional geotechnical engineering advice will be required to allow appropriate placement of unsuitable materials, so that performance of pavements and buildings in the vicinity of the containment zone is not compromised.

It is expected that asbestos impacted materials will be spread thinly (<100mm) placed across the fill area where it will be nominally compacted. If the geotechnical properties of the asbestos impacted material requires improvement to achieve the geotechnical design specification, coarse fill will be placed then worked into asbestos impacted materials to provide necessary structure to this geotechnically unsuitable material. Working of materials would include water application to keep raised dust to a practical minimum.

Based on available information, remediation of asbestos impact will occur at the beginning of earthworks, however, development may be undertaken in three or four separate events, the timing of which will be governed by land releases. The period between land releases could be several months to a year or more. At the completion of each earthworks event, the asbestos impacted material will be covered with a minimum of 0.5m of suitable fill material and will be surveyed for lateral and vertical position. The area around the containment zone will be enclosed within a 1.8m high fence during the interval between earthworks events until Pad 3 is constructed to provide the final 3m cover.

#### **8.8. Contingency plan**

The following contingency plans have been considered:

- If ACM is encountered within low likelihood areas of the site, earthworks in that locality will be suspended and the area cordoned off from the rest of the work zone. The condition of the asbestos will be assessed by a competent person to determine if a Class A or Class B licenced asbestos removalist is required to supervise its removal. Bulk earthworks can resume in that locality after an asbestos clearance certificate is issued and validation completed according to the RAP.
- If friable ACM is identified during the removal activities within a "bonded asbestos" area, then work in that locality should cease. The removal works in that locality will continue under the supervision of a Class A licenced removalist along with implementation of all necessary safety controls during soil disturbance. These controls will be outlined in the AMP. An asbestos clearance certificate will be issued for that area and validation completed according to the RAP.
- If the asbestos containment zone reaches its capacity (i.e. 3m below final surface level), then, with approval of WSPT, the earthworks contractor will excavate a suitable area, likely to be immediately to the west of the initial containment zone, to provide additional containment

capacity. Excavated material will be natural soils likely to meet the definition of VENM. An environmental consultant will need to assess excavated material in order to provide this classification if the excavated material is to be removed from the site.

- If air monitoring at the perimeter of an asbestos work zone shows unacceptable spread of asbestos fibres in air, then the area for 20m on the down-wind side of the work zone will be assessed for presence of asbestos fibres on surface soil. The work zone would be extended to include any location where asbestos fibres were identified beyond the work zone. Investigation would be extended if asbestos fibres were identified at a frequency which indicated that impact could exceed the nominal 20m range. Control of air-borne dust is the primary measure used to minimise the potential for generation of air-borne asbestos fibres during remediation works.

## 8.9. Managing unexpected contamination

An unexpected find can be broadly defined as:

- Encountering ‘suspicious’ material such as, but is not limited to the following, oily materials or materials with unusual odours, drums, metal or plastic chemical containers, buried solid waste, ash, slag, coke or brightly coloured material, putrescible or other biological waste, etc.

An unexpected finds procedure should be included in the CEMP to manage such occurrences and construction workers should be made aware of their responsibilities under the procedure during the site’s induction process. This is recommended so that workers directly involved in earthworks activities understand the nature of these occurrences and what processes to follow upon their discovery.

An addendum to this RAP would be provided should unexpected contamination be discovered resulting in remediation objectives not being able to be met under the existing RAP.

## 9. Quality control plan

The quality assurance/quality control plan described in the following subsections is designed to achieve the predetermined Data Quality Objectives (DQOs) that will demonstrate accuracy, precision, comparability, representativeness and completeness of the data generated and the procedures for assessing the DQOs are met. DQOs are included in Appendix B.

### 9.1. Soil sampling methodology

#### 9.1.1. General

Sample collection will be undertaken with the assistance of an excavator or as a manual grab sample from directly from the excavation. Where an excavator is used, samples will be collected as manual grab samples from the centre of the excavator bucket to avoid potential cross-contamination.

Soil samples from the stockpiles will be collected by hand at least 0.3m below the surface of the stockpile to obtain a representative sample.

A new pair of disposable nitrile gloves will be used for handling each sample.

All samples will be transported in secure containers (e.g. ice chests or boxes) to a NATA accredited laboratory under chain of custody control.

### **9.1.2. Sampling asbestos in soil**

Sampling asbestos in soil will be carried out in accordance with the WA DOH (2009) guidelines. A 10L sample will be collected from the relevant stratum. Once the sample has been screened for bonded ACM, a 500mL subsample will be collected from the finer material passing the 7mm mesh and placed in a zip-lock bag. Any potential ACM fragments found during the screening process will also be placed in a separate zip-lock bag.

### **9.1.3. Sampling for other contaminants (if required)**

Soil samples will be placed in clean, laboratory prepared and supplied 250mL glass jars, which will be filled to minimise headspace and immediately sealed with Teflon lined caps to reduce the loss of volatiles. Samples will be then labelled and placed directly into ice filled cooler boxes for temporary storage and then later transport to the laboratory.

If petroleum hydrocarbon contamination is suspected, a portion of each soil sample will be placed inside a sealed plastic bag for field headspace screening for volatile organic compounds (VOCs). Samples will be screened using a PID which will be calibrated daily using 100ppm isobutylene calibration gas prior to use.

## **9.2. Field quality control procedures**

For each sampling event for contaminants other than asbestos, field quality control will include the following:

- Soil sampling and field screening will be performed in accordance with procedures listed in Schedule B2 of the National Environment Protection (Assessment of Site Contamination) Measure 1999 amended 2013 (NEPM) and relevant Australian Standards for environmental sampling by a practitioner who is deemed competent in asbestos sampling;
- Duplicate (split and blind) and rinsate samples, trip spike and blank samples are not required for asbestos assessment and these will only apply should a requirement for other contaminant testing arise during remediation (e.g. waste classification). Should other contaminant testing occur, quality samples will be collected at the frequency recommended in NEPM Schedule B2.
- There are no specific preservation requirements for asbestos, except that samples are double bagged for safety reasons.

## **9.3. Laboratory quality control and assurance**

NATA accredited laboratories only will be used for asbestos identification in accordance with Australian Standard Method for the Qualitative Identification of asbestos in bulk samples (AS4964-2004). At the Site Auditor's suggestion, inter-laboratory duplicate samples will be collected and submitted for asbestos analysis at a rate of 1 duplicate for 20 primary samples. The primary and duplicate pair will be prepared by homogenising a sufficient quantity of soil and splitting that quantity evenly between the primary and duplicate sample.

For contaminants other than asbestos, the laboratory will implement a quality control plan conforming to NEPM Schedule B (3) Guidelines for Analysis of Potentially Contaminated Soils.

Where applicable, Coffey will assess laboratory quality control data by:

- Checking that the results reported are consistent with field observations;
- Checking that the reporting limits and procedures are satisfactory;
- Checking that the samples are analysed within holding times and that NATA accredited methods were used to determine the result;
- Where data quality indicators are not met, the data and quality control measures will be reviewed to assess whether this was due to field procedures, laboratory procedures, sample heterogeneity or other reasons.

## **10. Validation plan**

### **10.1. Objective**

The objective of the validation plan is to provide a program of work that is adequate to demonstrate whether the remediation goals discussed in Section 7.1 have been met, or otherwise.

