Douglas Partners
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Report on
Remediation Action Plan

Proposed Industrial Development
253 - 267 Aldington Road, Kemps Creek, NSW

Prepared for
RP Infrastructure Pty Ltd

Project 204098.04
February 2025

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The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

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1. Introduction

This report (Remediation Action Plan (RAP)) has been prepared by Douglas Partners Pty Ltd (DP) for RP Infrastructure Pty Ltd (RP Infrastructure) to accompany a State Significant Development Application (**SSDA**) for the construction and operation of an industrial estate comprising four warehouse buildings at 253 – 267 Aldington Road, Kemps Creek, NSW 2178 ('the site') (SSD-23480429). The site is shown on Drawing 1, Appendix A.

The application seeks consent for:

- Site Establishment:
  - Demolition and removal of existing rural residential structures including removal of farm dams;
  - Remediation as required; and
  - Bulk earthworks and retaining walls.
- Staged construction and operation of an industrial estate with a total gross floor area of 34,245 m2, maximum FSR of 0.34:1, maximum height of 19.7m (inclusive of rooftop plant), split over four warehouses contained within three buildings with ancillary hardstand and office spaces:
  - Stage 1
    - Warehouse 1A: 7,189m2 with 318m2 office space (total GFA – 7,507 m2)
    - Warehouse 1B: 7,060m2 with 307m2 office space (total GFA - 7,367 m2)
    - Warehouse 1C: 6,480m2 with 307m2 office space (total GFA - 6,787 m2)
  - Stage 2
    - Warehouse 2 (temperature controlled): 11,959 m2 with total 625 m2 office space (total GFA - 12,584 m2)
- Use of the buildings for warehouse and distribution purposes 24 hours per day 7 days per week;
- Ancillary development including:
  - Signage (A pylon estate sign and individual tenant identification and wayfinding signage);
  - Undercroft Car parking (149 vehicular spaces)
    - Warehouse 1A: 32 spaces
    - Warehouse 1B/1C: 61 spaces
    - Warehouse 2: 56 spaces
- Landscaping;
- Utility infrastructure and services connection;
- Stormwater management including naturalised open channel drainage as well as below ground on-site detention of stormwater;

- Construction of two new industrial roads. This includes an east-west road (Road 1) and north-south road (Road 2). These roads are proposed to be delivered with an interim and ultimate access design;
    - o Interim road design: half-road design for Road 1 and cul-de-sac at the northern end of Road 2; and
    - o Ultimate road design: full road design for Road 1 and connection to the lot to the north (removal of cul-de-sac) for Road 2. The ultimate road design will be delivered in co-ordination with the neighbouring landowners. The roads will be dedicated to Council once both the ultimate access design and the Aldington Road Intersection upgrade have been completed.
- Subdivision of the site into two Torrens title allotments in addition to a road reserve lot for Road 1, Road 2 and area for the Aldington Road widening and intersection upgrade located on the site; and
- Dedication of land required for the widening of Aldington Road and the part of the Aldington Road Intersection upgrade which is located on the site.

The proposed architectural plan for the site (Nettletontribe Pty Ltd Drawing No. 12253_DA002 Issue 11) is provided in Appendix A.

This report has been prepared to address the Secretary's Environmental Assessment Requirements (**SEARs**) issued for the project (SSD-23480429), dated 30 July 2021 and additional SEARs issued on 25 March 2022. It also addresses the Test of Adequacy comments received on 1 October 2021.

Specifically, this report has been prepared to respond to the SEARs requirement as outlined in Table 1 below.

Table 1: Secretary's Environmental Assessment Requirements (SEARs)

Item	Description of Requirement	Section reference (this report)
Contamination	Including an assessment of site suitability under the provisions of SEPP 55*.	Entirety of the report

* State Environmental Planning Policy (SEPP) No. 55 – Remediation of Land has been repealed and replaced by SEPP (Resilience and Hazards) 2021 (see below).

The investigation was undertaken in accordance with DP's proposal 204098.04.P.001.Rev0, dated 7 April 2022. DP has previously prepared a RAP (204098.04.R.001.Rev0; DP 2022), dated 1 July 2022. This report (204098.04.R.001.Rev2) was completed by DP, based on correspondence with RP Infrastructure, dated 14 September 2023 and 27 May 2024, to reflect requested SSDA updates and comments. It should be noted that apart from the requested updates and limited historical aerial review since the issue of DP (2022), other components of the report have not been reviewed and/or updated.

DP has previously prepared several contamination investigations for the site (referenced and discussed in Section 2.1) that identified asbestos-impacted fill at the site which requires remediation and further investigation/validation (visual or by sampling and analysis) of soils associated with several areas of environmental concern (AEC) at the site. This RAP documents the remediation, further investigation and validation process required to resolve the identified contamination at the site.

The following key guidelines were consulted in the preparation of this report:

- *State Environmental Planning Policy* (SEPP) *(Resilience and Hazards) 2021*;
- Planning Guidelines SEPP 55 – Remediation of Land (Department of Urban Affairs and Planning [DUAP], Environment Protection Authority [EPA], 1998) (NSW DUAP/EPA, 1998);
- NSW EPA *Guidelines for Consultants Reporting on Contaminated Land: Contaminated Land Guidelines* (NSW EPA, 2020); and

- CRC Care National Framework for Remediation and Management of Contaminated Sites in Australia ('the NRF'[1]).

1.1 Purpose

The purpose of this RAP is three-fold:

- Summarise the site background, proposed development, ground conditions and the findings of previous contamination investigations undertaken at the site;
- Document the necessary further investigation works, remediation and validation procedures to resolve contamination identified at the site, specifically within the identified AEC's (as detailed within Section 2.1); and
- Provide an unexpected finds protocol to be used should further possible contamination be observed during earthworks at the site.

1.2 Regulatory Compliance

The following regulatory compliance requirements, licences and approvals apply to the site and the remediation works and have been considered in the preparation of this RAP:

- *State Environmental Planning Policy* (SEPP) *(Resilience and Hazards) 2021*;
- Planning Guidelines SEPP 55 – Remediation of Land (Department of Urban Affairs and Planning [DUAP], Environment Protection Authority [EPA], 1998) (NSW DUAP/EPA, 1998);
- SafeWork NSW Code of Practice, *How to Safely Remove Asbestos* (SafeWork NSW, 2019);
- NSW Work Health and Safety Regulation 2017 (NSW WHS 2017); and
- Protection of the Environment Operations Act 1997 (POEO Act) for the transportation, treatment and disposal of wastes.

Based on available information, it is considered that the remediation works outlined in this report constitute Category 2 Remediation under Clause 4.13 of *SEPP (Resilience and Hazards) 2021*. The Council must be notified at least 30 days prior to the commencement of the remediation work unless alternative conditions are applicable under the development consent.

Although the above documents and regulations have been consulted in preparing this RAP, this does not absolve the parties defined in this RAP (see Section 9.1) of their responsibilities in the execution of this RAP.

2. The Site[2]

The site is known as 253 – 267 Aldington Road, Kemps Creek and is legally described as Lot 9 in Deposited Plan (D.P.) 253503, zoned General Industrial (IN1). The site is rectangular in shape with an area of approximately 10 hectares (ha).

[1] It is noted that the NRF is not currently formally endorsed by the NSW EPA.
[2] Information contained within Section 2.1 was adopted, as requested form Urbis document *Consultant Standard Text – 253-267 Aldington Road Kemps Creek,* dated 14 September 2023.

The site has a primary frontage along its eastern boundary to Aldington Road of 160 m, in which multiple access roads are present, and a depth of 630 m. The site is currently occupied by a dwelling house, sheds, three dams and agricultural land as shown in the aerial photograph in Figure 1 below. Kemps Creek runs within 500 m south west of site before joining South Creek, Mamre Road runs between these creeks and site.

The site is undulating in parts but longitudinally falls slightly from Aldington Road at a reduced level (RL) of 54.00 to the western boundary with an RL 44.00 which equates to an average grade of 1.5% or 1 V in 65 H. The site also falls across the site from north to south at 4.3% or 1 V in 23 H.

The site is burdened by a 60.96 m wide Transgrid easement which runs north – south through the site. The easement is known as 'Dapto – Sydney West 330 kV Easement' and there is presently no high voltage transmission line infrastructure present. The site is approximately 5 kilometres (km) northeast of the future Western Sydney International (Nancy-Bird Walton) Airport, 14 km south-east of Penrith CBD and 38 km west of the Sydney Central Business District (CBD). The site is located within the suburb of Kemps Creek, which falls within the Penrith Local Government Area (LGA). It is in the Mamre Road Precinct within the broader Western Sydney Employment Area (WSEA) and is currently surrounded by rural residential land uses.

Multiple state significant developments (SSDs) and local development applications (DAs) are currently being progressed for industrial and warehouse development within the Mamre Road Precinct which will substantially change the nature of the surrounding area. The regional context is shown below in Figure 1 (following page).

Figure 1: Site Context

The surrounding land uses include:

- North: Pastoral/farmland extends towards the elevated Bakers Lane. Several properties have been purchased by developers for industrial development;
- South: Farm and pastoral lands with rural residential properties scattered within the landscape. The Mamre Road precinct extends further beyond Abbotts Road. A locally listed heritage item is located at 282 Aldington Road to the southeast;
- East: The site is bound to the east by Aldington Road. On the opposite side of Aldington Road several properties have been purchased in seeking approval for industrial development. Land rises to the east which provides a natural screen to the residential E4 Environmental Living zone beyond; and
- West: Farm and pastoral lands to Mamre Road and beyond. Sites on Mamre Road have been purchased for industrial uses.

All land in the immediate surrounding context to the north, east and south has now been zoned for industrial uses.

At the time of the investigation (early 2021), one residence was located in the eastern section of the site with multiple caravans scattered across the site. The remainder of the site comprised rural land being used for farming or was unoccupied.

2.1 Previous Investigations

The site has been subject to the following contamination specific investigations:

- Douglas Partners Pty Ltd (2023) *Report on Preliminary Site Investigation with Limited Sampling (Contamination), Proposed Industrial Development, 253 – 267 Aldington Road, Kemps Creek,* ref. 204098.01.R.001.Rev3 (DP 2023 – the 'PSI');
- Douglas Partners Pty Ltd (2023a) *Report on HAZMAT Assessment, Proposed Industrial Development, 253 – 267 Aldington Road, Kemps Creek,* ref. 204098.01.R.002.Rev1 (DP 2023a – the 'HAZMAT Assessment'); and
- Douglas Partners Pty Ltd (2023a) *Report on Limited Detailed Site Investigation (Contamination), Proposed Industrial Development, 253 – 267 Aldington Road, Kemps Creek,* ref. 204098.03.R.001.Rev1, (DP, 2023b – the 'DSI').

2.1.1 PSI (DP 2023)

The results of the PSI identified the following areas of environmental concern (AEC) that required either further investigation or validation to assess the potential for contamination and any potential impacts to the proposed development as follows:

- **AEC1 – Fill** - Fill impacted with asbestos (as Asbestos-containing material [ACM]) was identified in test pit TP4, in a fill platform/mound surrounding the eastern dam (identified as Fill Area 1). Although the concentrations of ACM reported were below the industrial land use criteria, further assessment of the mound, and of the mound surrounding the dam was required to confirm the contamination status. Demolition waste, indicative of asbestos, was also identified in pits TP1, TP2 and TP3

  ACM was also observed on the surface of a road adjacent to TP7. Further assessment of the underlying soil was required to assess for the source of the ACM (i.e. to confirm that the ACM was not in the fill but on the ground surface);

- **AEC2 – Timber power poles** - Two timber power poles were identified at the site which were grouped as AEC 2. Soil sampling targeted both poles. Concentrations of CoPC were below the site assessment criteria (SAC). Notwithstanding, due to the limited nature of testing, and the uneven distribution of CoPC in soils surrounding power poles, targeted soil sampling was required following decommissioning to determine remediation requirements and extents (if any). This RAP includes targeted soil sampling of soil below after the power poles have been removed;
- **AEC3 – Chemical and fuel storage areas -** Six locations were identified which were grouped as AEC 3. Soil sampling targeted four of the areas. Concentrations of CoPC were below the SAC in all locations, however testing for Paraquat (which was stored) at chemical mixing and storage locations was not undertaken due to the preliminary nature of the assessment. Testing for Paraquat was recommended in chemical storage and mixing areas once the site had been decommissioned

  Although no signs of fuel or other chemicals was evident, due to stored materials in locked sheds or containers, validation of storage areas was required to assess for potential contamination following the removal of structures;
- **AEC4 - Underground storage tank (UST) –** A UST with unknown contents (but likely associated with the septic system), was observed west of the house. Assessment of the tank was not undertaken as the septic system was still in use. Following decommissioning of the tank, testing of the soils surrounding the tank was recommended to confirm the contamination status/validate the side walls and base of the excavation;
- **AEC5 – Transpiration pit -** The location of the transpiration pit could not be determined during DP (2023). Following decommissioning of the septic system, further assessment to identify the location of the transpiration pit, and the potential for contamination was required;
- **AEC6 - Dams -** The dam water and sediment were not assessed as a part of DP (2023). Due to the presence of algae, and based on DP's experience with previous sites, it was considered likely that the dams are affected by nutrient overload. Additionally, due to the use of Paraquat on site, the potential for impacted waters to move off-site and the potential harm to aquatic life, was present. The later assessment of dam waters was recommended;
- **AEC7 – Potential asbestos pipes -** No asbestos pipes were identified at the site. However due to the rural land use, it was considered possible that buried asbestos pipes were present. If present, the pipes may become apparent during bulk earthworks or remediation works and would normally require remediation under an unexpected finds protocol; and
- **Refuse** - Although not considered an AEC, the removal of surface refuse would be required as part of initial site development works from an aesthetic perspective.

In addition to the above AEC, no fill was observed within the test pits located on the edges of market gardens within the site, however, due to the limited number of locations, The PSI stated that further testing in areas where data is lacking is required to confirm this.

DP (2023) considered that most of the site was suitable for the proposed development under the provisions of *SEPP (Resilience and Hazards) 2021* and NSW DUAP/EPA (1998). However, further investigations were required at a later stage to confirm the contamination status of selected AEC and to provide data to assist in the development of a remediation action plan (RAP).

2.1.2 HAZMAT (DP 2023a)

DP (2023a) comprised a hazardous building materials ('HAZMAT') assessment on the house and sheds on site to assess for the presence of any potential hazardous materials within the buildings on site so that protective measures could be implemented prior to demolition undertaken as a part of the development works.

DP (2023a) was completed in conjunction with DP (2023) which identified that the house and large shed on site appeared to have been constructed between 1986 and 1994, at a time when potentially hazardous materials (HBM), including asbestos, were being phased out in construction but was still being used in some building products. The assessment included the sampling and analysis of building materials and assumptions based on visual assessment. The results of the assessment identified minimal bonded asbestos in the electricity box, but also found that asbestos was absent in the interior walls and eaves of the house. Elevated lead was identified in dust in the ceiling cavities, but not in paint. A number of other materials, such as PCBs were assumed as they could not be ruled out (due to access).

It was concluded that any known or potential HBM were to be removed prior to the demolition of structures on site. Based on the above, it is considered that the potential for soil contamination related to HBM at the site is unlikely.

2.1.3 DSI (DP 2023b)

The scope of the DSI included excavation of 40 test pits and soil sampling targeting fill areas (AEC1) and sampling and analysis for COPC. Water samples were also collected from on-site dams and a water from a flooded UST storage area for COPC.

A minimum of six fill types were reported in Fill Area 1 to depths of up to 2.4 m bgl, with fill generally comprising silty clay, with variations in colour, gravel and cobble type and concentration, and presence of foreign materials. Asbestos and demolition wastes were observed in three of the six fill types in Fill Area 1. There were no signs of contamination (staining, odours or foreign materials) in any of the remaining test pits/fill areas.

The soil results reported asbestos, as ACM, in Fill Area 1, above the SAC of 0.05% w/w at TP131 and TP142 with concentrations of 0.51% w/w and 0.09% w/w, respectively. ACM was also reported (albeit below the SAC) at TP137, which reported concentrations of 0.03% w/w. Demolition waste indicating of potential asbestos presence (e.g. bricks, concrete, porcelain tile and metal) was also reported in pits TP129, TP130, TP132, TP133, TP138, TP140, TP141 and TP143. Asbestos, as asbestos fines/friable asbestos was not reported at the reporting limit of 0.001% w/w in any of the samples analysed.

