

6.11 Soils and contamination

The soils and contamination supplementary technical memorandum is provided in **Appendix K**, and a summary is provided below. This section should be read in conjunction with Section 8.1 of the EIS and the soils and contamination assessment report provided in Appendix O of the EIS.

6.11.1 Assessment methodology

The assessment methodology comprised the following:

- Review of existing information to determine if the proposed changes to the construction footprint (as part of the amended project) would be located within or closer to existing areas of environmental interest (AEIs) identified in the EIS
- Site investigation carried out in January 2020, focusing on areas of the amended construction footprint that lie outside the EIS construction footprint
- Impact assessment, identifying changes to potential impacts to human health and environmental receivers from contamination and latent soil conditions exposed during construction and operation of the amended project.

The site investigation area, groundwater bore search area and broader study area for the soils and contamination assessment (see Section 8.1.2 of the EIS) were all updated for the supplementary assessment (see **Figure 6-57**). The amended study areas and their purposes are defined as follows:

- Amended site investigation area – Accessible areas within the amended construction footprint, and nearby land uses and potential AEIs where the site investigation was carried out
- Amended groundwater bore search area – The amended construction footprint and about a 500 metres radius, which was used to identify nearby groundwater bores
- Amended broader study area – The amended construction footprint and about a two kilometres radius. This study area is used to assess regional soil and geological conditions.