### **10.2. Validation methodology**

Validation soil sampling will be completed with reference to the following guidelines (as applicable for the respective remedial area and contaminants):

- NEPM Schedule B1, Guideline on Investigation levels For Soil and Groundwater, Section 4 Asbestos materials in soil.
- NSW EPA (1995) Sampling Design Guidelines.
- WA DOH (2009) Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia.

The validation methodology uses a combination of field observations and field screening to assess effective removal of impacted soils. Soil samples will be collected to confirm field observations where friable asbestos is identified. If assessment criteria are met, then AMP controls will cease in areas where friable asbestos is being removed.

Validation procedures, quality control and assessment criteria are described in the following sections.

### **10.3. Validation sampling**

Validation sampling of the remedial excavation and following removal of stockpiles will depend on the following:

- Whether the asbestos is bonded or friable;
- If the excavation is terminated within fill material or natural;
- Condition of the ACM.

Upon completion of excavation works, a visual inspection of the walls and base will be undertaken.

Where the soil is clayey and in an undisturbed natural condition, then a photographic record of the excavated surface will be made as evidence of validation. Where the soil is clayey and is disturbed

Where the soil is amenable to tilling with a rake, inspection will involve two passes along the walls and base with a rake, with a 90° direction change between the passes. In areas where only bond ACM in good condition has been identified, no validation sampling will be undertaken. If no ACM is observed, the excavation would be considered successfully validated.

Validation soil sampling will be undertaken at excavations removing friable asbestos impact at TP21X and any other location where ACM fragments are assessed as being in poor condition. Validation sampling will be carried out in general accordance with the Western Australia Department of Health: Guidelines for the Assessment, Remediation and Management of Asbestos Contaminated Sites in Western Australia (WA DOH, 2009) and comprise the following:

- Sampling will be carried out every 5m along the excavation walls (assuming the depth of the excavation is <1m deep);
- Visually checking the base of the excavation to confirm absence of ACM;
- Collection one sample per 25m<sup>2</sup> of the base, with a minimum of 1 sample, number rounded up, if the excavation terminates in fill soil. If the excavation terminates on natural soils, a photographic record will be made and no soil validation sampling will be undertaken;
- Per sample location, 10 litres of material will be spread out for inspection on a contrasting colour material, or sieved through a 7mm sieve, and any ACM picked out and placed into a labelled zip lock bag for weighing by the analytical laboratory;
- One wetted 500ml sub sample will be collected for laboratory analysis for asbestos identification (AS4964-2004); and
- Where asbestos is detected in any sample, the concentration of asbestos as fragments (ACM) and as loose fibres (FA or AF) will be compared with the validation assessment criteria.

This validation process is considered to be consistent with Table 8 of the WA DOH (2009) guidelines.

At this stage, we have assumed existing stockpiles with inclusions of building rubble will be placed directly in the containment zone thus no validation sampling is required and a photographic record of the stockpile footprint will be made. An addendum to this RAP will be prepared should WSPT adopt Option 1 (Refer to Section 8.6.2).

The footprint of any stockpile of excavated asbestos impacted material placed outside an excavated area will be validated using the same approach as described for excavations of asbestos impact areas.

## 10.4. Validation assessment criteria

For Asbestos, Section 4 in NEPM Schedule B1 provides guidance on assessment of asbestos in soil. Section 4 also references the Western Australian Department of Health (WA DOH) Guidelines for the Assessment, Remediation and management of Asbestos-Contaminated Sites in Western Australia (2009).

NEPM Schedule B1 will be used to screen for health risks posed by asbestos if identified in validation samples. Using the above guidelines, Coffey proposes to adopt the following as the acceptance criteria for assessment:

- No visible fragments of asbestos containing material (ACM) present at the surface (surface defined as the upper 0.1m);
- No respirable fibres of asbestos identified in soil validation samples;
- The concentration of asbestos fines (AF) and/or friable asbestos (FA) should not exceed 0.001% w/w; and

- If one or more fragments of bonded ACM are found in validation samples, then the concentration of bonded ACM should not exceed
  - 0.05% w/w for commercial / industrial land use.
  - 0.04% w/w for residential with minimal access to soil.
  - 0.02% w/w for recreational open space areas.

Coffey notes that the southeastern corner of Pad 2 was identified as an area which has the potential for use as a children's playground. We note that this location may cover approximately 700m<sup>2</sup> and is on ground which consists of deep fill (more than 3m thick). If the location in plan coincides with an asbestos removal area, Coffey considers that the relevant exposure scenario for validation is commercial / industrial use because after placement of fill the exposure pathway from the remediation area is eliminated. Consequently, the more sensitive exposure scenario appropriate for a children's playground is not applicable to validation activity.

## 10.5. Validation of covering layer

The covering layer on the containment zone (interim and final) will be surveyed laterally and vertically and a competent practitioner will:

- Confirm that the cover layer leaves no asbestos impacted material exposed.
- Review pre and post survey data to confirm cover layer thickness and that it is appropriate relative to the design for that area.
- Documenting observations with site photographs showing areas following excavation and after covering and including this information in the validation report.
- This stage will be treated as a "hold point". If cover layer thickness is satisfactory, then the barrier fence around the containment zone will be erected (or extended or closed, as applicable).

## 10.6. Validation report

The laboratory data will be reviewed and assessed against the predetermined DQO's and DQI's. The data that is accepted will be compared to the validation assessment criteria. Based on the comparison, the areas that have been satisfactorily remediated will be identified and will be flagged as "No Further Action Required". Where the remediation objectives have not been met, Coffey will communicate to WSTP which areas are requiring further remediation and/or management.

Upon completion of the remediation and validation activities, a validation report will be prepared and include the following information:

- Summary of previous investigations;
- Summary of remediation works, with emphasis on material tracking records;
- Summary of validation results and field observations;
- Waste classification (if required);
- Any further investigations that may have been carried out during the course of site activities;
- Disposal and imported materials dockets (if required);
- Figures and photos showing remediation and validation activities and sampling locations;
- Site survey plan which will include specific detail of the asbestos containment zone including a cross section.

The validation report will be consistent with relevant recommendations in NSW EPA Guidelines for Consultants Reporting on Contaminated Sites. The report will provide a statement as to whether the objectives of the remediation have been met.

This report must be submitted to relevant authorities (i.e. Department of Planning) following completion, to comply with development consent conditions.

## **11. Environmental management plan for remediation**

The main environmental impact associated with the proposed remedial works will be associated with the removal of contaminated soil. Typically soil removed from excavation will be either temporarily stockpiled or directly placed into waiting trucks for transfer to the containment zone.

Any stockpiled material that is not moved within a day will be enclosed by silt-trapping barriers for the control of silt and surface water runoff. Sediment erosion control devices shall be installed and will be maintained throughout the remediation process. We understand that a CEMP will be developed by earthworks contractor and the relevant elements of the items below should be properly addressed in the CEMP.

### **11.1. Air Emissions**

The main type and source of air emissions from the site during remedial activities will be dust and other particulates generated during soil disturbance. Dust and particulates are discussed in the following section. The actual concentrations of the air emissions will vary depending on weather conditions and the composition of the impacted soils. During removal of asbestos impacted material, air monitoring will be undertaken at the site as required by the AMP.

No other chemical emissions, such as petroleum hydrocarbons are expected.