Given that the asbestos impact is (a) reported above the SAC; (b) is on the surface and in fill, and (c) is present across multiple fill types, it is considered that all fill in Fill Area 1 has the potential to be impacted with asbestos, and therefore requires management or remediation to consider the site suitable for the proposed development.

The analytical results for all chemical contaminants tested in all samples were below the SAC, with BTEX, OCP, OPP, PCBs and phenols also below the laboratory practical quantitation limit (PQL).

The results of water analysis reported human health and ecological exceedances for copper, zinc, ammonia, total phosphorus and total nitrogen.

The water retained in the on-site dams and within the UST excavation (unknown contents, likely associated with the septic system) is unsuitable for discharge direct to a receiving water body. Therefore, a dam dewatering plan (utilising the results obtained during this assessment) is required prior to the discharge of water from the dams on site. Additionally, given the high concentrations of metals and nutrients in the UST excavation, the water is also not suitable for discharge into the environment, with the most likely form of management of this water comprising treatment, disposal or discharge into the sewer (pending approval from the relevant authorities) or via a licensed liquid waste removal contractor.

The DSI concluded that the site can be made suitable for the proposed industrial development under the provisions of *SEPP (Resilience and Hazards) 2021* and NSW DUAP/EPA (1998) subject to implementation of the below:

- The remediation of asbestos-impacted Fill Area 1 **(AEC1)** surrounding the eastern dam. Subject to regulatory approval, DP considers that the below remediation strategies would be appropriate to render AEC suitable for the proposed development.
  - On-site treatment and burial;
  - On-site capping and containment; and
  - Off-site disposal.
- Validation (visual and, if considered necessary, confirmatory sample analysis) of the below following the removal of structures and decommissioning of services:
  - The footprint and surrounds of the caravan located adjacent to TP7 – for asbestos (ACM);
  - **AEC2** - The timber power poles – CoPC include metals, PAH and TRH;
  - **AEC3** - Chemical storage and mixing areas – CoPC include metals, TRH, BTEX, OCP and Paraquat;
  - **AEC4** – the UST – CoPC include lead, zinc, TRH, BTEX, PAH, nutrients, and faecal coliforms. It is noted that the water currently contained in the UST excavation is not suitable for discharge to surface water courses due to exceedances of the SAC for copper, zinc and nutrients. Prior permission must be sought by the relevant authority/authorities to discharge impacted (waste) waters to the sewer;
  - **AEC5** – Transpiration pit – CoPC include asbestos, nutrients and faecal coliforms; and
  - Building footprints – CoPC include asbestos, metals, OCP, PCB;

Additionally, the following was also recommended:

- Due to the presence of high nutrient loads, the waters contained in the on-site dams are currently unsuitable for discharge directly to receiving waters. The results obtained in this investigation should be utilised to inform a de-watering plan prior to the discharge of any dam waters;
- The preparation and implementation of an asbestos finds protocol in the construction to manage the removal of asbestos pipes that may be discovered during construction; and
- The removal of surface refuse and stored materials. While not considered a contamination issue, their removal would be required as part of initial site development works from an aesthetic perspective.

Should redevelopment of the site comprise a more sensitive land use, i.e., residential or open space/recreational, the above requirements would need to be adjusted.

2.2 Regional Geology, Soils, Hydrogeology and Hydrology

With reference to Penrith 1:100,000 Geology Sheet, the site is underlain with Bringelly Shale, which is characterised by shale, carbonaceous claystone, claystone, laminate, fine to medium-grained lithic sandstone, rare coal and tuff.

With reference to Penrith 1:100,000 Soils Landscape Sheet indicates that the site is mostly underlain by residual soils of the Blacktown Landscape with a minor portion of erosional soils of the Luddenham Landscape located in the south-eastern corner.

The Blacktown Landscape is characterised by moderately reactive highly plastic subsoil with low fertility and poor soil drainage. The Luddenham Landscape comprises a high erosional hazard, a localised impermeable highly plastic subsoil and is highly reactive.

The upper reaches of Kemps Creek intersect the site (flowing northeast to southwest) with three dams located along the watercourse. This reach of Kemps Creek is non-perennial, whereas the downgradient lower reaches of Kemps Creek, located approximately 590 m southwest of the site is perennial. Kemps Creek flows generally north towards the confluence of South Creek approximately 2.5 km northwest of the site.

A search of the groundwater bore data supplied by Water NSW showed no registered groundwater bores within 1 km of site as of January 2025. Based on the regional topography and the inferred flow direction of nearby water courses, the anticipated flow direction of groundwater beneath the site is to the south-west, towards Kemps Creek, the likely receiving surface water body for the groundwater flow path. Given the local geology (i.e.: Bringelly Shale), the groundwater in the fractured rock beneath the site is anticipated to be saline and very low yield. Accordingly, there would be no significant potential beneficial uses of the groundwater.

2.3 Site Specific Soil Conditions

Soil conditions observed in the PSI and DSI are summarised below and the corresponding test pit (TP) location is shown in Drawing 1, Appendix A:

- Topsoil and Topsoil Fill – silty clay topsoil and topsoil fill to depths of 0.2 – 0.8 m;
- FILL: silty clay and clayey gravel to depths of 0.15 – 3.0 m in all pits except for TP11, TP12, TP15, TP16 and TP18;

  Anthropogenic material including brick, wood, concrete, glass, and tile were observed in fill at TP1, TP2, TP3 and TP4. Fragments of asbestos-containing materials (ACM) were observed in surface and subsurface fill in TP4, and on the ground surface of an internal road (but not in fill) at TP7;
- Residual CLAY: variably soft to hard silty clay to depths of 0.3 m - 2.6 m in all test pits except for TP3; and
- SILTSTONE: Siltstone in TP12 from 2.6 m bgl and TP15 from 1.9 m bgl to test pit termination.

The DSI further explored the fill types present at the site, and these are provided in Table 2 below.

Table 2: Fill Types Encountered

Description	Location(s)	Depth Range
Fill Area 1		
Fill Type 1 – Grey brown silty clay and sandy silty clay with gravel. Refuse including brick, cobble and boulder sized fragments of concrete, plastic and porcelain tile. Asbestos (as ACM) was also observed in surface fill at TP142.	TP129 to TP131, TP133, TP138, TP140 to TP143	0.5 m to 2.4 m bgl
Fill Type 2 – Red and dark brown silty clay with refuse including asbestos (as ACM) – reported at a depth of 0.6 m bgl.	TP131	0.7 m bgl
Fill Type 3 – Brown and dark brown silty clay. Brick, tile and plastic were also reported in TP139. Asbestos (as ACM) was reported in surface fill at TP137.	TP122, TP124, TP130, TP133, 134, 136 to 139	0.2 m to 1.7 m bgl
Fill Type 4 – Mottled orange brown silty clay. Refuse including timber, metal and polystyrene were also reported in TP123, TP126, TP132 and TP135	TP122 to TP128, TP132 and TP135	0.1 m to 1.7 m bgl
Fill Type 5 – Dark brown silty clay with fine-grained sandstone gravel	TP140 and TP141	1.9 m and 2.4 bgl
Fill Type 6 – Grey brown gravelly clay	TP127	0.1 m bgl
Fill Area 2		
Topsoil/Fill – dark brown silty clay with rootlets	All locations in Fill Area 2	0.3 m to 0.4 m bgl
Fill Area 3		
Fill Type 7 – dark brown silty clay with rootlets	TP114 and TP115	1.4 m and 1.7 m bgl
Fill Type 8 – mottled red and grey silty clay with rootlets	TP112 and TP113	0.3 m and 0.4 m bgl
Building Footprint		
Fill Type 9 – mottled orange, brown, grey with rootles. Plastic and glass was also reported in surface fil at TP104 and TP105	TP103, TP104 and TP105	0.4 m and 0.8 m bgl
Fill Type 8 – mottled red and grey silty clay with rootlets	TP103, TP144 and TP145	0.5 m bgl
Paddock		
Topsoil/Fill – dark brown silty clay with rootlets	All locations in paddock	0.1 m to 0.3 m bgl

A minimum of six fill types were reported in Fill Area 1, with fill generally comprising silty clay, with variations in colour, gravel and cobble type and concentration, and presence of foreign materials. Asbestos and demolition wastes were observed in three of the six fill types in Fill Area 1. Free groundwater or seepage was observed in test pits at varying depths between 0.3 and 2.9 m bgl.

Groundwater was observed at a depth of 2.9 m (RL48.8 Australian Height Datum [AHD]) in TP11, 2.1 m (RL46.8 AHD) in TP14, 1.9 m (RL44.4 AHD) in TP17 and 0.3 m (RL45.5 AHD) in TP18 during excavation. No free groundwater was observed in the remaining pits for the short time that they were left open. It is also noted that the pits were immediately backfilled following excavation which precluded longer term monitoring of groundwater levels. Groundwater levels are affected by factors such as soil permeability and weather conditions and can therefore vary with time.

2.4 Summary Site History and Limited Historical Aerial Review

The site history information provided in the PSI and the DSI indicates that the site was acquired by Icon Ocean in 1993 and prior to 1993 the site comprised pastoral land use until the 1980s/1990s when a house was constructed on the site, changing the land to use to rural residential land use combined with pastoral and market garden land use. The three on-site dams along Kemps Creek have been present on the site since the early 1960s. Filling has been identified in portions of the site in the proximity of the dams and surrounds. Structures containing hazardous materials are present and historical structures no longer present have been identified.

A review available aerial photographs for the purpose of identifying the sites land use from 1993 to present was completed as part of the preparation of this RAP which identified the following observation:

- Between 1998 and 2004 the market gardens appear to have been deconstructed, and surface disturbance can be seen next to the west dam;
- Between 2006 and 2010 numerous small structures appeared across site. Further ground disturbance around the dams could be seen. Materials and vehicles were observed to have been stored along the southern boundary and next to the house shed. Crops could be seen growing along the north, east and west boundaries;
- Between 2010 and 2015 further filling can be seen along the east dam. The balance of the site appeared relatively unchanged;
- In 2024 a stockpile of refuse was observed within the central dam and appeared to have been sourced from the southern boundary; and
- In 2025 the house and shed appeared to have been demolished and removed from site, as well as the bulk of scrap and refuse across site. Some structures remain.

In addition, a limited historical aerial review was also conducted as part of this report to determine whether any substantial changes have occurred on site since the issue of DP's *Report on Limited Detailed Site Investigation (Contamination), Proposed Industrial Development, 253 – 267 Aldington Road, Kemps Creek*, ref. 204098.03.R.001.Rev0, dated 13 December 2021 (DP 2021)[3].

- At the time of completing DP (2021), the latest available imagery was dated 15 August 2021, as shown in Figure 2 (following page). The most recent aerial imagery now available is dated 1 August 2023, as shown in Figure 3 (following page), and depicts that the site and its surrounds have remained relatively unchanged since the issue of DP (2021), with the exception of the following observations from the surroundings of the site:
- Greenhouses associated with market garden activities were removed from the land located north of the site;
- Additional greenhouses are visible south of the site; and
- Continuing of bulk earthworks, including the construction of new roads are visible northeast of the site.

[3] A recent, revised copy of this report is available (ref. 204098.03.R.001.Rev1).

Figure 2: MetroMap Aerial Imagery Dated 15 August 2021

Site boundary is denoted by the red outline.

Figure 3: MetroMap Aerial Imagery Dated 1 August 2023

Site boundary is denoted by the red outline.

3. Conceptual Site Model

A conceptual site model (CSM) is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM provides the framework for identifying how the site became contaminated and how potential receptors may be exposed to contamination either in the present or the future i.e., it enables an assessment of the potential source – pathway – receptor linkages (complete pathways).

This CSM has been informed by DPs previous investigations (2023, 2023a and 2023b).

3.1 Summary of Potential and Identified Sources

The following potential and identified sources of contamination and associated contaminants of potential concern (COPC) have been established in previous investigations.

Identified

- AEC1: Fill surrounding the eastern dam:
  - COPC: asbestos.

Potential

- AEC2: Timber Power Poles: Two power poles are present on site and were targeted as part of the PSI investigation. Whilst the concentrations of COPC were below criteria, there is the potential for contamination to be present in soils elsewhere at this AEC. Potential contamination related to the leaching of timber treatment chemicals into the surrounding soils.
  - CoPC include metals, TRH and PAH.
- AEC3: Chemical Storage and mixing areas:
  - CoPC requiring further assessment during remediation: Paraquat; and
  - CoPC potentially, subject to the findings of a visual assessment: metals, TRH, BTEX, OCP.
- AEC4: UST: The open UST (located west of the house and septic system) was in situ at the time of the investigations and therefore the surrounding soil conditions could not be investigated.
  - COPC include lead, zinc, TRH, BTEX, PAH, nutrients, and faecal coliforms.
- AEC5: Transpiration pit: While the location of the transpiration pit could not be determined, based on DP's experience with similar sites, a pit is likely to be near the septic system, and also may contain sand fill with building materials including asbestos.
  - CoPC include metals, asbestos and nutrients.
- Building footprints:
  - CoPC include asbestos, metals, OCP, PCB.
- Market Gardens: Fill

Further visual assessment to confirm low potential for fill to be present. Where present COPC would include asbestos, metals, OCP, PCB.

3.2 Summary of Receptors

The following potential human receptors have been identified:

- R1: Current users [residential and site workers];
- R2: Future construction and maintenance workers;
- R3: End users [site workers and visitors]; and
- R4: Adjacent site users [residential and agricultural].

The following potential environmental receptors have been identified:

- R5: Surface water [Kemps Creek and the three on-site dams];
- R6: Groundwater; and
- R7: Terrestrial ecology.

3.3 Summary of Potential Pathways

The following potential pathways have been identified:

- P1: Ingestion and dermal contact;
- P2: Inhalation of dust and/or vapours;
- P3: Surface water run-off;
- P4: Lateral migration of groundwater providing base flow to water bodies;
- P5: Leaching of contaminants and vertical migration into groundwater; and
- P6: Contact with terrestrial ecology.

3.4 Conceptual Site Model

A 'source–pathway–receptor' approach has been used to assess the potential risks of harm being caused to human or environmental receptors from contamination sources on or in the vicinity of the site, via exposure pathways (potential complete pathways). The possible pathways between the above sources (AEC1 to AEC7) and receptors (R1 to R7) are provided in Table 3.