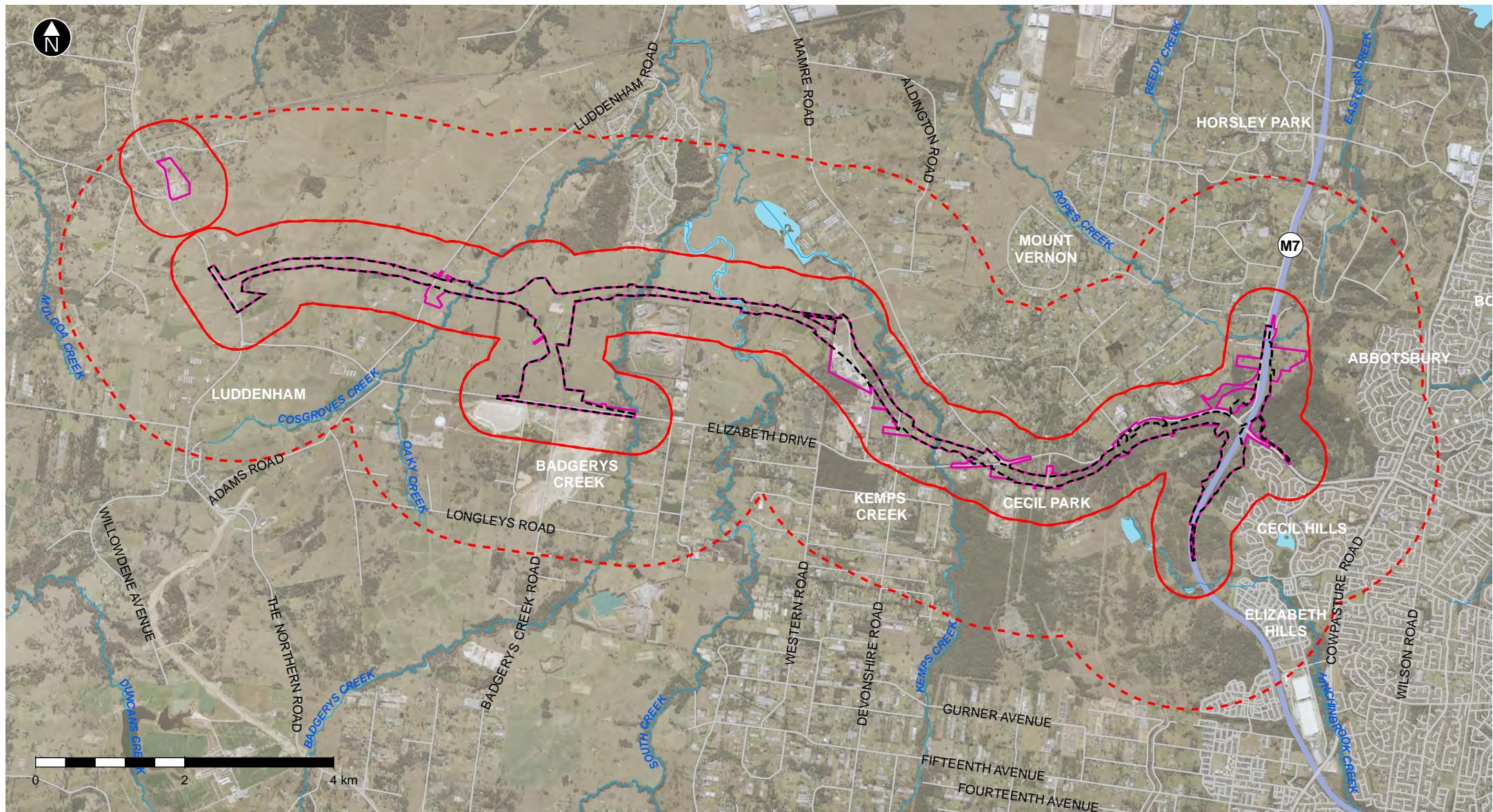
6.11.2 Existing environment

The existing environment described in Section 8.1.3 of the EIS is still applicable to the amended project, with the exception of soil landscapes and contamination which is discussed in the following sections.

6.11.2.1 Soil landscapes

Section 8.1.3 of the EIS identified four soil landscape types; Luddenham, Picton, Blacktown and South Creek. A small area was also mapped as Disturbed Terrain.

In addition to the soil landscapes identified in the EIS, the ancillary facilities between Clifton Avenue and Salisbury Avenue for the amended project are located within the Berkshire Park soil landscape type. Relevant limitations for the project include a very high wind erosion hazard if cleared, gully, sheet and rill erosion on dissected areas, localised seasonal waterlogging, localised flood hazard, low fertility and impermeable soils.



[Dashed red line] The project construction footprint as per EIS
 [Solid red line] The amended project construction footprint

[Pink dashed line] Amended broader study area (2 km)