Records of air monitoring conducted during excavation works will be made available to relevant regulatory officers upon request.

### **11.2. Dust**

The remedial works will involve excavation of a shallow layer of soil, stockpiling, transportation and placement of soil, and general movement of vehicles across the site. As such, dust generation is considered a potential environmental impact to the surrounding environment and the public.

The following management measures will be implemented to prevent dust impacts.

#### **11.2.1. General Work Area**

- Where the area of remediation is within 20m of a public road (except for the M7 Motorway), a fence covered with high density woven shade-cloth will be erected as a barrier between the remediation work zone and public land; and
- A communication and complaints register will be operated on site to ensure that any concerns of local residences and businesses are recorded and addressed.

### **11.2.2. Excavation Areas**

- Emission of air-borne dust beyond the immediate area of excavation will be kept to a practical minimum by regular application of water across exposed soil areas, including any roads within the site; and
- If dust migration from excavation areas is considered excessive due to high winds and cannot be controlled with water, the works will be delayed or limited during these periods.

### **11.2.3. Stockpile Areas**

- Temporary stockpiling of the impacted soils may result in dust generation. When stockpiles are not in active use, the material will be covered by a high density polyethylene (HDPE) sheet which will reduce the potential of dust generation;
- Where stormwater from the stockpile location has the potential to discharge onto the verge of a public road, silt fencing and/or hay bales should be placed around stockpiled soils to filter runoff;
- Stockpiles will be positioned where erosion of the stockpile by overland flow will be minimised;
- Stockpiles should be covered securely to prevent erosion by rain;
- Regular dampening of stockpiles with water mist may be carried out to minimise dust generation. Note that the amount of water used for dust suppression needs to be minimal in order to prevent runoff; and
- For remediation areas where a fence on the adjacent site boundary is required, stockpiles will not exceed the height of the fencing in order to reduce dust spreading to the surrounding environment.

### **11.2.4. Haulage of Soils**

- All trucks transporting asbestos impacted soil must be covered in order to minimise dust generation;
- Consideration for a tyre grid/wash may be required to prevent soil being transported off site via vehicular movement to and from the site.
- All vehicles involved with handling asbestos impacted soil must be washed down in a designated area which has a trap for sediment from wash-down water before leaving the site or being reassigned to activity in an area with low likelihood of asbestos impact.

## **11.3. Noise Controls**

Any noise impact associated with the site works is acknowledged as an important environmental issue. Some noise will be generated during the excavation activities when using machinery such as excavators, backhoes and soil screening equipment.

Contractors are bound to comply with the statutory regulations regarding noise limitations in residential and commercial areas, and hours as restricted by Blacktown City Council.

If these measures are not sufficient to reduce noise levels, a noise monitoring program may be implemented. This program would involve short term operator attended noise surveys at the noise source, as well as at surrounding properties to quantify the contribution of noise levels from the site to the ambient background levels.

## 11.4. Stormwater and Sediment Control

At this stage we anticipate excavated soils will be stockpiled directly on the ground surface adjacent to the excavation. The stockpiled soils should be bunded with adequate provision for off-site stormwater control. This can include providing silt fencing and hay bales around the stockpiled soils. The following general soil erosion and sedimentation control measures will be implemented for the proposed works:

- Controls for stockpiles are discussed in Section 11.2.3;
- Ensuring silt fencing and hay bales will cope with high rainfall events particularly on the down gradient sides of each stockpile;
- Have additional sediment erosion and control structures readily available on site in case installed controls fail;
- An inspection of all vehicles ending work involving asbestos impacted material will be completed to ensure soil is not transported to other parts of the site or off-site; and
- Regular maintenance will be undertaken to replace damaged sediment control structures and maintain and improve other temporary measures as required.

## 11.5. Water Management

Seepage water and stormwater may collect and accumulate in open excavations. Based on the level of contamination present, any accumulated water will be pumped out of excavations and reused on site for dust suppression.

Surface water runoff must also be directed away from the excavations and onsite watercourses where possible through use of bunding or sand bags (or similar).

## 11.6. Waste Disposal

The general waste generated from remedial activities may include domestic rubbish, disposable PPE and disused sediment and erosion control structures. The domestic rubbish and disposable PPE will be collected and disposed of appropriately at regular intervals (say weekly). Disposal of disused sediment and erosion control structures used at the site for this project will be disposed off-site to landfill. General waste potentially containing asbestos should be handled and disposed of according to protocols outlined in the AMP.

A relatively small volume of water may be used in the decontamination of sampling equipment will also require disposal at the end of each day. It is proposed that this water will be spread over stockpiled soils which will be placed in the containment zone.

## 11.7. Traffic

Excavation and other equipment will be transported to the area in accordance with standard regulatory requirements. It is expected that an internal traffic control plan will be developed by the construction contractor to ensure the safe movement of light and heavy vehicles across the site.

## 11.8. Working hours

Working hours for on-site remedial works will be completed in accordance with Blacktown City Council requirements. The working hours would need to be checked with Council but typically include:

- 7am to 6pm Monday to Friday (inclusive);
- 8am to 5pm Saturdays; and
- No construction or demolition activity on Sundays and Public Holidays if audible at any residential premise or other sensitive noise receptor.

## 11.9. Access restriction

Access to the remediation area will be restricted solely to authorised staff and contractors who have been inducted and have appropriate levels of personal protective equipment. Temporary and/or permanent fencing will be used to limit unauthorised access, depending on the particular location of the remediation area.

Signage, including contractor details and contact numbers, place near site entrance or at site office. The signage will remain displayed on the site entrance throughout the duration of the remediation works.

The site supervisor shall control site access and shall authorise visitors on an “as needed” basis.

## 12. Occupational health and safety

The environmental consultant, in compliance with the NSW *Work Health and Safety Act 2010* and associated regulations and codes of industry practice, will prepare a safety plan prior to the commencement of the remedial and validation works in order to protect workers at the site as well as people in the surrounding areas. The Site Safety Plan (SSP) would consider the following.

- Hazard Identification and Control;
- Air monitoring during earthworks;
- Chemical Hazard Control;
- Handling Procedures;
- Personal Protective Equipment;
- Work Zones;
- Decontamination procedures;
- Contingency Plans; and
- Incident Reporting.

The SSP will be periodically reviewed and updated prior to various project tasks being conducted. It will be specifically written for all onsite tasks relating to guiding remedial works, air monitoring and validating remedial areas. The environmental consultant will be required to work strictly to this plan.

All staff will require inductions by the Class A licensed asbestos removalist prior to entering the designated work area for removal of soil impacted by friable asbestos.

## 13. Environmental incidents and communication

### 13.1. Environmental incident response

In the event of a major environmental incident, Site Supervisor will contact:

**Table 6: Incident response contacts**

Service or Contact	Phone number and/or Address
The fire brigade/ambulance/police	000
WSPT project manager:	TBA
Hansen Yuncken project manager:	TBA
NSW EPA	131 555
NSW WorkCover	131 050
Blacktown City Council:	<ul style="list-style-type: none"> <li>A: 62 Flushcombe Road, Blacktown</li> <li>P: (02) 9839 6000 (emergency) or 1300 133 491 (general enquires)</li> </ul>
Mt Druitt Hospital:	<ul style="list-style-type: none"> <li>A: 75 Railway Street, Mt Druitt</li> <li>P: (02) 9881 1555</li> </ul>
Mt Druitt Police Station:	<ul style="list-style-type: none"> <li>A: Cnr Luxford Road &amp; Kelly Close, Mt Druitt</li> <li>P: (02) 9675 0699</li> </ul>
Mt Druitt Fire Station	<ul style="list-style-type: none"> <li>A: Cnr Belmore Road &amp; Varian Street, Mt Druitt</li> <li>P: (02) 9625 4403</li> </ul>

Other emergency numbers will be included in the SSP.