Table 3: Conceptual Site Model

Source and COPC	Transport Pathway	Receptor	Risk Management Action
Identified			
AEC1: Fill surrounding the eastern dam Asbestos	P1: Ingestion and dermal contact P2: Inhalation of dust and/or vapours	R1: Current users [residential and site workers R2: Future construction and maintenance workers R3: End users [industrial] R4: Adjacent site users [rural residential and agricultural].	Asbestos impacted fill requires remediation.
Potential			
AEC2: Timber Power Poles Metals, TRH and PAH	P1: Ingestion and dermal contact P2: Inhalation of dust and/or vapours P3: Surface water run-off P4: Lateral migration of groundwater providing	R1: Current users [residential and site workers R2: Future construction and maintenance workers R3: End users [industrial]	Visual validation after power poles are removed and confirmatory sample analysis

Source and COPC	Transport Pathway	Receptor	Risk Management Action
	base flow to water bodies P5: Leaching of contaminants and vertical migration into groundwater P6: Contact with terrestrial ecology	R4: Adjacent site users [rural residential and agricultural]. R5: Surface water [Kemps Creek and the three on-site dams]; R6: Groundwater; and R7: Terrestrial ecology.	
AEC3: Chemical Storage and mixing areas Paraquat, metals, TRH, BTEX, OCP	P1: Ingestion and dermal contact P2: Inhalation of dust and/or vapours P3: Surface water run-off P4: Lateral migration of groundwater providing base flow to water bodies P5: Leaching of contaminants and vertical migration into groundwater P6: Contact with terrestrial ecology	R1: Current users [residential and site workers R2: Future construction and maintenance workers R3: End users [industrial] R4: Adjacent site users [rural residential and agricultural]. R5: Surface water [Kemps Creek and the three on-site dams]; R6: Groundwater; and R7: Terrestrial ecology.	Paraquat: Additional sampling and analysis is required. Metals, TRH, BTEX, OCP: Visual validation of soils following the removal of structures/demolition of services and confirmatory sample analysis
AEC4: UST Lead, zinc, TRH, BTEX, PAH, nutrients, and faecal coliforms	P1: Ingestion and dermal contact P2: Inhalation of dust and/or vapours P3: Surface water run-off P4: Lateral migration of groundwater providing base flow to water bodies P5: Leaching of contaminants and vertical migration into groundwater P6: Contact with terrestrial ecology	R1: Current users [residential and site workers R2: Future construction and maintenance workers R3: End users [industrial] R4: Adjacent site users [rural residential and agricultural]. R5: Surface water [Kemps Creek and the three on-site dams]; R6: Groundwater; and R7: Terrestrial ecology.	Visual validation of soils following the removal of structures/demolition of services and, confirmatory sample analysis. The water in the UST excavation is not suitable for discharge due to exceedances of the SAC for copper, zinc and nutrients. Prior permission must be sought by the relevant authority/authorities to discharge impacted (waste) waters to the sewer. Alternatively, it can be removed and disposed of as liquid waste

Source and COPC	Transport Pathway	Receptor	Risk Management Action
AEC 5: Transpiration pit Metals, asbestos and nutrients	P1: Ingestion and dermal contact P2: Inhalation of dust and/or vapours P3: Surface water run-off P4: Lateral migration of groundwater providing base flow to water bodies P5: Leaching of contaminants and vertical migration into groundwater P6: Contact with terrestrial ecology	R1: Current users [residential and site workers R2: Future construction and maintenance workers R3: End users [industrial] R4: Adjacent site users [rural residential and agricultural]. R5: Surface water [Kemps Creek and the three on-site dams]; R6: Groundwater; and R7: Terrestrial ecology.	Visual validation of soils following the removal of structures/demolition of services and, confirmatory sample analysis
Building footprints Asbestos, metals, OCP, PCB	P1: Ingestion and dermal contact P2: Inhalation of dust and/or vapours P3: Surface water run-off P4: Lateral migration of groundwater providing base flow to water bodies P5: Leaching of contaminants and vertical migration into groundwater P6: Contact with terrestrial ecology	R1: Current users [residential and site workers R2: Future construction and maintenance workers R3: End users [industrial] R4: Adjacent site users [rural residential and agricultural]. R5: Surface water [Kemps Creek and the three on-site dams]; R6: Groundwater; and R7: Terrestrial ecology.	Visual validation of soils following the removal of structures/demolition of services and, confirmatory sample analysis
Market Garden Areas – Potential for Fill Asbestos, metals, OCP, PCB	P1: Ingestion and dermal contact P2: Inhalation of dust and/or vapours P3: Surface water run-off P4: Lateral migration of groundwater providing base flow to water bodies P5: Leaching of contaminants and vertical migration into groundwater P6: Contact with terrestrial ecology	R1: Current users [residential and site workers R2: Future construction and maintenance workers R3: End users [industrial] R4: Adjacent site users [rural residential and agricultural]. R5: Surface water [Kemps Creek and the three on-site dams]; R6: Groundwater; and R7: Terrestrial ecology.	Further visual assessment to confirm low potential for fill to be present.

Source and COPC	Transport Pathway	Receptor	Risk Management Action
Surface waters in on-site dams (discharge requirements) High nutrient load	P6: Contact with terrestrial ecology	R5: Surface water [Kemps Creek and the three on-site dams]; R6: Groundwater; and R7: Terrestrial ecology.	Waters are unsuitable for discharge. A de-watering plan informed by the results and findings of the DSI should be prepared prior to the discharge of any dam waters.

3.5 Summary of Further Investigation and Remediation Required

Based on the findings of the previous investigations (discussed in Section 2.1) the extent of further investigation and/or remediation required is summarised as follows:

- **AEC1** – Remediation of ACM Impacted fill – COPC include Asbestos;
- **AEC2** – Further visual validation of soils at base of the timber power poles (post removal) for staining and/or odours, where identified further investigation and remediation (if required) will be required – CoPC include metals, PAH and TRH;
- **AEC3** – Post demolition/removal, further investigation and remediation (if required) of soils within the footprint of the chemical storage and mixing areas – CoPC include metals, TRH, BTEX, OCP and Paraquat;
- **AEC4** – post removal of the UST, further investigation and remediation (if required) of soils within the UST excavation pit – CoPC include lead, zinc, TRH, BTEX, PAH, nutrients, and faecal coliforms;
- **AEC5** – Further investigation and remediation (if required) of soils within and surrounding the Transpiration pit – CoPC include asbestos, nutrients and faecal coliforms;
- **Building footprints** (including footprint of caravan area) – Post demolition/removal, further investigation and remediation (if required) of soils within the building footprints – CoPC include asbestos, metals, OCP, PCB; and
- **Market Gardens –** Further visual assessment for the presence or absence of fill across the market garden areas of the site. Where fill is observed, the CoPC include asbestos, metals, OCP, PCB.

The PSI and DSI was completed prior to PFAS being identified as a contaminant of potential concern for agricultural sites. Due to the relatively small site and the unlikelihood of biosolids being applied to the site, it is considered that there is a low potential for PFAS contamination. Nevertheless, the additional testing proposed for the relevant AEC has been revised to include limited PFAS screening.

Owing to the high nutrient load in surface water on-site dams, a dewatering plan is required to effectively manage the surface water present in dams. Additionally, the Unexpected Finds Protocol must be implemented during both remediation and bulk earthworks to manage the potential for any unidentified contamination encountered during the works (including asbestos contamination).

4. Remediation Acceptance Criteria

4.1 Key Guidelines

The remediation acceptance criteria (RAC) is consistent with the criteria adopted in the DSI and is sourced from the following NSW EPA endorsed guidelines:

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure* 1999 (as amended 2013) [NEPM] (NEPC, 2013);
- CRC CARE *Health screening levels for petroleum hydrocarbons in soil and groundwater* (CRC CARE, 2011);
- ANZG *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG, 2018);
- NHMRC, NRMMC *Australian Drinking Water Guidelines 6 2011*, Version 3.2 (NHMRC, NRMMC, 2016);
- ANZECC *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC, 2000); and
- Health Canada *Guidelines for Canadian Drinking Water Quality*, Guideline Technical Document, Paraquat (1986)

The RAC has been defined based on the following assumptions and as presented in the DSI:

- NSW site, land use industrial and low traffic volume;
- Corresponding to land use category 'D', commercial/industrial such as shops, offices, factories and industrial sites;
- Soil type: clay;
- Contamination is more than 2 years old ("aged");
- Average measured soil pH from the DSI: 5.54;
- Average measured soil cation exchange capacity (CEC) from the DSI: 16.87 $cmol_c/kg$; and
- 20 % clay content in soil.

4.2 Summary of RAC

The RAC informed by the Health Investigation Levels (HILs), Health Screening Levels (HSLs), Ecological Investigation Levels (EILs), Ecological Screening Levels (ESLs), Management Limits (ML) and assumptions summarised in the previous section are presented in Table 4 below. The lowest criteria for each compound/contaminant are presented in bold in the end column and should be used as the primary RAC.

Table 4: Summary of RAC (mg/kg – unless otherwise specified)

Contaminant	HIL-D	HSL-D Clay 0 – <1 m	DC HSL-D	EIL-D	ESL-D	ML-D	RAC
Metals							
Arsenic	3,000	-	-	160	-	-	**160**
Cadmium	900	-	-	-	-	-	**900**
Chromium (VI)	3,600	-	-	-	-	-	**3,600**
Chromium (III)				840	-	-	**840**
Copper	240,000	-	-	320	-	-	**320**
Lead	1,500	-	-	1,800	-	-	**1,800**
Mercury (inorganic)	730	-	-		-	-	**730**
Nickel	6,000	-	-	410	-	-	**410**
Zinc	400,000	-	-	930	-	-	**930**
BTEX, TRH							
Benzene	-	4	430	-	95	-	**4**
Toluene	-	NL	99,000	-	135	-	**135**
Ethylbenzene	-	NL	27,000	-	185	-	**185**
Xylenes	-	NL	81,000	-	95	-	**95**
TRH F1	-	310	26,000	-	215*	800	**215***
TRH F2	-	NL	20,000	-	170*	1,000	**170***
TRH F3	-	-	27,000	-	2,500	5,000	**2,500**
TRH F4	-	-	38,000	-	6,600	10,000	**6,600**
PAH							
Naphthalene	-	-	11,000	370	-	-	**370**
B(a)P	-	-	-	-	1.4	-	**1.4**
B(a)P TEQ	40	-	-	-	-	-	**40**
Total PAH	4,000	-	-	-	-	-	**4,000**
Phenols							
Phenol	240,000	-	-	-	-	-	**240,000**
Pentachlorophenol	660	-	-	-	-	-	**660**
OCP							
DDT+DDE+DDD	3,600	-	-	-	-	-	**3,600**
DDT	-	-	-	640	-	-	**640**

Contaminant	HIL-D	HSL-D Clay 0 – <1 m	DC HSL-D	EIL-D	ESL-D	ML-D	RAC
Aldrin and dieldrin	45	-	-	-	-	-	**45**
Chlordane	530	-	-	-	-	-	**530**
Endosulfan	2,000	-	-	-	-	-	**2,000**
Endrin	100	-	-	-	-	-	**100**
Heptachlor	50	-	-	-	-	-	**50**
HCB	80	-	-	-	-	-	**80**
Methoxychlor	2,500	-	-	-	-	-	**2,500**
OPP							
Chlorpyrifos	2,000	-	-	-	-	-	**2,000**
PCB							
PCB	7	-	-	-	-	-	**7**
Herbicides							
Paraquat	10	-	-	-	-	-	**10**
Asbestos							
ACM	0.05%	-	-	-	-	-	**0.05 %**
FA and AF	0.001%	-	-	-	-	-	**0.001 %**
FA and AF and ACM	No visible asbestos for surface soil *	-	-	-	-	-	**No visible asbestos for surface soil ***

Notes: DC: Direct contact

ESL are of low reliability except where indicated by * which indicates that the ESL is of moderate reliability

TRH F1 is TRH C_6-C_{10} minus BTEX

TRH F2 is TRH >C_{10}-C_{16} minus naphthalene

The soil saturation concentration (Csat) is defined as the soil concentration at which the porewater phase cannot dissolve any more of an individual chemical. The soil vapour that is in equilibrium with the porewater will be at its maximum. If the derived soil HSL exceeds Csat, a soil vapour source concentration for a petroleum mixture could not exceed a level that would results in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'

4.3 Aesthetic Material

It is a requirement of NEPC (2013) to manage soil containing refuse that otherwise complies with the RAC. These include highly malodorous soils, putrescible material that may degrade over time (and release odours or gases), soils containing residue from animal burial and material that may present a physical risk to humans including glass or metal fragments which may break the skin surface.

Management requirements are presented in this RAP for soils containing aesthetically undesirable material (see Section 7.3) which are to be managed based on visual identification of the presence of aesthetically undesirable material in soil. Soils containing putrescible material (excluding some landscaping media) is unlikely to be suitable for use as fill and should only be used subject to assessment by the Environmental Consultant.

5. Further investigation requirements

As recommended by the PSI and DSI, further investigation is required for the following AEC:

- **AEC3** - Chemical storage and mixing areas;
- **AEC5** – Transpiration pit;
- Building footprints (including the footprint surrounding the caravan located adjacent to TP7); and
- Market Garden Areas of the site

The recommended investigations are provided in Sections 5.1 to 5.3.

All sampling and inspections detailed in the following sections will be completed by the Environmental Consultant.

The further investigation will require to be completed prior to remediation works commencing. The methodology and results will require to be detailed within either a standalone investigation report or be included within the remediation works plan which will be required detailing the final extent of remediation works required to be completed for the site.

5.1 AEC3 - Chemical storage and mixing areas

The investigation of AEC3 will include the following:

- Undertake a detailed site inspection of the AEC for asbestos on an approximate 2 m grid;
- Collect one surface soil samples from each AEC3 location;
- Submit selected soil samples to a NATA accredited laboratory for analysis of a selection of the following common contaminants;
    - Paraquat;
    - PFAS;
    - Metals – arsenic)As), cadmium (Cd), chromium (Cr), copper(Cu), mercury (Hg), lead (Pb), nickel (Ni), zinc (Zn);
    - TRH and BTEX;
    - OCP;
    - Asbestos in soil (500 ml); and
    - Asbestos field screening (10 L bulk samples – where fill with anthropogenic materials is encountered);

Field sampling and laboratory analysis to be completed as per standard environmental protocols, including QA/QC requirements as detailed within Section 8.

The investigation will be overseen by the Environmental Consultant. If various fill layers are encountered, collection of additional samples may be required based on onsite observations. If the investigation results exceed the SAC, further investigation and/or remediation of AEC3 may be required, followed by validation sampling.

5.2 AEC5 – Transpiration pit

Once the location of the transpiration pit has been identified, the following investigation will be required to be completed.

- Undertake a detailed site inspection of the AEC for asbestos on an approximate 2 m grid;
- Excavate test pits across AEC5. The number of test pits proposed must meet the recommended sampling density specified in the (NSW EPA, 2022) for the AEC area (to be determined by the environmental consultant once location confirmed). Test pits will be excavated to a depth of 0.5 m into natural material, to a maximum depth of 3.0 m. The soil profile encountered at each location will be logged. The coordinates of each test location will be recorded by hand-held GPS;
- Collect soil samples from test pits at approximate depth ranges of 0.0 m to 0.2 m and from regular depth intervals thereafter based on field observation; and
- Submit selected soil samples to a NATA accredited laboratory for analysis of a selection of the following common contaminants;
    - PFAS;
    - Phosphorous and Nitrogen;
    - Faecal coliforms and E-coli;
    - Metals – arsenic)As), cadmium (Cd), chromium (Cr), copper(Cu), mercury (Hg), lead (Pb), nickel (Ni), zinc (Zn);
    - TRH and BTEX;
    - PAH;
    - OCP, OPP and PCB;
    - Asbestos in soil (500 ml); and
    - Asbestos field screening (10 L bulk samples – where fill with anthropogenic materials is encountered);

Field sampling and laboratory analysis to be completed as per standard environmental protocols, including QA/QC requirements as detailed within Section 8.

The investigation will be overseen by the Environmental Consultant. If various fill layers are encountered, collection of additional samples may be required based on onsite observations. If the investigation results exceed the SAC, further investigation and/or remediation of AEC5 may be required, followed by validation sampling.

5.3 Building Footprints

As noted in the DSI, where buildings and structures are to be demolished as part of the proposed development, the following investigation of the resultant footprints will be required to confirm the contamination status:

- Inspection of the footprints and surrounding areas of all demolished structures, to assess if surface soils are cleared of demolition waste and fragments of suspected ACM;
- Collection of a minimum of four soil samples (to be determined by the Environmental Consultant based on the results of the inspections) from the surfaces of each former building footprint and surrounding area;
- The coordinates of each test location will be recorded by hand-held GPS;
- Samples to be sent for laboratory analysis of the COPC including metals, OCP, PCB and asbestos (500 mL and 10 L field screening); and
- Preparation of an investigation report detailing the methodology and results of the assessment.

Depending on the timing and staging, this could be completed as a standalone report or included in the site validation report.

In the event that signs of staining or odours are observed within any of the footprints of sheds suspected of fuel/chemical storage, soil samples should be collected for laboratory analysis of VOC, TRH, BTEX and PAH.

5.4 Market Garden Areas

The investigation of the market garden areas of the site will include the following:

- Undertake a detailed site inspection of the market garden areas for fill and/or asbestos on an approximate 2 m grid;
- Excavate test pits across the market garden areas. The number of test pits proposed must meet 50% of the recommended sampling density specified in the (NSW EPA, 2022) for the 5 ha area (as the sampling completed for the PSI equated to 50% of the NSW EPA, 2022). Test pits will be excavated to a depth of 0.5 m into natural material, to a maximum depth of 3.0 m. The soil profile encountered at each location will be logged. The coordinates of each test location will be recorded by hand-held GPS;
- Where fill with anthropogenic materials is encountered, collect representative soil samples from each fill layer obsered;
- Submit selected soil samples to a NATA accredited laboratory for analysis of a selection of the following common contaminants;
    - Metals – arsenic)As), cadmium (Cd), chromium (Cr), copper(Cu), mercury (Hg), lead (Pb), nickel (Ni), zinc (Zn);
    - OCP and OPP;
    - Asbestos in soil (500 ml); and
    - Asbestos field screening (10 L bulk samples – where fill with anthropogenic materials is encountered);

Field sampling and laboratory analysis to be completed as per standard environmental protocols, including QA/QC requirements as detailed within Section 8.

The investigation will be overseen by the Environmental Consultant. If various fill layers are encountered, collection of additional samples may be required based on onsite observations. If the investigation results exceed the SAC, further investigation and/or remediation of these areas may be required, followed by validation sampling.