[Red box] Amended study area for the purpose of the groundwater bore search (500 m)

- ~~~~ Waterways
- Motorway
- Main roads

Figure 6-57 Soils and contamination study area for the amended project



6.11.2.2 Contamination

Renamed AEIs

Twenty-nine AEIs were identified within the broader study area that could pose a potential contamination risk to construction activities of the project as described in the EIS, and contain contaminants of concern.

A review of the additional information during this supplementary assessment has resulted in the renaming of two of the AEIs discussed in the EIS:

- AEI 7
 - Formerly: Former Kari & Ghossayn Pty Ltd (Solid Waste Landfill)
 - Now: Area of waste and imported fill
- AEI 9
 - Formerly: Sydney Recycling Park / Wanless Recycling
 - Now: Sydney Recycling Park / Wanless Recycling and Former Kari & Ghossayn Pty Ltd (Solid Waste Landfill).

Risk exposure rating review

Seven of these AEIs identified in the EIS were identified to have a moderate to high exposure risk rankings (see Section 4.1 of **Appendix K**). Risk exposure rankings were reassessed for all the AEIs to understand changes due to the amended project. The following AEI risk ratings have changed from the EIS, including:

- AEI 6: PGH Bricks and Pavers. This AEI would experience an increase in risk rating from low to moderate due to the amended project being closer in proximity to the AEI and located within the potential contamination distribution range (laterally and vertically)
- AEI 9: Sydney Recycling Park/ Wanless Recycling and Former Kari & Ghossayn Pty Ltd (Solid Waste Landfill). This AEI would experience an increase in risk rating from low to moderate due to the amended project being closer in proximity to the AEI and located within the potential contamination distribution range (laterally and vertically)
- AEI 21: Area of illegally dumped material. This AEI would experience an increase in risk rating from moderate to high due to the confirmed presence of asbestos containing material during the site investigation.

Further detail on these AEIs is provided in **Section 6.11.3**.

AEIs associated with proposed changes

The only area of the amended project that is not covered by the groundwater bore search area as described in the EIS, is the additional construction ancillary facility east of The Northern Road (AF 10). Desktop reviews for the proposed location of AF 10 conclude that:

- There is no known or expected occurrence of ASS within the vicinity of the location of AF 10
- The potential for encountering acid rocks at the location of AF 10 is considered to be extremely low given the underlying geology consists of Bringelly shales which has no documented occurrence of acid rock to date
- There are no registered groundwater wells within a 500 metre radius of AF 10

- There are no contaminated sites or regulated sites (ie current notices) registered with the NSW EPA identified within 500 metres of additional ancillary area AF 10
- One premise within the area of additional ancillary area AF 10 or within approximately 500 metres of AF 10 which was historically or is currently licensed by the NSW EPA. This premise is located next to the amended project to the west and comprises CPB Contractors Pty Limited; Road construction (see AEI 23 in **Table 6-59**).

Amended AEIs

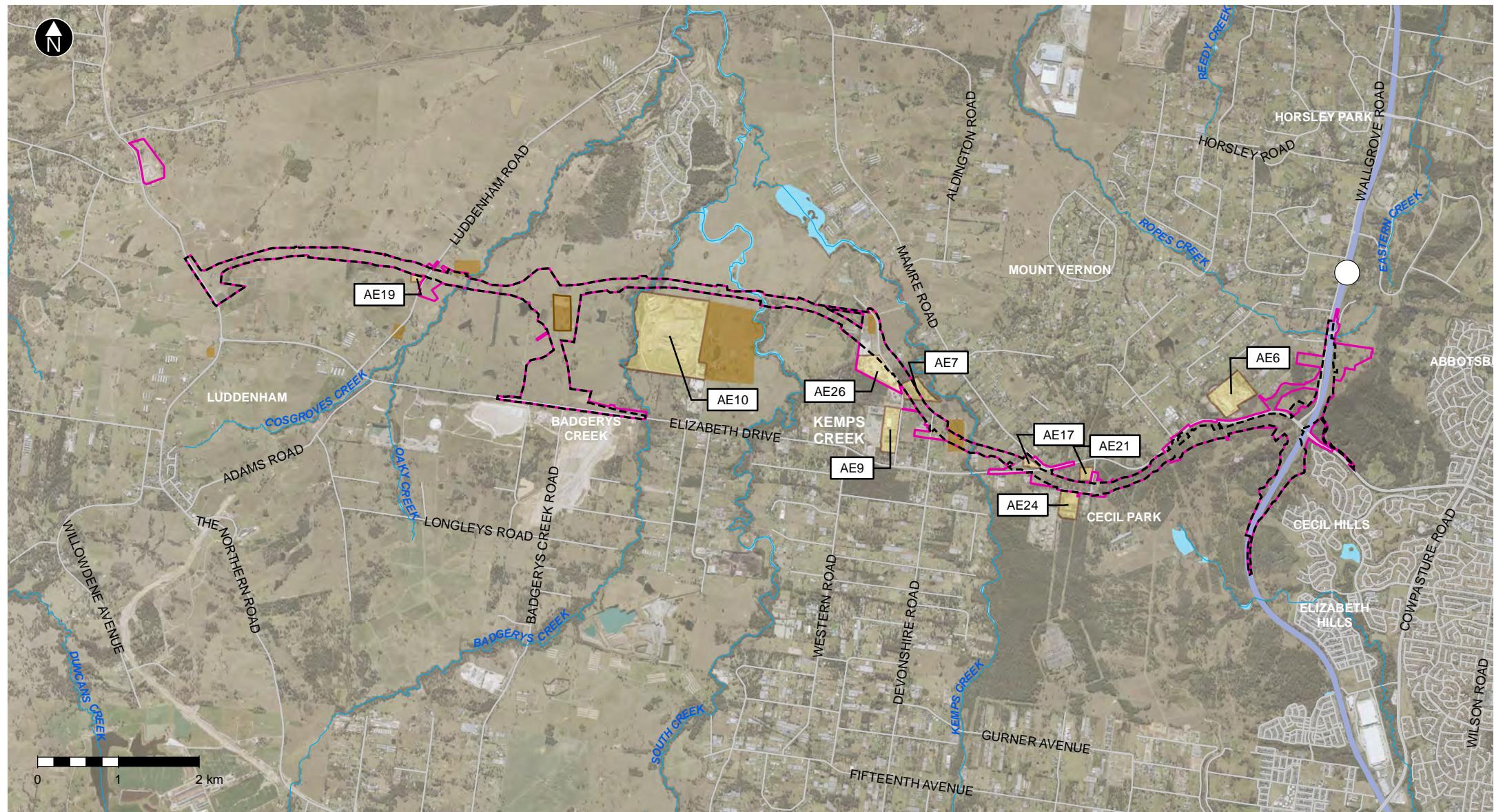
Based on the desktop review and site investigations, four additional AEIs have been identified for the amended project and are described in **Table 6-59**, two with a moderate risk rating. Three of these (AEI 24, 25 and 26) were identified during site investigation. There are, therefore, 33 AEIs relevant to the amended project. There would be no changes to the findings on areas of identified historical filling as a result of the amended project.

In addition, the assessment identified that the two additional areas of cut; Airport interchange northern cut and Airport interchange southern cut (see **Figure 6-56**), are located within a potential area of existing fill.

In summary, there would be a total of 11 AEIs identified as having a moderate to high risk rating for the amended project (an increase from seven AEIs identified in the EIS), including:

- AEI 6: PGH Bricks and Pavers (re-assessed risk rating – low to moderate)
- AEI 7: Area of waste and imported fill
- AEI 9: Sydney Recycling Park/ Wanless Recycling and Former Kari & Ghossayn Pty Ltd (Solid Waste Landfill) (re-assessed risk rating – low to moderate)
- AEI 10: SUEZ Kemps Creek Resource Recovery Park
- AEI 17: Stockpiles within Hi-quality Quarry Group Head Office
- AEI 19: Miscellaneous construction activities and stockpiles of building materials
- AEI 21: Area of illegally dumped material
- AEI 24: Stockpiles within the OzSource property (new AEI)
- AEI 26: TreeServe (new AEI)
- Generic AEI: Potential areas of existing fill
- Generic AEI: Historical uncontrolled earthworks containing asbestos and buildings/ structures.

The location of AEIs with a moderate to high rating for the amended project is shown in **Figure 6-58**.