An example of a major incident would include significant spillage of hazardous or toxic liquids to stormwater or sewer.

In the case of minor incidents (such as an oil spillage from a burst hydraulic hose), the Site Supervisor should respond to the incident. Site workers are required to report any accidents or incidents to the Site Supervisor at the work site. The Site Supervisor will forward any accidents or incidents to WSTP.

The earthworks contractor will bring to site a "spill kit" which includes absorbents (such as socks, mats, pillows saw dust or equivalent) capable of containing up to 50L of hydrocarbons. These will be applied by the contractor immediately in the event of a spill.

### 13.2. Community relations

The procedures outlined in the RAP intend that the impact on the surrounding community from the site works will be minimal. Inquiries regarding environmental and contamination issues from

members of the local community and neighbouring properties will be documented and referred to WSPT.

### 13.3. Complaints management

Any complaints received shall be recorded and attended to promptly in consultation with the WSTP. On receiving a complaint, works will be reviewed to determine whether issues relating to the complaint can be avoided or minimised. Proposed feedback to the complainant will be reviewed by the WSTP prior to explaining what outcomes have resulted.

## 14. Conclusions

Asbestos impact to soil, mostly in the form of fragments of Bonded ACM, is the contamination which currently makes the site unsuitable for its planned use. The sources of asbestos impact are either remnant fragments of ACM used in former buildings (known as fibro) and ACM entrained in uncontrolled fill materials placed in stockpiles at various locations around the site, but mostly at the southern end of the site. Redevelopment of the site commences with Phase 1 Early Works which comprises bulk earthworks to change the naturally sloping topography into four large level areas amenable for future use as retail centres or retirement residential facilities.

The bulk earthworks provides an opportunity for isolation of asbestos impacted materials in one or more containment zones which will have a final cover of 3m of fill placed for pad construction. The asbestos impacted material may require mixing with more granular fill to achieve an acceptable geotechnical performance. Remediation areas will be validated after asbestos impacted material is removed. Controls will be placed on storage and transport of asbestos impacted material so that potential for incidental contamination of other areas of the site does not occur.

Coffey concludes that, through implementation of the RAP by a competent contractor with advice from a suitably qualified environmental consultant, the site can be made suitable for its planned use.

## 15. References

1. **Douglas Partners Pty Ltd (2009)** Proposed Redevelopment Parcel 2.4, Western Sydney Parklands Rooty Hill Road South, Doonside, NSW (Report Ref: 71065.02, November 2009).
2. **CDM Smith Australia Pty Ltd (2012)** Sampling, Analytical and Quality Plan, Eastern Creek Business Hub, Rooty Hill Road South, Rooty Hill NSW (Report Ref: S12388.01\_SAQP\_17Aug12, dated 17 August 2012).
3. **CDM Smith Australia Pty Ltd (2013)** Eastern Creek Business Hub Environmental Site Assessment, Rooty Hill Road South, Rooty Hill, NSW (Report Ref: MN - S12388 01\_ECBH ESA (Draft 1.2f) 11Feb2013 - Clean.docx, dated 13 February 2013).
4. **Consara Pty Ltd (2013a)** Concept RAP for Eastern Creek Business Hub, Rooty Hill Road South, Rooty Hill, NSW (Report Ref: C121009\_CRAP\_08Apr13.docx, dated 8 April 2013).
5. **Consara Pty Ltd (2013b)** RAP Phase 1 Early Works for Eastern Creek Business Hub Rooty Hill Road South, Rooty Hill, NSW (Report Ref: C121009\_P1RAP\_25Jun13.docx, dated 25 June 2013).

6. **E3 Consulting Australia Pty Ltd (2012)** Advice Relating to the Contamination Status of Soil and Groundwater, Formerly Precinct 2.4 of Western Sydney Parklands (Letter Ref: S12388.01, dated 2 May 2012).
7. **JBS Environmental Pty Ltd (2013)** Site Audit Report for Eastern Creek Business Hub Rooty Hill Road South, Rooty Hill, NSW (Report Ref: JBS42270-53571, dated April 2013).
8. **NEPC (2013)** National Environmental Protection (Assessment of Site Contamination) Measure 1999, as amended in 2013, National Environment Protection Council;
9. **NSW DEC (2006)** Guidelines for the NSW Auditor Scheme 2<sup>nd</sup> Edition;
10. **NSW EPA (1995)** Sampling Design Guidelines;
11. **NSW EPA (2014)** Waste Classification Guidelines: Part 1: Classifying Waste.
12. **NSW EPA (2014)** Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014 - The excavated natural material order 2014;
13. **NSW OEH (2011)** Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites, OEH 2011/0650, ISBN 0 7310 3892 4, Office of Environment and Heritage, Sydney;
14. **WA DOH (2009)** Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia.

# Important information about your Coffey Environmental Report

## Introduction

This report has been prepared by Coffey for you, as Coffey's client, in accordance with our agreed purpose, scope, schedule and budget.

The report has been prepared using accepted procedures and practices of the consulting profession at the time it was prepared, and the opinions, recommendations and conclusions set out in the report are made in accordance with generally accepted principles and practices of that profession.

The report is based on information gained from environmental conditions (including assessment of some or all of soil, groundwater, vapour and surface water) and supplemented by reported data of the local area and professional experience. Assessment has been scoped with consideration to industry standards, regulations, guidelines and your specific requirements, including budget and timing. The characterisation of site conditions is an interpretation of information collected during assessment, in accordance with industry practice,

This interpretation is not a complete description of all material on or in the vicinity of the site, due to the inherent variation in spatial and temporal patterns of contaminant presence and impact in the natural environment. Coffey may have also relied on data and other information provided by you and other qualified individuals in preparing this report. Coffey has not verified the accuracy or completeness of such data or information except as otherwise stated in the report. For these reasons the report must be regarded as interpretative, in accordance with industry standards and practice, rather than being a definitive record.

## Your report has been written for a specific purpose

Your report has been developed for a specific purpose as agreed by us and applies only to the site or area investigated. Unless otherwise stated in the report, this report cannot be applied to an adjacent site or area, nor can it be used when the nature of the specific purpose changes from that which we agreed.

For each purpose, a tailored approach to the assessment of potential soil and groundwater contamination is required. In most cases, a key objective is to identify, and if possible quantify, risks that both recognised and potential contamination pose in the context of the agreed purpose. Such risks may be financial (for example, clean up costs or constraints on site use) and/or physical (for example, potential health risks to users of the site or the general public).

## Limitations of the Report

The work was conducted, and the report has been prepared, in response to an agreed purpose and scope, within time and budgetary constraints, and in reliance on certain data and information made available to Coffey.

The analyses, evaluations, opinions and conclusions presented in this report are based on that purpose and scope, requirements, data or information, and they could change if such requirements or data are inaccurate or incomplete.