6. Assessment of Remediation Options

6.1 Remediation Goal

The ultimate goal/objective of the remediation will be to render the site compatible with the proposed land use (industrial).

6.2 Extent of Remediation

The extent of remediation for AEC 1 is defined as the extent of asbestos impact in fill in this part of the site. The inferred extent of asbestos impact in fill is shown in Drawing 1, Appendix A.

The extent of remediation (if any) for the remainder of the AECs (2 to 5) and below buildings and structures is not yet known and will be defined post completion of visual validation and further investigation works detailed within Section 5.

6.3 Remediation Options Assessment

The preferred hierarchy for remediation of soil at contaminated sites in a decreasing order of preference, as set out in NEPC (2013) and outlined in NSW EPA *Contaminated Land Management Guidelines for the NSW Site Auditor Scheme* 3rd Edition, 2017 is:

1) On-site treatment of excavated soil (so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level);
2) Off-site treatment of excavated soil (so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level, after which the soil is returned to the site);

If the above is not practicable:

3) Consolidation and isolation of the contaminant by containment within a properly designed barrier; and
4) Removal of contaminated material to an approved site or facility, followed, where necessary, by replacement with appropriate material.

DP assessed selected remediation alternatives, taking into considerations their applicability for the site, time constraints, economic feasibility, long-term management implications, and potential environmental and health impacts. Off-site treatment is generally not viable for asbestos; therefore, this option is not further considered at this time. The remediation options evaluation is summarised in Table 5 below and includes a red (not suitable), amber (potentially suitable – refer to comments) and green (suitable) overall grading system to assist the Proponent in their decision making.

Table 5: Remediation Options Assessment

Option	AEC1 – Asbestos Impacted Fill	AEC 2 – Soils surrounding Timber Power Poles, AEC 3 – Soils below Chemical Storage/Mixing Areas, AEC 4 – Soils below/surrounding the UST, AEC5 – Soils below Transpiration Pit, Building/Structure Footprints
1 – Do nothing	It will be necessary to address asbestos impact in fill in AEC1 for the proposed development.	If suspected contamination is observed during visual validation and then confirmed during sampling and analysis, it will be necessary to address the contamination risks under the remediation framework. If no contamination is identified, the remediation framework does not apply.
	Not suitable	**Not suitable**
2 – On-site treatment and placement at depth	ACM can be removed using a process of excavating fill, placing in a dedicated treatment area where it is spread for visual inspection and removal of ACM by a team of pickers. Treated material would be validated to demonstrate if RAC have been met. Validated material would be placed below a minimum 1.0 m below final site level subject to review of construction details (depth of footings etc.) to minimise any disturbance of the soil during construction works and to ensure that no long-term management or notice would be required. Council may impose constraints associated with the placement of treated and validated material at depth on land dedicated to Council as part of the development.	If remediation is required for other contaminants, this method is unlikely to be suitable in isolation because it is only suitable for ACM. If suspected contamination is not observed during visual validation no further action is required under the remediation framework.
	Potentially suitable subject to Council endorsement	**Potentially suitable if required, and if the only COC is asbestos. This method would be subject to Council endorsement**Error! Bookmark not defined.

3 – Off-site disposal to an approved facility	Off-site disposal is technically a straightforward option and could be completed in a relatively short time scale prior to development of the site. The option would remove from the site any maintenance and risk legacy associated with impacted soils.	If required to remediate soil, off-site disposal is technically a straightforward option and could be completed in a relatively short time scale prior to development of the site. The option would remove from the site any maintenance and risk legacy associated with impacted soils. If suspected contamination is not observed during visual validation no further action is required under the remediation framework.
	Suitable	**Suitable, if required**
4 – On-site burial/containment at depth	Impacted material can be placed at depth in a dedicated cell which would be constructed with a geotextile liner without the need for any other form of remediation prior. It is noted that this method differs from the placement of treated and validated material at depth (previous option) as follows: • Material would be buried in a dedicated cell with liner and placed at depth (minimum0.5 m below final level); • Material buried in the cell is assumed to exceed the RAC; and • Long-term management and a notice on title (planning certificate) would be required. The containment cell is to be constructed with due consideration to NSW EPA guidelines including NSW EPA *Contaminated Land Management, Guidelines for the NSW Site Auditor Scheme (3rd edition)* (NSW EPA, 2017 – 'the Site Auditor Guidelines'). There will be a requirement for a long-term Environmental Management Plan (EMP) that must be made legally enforceable and publicly notified. Council may impose constraints associated with the construction and use of such a containment cell on land dedicated to Council as part of the development.	If suspected contamination is observed during visual validation and then confirmed during any sampling and analysis, additional assessment of the contamination will be required to demonstrate if the material is suitable for placement in a containment cell. The additional assessment would consider if the containment cell option addresses all contaminant pathways. For example, soil leachate analysis may be required to demonstrate if the contamination can potentially leach into the underlying soil/groundwater when placed into the cell or if a liner is required, or, if the material is not suitable for placement into the containment cell. If suspected contamination is not observed during visual validation no further action is required under the remediation framework.
	Suitable	**Potentially suitable – subject to visual validation and sampling, analysis, and additional assessments**

6.4 Summary of Potential Remediation Options

From review of the possible remediation options there are three potentially viable remediation options for ACM impacted soil from AEC1:

- On-site treatment and placement at depth: Potentially suitable subject to Council endorsement. ;
- Off-site disposal to an approved facility: Suitable; and
- On-site burial/containment: Suitable subject to Council endorsement (if being placed on land dedicated to Council). A long term EMP will be required that must be made legally enforceable and publicly notified.

7. Remediation Strategy

7.1 Remediation Procedure and Sequence

The procedures for the remediation process outlined below will rest with the Contractor and will depend upon the equipment to be used and the overall sequence of removal. It is the contractor's responsibility to devise a safe work method statement and to implement proper controls that enable the personnel undertaking the remediation to work in a safe environment. This RAP does not relieve the contractor(s) of their ultimate responsibility for occupational health and safety of their workers and to prevent contamination of areas outside the immediate workspace. This RAP sets out the minimum standards and guidelines for remediation which will need to be used in preparing individual method statements for each remediation location.

All asbestos excavation works must be undertaken by an appropriately licensed Asbestos Contractor (Class B asbestos licence as a minimum). Works must comply with all NSW legislative requirements including (but not limited to) all SafeWork requirements, notification of works to SafeWork five days prior to work commencing, implementation of this RAP and the Asbestos Contractor's Work Method Statement, wearing of appropriate personal protective equipment (PPE) and air monitoring for asbestos fibres (where appropriate). An Environmental Consultant will provide information/reporting to the Asbestos Contractor as required enabling the Asbestos Contractor to undertake the work safely and in accordance with relevant NSW legislation.

In addition, this RAP has been prepared to support a SSDA for the site, and as such, remediation works can only commence once SSDA approval has been granted. Once approved, the PR will require to provide notification to Principal Certifying Authority of the planned commencement of remediation works. The notification will require to be provided at least 28 days prior to the remediation works commencing.

As part of initial development practices, all surface refuse and materials are required to be removed and/or disposed from the site. If unexpected conditions are encountered during this process, the unexpected finds protocol detailed within this RAP will require to be implemented.

7.1.1 AEC1 – Fill Areas

AEC1 is an area of the site which has been identified to have ACM impacted fill.

Remediation of the ACM impacted fill AEC1 should be conducted as follows:

1. The Environmental Consultant is to undertake air monitoring during the works;
2. Determine the remediation/disposal methodology to be adopted for the materials (i.e. disposal, treatment and/or containment) as detailed in Section 7.2;
3. If the disposal option has been adopted, prepare a waste classification for the materials to facilitate off-site disposal to a licenced landfill;
4. The licensed asbestos contractor will excavate/strip/poison (or combination of the three) all grass from the AEC to allow inspection of the underlying topsoil and any fill. The excavated grass and associated topsoil will require remediation/disposal as detailed within Section 7.2;
5. The licensed asbestos contractor will excavate the surface soil (topsoil) and any filling within the AEC, in the presence of the Environmental Consultant's 'Spotter'. The Spotter will be a Competent Person to conduct assessments of asbestos in soil;
6. Excavation will progress to chase out all filling observed within the side walls of the excavations, if present;
7. The spotter will segregate the topsoil and any filling into the following three separate fill types:
    - Fill Type A – Fill/topsoil with rare construction/demolition material (<2% by volume which is equivalent to allowance within ENM Order);
    - Fill Type B – Fill with observed ACM; and
    - Fill Type C – Fill with frequent construction/demolition material and no observed ACM.
8. The following will be completed for each fill type:
    - Fill Type A – Stockpiles are recommended to be limited to a maximum volume of 20 m^3 and validated as per Section 8.2.1; and
    - Fill Type B and C – Remediate/Dispose stockpiled materials - the remediation/disposal methodology will require to be determined and adopted for the stockpiled materials (i.e. disposal/treatment/containment) as detailed in Section 7.2.
9. Following removal of the surface soil (topsoil) and any filling, the site surface will be validated by the environmental consultant as per Section 8.4;
10. If required, further excavation to 'chase out' any additional anthropogenic impacted filling or ACM identified by the validation inspection and sampling which will be followed by further validation by DP as per Section 8.2.2; and
11. If backfilling of the excavation is required, backfill with VENM or with uncontaminated material from the site (i.e. materials meeting the RAC) (refer in Section 7.12).

Based on discussions with RP Infrastructure, the preferred remediation option for excavated Fill Type B and Fill Type C material is on site containment.

However, contingencies for on-site treatment and screening, and off-site disposal have been included (refer Section 7.2). Depending on the volume generated during excavation works and material composition (i.e. determined to be suitable for use as engineered fill), the contingencies can be implemented. As chase out excavation is proposed, the adoption of any contingencies will require to be determined by the Environmental Consultant, in consultation with RP Infrastructure at the time of remediation.

Please note that if the treatment or containment options are elected, the ACM impacted material identified within the AEC may comprise topsoil which may not be suitable, from a geotechnical perspective, for use as engineered fill and as such, the treated and validated material may require further strategic burial (i.e. potentially within a dedicated non-structural fill area) or have geotechnical constraints for the burial area.

7.1.2 AEC2 – Timber Power Poles

The soils surrounding the base of each timber power pole present within the site will be assessed by the Environmental Consultant with validation/delineation samples to be collected to determine their contamination status. The validation procedure is included in Section 8.2.4 of this RAP.

Based on our experience with timber power poles, the below remediation strategy will likely be applicable to remediate impacted residual topsoil and clay surrounding power poles (where identified):

1. The Environmental Consultant is to undertake a preliminary waste classification and delineation assessment to determine the lateral extent of impacted soils surrounding each power pole and its preliminary waste classification;
2. Once de-energised remove the poles and wires leaving the holes open (Contractor). Given that the power poles are treated timber they are considered building and demolition waste and are therefore pre-classified as General Solid Waste (non - putrescible) in accordance with NSW Environment Protection Authority (EPA) *Waste Classification Guidelines, Part 1: Classifying Waste*, November 2014 (EPA, 2014). Disposal of power poles is required to a facility which can legally receive such waste. Given the chemical content of the power poles they would be deemed unacceptable for any recycling or resource recovery activities;
3. Excavate the topsoil around the former power poles to expose underlying natural clay and stockpile the excavated soils on an impermeable membrane. The lateral extent of the topsoil excavation will be advised by the Environmental Consultant based on delineation sampling completed prior to remediation;
4. Extend the excavation to a depth of 0.3 m below the base of the pole within an initial 0.3 m radius (i.e. 0.6 m diameter). DP has previously used a 0.6 m diameter augur to successfully remediate impacted clay from the base of power poles. Stockpile excavated material separately to the above topsoil;
5. Collect validation samples from the bases and walls of the excavations as per the procedures outlined in Section 8.2.4. If a validation sample exceeds the RAC, chase out and resample the excavation as required until the RAC are met; and
6. Backfill excavations with either VENM or using a suitable material from within the site.

Depending on the findings of the proposed assessment, where variation to the above remediation strategy is deemed required by the environmental consultant, a standalone WMS, future addendum of this RAP or remediation works plan will be required to be prepared detailing the revised strategy.

7.1.3 AEC3 – Chemical Storage and Mixing Area

The soils within the footprints of AEC3 will be assessed by the Environmental Consultant to confirm their contamination status. The assessment procedure is included in Section 5.1 of this RAP.

Based on our experience, the below remediation strategy will likely be applicable to remediate any impacted residual topsoil and clay soils within the footprints of the chemical storage and mixing areas (if identified):

1. Determine the remediation/disposal methodology to be adopted for the materials (i.e. disposal or containment) as detailed in Section 7.2;
2. If the disposal option has been adopted, prepare a waste classification for the materials to facilitate off-site disposal to a licenced landfill;
3. Delineation sampling to determine lateral and vertical extent of impact undertaken by the Environmental Consultant;
4. Excavate all surface soils within the delineated impacted area and to the delineated depth, under full time presence of the Environmental Consultant;
5. Dispose of impacted materials to an appropriate licenced landfill or transport to the containment cell location. If stockpiling is undertaken, the controls detailed in Appendix C will be required to be adopted;
6. Following removal of the impacted material, the resultant excavation footprints will be validated by the Environmental Consultant as per Section 8.2.2;
7. Once the remediation areas/excavations have been successfully validated, survey the full extent of the remediation area or excavation and produce survey drawings showing the depth and extent of the remediation; and
8. If backfilling of the excavation is required, backfill with VENM or with uncontaminated material from the site (refer to Section 7.12).

Depending on the findings of the proposed assessment, where variation to the above remediation strategy is deemed required by the environmental consultant, a standalone WMS, future addendum of this RAP, or remediation works plan will be required to be prepared detailing the revised strategy.

7.1.4 AEC4 - UST

The removal and inspection of the septic tank and associated services will comprise:

1. Removal of contents from the UST and/or UST excavation (i.e. pump out) and appropriately dispose in compliance with the requirements of the NSW EPA. Provide disposal dockets to the environmental consultant;
2. Once the contents of the UST and/or excavation have been emptied, the tank (if present) will require to be cleaned out so that any residue is removed from the sidewalls;
3. Once cleaned, the environmental consultant will require to inspect the tank to assess the integrity of the tank;
4. Excavation of the tank, any observed infrastructure, and surrounding fill material (if present and observed to be potentially impacted), under supervision by an environmental consultant. The extent of the excavation will be directed by the environmental consultant using visual and olfactory signs of contamination and results from field screening using a photo-ionisation detector (PID). The environmental consultant will also observe the excavation for signs of preferential migration pathways (e.g. cracks and fissures);
5. Disposal of the tank at an appropriately licensed facility;

6. Logging of fill and soils conditions around septic tank after the excavation carried out in). Note that if signs of contamination are still observed or the water table is intercepted additional investigation/validation works beyond that outlined in this RAP may be required;
7. If backfilling of the excavation is required, backfill with VENM or with verified uncontaminated material from the site (i.e. materials meeting the RAC) (refer in Section 7.12); and
8. A survey of the final remediation excavation areas is to be undertaken and provided to the environmental consultant prior to final validation.

7.1.5 AEC5 – Transpiration Pit

Once the transpiration pits present within the site have been identified a detailed inspection and sampling will be completed by the Environmental Consultant to confirm their contamination status. The assessment procedure is included in Section 5.2 of this RAP.

Based on our experience with transpiration pits, the remediation strategy detailed within Section 7.1.1 and/or Section 7.1.3 will likely be applicable to remediate potential impacts which may be associated with transpiration pits.

Depending on the findings of the proposed investigation, any alteration to the remediation strategy required to render the transpiration pits suitable for the proposed development will require to be confirmed within a future addendum of this RAP, remediation works plan or a standalone work method statement (if required).

7.1.6 Building and Structure Footprints

Once the buildings and structures present within the site have been demolished, a detailed inspection and sampling will be completed by the Environmental Consultant to confirm their contamination status of the footprints. The assessment procedure is included in Section 5.3 of this RAP.

Based on our experience with building footprints, the remediation strategy detailed within Section 7.1.1 and/or Section 7.1.3 will likely be applicable to remediate potential impacts which may be associated with the building and structures footprints (if considered required).

Depending on the findings of the proposed investigation, any alteration to the remediation strategy required to render the transpiration pits suitable for the proposed development will require to be confirmed within a future addendum of this RAP, remediation works plan or a standalone work method statement (if required).

7.1.7 Market Gardens

Once the market gardens present within the site have been investigated as detailed in Section 5.4 of this RAP. The Environmental consultant will confirm if the site is suitable for the intended land use or if further investigation or remediation is considered required to render the site suitable.