- ~~~~ Waterways
- Motorway
- Main roads
- The project construction footprint as per EIS
- The amended project construction footprint

- Potential areas of existing fill
- Areas of environmental interest:

Site Id	Site name
6	PGH Bricks and Pavers
7	Area of waste and imported fill
9	Sydney Recycling Park/ Wanless Recycling & Former Kari & Ghossain Pty Ltd (Solid Waste Landfill)
10	SUEZ Kemp's Creek Resource Recovery Park
17	Stockpiles within Hi-quality Quarry
19	Miscellaneous construction activities and stockpiles of building materials
21	Area of significant flytipped waste
24	Stockpiles within the OzSource Property
26	TreeServe (wood processing, stockpiles of woodchips, logs and fire wood)



Figure 6-58 Amended AEIs with moderated to high ranking and potential fill areas

Table 6-59 Additional AEIs identified for the amended project

AEI	Site	Location	Potential contaminants of concern	Risk rating
23	CPB Contractors Pty Limited- Road construction	Between Eaton Road, Luddenham and Glenmore Parkway at Orchard Hills and Luddenham (next to additional ancillary facility site AF 10)	Heavy metals, total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene and xylene (BTEX), phenols and poly-aromatic hydrocarbons (PAH), organochlorine Pesticides (OCP), organophosphorus Pesticides (OPP), asbestos	Low
24	Stockpiles within the OzSource property	Range Road, Cecil Park (within amended construction footprint south of Range Road)	Heavy metals, BTEX, asbestos, PAH, OCP, OPP, polychlorinated biphenyls (PCB), TRH associated with stockpiled material	Moderate
25	Large area of fill placed in stockpiles	2161-2177 Elizabeth Drive, Luddenham (800 metres south of amended construction footprint)	Heavy metals, BTEX, asbestos, PAH, OCP, OPP, PCB, TRH associated with stockpiled fill material	Low
26	TreeServe – stockpiles of woodchips, logs and fire wood	90 Clifton Avenue, Kemps Creek (within the amended construction footprint)	Heavy metals, BTEX, PAH, TRH, (volatile organic compound) VOC associated with the onsite, processing of wood products (ie woodchips, large logs and firewood) and machinery/plant used to handle and process the wood.	Moderate

6.11.3 Assessment of potential impacts

6.11.3.1 Construction impacts

Soil contamination

Table 8-9 in the EIS identified that a Phase 2 Detailed Site Investigation (Phase 2 DS) would be carried out for the six AEIs identified as having a risk ranking of moderate or high, and for AEIs where PAH has been identified in soils at concentrations exceeding the respective human health investigation levels. Based on the amended project, an additional two AEIs would require a Phase 2 DS. The following eight AEIs would require a Phase 2 DS, with additional AEIs shown in **bold**:

- AEI 7: Area of waste and imported fill
- AEI 10: SUEZ Kemps Creek Resource Recovery Park
- AEI 17: Stockpiles within Hi-quality Quarry Group Head Office
- AEI 19: Miscellaneous construction activities and stockpiles of building materials
- AEI 21: Area of significant illegally dumped material

- AEI 24: Stockpiles within the OzSource property
- AEI 26: TreeServe (wood processing, stockpiles of woodchips, logs and fire wood)
- Generic AEI: Potential areas of existing fill.

Further soil investigations would also be required in areas of the amended construction footprint located adjacent to the following three AEIs:

- AEI 6: PGH Bricks and Pavers
- AEI 9: Sydney Recycling Park/ Wanless Recycling and Former Kari & Ghossayn Pty Ltd (Solid Waste Landfill)
- AEI 10: SUEZ Kemps Creek Resource Recovery Park.