This report is valid as of the date of preparation. The condition of the site (including subsurface conditions) and extent or nature of contamination or other environmental hazards can change over time, as a result of either natural processes or human influence. Coffey should be kept apprised of any such events and should be consulted for further investigations if any changes are noted, particularly during construction activities where excavations often reveal subsurface conditions.

In addition, advancements in professional practice regarding contaminated land and changes in applicable statutes and/or guidelines may affect the validity of this report. Consequently, the currency of conclusions and recommendations in this report should be verified if you propose to use this report more than 6 months after its date of issue.

The report does not include the evaluation or assessment of potential geotechnical engineering constraints of the site.

## Interpretation of factual data

Environmental site assessments identify actual conditions only at those points where samples are taken and on the date collected. Data derived from indirect field measurements, and sometimes other reports on the site, are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact with respect to the report purpose and recommended actions.

Variations in soil and groundwater conditions may occur between test or sample locations and actual conditions may differ from those inferred to exist. No environmental assessment program, no matter how comprehensive, can reveal all subsurface details and anomalies. Similarly, no professional, no matter how well qualified, can reveal what is hidden by earth, rock or changed through time.

The actual interface between different materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but

steps can be taken to reduce the impact of unexpected conditions.

For this reason, parties involved with land acquisition, management and/or redevelopment should retain the services of a suitably qualified and experienced environmental consultant through the development and use of the site to identify variances, conduct additional tests if required, and recommend solutions to unexpected conditions or other unrecognised features encountered on site. Coffey would be pleased to assist with any investigation or advice in such circumstances.

### **Recommendations in this report**

This report assumes, in accordance with industry practice, that the site conditions recognised through discrete sampling are representative of actual conditions throughout the investigation area. Recommendations are based on the resulting interpretation.

Should further data be obtained that differs from the data on which the report recommendations are based (such as through excavation or other additional assessment), then the recommendations would need to be reviewed and may need to be revised.

### **Report for benefit of client**

Unless otherwise agreed between us, the report has been prepared for your benefit and no other party. Other parties should not rely upon the report or the accuracy or completeness of any recommendation and should make their own enquiries and obtain independent advice in relation to such matters.

Coffey assumes no responsibility and will not be liable to any other person or organisation for, or in relation to, any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report.

To avoid misuse of the information presented in your report, we recommend that Coffey be consulted before the report is provided to another party who may not be familiar with the background and the purpose of the report. In particular, an environmental disclosure report for a property vendor may not be suitable for satisfying the needs of that property's purchaser. This report should not be applied for any purpose other than that stated in the report.

### **Interpretation by other professionals**

Costly problems can occur when other professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, a suitably qualified and experienced environmental consultant should be retained to explain the implications of the report to other professionals referring to the report and then review plans and specifications produced to see how other professionals have incorporated the report findings.

Given Coffey prepared the report and has familiarity with the site, Coffey is well placed to provide such

assistance. If another party is engaged to interpret the recommendations of the report, there is a risk that the contents of the report may be misinterpreted and Coffey disowns any responsibility for such misinterpretation.

### **Data should not be separated from the report**

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, laboratory data, drawings, etc. are customarily included in our reports and are developed by scientists or engineers based on their interpretation of field logs, field testing and laboratory evaluation of samples. This information should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

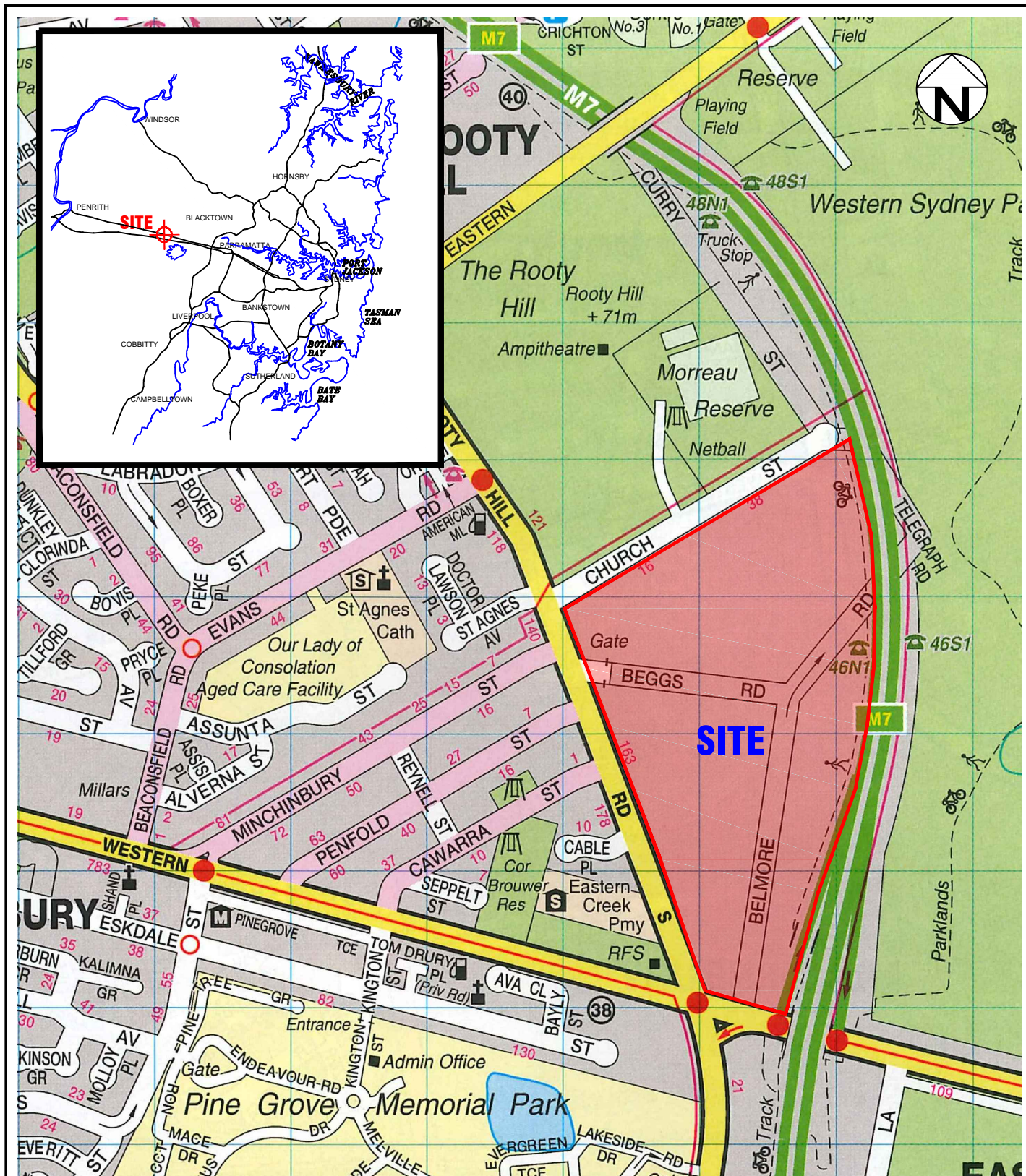
This report should be reproduced in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

### **Responsibility**

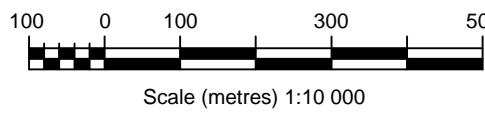
Environmental reporting relies on interpretation of factual information using professional judgement and opinion and has a level of uncertainty attached to it, which is much less exact than other design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. As noted earlier, the recommendations and findings set out in this report should only be regarded as interpretive and should not be taken as accurate and complete information about all environmental media at all depths and locations across the site.