Based on our experience with fill present within market gardens, the remediation strategy detailed within Section 7.1.1 and/or Section 7.1.3 will likely be applicable to remediate potential impacts which may be associated with the building and structures footprints (if considered required).
Depending on the findings of the proposed investigation, any alteration to the remediation strategy required to render the transpiration pits suitable for the proposed development will require to be confirmed within the future addendum of this RAP, remediation works plan or a standalone work method statement (if required).

7.2 Remediation of materials which exceeds the RAC

7.2.1 Option 1 - Containment Cell: Asbestos

If the containment cell option is adopted, any material which exceeds the RAC for asbestos will be placed within a containment cell. In addition, materials which exceed the RAC for other analytes may also be assessed by the environmental consultant to confirm suitability for use within the containment cell. This will require to be completed on a case by case basis.

The containment cell is to be prepared with due consideration to NSW EPA guidelines including NSW EPA *Contaminated Land Management, Guidelines for the NSW Site Auditor Scheme (3rd edition)* (NSW EPA, 2017 – 'the Site Auditor Guidelines').

The following sections detail the general design requirements and considerations for the containment cell. The civil designer is to prepare plans which detail the proposed containment cell. These cell design must be designed to meet the requirements detailed within this RAP.

The cell volume should account for the identified AEC's but also include allowances for further unexpected finds that may be identified during site development works. Once the cell location has been confirmed and the further investigations detailed within this RAP are completed, the cell location, anticipated volumes of contaminated material, anticipated volume of the containment cell for contaminated materials, and contingent volume allowance for unexpected finds will need to be detailed within the remediation works plan.

In addition to the above, when a staged remediation approach is adopted, the containment cell must remain open until all proposed remediation activities utilizing the cell are completed.

7.2.2 Site Preparation

The designer must consider and document the need to position, relocate or deepen services where they will be impacted by earthworks associated with the containment cell. Where services are to be relocated or installed, it is preferable that services do not run below the capping layer but instead are routed around the fill or within deepened areas of the cap. This is to allow for future maintenance without disturbing the ACM impacted fill.

A service location plan will be required to be developed prior to remediation works commencing.

The designer must consider and document the need to remove vegetation from the site in order to complete the remediation work. A landscaping plan will need to be developed prior to remediation works commencing. The landscaping plan should identify the locations and dimensions of the proposed areas with low lying vegetation with shallow root systems (shrubs) and tree pits for larger vegetation (trees) for the proposed development. These garden beds and tree pits should be designed so that the root system does not disturb the geotextile marker layer and underlying filling (as specified in Section 7.2.1). DP must review and accept in writing the service relocation plan and landscaping plan well in advance of construction. It is anticipated that the review process will likely require several rounds of review and changes and adequate time must be allowed by the designer.

7.2.3 Landscaping Requirements

Any proposed areas of landscaping (i.e garden bed) and tree pits will require to be constructed so that the root system does not disturb the geotextile marker layer and underlying filling. General requirements are provided below, that can be used for the landscaping design, however, these are not limiting and a case by case review can be undertaken for any specific requirements for individual proposed pits/mounds.

7.2.4 Tree Pits

Proposed tree pit should be excavated to natural material, with the geotextile marker layer lining the tree pit sidewalls. The dimensions of the tree pits (i.e lateral width / diameter required) are to be determined in consultation with a landscape architect and specified on the design plans.

A typical schematic for a tree pit is shown on Figure 4, below.

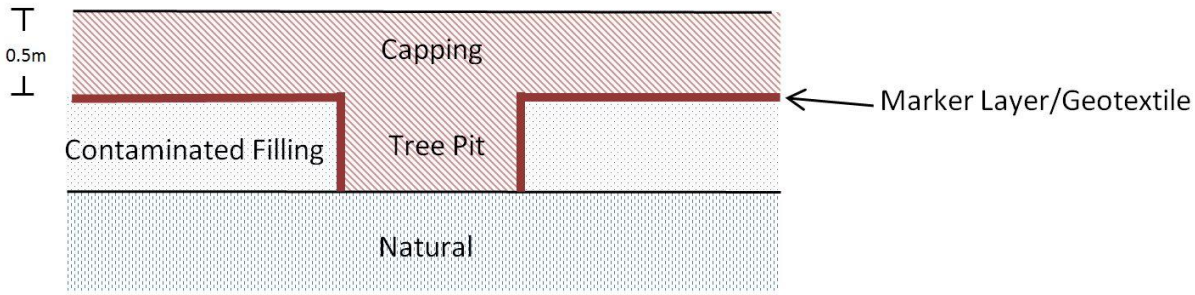


Figure 4: Typical schematic for Tree Pit

Where contaminated filling extends more than 1.5 m below the ground surface tree pits could be designed to terminate prior to reaching the natural ground. In this instance the base of the tree pit must be lined by the marker layer and a root barrier. In this case the depth of the tree pit must be determined as appropriate for the proposed species by a landscape architect.

7.2.5 Garden Beds

With regards to the garden beds for low lying vegetation with shallow root systems (shrubs), mounds are to be formed in addition to the 0.5m capping requirement (refer Section 7.2.1.3). This is to ensure any maintenance or further planting would not result in the 0.5 m capping being disturbed. As such the mounds should at least be 0.25 m thick (i.e. a 0.75 m capping from the marker layer).

A typical schematic for a garden mound is shown on Figure 5 below.

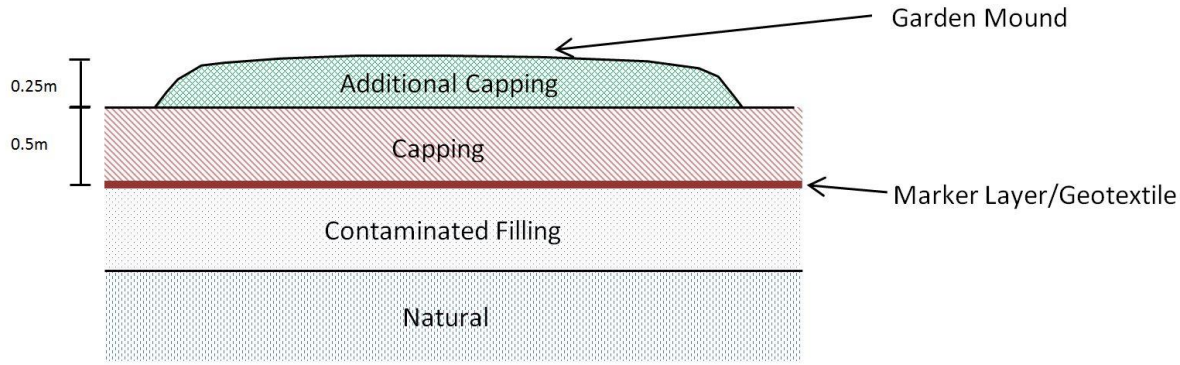


Figure 5: Typical schematic for Garden Mound

7.2.6 Confirmation of Capping Thickness

The designer must establish the final landform levels (ie the design level). The final levels must include a minimum 0.5 m thick cover (soil capping) or a minimum 0.2 m thick cover of road base and concrete in order to comply with the capping requirements of this RAP.

7.2.7 Placement of Impacted Soil in the Containment Cell

Impacted soil should be placed in a manner that prevents visible dust generation and ensures that tipped soil is entirely placed within the containment cell. The soil should be placed into the containment cell in a manner that minimises soil bulking e.g. by using a roller but ensuring that the roller driver remains in their cab with the air conditioning on reverse cycle and all airways closed. Geotechnical requirements should be confirmed separately by a suitably qualified geotechnical consultant (outside of the remit of this RAP).

7.2.8 Placement of the Geotextile Marker Layer

In order to provide a demarcation layer that will allow future contractors undertaking sub-surface work at the site to identify where ACM-impacted fill is located, the designer must incorporate a geotextile marker layer into the capping design.

The geotextile marker layer is to be placed over the placed ACM impacted filling within the designated containment area beneath the soil capping and/or the roadbase and hardstand. The geotextile marker layer shall be a Class A fabric (such as Polyfabric Australia's Terrastop A1 Marker Layer material or equivalent).

7.2.9 Placement of Capping

Non-Hardstand Areas

Placement of capping shall comprise the following:

- Placement of verified clean fill above the geotextile marker layer to a depth of at least 0.5 m. The verified clean fill/capping material must comprise a minimum of 0.4 m of virgin excavated natural material (VENM) which must be a cohesive material (clay), must not be highly dispersive or erodible and be compacted to an appropriate specification under standard geotechnical controls. Where required, the surface of the capping can comprise a maximum of 0.1 m of material that is a suitable growth medium for plants (i.e. verified VENM or site won topsoil). If topsoil depths of greater than 0.1 m are required, than this will need to be in addition to the capping thickness (i.e. to ensure the above mentioned minimum 0.4 m soil capping is achieved);
- Place filling in maximum 250 mm thick compacted layers to at least 100% of standard maximum dry density (SMDD) with moisture contents maintained within 2% of standard optimum moisture content as measured in the standard compaction test. The material must also meet the requirements of Section 7.12; and
- Preparation of a survey by a registered surveyor indicating at minimum: the exact location of the capped area, the level of the top of the contained filling material, the surface level of the VENM capping material and the surface of VENM Topsoil Capping Material.

A typical schematic for capping is shown in Figure 6. The capping details shown in the schematic should be incorporated into the detailed design of the proposed development. The detailed design should also include a growing medium or non-sealed pavement (as appropriate) that covers the soil capping.

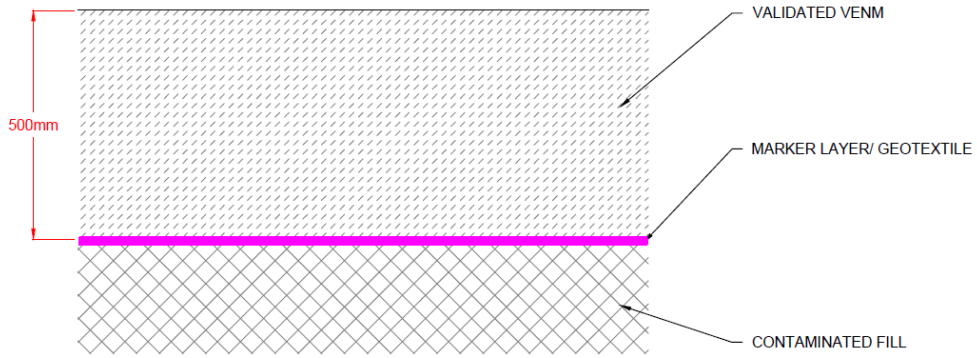


Figure 6: Typical schematic for capping

Hardstand Areas

Placement of capping at concreted areas shall comprise the following:

- Placement of verified road base above the geotextile marker layer to a depth of at least 0.1 m. The verified road base material must be virgin excavated natural material (VENM), and be compacted to an appropriate specification under standard geotechnical controls;

- The material must also meet the requirements of Section 7.12;
- Construction of the concrete hardstand; and
- Preparation of a survey by a registered surveyor indicating at minimum: the exact location of the capped area, the level of the top of the contained filling material and surface level of the concrete.

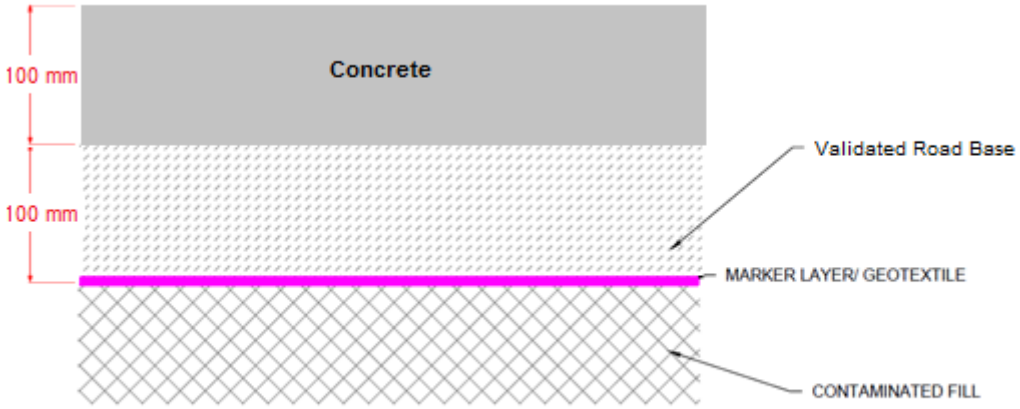


Figure 7: Typical schematic for capping within hardstand area

7.2.10 Monitoring during works

Air monitoring for airborne asbestos fibres will be required throughout the duration of the remediation works (undertaken by DP).

An environmental engineer/scientist from DP will be required full time for the duration of the works to monitor compliance with the RAP.

7.2.11 Review of Design Drawings

The Environmental Consultant must review all design drawings (including landscaping and/or development plans) and provide comment with reference to the requirements detailed within this RAP in advance of construction. It is anticipated that the review process will likely require several rounds of review and changes and adequate time must be allowed by the designer.

7.2.12 Requirement for a Long-Term Environmental Management Plan

A long-term Environmental Management Plan (EMP) will be required for the ongoing management of contamination remaining on site. The EMP should include:

- Procedures for the management and maintenance of the cap; and
- Procedures for scenarios where the capping needs to be penetrated and underlying potentially contaminated material will be disturbed.

The EMP will require establishment of appropriate public notification under Section 10.7 of the EP&A Act or a covenant registered on the title to land under Section 88B of the Conveyancing Act 1919.

7.2.13 Proposed Containment Cell Location

Douglas has been advised by RP Infrastructure of a potential containment cell location within the site which is shown on Figure 8, below. The indicative location of the containment cell is proposed to be located under the hardstand on proposed Lot 1B. This location is a proposed fill area of the site with up to 4 m of fill proposed.

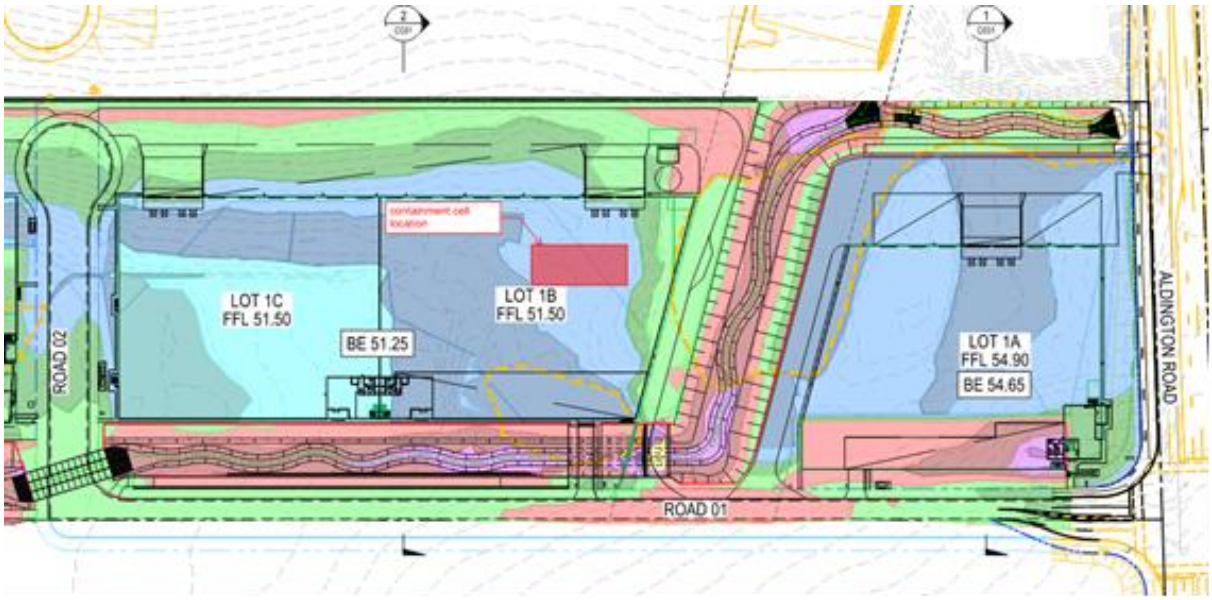


Figure 8: Potential Containment Cell Location

It is noted that the indicative location provided in Figure 8 is one possible location, and that this may be revised.