Additional soil investigations for potential contaminants of concern for the area's current and historical agricultural land use and areas of potential fill, would be also required at the two additional areas of cut (airport interchange northern cut and airport interchange southern cut) (see **Section 6.10.3**).

Groundwater contamination

As discussed in **Section 6.10.3**, the EIS identified one location where the project may interest the water table, the western cut. The amended project would result in two additional areas of cut that may potentially intersect the water table, airport interchange northern cut and airport interchange southern cut.

At all three areas of cut, estimated inflow rates are considered very low and would likely mostly or fully evaporate prior to being discharged. The potential discharge of groundwater inflows are therefore not anticipated to impact the receiving environment. However, where excavations for these cuts encounter groundwater there is the potential for impacts to human health through the possibility of construction workers to come into direct contact with the groundwater during excavation works.

The groundwater quality at these proposed cut locations could be impacted by general filling and historical or current agricultural land use in the vicinity of these cuts. Based on the potential for human health impacts to construction workers, groundwater would be required to be assessed for potential contaminants of concern including, heavy metals, TRH, BTEX, PAH, PCB, OCP, OPP and nutrients.

6.11.3.2 Operational impacts

Soil and contamination impacts during the operational phase of the amended project are assessed to be generally consistent with those described in the EIS.

As discussed in **Section 6.10.3**, groundwater inflows during operation at the two additional areas of cut are likely to be the same or less than during construction due to reduced hydraulic gradients. Similarly, discharge volumes (if there are any) would be less during operation. Adverse impacts to receiving environments due to potential operational groundwater discharge from the additional areas of cuts are therefore not anticipated to impact the receiving environments.

6.11.4 Cumulative impacts

The cumulative soil and contamination impacts associated with the amended project would be likely to remain unchanged from the assessment carried out as per Section 8.1.5 of the EIS.

6.11.5 Environmental management measures

The environmental management measures identified in Section 8.1.6 of the EIS are considered appropriate to manage the soil and contamination impacts associated with the amended project. The proposed changes would not require any additional environmental management measures.

However, one environment management measure (SC05) has been revised to include the additional sites requiring a Phase 2 DS1 as discussed in **Section 6.11.3.1**. The revised environmental management measures for impacts of soils and contamination are presented in **Table 6-60**, with additional text shown in **bold** and removed text shown as strikethrough text (~~example~~).

Table 6-60 Revised environmental management measures (soils and contamination) (bold and strikethrough text shows change from EIS)

Impact	Reference	Environmental management measures	Responsibility	Timing
Impacts of soil and groundwater contamination	SC05	<p>Detailed site (contamination) investigations will be carried out in accordance with the NSW EPA (1995) Sampling Design Guidelines and other NSW EPA endorsed guidance including the NEPM (2013) guidelines within the following AEI locations to confirm the presence of contamination before the start of construction at these locations:</p> <ul style="list-style-type: none"> • AEI 17: Stockpiles within Hi-quality Quarry Group Head Office • Within AEI 19: the area of miscellaneous construction activities and stockpiles of building materials along Luddenham Road (Lot 1, DP228498) • Within AEI 7: Area of waste and imported fill Former Kari and Ghessayn solid waste landfill (Lot 17, Clifton Avenue) • Within AEI 21: Area of illegally dumped material along Range Road, Cecil Park • Within AEI 24: Stockpiles within the OzSource property • Within AEI 26: TreeServe (wood processing, stockpiles of woodchips, logs and fire wood) • Within the 'potential areas of existing fill' identified in the Soils and contamination assessment report (Appendix K Appendix O) for the amended project. <p>Further soil investigations will be required in areas of the amended construction footprint located adjacent to the following two AEIs to confirm the presence of contamination before the start of construction at these locations:</p> <ul style="list-style-type: none"> • Within AEI 6: PGH Bricks and Pavers 	Contractor	Prior to construction

Impact	Reference	Environmental management measures	Responsibility	Timing
		<ul style="list-style-type: none"> • Within AEI 9: Sydney Recycling Park/ Wanless Recycling and Former Kari & Ghossayn Pty Ltd (Solid Waste Landfill) • AEI 10: SUEZ Kemps Creek Resource Recovery Park <p>Additional soil and groundwater investigations will be required in the areas of additional cut around the airport interchange northern cut and airport interchange southern cut to further assess the potential impacts to the amended project.</p> <p>Depending on results of the investigations, or if remediation is deemed required at any site within the amended construction footprint, a Remedial Action Plan will be prepared before construction.</p>		