## Appendix A – Figures

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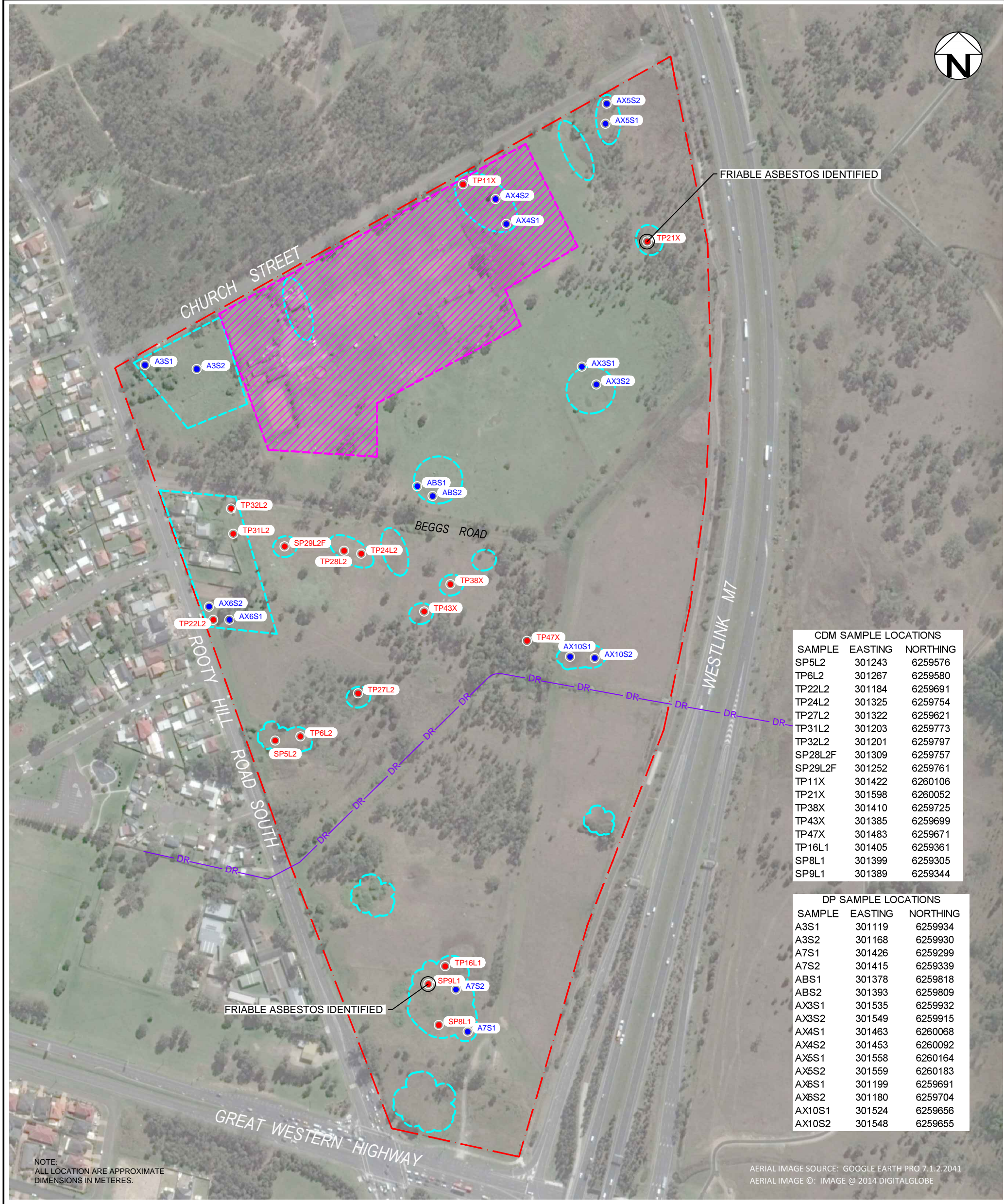
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drawn	MV
approved	MD
date	20/07/15
scale	AS SHOWN
original size	A4



client:	WESTERN SYDNEY PARKLANDS TRUST		
project:	REVISED EARLY WORKS REMEDIATION ACTION PLAN BETWEEN M7 MOTORWAY, ROOTY HILL ROAD SOUTH AND CHURCH STREET, EASTERN CREEK, NSW		
title:	SITE LOCALITY PLAN		
project no:	ENAUHOD04683AC-R01	figure no:	FIGURE 1
		rev:	A



CDM SAMPLE LOCATIONS		
SAMPLE	EASTING	NORTHING
SP5L2	301243	6259576
TP6L2	301267	6259580
TP22L2	301184	6259691
TP24L2	301325	6259754
TP27L2	301322	6259621
TP31L2	301203	6259773
TP32L2	301201	6259797
SP28L2F	301309	6259757
SP29L2F	301252	6259761
TP11X	301422	6260106
TP21X	301598	6260052
TP38X	301410	6259725
TP43X	301385	6259699
TP47X	301483	6259671
TP16L1	301405	6259361
SP8L1	301399	6259305
SP9L1	301389	6259344

DP SAMPLE LOCATIONS		
SAMPLE	EASTING	NORTHING
A3S1	301119	6259934
A3S2	301168	6259930
A7S1	301426	6259299
A7S2	301415	6259339
ABS1	301378	6259818
ABS2	301393	6259809
AX3S1	301535	6259932
AX3S2	301549	6259915
AX4S1	301463	6260068
AX4S2	301453	6260092
AX5S1	301558	6260164
AX5S2	301559	6260183
AX6S1	301199	6259691
AX6S2	301180	6259704
AX10S1	301524	6259656
AX10S2	301548	6259655

NOTE:  
ALL LOCATION ARE APPROXIMATE  
DIMENSIONS IN METERS.