7.2.14 Option 2 - Waste Classification and Off-site Disposal

If materials are required to be disposed of at an off-site location, sampling and analysis of the materials at a frequency of 1 sample per 25 - 250 m^3 of soil (dependent on stockpile volume and composition) will be required to provide a classification of the materials for waste disposal according to the provisions of NSW EPA *Waste Classification Guidelines* (2014) (EPA, 2014b). The sample density adopted will require to be justified within the waste classification report.

The material will require disposal at a waste facility licensed to receive asbestos waste. The tipping dockets will require to be provided to the Environmental Consultant for waste reconciliation purposes. In addition, any asbestos disposal must be tracked and reported to the EPA using WasteLocate.

7.2.15 Option 3 - Treatment of Asbestos Contaminated Soils

If the asbestos treatment contingency is adopted, an asbestos treatment area (ATA) should be established at the site for treatment of ACM-impacted soils.

The ATA and storage area(s) is/are to be set up outside of the known areas of contamination above RAC. If it is necessary to set up the ATA and storage area(s) on portions of the site that have not yet been remediated, a pad comprising previously validated site-won material shall be established across the ATA and area for stockpiling of treated soils.

Establishment of the ATA and storage areas will involve stripping topsoil/fill at the designated site area until natural soil is exposed. Appropriate signage and demarcation must be placed around both the ATA and ACM material awaiting disposal so to prevent cross contamination as well as prevent unauthorised access by non-inducted personnel and members of the public.

The following steps shall be undertaken for the remediation of materials contaminated with bonded ACM fragments, initially as a trial to demonstrate that screening/segregation (treatment) will meet the desired objectives:

1. Excavation of ACM-impacted filling and transport to the designated ATA awaiting treatment;
2. Spreading materials in a designated ATA in a layer no thicker than 0.1 m. Given the inherent heterogeneous distribution of bonded ACM in fill, it is recommended that impacted materials are treated in 10 m^3 portions to minimise the potential for mixing of highly impacted soils with low/non impacted soils as part of the treatment process and to mitigate overall risks associated with potential cross-contamination;
3. Inspection and removal by hand ("emu-bobbing") of the asbestos by the Remediation Contractor. In addition, any oversize anthropogenic materials (i.e. materials greater than 150 mm diameter) should also be picked out by the remediation contractor;
4. Re-working and spreading the material across the ATA using appropriate plant/equipment, with the material being "emu-bobbed" by the Remediation Contractor. Clods of clay must be broken down/crushed as part of the spreading process. Each spreading will be recorded, which will specify the date, time, ID of stockpile, volume of material being treated, description of the soil, number of passes, number of asbestos finds per pass, and photographed;
5. Repeating the spreading and "emu-bobbing" process iteratively until no bonded ACM fragments are observed on three consecutive complete passes by the Remediation Contractor and Environmental Consultant;
6. Place recovered bonded ACM in a demarcated stockpiling/treatment/storage area with clear signage and fencing to limit access. Double bag bonded ACM fragments for temporary storage whilst on site in a secure designated area awaiting off-site disposal;
7. Validation of the material by both visual, screening test and laboratory analysis and with reference to the procedures specified in Section 7.5.1 of NEPC (2013) Schedule B2 comprising:
    - Validation samples collected by the Environmental Consultant at a minimum approximate rate[4] of one sample per 10 m^3 comprising:
        - Manual on-site screening by passing one ~10 L bulk sample through a 7 mm aperture sieve (or spreading out each sample on contrasting coloured sheeting if soils are too cohesive) for visual identification of bonded ACM and weighing recovered fragments to calculate the asbestos %w/w and compare against the RAC (Section 4); and

[4] The nominated minimum approximate frequency of one sample per 10 m^3 exceeds that recommended in DoH (2009) for the validation of 'screened' material of one sample per 70 m^3. The recommended sampling frequency is considered appropriate given that treatment will not comprise 'screening' through a 7 mm x 7 mm (or larger) mesh, rather, it will comprise turning and manual hand picking which has a lower likelihood of removing all or most ACM fragments.

- Collect a 500 ml sample for each ~10 L sample for laboratory analysis of FA and AF (with scope to reduce the frequency to 30% if bonded ACM is consistently observed to be in good condition) to calculate the asbestos %w/w and compare against the RAC (Section 4).

8. If the tests indicate the material fails validation due to the presence of bonded ACM fragments, the treatment/process can be repeated. If the tests indicate the material fails the validation due to FA and AF in soil, it will be considered a contingency situation (i.e. off-site disposal to landfill);
9. Successfully validated material will be transported out of the designated ATA for re-use at depth (greater than 1 m) within the site; and
10. Following completion of all treatment, visual validation of the resultant ATA surface, undertaken by the Environmental Consultant including the collection of validation samples in accordance with Section 8.2.6 will be undertaken.

The procedures described herein must be clearly documented including compilation of a photographic record. All pieces of bonded ACM and material not suitable for Residential A land use are to be manually removed as they are encountered during the remediation and bulk earthworks programme and disposed off-site in accordance with regulatory requirements. The removal of these materials shall be recorded on daily field sheets that are to be copied and provided to the Environmental Consultant for inclusion in the validation report. The recorded information shall include, but may not be limited to, the date, location, description of the material removed, quantity estimate, and how it was disposed, including tip dockets for volume reconciliation.

The treated validated material must be reused within the site, at depth (greater than 1 m). The final resting place of the material must be surveyed and the plan included as part of the validation report. Please note that the ACM impacted material identified within site may comprise topsoil and other materials with high organic content which may not be suitable, from a geotechnical perspective, for use as engineered fill and as such, the treated and validated material may require further strategic burial (i.e. potentially within a dedicated fill area).

Measures are to be taken by the Remediation Contractor to minimise dust generation capable of leaving the ATA. Air quality (para-occupational monitoring) adjacent to the ATA shall be monitored by the Environmental Consultant while stockpiles are present or soil treatment is occurring. The para-occupational monitoring shall be undertaken with reference to the National Occupational Health and Safety Committee (NOHSC) (2005a) *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC:3003 (April 2005)]* during the remediation works using static battery operated air monitoring pumps.

7.3 Management of Soil Aesthetics

It is a requirement of NEPM (2013) to manage soil containing refuse that otherwise complies with the RAC. These include highly malodorous soils, putrescible material that may degrade over time (and release odours or gases), soils containing residue from animal burial and material that may present a physical risk to humans including glass or metal fragments which may break the skin surface. Such material containing soil aesthetic issues should be managed as follows:

- Placed in the containment cell if it comprises material already earmarked for placement in the cell; and

- If the material is treated and some visible aesthetic material remains evident, place the material in the same manner as treated and validated ACM impacted material (i.e. minimum 1.0 m below final site level subject to review of construction details (depth of footings etc.).

It is noted that material containing putrescible material (excluding some landscaping media) is unlikely to be suitable for use as fill and should only be used subject to assessment by the Environmental Consultant.

7.4 Site Establishment

Prior to the implementation of remediation, the site is to be established in accordance with all NSW legislative requirements.

Air quality monitoring for airborne asbestos fibres using the Membrane Filter Method in accordance with the *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres* (NOHSC: 3003, April 2005) is to be conducted prior to commencement of works (baseline) and on a daily basis when works involving the excavation, transport or placement of asbestos impacted and potentially impacted soils/materials are being conducted within the site. The Environmental Consultant is to conduct the air quality monitoring or manage the works through an experienced contractor. If friable asbestos is recorded at any stage of the remediation works, air quality monitoring will be required to be carried out by a suitably licensed asbestos assessor.

The client should be notified by the Environmental Consultant of any laboratory detections of airborne asbestos fibres during the course of the works. In the event of detections, the Remediation Contractor should make appropriate modifications to works methods, as required.

7.5 Minimisation of Cross-Contamination

Appropriate measures should be adopted, as required, to eliminate or at least minimise the potential for cross contamination. In addition to the recommendations provided in the following sections for management of the remediation works, plant movement within areas of active remediation should be restricted and monitored to ensure vehicles do not unnecessarily pass over validated surfaces or through contaminated areas.

7.6 Waste Disposal

A waste classification assessment should be carried out in accordance with NSW EPA (2014) *Waste Classification Guidelines, Part 1: Classifying Waste* (EPA, 2014) for any material requiring off-site disposal. The scope of the assessment will depend on the volume and type of material requiring disposal.

7.7 Stockpile Management

Potentially contaminated material shall be stockpiled at a suitable designated location. Dust control is required for all stockpiled materials and should include light conditioning with water (spray) for exposed materials or covering with anchored geotextile or similar.

All stockpiles of contaminated material which may be required to remain on the site overnight shall be demarcated to clearly delineate their boundaries and be adequately secured in order to reduce the risk of sediment runoff and dust blow. Should the stockpiles remain for over 48 hours, they should be appropriately managed to prevent fugitive dust leaving the site (e.g.: light wetting or covering with anchored geotextile depending on weather conditions). The defined stockpile footprint area should be subject to validation upon completion of the remediation works (refer to Section 8).

Tracking of stockpile movements and remediation status must be undertaken by the environmental consultant during remediation. An appropriate tracking process is to be determined by the environmental consultant once detailed procedures and sequence for the remediation work is determined by the remediation contractor. A materials tracking plan is required to be prepared and maintained to confirm the movement, treatment and placement of stockpiles and should be provided to the Environmental Consultant to support validation works. The material tracking process and materials tracking plan proforma is to be reviewed and endorsed by the site auditor prior to remediation.

7.8 Loading and Transporting of Spoil

All transport of waste and disposal of materials must be conducted in accordance with the requirements of the *POEO* Act (1997). All required licences and approvals required for disposal of the material should be obtained prior to removal of the materials from the site.

Transport of spoil shall be via a clearly delineated, pre-defined haul route.

Removal of waste materials from the site shall only be carried out by a licensed contractor holding the appropriate licence, consent or approvals to dispose of the waste materials according to the classification outlined in the NSW EPA *Waste Classification Guidelines* (2014) and with the appropriate approvals obtained from the NSW EPA, if required.

The proposed waste transport route should be notified to the local Council and truck dispatch shall be logged and recorded by the Contractor for each load leaving the site. A record of the truck dispatch should be provided to the Proponent via their Environmental Consultant. Asbestos transporters and facilities receiving asbestos waste in NSW weighing more than 100 kilograms or consisting or more than 10 square metres of asbestos sheeting in one load must track and report this waste to the EPA using WasteLocate5. Disposal dockets are to be included in the Validation Report.

[5] http://www.epa.nsw.gov.au/your-environment/waste/transporting-asbestos-waste-tyres/tracking-asbestos-waste-locate

7.9 Disposal of Material

All materials excavated and removed from the site shall be disposed in accordance with the *POEO* Act 1997 and to a facility/site legally able to accept the material. Confirmation on the current licensing of the landfill should be provided to the Environmental Consultant prior to commencement of disposal.

Copies of all necessary approvals from the receiving site shall be given to the Environmental Consultant prior to any contaminated material being removed from the site. A record of the disposal of materials should be maintained and provided to the Environmental Consultant for waste reconciliation purposes.

All relevant analysis results shall be made available to the Contractor and proposed receiving site/waste facility to enable selection of a suitable disposal location.

Details of all contaminated and spoil materials removed from the site shall be documented by the Contractor with copies of weighbridge slips, trip tickets and consignment disposal confirmation where appropriate) provided to the Environmental Consultant and the Proponent. A site log should be maintained by the Proponent to track disposed loads against on-site origin including Waste Locate records for material containing asbestos.

7.10 Reuse of Treated, Validated and/or Pre-validated Material

Treated material that has been validated and demonstrated to pass RAC as well as material that has been pre-validated and passes RAC can be re-used at the site if it is placed at depth (minimum 0.5 m below final site level to the top of the treated material).

The purpose of the minimum depth to place treated material is to meet the requirements of WA DoH (2009) guidelines which require that the top 0.1 m of the site is visibly free of asbestos. Whilst treated and validated/pre-validated material has been demonstrated to meet the RAC, the presence of some asbestos below the RAC may occur.

The above depths are subject to review of construction details, including depth of footings. It is intended that the above depths minimise the risk of any disturbance of the soil during construction works. In the case of in areas of landscaping this includes, landscaping activities and minor construction works (e.g. construction of sheds and garages amongst other things). This also ensures that no long-term management or notice can be avoided. It is also noted that soil containing aesthetically undesirable material (see Section 7.3) but passes the RAC would also be reused in the same manner.

7.11 Contingency for Soil Exceeding RAC / Excess Impacted Soil

If material fails RAC the material is to be placed in the containment cell (where considered suitable), treated in the ATA (ACM only) or disposed of in accordance with Section 7.2.

7.12 Materials for Use in Backfilling and Imported Fill

Any soil, aggregate etc imported for the remediation works must have contaminant concentrations that meet the relevant criteria outlined in Section 4. Imported materials will only be accepted for use at the site if:

- It can legally be accepted onto the site (e.g. classified as virgin excavated natural material (VENM), accompanied by a report / certificate prepared by a qualified environmental consultant);
- Visual inspection of the imported soil confirms that the soil has no signs of concern and is consistent with those described in the supporting classification documentation;
- Have no aesthetic issues of concern, and
- The materials are validated (by inspection/sampling) by the Environmental Consultant as being suitable for use at the site.

The classification report / certificate for all material proposed for import must be reviewed and approved in writing by the Environmental Consultant prior to import. Materials to be imported may need to meet geotechnical requirements which are to be assessed by others, as required.

If permitted by the development consent and approved by the site owner, Remediation Contractor and Environmental Consultant and Site Auditor, material classified under a NSW EPA RRO may also be accepted, provided the material can be used on site in accordance with the corresponding RRE. This could include excavated natural material (ENM), classified under NSW EPA Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014, The excavated natural material order 2014 (NSW EPA, 2014d).

The need for check-sampling of RRO material is to be determined by the Environmental Consultant depending on the source of the material, adequacy of the supporting documentation provided and inspection(s) of material. Quarried material / VENM may need little or no check sampling.

Any recycled materials proposed for importation must be sampled at a frequency of one sample per 25 m^3, with a minimum of three samples per load. The recycled material will not be permitted to be used on site until the results of the inspection and laboratory analysis have been approved in writing by the Environmental Consultant.

Based on the current proposed fill import requirements for the site, \a standalone fill management protocol could be prepared to detail more specific import protocols and controls that can be implemented to confirm consistency of the materials received at the site and provided protocols for the rejection of non-conforming loads.

8. Validation Plan

8.1 Validation Data Quality Objectives (DQO)

The objective of the validation plan is to assess the results of post remediation testing against the RAC stated within this RAP (Section 4).

The RAC (Section 4) includes requirements for aesthetic material i.e., highly malodorous soils, putrescible material that may degrade over time (and release odours or gases), soils containing residue from animal burial and material that may present a physical risk to humans including glass or metal fragments which may break the skin surface. Aesthetic material is to be visually identified by the Environmental Consultant and then managed in accordance with Section 7.3.

The validation assessment will be conducted in accordance with Data Quality Objectives (DQOs) and Quality Assurance/Quality Control (QA/QC) procedures to demonstrate the repeatability and reliability of the results.

The following DQOs will be adopted in the validation works and documented in the Validation Report. The DQOs are based on those provided in Appendix B, Schedule B2 of NEPC (2013). The DQO process is outlined as follows:

- State the Problem;
- Identify the Decision;
- Identify Inputs to the Decision;
- Define the Boundary of the Assessment;
- Develop a Decision Rule;
- Specify Acceptable Limits on Decision Errors; and
- Optimise the Design for Obtaining Data.

A checklist of Data Quality Indicators (DQI) will be completed as part of the validation assessment.

8.2 Validation Sample Collection and Analysis

8.2.1 Validation of AEC1 Excavated and Stockpiled Materials (i.e. Type A Materials)

All soils requiring validation for asbestos will be validated as follows:

Collect validation samples (10 L and 500 mL) at the rate of one sample per 20 m^3 which is meets NEPC (2013) sampling requirements for stockpiles. If ACM is observed, record the weight, size and condition of the ACM.

Based on the results of the 10 L and 500 mL samples, the Environmental Consultant should determine the fate of the soil stockpiles as per below:

- ACM, FA and AF are below the RAC – soil is suitable for re-use on site (minimum 1.0 m below final site level – refer to Section 7.10);
- ACM exceeds the RAC, but FA and AF are below the RAC – soil requires treatment at the ATA, placement within the containment cell or disposed off site; or
- FA and AF exceed the RAC – soil is not suitable for on-site re-use and so requires either placement in the containment cell, or waste classification (Waste Classification Guideline NSW EPA 2014) and off-site disposal to a suitably licensed landfill.