AERIAL IMAGE SOURCE: GOOGLE EARTH PRO 7.1.2.2041  
AERIAL IMAGE ©: IMAGE @ 2014 DIGITALGLOBE

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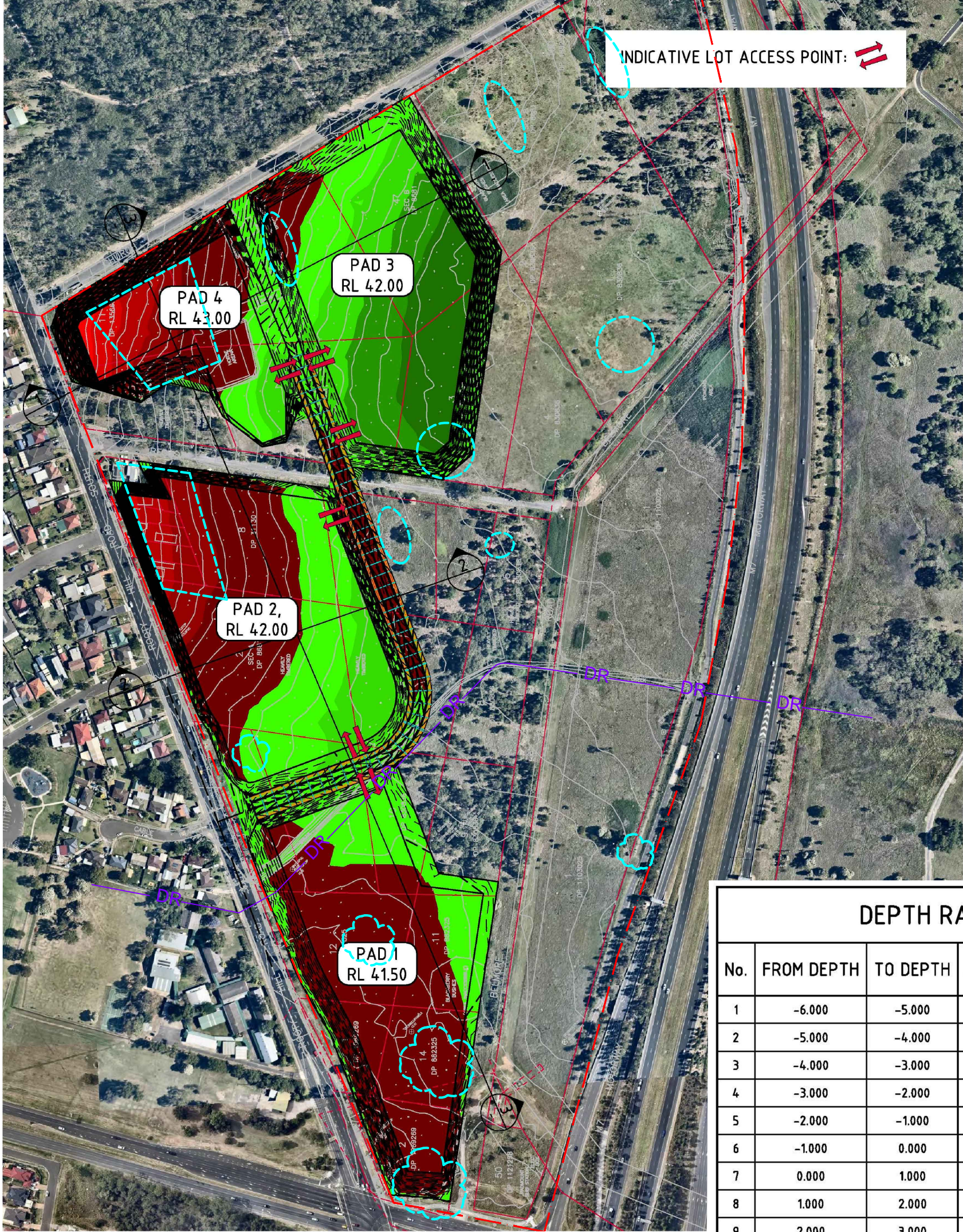
no.	description	drawn	approved	date
A	ORIGINAL ISSUE			

**LEGEND**

- APPROXIMATE SITE BOUNDARY
- SUSPECTED ASBESTOS IMPACT
- FORMER MARKET GARDEN
- DR — STORM DRAINAGE CHANNEL
- CDM SMITH SAMPLES
- DP SAMPLES

	drawn	MV
	approved	MD
	date	20/07/15
	scale	AS SHOWN
	original size	A3

client:	WESTERN SYDNEY PARKLANDS TRUST		
project:	REVISED EARLY WORKS REMEDIATION ACTION PLAN BETWEEN M7 MOTORWAY, ROOTY HILL ROAD SOUTH AND CHURCH STREET, EASTERN CREEK, NSW		
title:	SITE LAYOUT PLAN		
project no:	ENAUHOD04683AC-R01	figure no:	FIGURE 2
rev:	A		



INDICATIVE LOT ACCESS POINT:

PAD 3  
RL 42.00

PAD 4  
RL 43.00

PAD 2,  
RL 42.00

PAD 1  
RL 41.50

SOURCE: COSTINROE CONSULTING, C012693.00-SKC11, 23.01.2015.

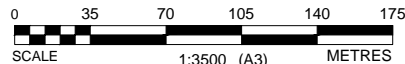
DEPTH RANGE				
No.	FROM DEPTH	TO DEPTH	COLOUR	DEPTH RANGE VOLUME
1	-6.000	-5.000		107m <sup>3</sup>
2	-5.000	-4.000		1056m <sup>3</sup>
3	-4.000	-3.000		3671m <sup>3</sup>
4	-3.000	-2.000		9196m <sup>3</sup>
5	-2.000	-1.000		19308m <sup>3</sup>
6	-1.000	0.000		49237m <sup>3</sup>
7	0.000	1.000		56480m <sup>3</sup>
8	1.000	2.000		25578m <sup>3</sup>
9	2.000	3.000		13661m <sup>3</sup>
10	3.000	4.000		2925m <sup>3</sup>

IMAGE SOURCE: HANSEN YUNCHEN, 12693.00-SKC31, 2015.

no.	description	drawn	approved	date
A	ORIGINAL ISSUE			

**LEGEND**

- APPROXIMATE SITE BOUNDARY
- SUSPECTED ASBESTOS IMPACT
- STORM DRAINAGE CHANNEL



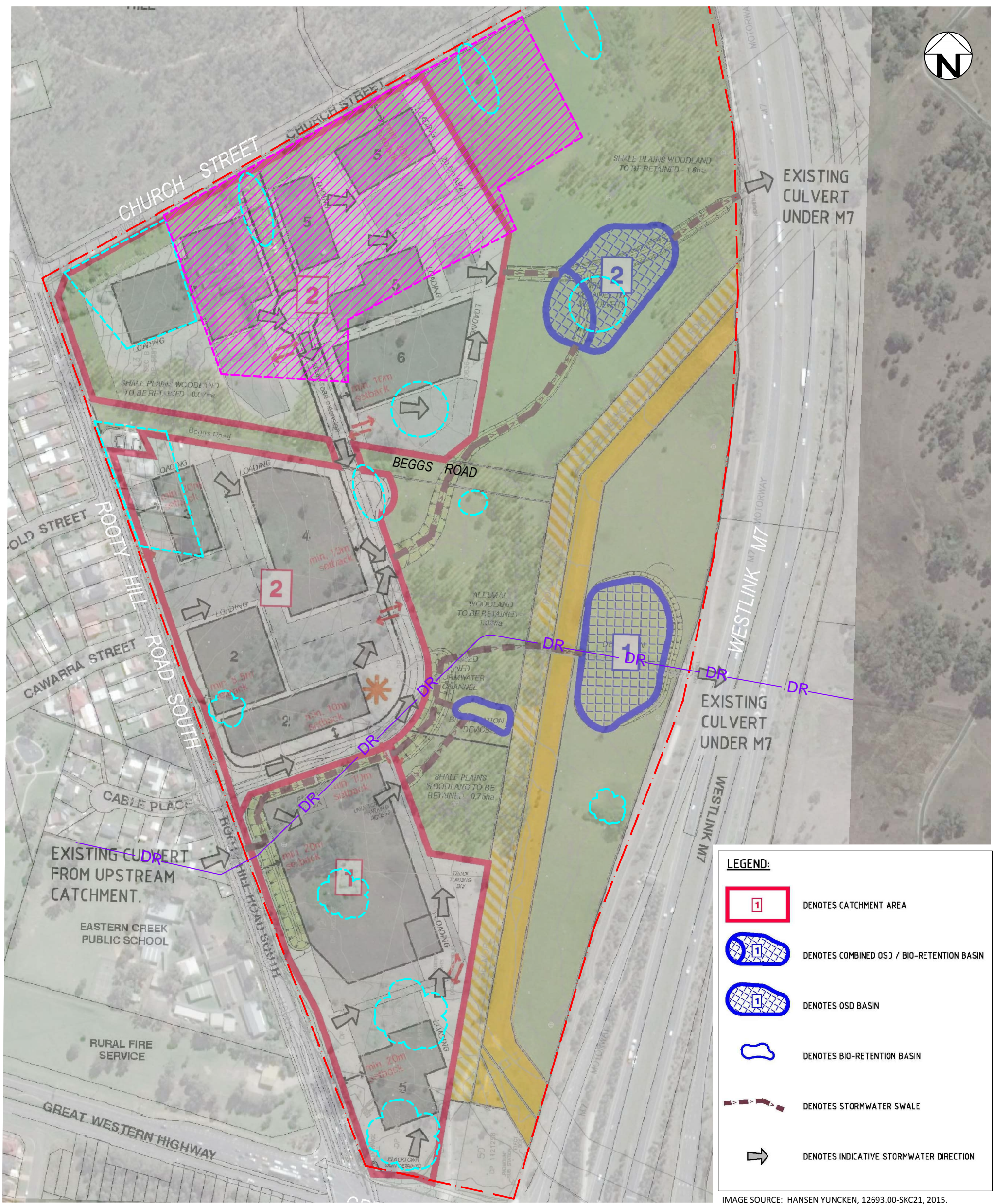
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approved	MD
date	20/07/15
scale	AS SHOWN
original size	A3



client:	WESTERN SYDNEY PARKLANDS TRUST		
project:	REVISED EARLY WORKS REMEDIATION ACTION PLAN BETWEEN M7 MOTORWAY, ROOTY HILL ROAD SOUTH AND CHURCH STREET, EASTERN CREEK, NSW		
title:	CUT AND FILL		
project no:	ENAUHOD04683AC-R01	figure no:	FIGURE 3
		rev:	A

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**LEGEND:**

- 1 DENOTES CATCHMENT AREA
- 1 DENOTES COMBINED OSD / BIO-RETENTION BASIN
- 1 DENOTES OSD BASIN
- 1 DENOTES BIO-RETENTION BASIN
- DENOTES STORMWATER SWALE
- ➔ DENOTES INDICATIVE STORMWATER DIRECTION

IMAGE SOURCE: HANSEN YUNCKEN, 12693.00-SKC21, 2015.

no.	description	drawn	approved	date
A	ORIGINAL ISSUE			

**LEGEND**

- APPROXIMATE SITE BOUNDARY
- 1 SUSPECTED ASBESTOS IMPACT
- 1 FORMER MARKET GARDEN
- STORM DRAINAGE CHANNEL

NOTE:  
ALL LOCATION ARE APPROXIMATE DIMENSIONS IN METERS.

Scale (metres) 1:3000

drawn	MV
approved	MD
date	20/07/15
scale	AS SHOWN
original size	A3



client:	WESTERN SYDNEY PARKLANDS TRUST		
project:	REVISED EARLY WORKS REMEDIATION ACTION PLAN BETWEEN M7 MOTORWAY, ROOTY HILL ROAD SOUTH AND CHURCH STREET, EASTERN CREEK, NSW		
title:	DRAINAGE CHANNEL		
project no:	ENAUHOD04683AC-R01	figure no:	FIGURE 4
rev:	A		

## **Appendix B – Data Quality Objectives**

## DATA QUALITY OBJECTIVES

The following data quality objectives (DQO) are based on the requirements detailed in Appendix IV of the *Guidelines for the NSW Site Auditor Scheme (2<sup>nd</sup> edition)* (NSW DEC, 2006).

<b>Step 1: State the problem</b>	<p>The primary objective of the remediation and validation program is to:</p> <ul style="list-style-type: none"> <li>Relocate and contain asbestos impacted soil and ACM to make the site suitable for the proposed land uses, taking into consideration the protection of the broader community and environment.</li> </ul> <p>The main problems are:</p> <ul style="list-style-type: none"> <li>What evidence of removal of asbestos impacted material should be collected?</li> <li>What extent or frequency of evidence is needed to support a defensible conclusion about the condition of the site?</li> <li>What analytes should be tested?</li> </ul>
<b>Step 2: Identify the decision</b>	<ul style="list-style-type: none"> <li>Following remediation, is the Site suitable for the proposed land use?</li> <li>Based on the outcome of the remedial works, will other media (groundwater, surface water, vapour) require assessment?</li> <li>If fill is brought to the site, is it suitable for use?</li> <li>If waste is to be disposed off-site, what is its waste classification?</li> <li>Will the containment zone have sufficient capacity?</li> <li>Will a long term site management plan be required for the containment zone?</li> </ul>
<b>Step 3: Identify inputs to the decision</b>	<ul style="list-style-type: none"> <li>Information from previous environmental assessments undertaken at the site, including the Concept RAP and the Site Audit Report presenting findings relating to the Concept RAP;</li> <li>Field observations, PID screening results, soil laboratory results;</li> <li>Applicable NSW EPA guidelines endorsed under the NSW <i>Contaminated Land Management Act 1997</i> and WA DOH Guidelines for the Assessment, Remediation and management of Asbestos-Contaminated Sites in Western Australia (2009).</li> </ul>
<b>Step 4: Define the boundaries of the study</b>	<p>The Site is shown on Figure 3. The remediation boundaries are defined by the extent of asbestos found at the site. Vertically, the study boundary is the upper 0.1m and 0.15m of the soil profile.</p>
<b>Step 5: Develop a decision rule</b>	<p>The decision rule for soil for each identified contaminant/layer to assess the suitability of the site will be as follows:</p> <ul style="list-style-type: none"> <li>QA/QC assessment indicates that the data is usable;</li> <li>Where contaminant concentrations for each sample are below the validation acceptance criteria then no further assessment/remediation is required with respect to that contaminant/soil unit/area;</li> <li>Where contaminant concentrations are reported to exceed the validation acceptance criteria, additional excavation and validation works will be carried out to remove the identified impact.</li> <li>If ACM as friable asbestos is not observed in trial pits then earthworks can proceed without adopting controls outlined in the AMP.</li> </ul>
<b>Step 6: Acceptable limits on decision error</b>	<p>There are two types of decision errors:</p> <ul style="list-style-type: none"> <li>Sampling errors, which occur when the samples collected are not representative of the conditions within the remediation area; and</li> <li>Measurement errors, which occur during sample collection, handling, preparation, analysis and data reduction.</li> </ul> <p>The null hypothesis for this study is:</p>

	<ul style="list-style-type: none"><li>• Contaminant concentrations within the subsurface of the site are more than the proposed validation criteria.</li></ul> <p>These errors may lead the decision maker to make the following errors:</p> <ol style="list-style-type: none"><li>1. Deciding that the Site has been validated when it has actually not; and</li><li>2. Deciding that the Site has not been validated when it actually is.</li></ol> <p>Asbestos identification results are not amenable to statistical analysis..</p>
<b>Step 7: Optimise the design for obtaining data.</b>	The methodology for validation and numbers of validation samples/ locations selected will be based on the RAP as described in Section 8.6.

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