8.2.2 Validation of Excavations (AEC1, AEC3, AEC5, and Building/Structure Footprints)

The following validation works will be carried out for AEC1 and AEC3, AEC5, and Building/Structure Footprints (where further investigation identified the requirement of remediation) by the Environmental Consultant:

1. Visual inspection of the remedial excavation;
2. Sampling and analysis of the soil by the environmental consultant with reference to NEPC (2013) and guidelines as follows:
    a. For small to medium excavations (base <500 m^2):
    - Base of excavation: one sample per 25 - 50 m^2 or part thereof; and
    - Sides of excavation: one sample per 10 m length or part thereof and at 1 m depth intervals.
    b. For Large excavations (>500 m^2):
    - Base of excavation: sampling on a grid at a density in accordance with the EPA Contaminated Sites: Sampling Design Guidelines (2022); and
    - Sides of excavation: one sample per 20 m length or part thereof and at 1 m depth intervals.
3. Laboratory analysis of collected samples for COPC specific to the excavation/area of the site; and
4. Where the reported concentration of the COPC are greater than the RAC, further chase out of that location will be required and steps 1 to 3 will be repeated. The additional soil generated during the chase out will require remediation with reference to Section 7.2.

8.2.3 Validation of Asbestos Impacted Stockpile Footprints

The footprint of stockpiles should be validated as follows:

- Validation of stockpile footprints will be undertaken after removal of the stockpile(s);
- Validation samples will be collected and analysed at a rate of one sample per 25 m^2 of stockpile footprint area;
- Sampling shall be conducted with reference to NEPC (2013) and DoH (2020) guidelines and shall include collection of ~10 L and 500 mL sample for laboratory analysis of AF and FA; and
- Analyse samples (where collected) for asbestos and validate to RAC. If asbestos is reported in any form in the validation sample, further excavate and re-validate the stockpile/ATA footprints until the validation results are within the RAC.

8.2.4 AEC2 - Timber Power Poles

Initial visual validation at each power pole for staining and/or odours will be completed by the environmental consultant post removal of the power poles. Where staining or odours are present further investigation in the form of sampling will be required.

Where results indicate remediation is required, remediation will require to be completed with reference to Section 7.1.2. The sampling strategy listed below is applicable for validating former timber power pole excavations (where considered required):

1. Excavation Side Walls - Topsoil Excavation: One sample per side wall within the topsoil layer (*i.e.* four samples);
2. Base - Underlying Topsoil: One sample per base of excavations;
3. Excavation Side Walls - Clay Excavation: One sample from the northern and southern side walls within the clay layer (*i.e.* two samples);
4. Base - Underlying base of former pole: One sample per base of excavations;
5. QA/QC samples: As per Section 8.9; and
6. Sample Analysis: All validation samples will be analysed for PAH, TRH and metals. Compare the results against the RAC listed in Table 1.

The Environmental Consultant will undertake all validation sampling.

8.2.5 AEC4 - UST

The general remediation and validation procedure for the UST and associated services removal will comprise:

1. Validation sampling of the sides and base of the septic tank excavation, and of the footprint of any removed pipe infrastructure (if present) will be collected by the environmental consultant at a rate of:
   - one sample per 5 m by 5 m grid over the excavation footprint with a minimum of one sample; and
   - one sample per 5 m length of sidewall or part thereof with a minimum of one sample per sidewall.
2. Soils samples are to be collected from any septic tank excavation spoil (if required) to assess the material's suitability to remain on-site or to waste classify it for off-site disposal.
3. Analysis of validation and excavation spoil samples for a combination of the following contaminants of concern:
   - total recoverable hydrocarbons (TRH);
   - benzene, toluene, ethyl benzene and xylenes (BTEX);
   - polycyclic aromatic hydrocarbons (PAH);
   - 8 heavy metals (including arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc);
   - Nutrients (i.e. phosphorus and nitrogen); and
   - faecal coliforms and e.coli.

Currently, there is no guideline available to assess microbial contamination in soil. In the absence of relevant guidelines, the criteria provided for pathogens in NSW EPA Use and Disposal of Biosolids Products, 1997 - Stabilisation Grade A Microbiological Standards (NSW EPA, 2007) will be adopted as the reference level for initial screening of microbiological data.

8.2.6 Asbestos Treatment Contingency

8.2.6.1 Validation of Soils within the ATA

All soils excavated from the remediation areas and transported to the ATA require successful validation as outlined below prior to on-site re-use.

The above soil is to be validated as follows:

1. Sampling and analysis of the soil by the Environmental Consultant with reference to NEPC (2013) and the Western Australian Department of Health – *Guidelines for Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia* (DoH, 2009), guidelines as follows:
    - Collection of ~10 L bulk samples by the Environmental Consultant at a minimum rate of one sample per 10 m^3 (per stockpile);
    - Bulk samples will be weighed using pre calibrated scales and manually screened on site through a 7 mm sieve. All fragments of suspected ACM of 7 mm and larger will be collected and weighed, and the percentage asbestos in soil (% w/w) calculated in accordance with Section 4.1.7 of DoH (2009) and compared against the RAC (Section 4); and
    - Collection of a 500 ml sample for each ~10 L sample for laboratory analysis of AF and FA to calculate the asbestos %w/w and compare against the RAC (Section 4).
2. Upon receipt of the results, designation of each stockpile by the Environmental Consultant as:
    - Suitable for **reuse** on site – ACM, FA and AF are below the RAC;
    - Suitable for further **remediation** at the ATA – ACM exceeds the RAC but FA and AF are below the RAC; or
    - Requiring **disposal** off-site to landfill – FA and/or AF exceed the RAC.

Material that is to be disposed off-site must be:

- Classified prior to disposal with reference to EPA (2014); and
- Disposed to a landfill licensed to accept the category of waste.

Assuming a soil bulk density of 1.8 t/m^3, ACM fragments weighing >12 g in a 10 L bulk sample will fail the RAC for ACM. This can be used as a quick first pass check for a stockpile of ACM impacted soil to automatically trigger the further soil remediation process.

8.2.6.2 Validation of the ATA Footprint

Following removal of soil from the ATA, the footprint of the ATA will require validation by the Environmental Consultant as follows:

1. A visual inspection for signs of fill and anthropogenic material (including ACM) on the ground surfaces on a 2 m grid;
2. Surface soil sampling (50 g samples) on a 5 m x 5 m grid based density with a minimum of three samples being collected and analysed. Samples are to be analysed for asbestos in accordance with AS 4964 (2004);
3. Asbestos analytical results will be assessed against the adopted RAC (Section 4); and
4. Where ACM is observed, or analytical results indicate the presence of asbestos, the material will be removed and re-treated or remediated in accordance with Section 7.2, validated in accordance with Section 8.8 and the ATA footprint re-validated in accordance with steps 1 to 3 (above).

An appropriately qualified Environmental Consultant with experience in asbestos assessment and validation will undertake the validation sampling.

8.3 Quality Assurance Plan

8.3.1 Sample Collection and Handling

The general sampling procedures comprise:

- The use of stainless steel or disposable sampling equipment;
- Decontamination of sampling equipment prior to the collection each sample by removing soil residue from sampling equipment with a wetted down brush or towel;
- Labelling of the sample containers with individual and unique identification including Project No. and Sample No.;
- The use of chain-of-custody documentation so that sample tracking and custody can be cross-checked at any point in the transfer of samples from the field to hand-over to the laboratory; and
- Soil samples collected for asbestos analysis for validation purposes should be collected from the same sample location as the 10 L sample for field gravimetry analysis for ACM (if one is required), but *not* from the sieved fractions from the gravimetry analysis process. The soil sample is to be placed into a 500 mL capacity sealable bag and labelled with the sample name, date collected and project reference. A smaller 50 g bag is sufficient for waste classification purposes, only (refer to Section 7.2).

8.3.1.1 Field Gravimetry Analysis

Where field gravimetry analysis is required of 10 L soil samples for ACM, the following procedure should be followed with reference to WA DoH (2009):

- Samples to be measured into a 10 L bucket, weighed and the weight recorded (with the scale ‘zeroed’ for the weight of the bucket);

- Samples should then be screened manually (wearing appropriate personal protective equipment – see Section 9.3) on-site through a 7 mm sieve and/or spread out for inspection on a contrasting colour material;
- Fragments of suspected ACM removed and recorded (weight, dimensions and condition). ACM in poor condition is recorded as FA; and
- The identified ACM and FA is weighed to calculate asbestos soil concentrations as per Section 4.1.7 of WA DoH (2009) guidelines.

If a soil sample is required for asbestos analysis from the same sample location, the sample should be collected representative of the same soil subject to field gravimetry analysis, but *not* from the sieved fractions from the gravimetry analysis process.

8.3.2 Field QA/QC

Appropriate sampling procedures will be undertaken to prevent cross contamination. These include:

- Standard DP operating procedures are followed;
- Samples are stored under secure, temperature-controlled conditions;
- Chain-of-custody documentation is employed for the handling, transport and delivery of samples to the selected laboratory; and
- Proper disposal of contaminated soil, fill or surface water originating from the site.

No field replicates are proposed for asbestos analysis. If other contaminants are identified (e.g., an Unexpected Find), field replicates (inter and intra) shall be collected at a minimum rate of 20% / one replicate pair (inter and intra) per 20 samples.

8.3.3 Laboratory QA/QC

A NATA accredited laboratory will be used to conduct analysis.

8.3.4 Achievement of Data Quality Objectives

Based on fulfilment of the data quality objectives, an assessment of the overall data quality will be presented in the final validation report.

8.4 Validation Reporting

A validation assessment report will be required once the remediation works have been completed and should be prepared by the environmental consultant in accordance with EPA NSW *Guidelines for Reporting on Contaminated Land: Contaminated Land Guidelines* (2020). The validation report(s) may be prepared in a staged manner, depending on the Project Programme.

The objective of the validation report will be to document that the site has been remediated to a suitable standard for the proposed redevelopment and that no related adverse human health and environmental effects have occurred as a result of the works. The validation report will include:

- Documentation of the implementation of the Remedial Strategy;

- Document the DQOs;
- Details of the location and total estimated volume of materials excavated and replaced within the site and volume of material removed from the site for disposal as well as the tonnages reported by the licensed landfill;
- Photographic record during the works and of final excavations;
- Survey records of excavations and final levels after fill placement;
- Drawings showing contamination assessment sample locations and validation sample locations;
- Detailed analytical results;
- Details of materials imported to the site and a record of inspection, as required;
- Details, including survey records, of the final cover; and
- Provide a summary of material tracking and waste disposal. Copies of disposal dockets are also to be provided attached to the Validation Report. A review of the disposal dockets will require to be completed to confirm materials were disposed off-site to a waste facilitate licenced to accept the waste.

9. Site Management Plan for Remediation Works

It is the responsibility of the Contractor to develop a Site Management Plan (SMP) detailing overall site management, environmental management (including soil, air and water) and occupational health and safety (OH&S) plans. This section provides a brief summary of some of the items which need to be included in the Contractor's plans.

Works should comply with all legislative requirements including, but not limited, to those set out under the following Acts (and subsequent amendments and regulations):

- Environmentally Hazardous Chemicals Act (1985);
- *Hazardous Chemicals* Act (1985) (under review);
- Environmental Offences and Penalties Act (1989);
- Agricultural and Veterinary Chemicals Act (1994);
- *Protection of the Environment Operations* Act (POEO) (1997) and associated exclusions;
- *Pesticide* Act (1999);
- Work Health and Safety Act 2011;
- *OHS Amendment (Dangerous Goods)* Act 2003 (including OHS Amendment (Dangerous Goods) Regulation 2005); and
- *POEO Amendment* Act 2005 (including POEO Amendment (Scheduled Activities and Waste) Regulation 2008).

9.1 Site Operations

The schedule of remedial works, including timing and staging is to be prepared by the Contractor to meet the requirements of this RAP. Remediation works will be restricted to the hours set out by Council.

It is the site owner/developer's responsibility to ensure that appropriate personnel are appointed to manage and conduct the remediation and validation works. This will include:

- The Principal's Representative (PR – Icon Oceania), who is responsible for overseeing the implementation of this RAP;
- The Contractor, who is responsible for overseeing the implementation of this RAP, conducting the remedial works (may be subcontracted) and managing the site; and
- An Environmental Consultant, who will be responsible for providing advice as required for the remedial works and undertaking the validation works in accordance with this RAP.

Other parties who may be employed to assist in the implementation of this RAP include, but are not limited to, occupational hygienist(s) and licensed asbestos contractor(s).

The Contractor will be responsible for preparing a list of contacts for the works, including emergency contacts for the site operations and provision of signage at the site to allow the public to contact nominated site personnel out of hours.

9.2 Environmental Management

The work shall be undertaken with all due regard to the minimisation of environmental effects and to meet all statutory requirements. The Contractor shall have in place a Contractors' Environmental Management Plan (CEMP) including the following:

- Site stormwater management plan;
- Soil management plan;
- Noise control plan;
- Dust control plan;
- Odour control plan; and
- Contingency measures for environmental incidents.

The Contractor shall also be responsible to ensure that the site works comply with the following conditions:

- Fugitive dust leaving the confines of the site is minimised;
- No water containing suspended matter or contaminants leaves the site in a manner which could pollute the environment;
- Vehicles shall be cleaned and secured so that no mud, soil or water are deposited on any public roadways or adjacent areas;
- Spoil is managed in accordance with this RAP; and
- Noise and vibration levels at the site boundaries comply with legislative requirements.

9.3 Occupational Health and Safety

The Contractor should develop a site emergency response plan (ERP) and work health and safety management plan (WHS). This will ensure the safety of the personnel working on site, given any likely emergency situation which may occur. The WHS and ERP should include emergency phone numbers and details of local emergency facilities.

Appropriate fencing and signage should be installed around and within the site to prevent unauthorised access to the site, restricted access remedial areas (e.g.: asbestos remediation areas) and deep excavations. Signage should be appropriate to inform of the occurrence of asbestos remediation works.

All asbestos works will be conducted by an appropriately licensed asbestos contractor and in accordance with SafeWork requirements.

All personnel on site should be required to wear the following personnel protective equipment (PPE) at all times (as a minimum):

- Steel-capped boots;
- High visibility clothing; and
- Hard hat meeting AS1801-1981 requirements.

The following additional PPE will be worn as required e.g. In the ATA and within remediation areas:

- All PPE required by the Licensed asbestos contractor (e.g.: P2 disposable dust mask or a particulate half-face mask with a P3 filter, disposal coveralls);
- Hearing protection meeting AS1270-1988 requirements when working around machinery or plant equipment if noise levels exceed exposure standards;
- Safety glasses or safety goggles with side shields meeting AS1337-1992 requirements (as necessary, particularly during demolition);
- Disposable coveralls (if necessary) to prevent contact with splashed contaminated soil, materials or water;
- Nitrile work gloves meeting AS2161-1978 requirements or heavy duty gauntlet gloves; and
- Any additional protection identified by the Environmental Consultant.

All contractors are required to show compliance with the Work Health and Safety Regulation 2011, including the preparation of a Site Safety Management Plan and Safe Work Method Statements.

9.4 Interim Site Management

As the identified AECs are not proposed to be disturbed without consultation to this RAP, Douglas does not consider interim site management to be required for the site.

10. Unexpected Finds

If unexpected conditions are encountered during site works (such as buried tanks and further suspected unexpected, contaminated soil), the following general approach will be adopted:

- Stop work in the area of impact and barricade area to prevent access;
- The Remediation Contractor is to contact the principal's representative (PR – Icon Oceania) or their Project Manager and the Environmental Consultant;
- The Environmental Consultant will make an assessment of the severity/extent of the unexpected find in terms of the potential impact to human health and the environment. If the suspected contamination includes potentially volatile contamination, the Environmental Consultant will screen the soil sample (headspace test) using a Photo-Ionization Detector (PID);
- The Environmental Consultant will liaise with the PR as required;
- The Environmental Consultant will provide advice to the PR regarding the recommended course of action. The remediation strategies detailed within this RAP for the known AEC's are also considered appropriate to remediate unexpected finds identified during construction for the same contaminants of concern (i.e. asbestos impacted fill, etc); and
- The Remediation Contractor is to implement the agreed management/remedial strategy.

10.1 Asbestos Unexpected Finds

In the event that the unexpected find relates to the identification of suspected asbestos containing material (ACM) (which includes ACM pipes, ACM in fill or buried ACM) the following additional steps will also apply:

- Upon discovery of suspected ACM, the Site Manager is to be notified and the affected area closed off using barrier tape and warning signs. Warning signs shall be specific to Asbestos Hazards and shall comply with the Australian Standard 1319 - 1994 *Safety Signs for the Occupational Environment*;
- The location of the unexpected find should be surveyed using dGPS with sub-metre accuracy;
- The Site Manager is to contact the Principal's Representative (PR), and the PR is to notify the Environmental Consultant;
- The Environmental Consultant is to confirm the presence of asbestos and assess the extent of remediation works to be undertaken. An assessment report detailing this information will be compiled by the Environmental Consultant and provided to the PR;
- The Environmental Consultant will prepare a report detailing their assessment including the extent and methods of management/remediation, as required;
- The Environmental Consultant will provide advice to the PR regarding the recommended course of action. The remediation strategies detailed within this RAP for the known AEC's are also considered appropriate to remediate unexpected finds identified during construction for the same contaminants of concern (i.e. asbestos impacted fill, etc). With respect to asbestos pipes, a contingent procedure for the removal of asbestos pipes is detailed in Section 10.1.1, instance where asbestos pipes being identified ;
- The agreed management/remedial strategy shall be implemented;

- The impacted soil should be stockpiled for:
  - Remediation (if evaluated to be feasible by the Environmental Consultant); or
  - Waste classification (including sampling and chemical analysis) prior to off-site disposal.
- In dry and windy conditions, stockpiles should be lightly wetted and covered with plastic sheet whilst awaiting remediation/disposal;
- All work associated with asbestos in soil should be undertaken by an appropriately licenced contractor;
- Monitoring for airborne asbestos fibres is to be carried out during the soil excavation and remediation (if undertaken);
- Documentary evidence (weighbridge dockets) of correct disposal is to be provided to the contractor's construction manager;
- At the completion of the excavation, a clearance inspection is to be carried out and written confirmation is to be provided by the Environmental Consultant or Occupational Hygienist that the area is safe to be accessed and worked. Validation will include soil sampling and testing; and
- Details of the incident are to be recorded in the site record system and validation to be included within the validation report (refer Section 11).

10.2 Unexpected Asbestos Pipe Finds

The remediation of any identified ACM pipe fins should be completed as per below:

- Undertake air monitoring for the duration of works (Environmental Consultant);
- On a 2 m grid, inspect the ground surface requiring remediation to the defined extent (or until the site boundary) (Environmental Consultant);
- If this ACM Pipe is visible and embedded in the soil, excavate 0.3 m of the soils adjacent to the pipe and stockpile separately. Stockpiled materials will be assessed for site suitability (Asbestos Contractor);
- If ACM pipe is not visible, excavate overlying soils gently (to minimise potential damage to the underlying pipe) until the ACM pipe is visible, stockpile soils separately. Stockpiled materials will be assessed for site suitability;
- Gently remove the ACM pipe by hand or machine for off-site disposal (Asbestos Contractor);
- If the ACM pipe is in poor condition, excavate soils with the ACM pipe and stockpile soils for off-site disposal, until the pipe is observed to be in good condition;
- The Asbestos Contractor is to excavate the fill in the presence of the Environmental Consultant's 'Spotter'. The Spotter will be a competent person to conduct assessments of asbestos in soil;
- The spotter will assist in segregating the soils and identifying ACM pipes (Environmental Consultant);
- The stockpiled materials for potential re-use will be assessed for site suitability (Section 5.2.1) (Environmental Consultant);
- The stockpiled materials for disposal (soils containing observable ACM) will be assessed and classified for off-site disposal (Environmental Consultant);

- Supply tipping dockets to Environmental Consultant (Asbestos Contractor);
- Validation of the resultant remedial excavation surface and sidewalls, including the collection of validation samples in accordance with Section 5.2 (Environmental Consultant);
- If required, further excavation by the contractor to 'chase out' any additional asbestos impacted materials identified by the validation inspection and/or sampling which will be followed by further validation by the Environmental Consultant as per Section 5.2 (Asbestos Contractor);
- If required, backfill the excavation with validated material (Asbestos contractor, Environmental Consultant to review validation reports prior to import – refer Section 7.12); and
- Details of the incident are to be recorded in the site record system and validation to be included within the validation report (refer Section 11) including documenting the tipping dockets, air monitoring results and results of the validation inspection and sampling.

11. Reporting

Post completion of the further investigation works detailed within Section 5 of this RAP, a remediation work plan will require to be prepared to confirm the remediation required to be completed to render the site suitable for the proposed development for the identified AEC. The remediation works plan must be completed prior to remediation works commencing on site.

The results of the further investigation works detailed within Section 5 can be included within this remediation works plan or within a standalone investigation report.

Post remediation works, a validation assessment report will be required and should be prepared by the environmental consultant in accordance with EPA NSW *Guidelines for Reporting on Contaminated Land: Contaminated Land Guidelines* (2020). The validation report(s) may be prepared in a staged manner, depending on the Project Programme.

The objective of the validation report will be to document that the site has been remediated to a suitable standard for the proposed redevelopment and that no related adverse human health and environmental effects have occurred as a result of the works. The Validation Report will include:

- Documentation of the implementation of the RAP;
- Details of the location and total estimated volume of materials excavated, treated and replaced within the site and volume of material removed from the site for disposal as well as the tonnages reported by the licensed landfill;
- Photographic record during the works and of final excavations;
- Survey records of excavations and final levels after fill placement;
- Drawings showing contamination assessment sample locations and validation sample locations;
- Detailed analytical results;
- Details of materials imported to the site and a record of inspection of imported material., as required;
- Details, including survey records, of the final cover; and
- Provide a summary of material tracking and waste disposal. Copies of disposal dockets are also to be provided attached to the Validation Report.

If a containment cell is constructed on site and used for containment of contaminated soils, an Environmental Management Plan (EMP) is required to be prepared by the Environmental Consultant. The EMP is to be prepared in accordance with the EPA (2020) reporting guidelines and include the following:

- The nature and location of contamination remaining on site;
- What long-term management is required to ensure the ongoing protection of human health; and
- A mechanism for enforcement of the monitoring.

12. Conclusion

It is considered that the site can be made suitable for the proposed development subject to implementation of this RAP. In addition, the RAP should enable appropriate management of any potential impacts on the environment which may occur during the course of the remediation works.

It is noted that as part of standard practices for development sites, all surface refuse and materials are required to be removed and/or disposed from the site. If unexpected conditions are encountered during this process, Douglas considers that these finds can be address by implementing the unexpected finds protocol detailed within this RAP.

- The RAP also details the requirement for further investigation and reporting to be completed to aid and direct the remediation of the site, which are summarised below: Undertake the further investigation of the site as detailed within Section 5;
- Prepare a data gap report and/or Remediation Works Plan to detail the results of the further investigation works and confirm the remediation works to be completed for those AEC requiring further investigation;
- Preparation of a dam dewatering plan;
- The unexpected finds protocol detailed within this RAP is to be implemented during both remediation and bulk earthworks; and
- A standalone fill management protocol can be prepared to detailing the import requirements and rejection protocols to aid the control of fill required to be imported for the proposed development.

13. Limitations

Douglas Partners Pty Ltd (DP) has prepared this report for this project 204098.04.R.001.Rev1 at 253 - 267 Aldington Road, Kemps Creek in accordance with DP's proposal 204098.04.P.001.Rev0 and acceptance received from David Badenoch-Jones dated 19 April 2022. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of Icon Oceania Kemps Development Pty Ltd for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party

Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

The assessment of atypical safety hazards arising from this advice is restricted to the (geotechnical/environmental/groundwater) components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

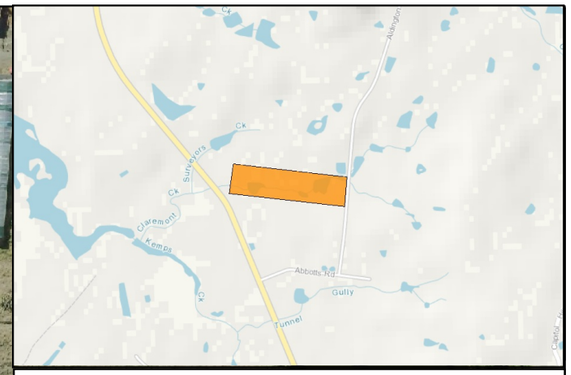
This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

Douglas Partners Pty Ltd

Appendix A

Drawing 1 and Architectural Plan
(Nettletontribe Pty Ltd Drawing No. 12253_DA002 Issue 11)



Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: RP Infrastructure Pty Ltd		
OFFICE: Macarthur	DRAWN BY: AP	
SCALE: As shown	DATE: 27.02.2025	

TITLE: **Site Locality, Boundary, Test Locations and AECs**
Proposed Industrial Development
253-267 Aldington Road, Kemps Creek, NSW

N
MGA

PROJ. #: 204098.03	
DRAWING No:	1
REVISION:	2

DEVELOPMENT SUMMARY

GROSS SITE AREA	101,453m²
LOT 1 SITE AREA	59,541m²
LOT 2 SITE AREA	31,928m²
ALDINGTON ROAD WIDENDING RESERVE	(1,672m²)
ROAD RESERVE	(8,312m²)
CUL-DE-SAC RESERVE	(297m²)
TRANSMISSION EASEMENT	(10,210m²)
NON-DEVELOPABLE AREA*	(32,396m²)
NET DEVELOPABLE AREA (NDA)*	69,057m²

** REFER TO DRAWING NO. DA003 - NDA CALCULATION PLAN FOR DETAILS*

LOT 1	
TOTAL BUILDING AREA	21,661m²
LANDSCAPED AREA	APPX. 16,500m² (28%)
LOT 2	
TOTAL BUILDING AREA	12,584m²
LANDSCAPED AREA	APPX. 7,500m² (23%)
TOTAL BUILDING AREA (GFA)	34,245m²
FLOOR SPACE RATIO (FSR) / GROSS SITE AREA	0.34 : 1
FLOOR SPACE RATIO (FSR) / NET DEVELOPABLE AREA	0.50 : 1

GFA SCHEDULE

WAREHOUSE 1A	7,189m²
OFFICE 1A	318m²
SUBTOTAL:	7,507m²
WAREHOUSE 1B	7,060m²
OFFICE 1B	307m²
SUBTOTAL:	7,367m²
WAREHOUSE 1C	6,480m²
OFFICE 1C	307m²
SUBTOTAL:	6,787m²
WAREHOUSE 2	11,959m²
OFFICE 2	575m²
DOCK OFFICE	50m²
SUBTOTAL:	12,584m²
TOTAL WAREHOUSE AREA	32,688m²
TOTAL OFFICE AREA	1,557m²
TOTAL BUILDING AREA (GFA)	34,245m²

PARKING SCHEDULE

TOTAL CARPARK REQUIRED	149 SPACES

Table 12 of Mamre Road Precinct DCP 2021

Warehouse: 1 space/300sqm

Office: 1 space/40sqm

TOTAL CARPARK PROPOSED	149 SPACES
WAREHOUSE 1A	32 SPACES
WAREHOUSE 1B & 1C	61 SPACES
WAREHOUSE 2	56 SPACES
TOTAL BICYCLE PARKING REQUIRED	34 SPACES

Table 12 of Mamre Road Precinct DCP 2021

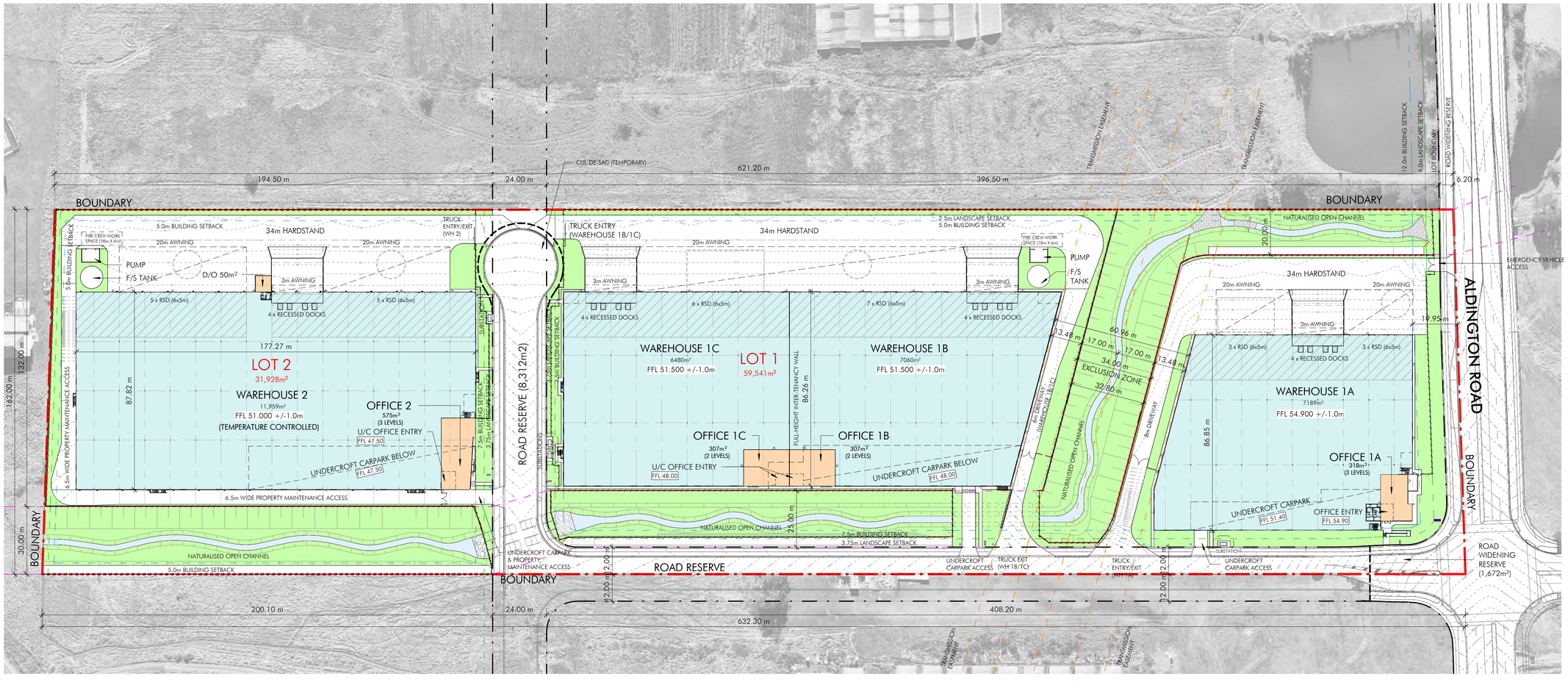
Warehouse: 1 space/1,000sqm (over 2,000m²)

Office: 1 space/600sqm (over 1,200m²)

TOTAL BICYCLE PARKING PROPOSED	34 SPACES
WAREHOUSE 1A	8 SPACES
WAREHOUSE 1B & 1C	14 SPACES
WAREHOUSE 2	12 SPACES

LEGENDS

- OVERALL SITE BOUNDARY
- LOT BOUNDARY
- ROAD RESERVE
- TRANSMISSION EASEMENT
- TRUNK DRAINAGE CORRIDOR EASEMENT
- LANDSCAPE SETBACK
- BUILDING SETBACK
- RETAINING WALL
- FENCE LINE



1 Master Plan
1 : 1000

Key Plan

0 20000 50000

Issue	Description	Date
11	ISSUED FOR DA	18.10.2024
10	ISSUED FOR COORDINATION	02.10.2024
9	ISSUED FOR DA	15.12.2023
8	ISSUED FOR DA	30.10.2023
7	ISSUED FOR DA	13.10.2023
6	ISSUED FOR COORDINATION	04.10.2023
5	ISSUED FOR DA	16.08.2023
4	ISSUED FOR DA	18.08.2022
3	ISSUED FOR DA	04.11.2011
2	ISSUED FOR DA	08.09.2021
1	PRELIMINARY ISSUE	24.08.2021

SSDA

Client
ICON OCEANIA

Builder

Project Name
PROPOSED WAREHOUSE & DISTRIBUTION CENTRE BUILDINGS

Project Address
253-267 ALDINGTON RD, KEMPS CREEK, NSW

Drawing Title
Master Plan

Author:	Checker:	Sheet Size:	Scale:
JM	MC	A1	1:1000

Drawing Number: **12253_DA002** Issue: **11**

nettletontribe

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Appendix B

About this Report

About this Report

October 2024

Introduction

These notes have been provided to amplify Douglas' report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

Douglas' reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, Douglas will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, Douglas cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, Douglas will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, Douglas requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. Douglas would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

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