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Dear Jeremy

**Barangaroo South - Building R1 Construction Works, Contamination Assessment, Hickson Road, Millers Point**

**1.0 Introduction**

This letter has been prepared by AECOM Australia Pty Limited (AECOM) for Lend Lease Building Pty Ltd (Lend Lease) in support of the Environmental Impact Statement (EIS) being prepared for the proposed Building R1 construction works to be conducted in the south east corner of the Barangaroo South site. The location of the proposed Building R1 is shown on the drawings listed in **Section 3.1**.

**2.0 Objectives**

The objectives of this letter are to confirm that the proposed Building R1 construction works:

- are generally consistent with what was contemplated with the *Amended ORWS Remediation Action Plan* (AECOM, 2011) and can be appropriately managed by that document; and
- will enable the relevant consent authority to comply with Clause 7(1), 7(2) and 17(1) of *State Environmental Planning Policy 55 - Remediation of Land*.

**3.0 Background Information**

For clarity, the following terms have been adopted in this letter:

- 'Stage 1A Development Area' – refers to the first development stage of Barangaroo South. This general area is also referred to by other documents, including the *ORWS Amended RAP* as the ORWS;
- 'Stage 1A Public Domain' – refers to all open space areas, including roads, walkways and foreshore areas that will be accessible to the Public within the Stage 1A development area;
- 'Other Remediation Works South (ORWS) Public Domain' – the area defined in the *ORWS Amended RAP* (AECOM, 2011) to include the western portion of the Stage 1a development area, west of the Stage 1a basement groundwater retention wall system (refer to Figure 3 in the *ORWS Amended RAP* [AECOM, 2011]); and
- 'ORWS Development Area' – the area defined in the *ORWS Amended RAP* (AECOM, 2011) to include the eastern portion of the Stage 1a development area, east of the ORWS Public Domain (refer to Figure 4 in the *ORWS Amended RAP* [AECOM, 2011]).

**3.1 Review of Available Documents**

In preparing this letter, AECOM has reviewed the following development drawings, prepared by Collins and Turner, and provided to AECOM by Lend Lease:

- Lend Lease, Barangaroo South Building R1 Development Application set of drawings (dated 13 August 2014). Specific reference is made by this letter to:
  - Drawing BR1-ASK-12-00-11 - Section (East-West) (here-in referred to as **Figure 1**); and
  - Drawing BR1-ASK-12-00-12 - Section (North-South) (here-in referred to as **Figure 2**).

### 3.2 Proposed Building R1 Construction Works

Based on the provided information, it is understood that the ground floor footprint of the proposed Building R1 (here-in referred to as the Site) is located predominantly within the footprint of the Stage 1A basement (that is within the Stage 1A basement groundwater retention wall).

The western edge of the building will be founded on four concrete piles which will be drilled approximately 3.0 m to the west of the Stage 1A basement groundwater retention wall (refer to the attached **Figure 1**). The four piles will be drilled at approximately 5.0 intervals and a shallow concrete ground beam will be constructed on top of the piles. The base of the ground beam is proposed to be at a depth of approximately Relative Level 2.3 m Australian Height Datum (AHD). Therefore, given that the current ground level is approximately RL 2.5 m AHD, excavation works required for the ground beam preparatory works will be limited to removal of the existing concrete slab and subgrade.

Shallow excavation works will also be required along the southern edge of Building R1 to prepare the ground for the 'proposed structural slab' (refer to **Figure 2**). Planter boxes will be placed on the structural slab in this area. The shallow excavation works may involve excavation of existing soils (including the existing concrete slab and subgrade) to a maximum depth of 0.5 m in an area approximately 1.5 m wide along the southern edge of Building R1.

Together construction of the four piles west of the Stage 1A basement groundwater retention wall, the associated ground beam, and the proposed structural slab on the southern side of Building R1 is likely to generate a relatively small volume of spoil. Spoil will be removed from the Site to a NSW EPA approved landfill facility (i.e. the spoil will not be reused onsite).

Based on the Lend Lease supplied design Drawings (refer to **Section 3.1**), the Building R1 will be 3 storeys high. There will be no direct access from Building R1 to the underlying basement. Access between floors within Building R1 will be via stairs.

### 4.0 Remedial Action Plan

The following Remedial Action Plan (RAP) has been approved in relation to the Stage 1A development area:

- *ORWS Amended RAP* (AECOM, 2011) - prepared for the Stage 1a development area (including Blocks 1 to 3 and the ORWS Public Domain). The *ORWS Amended RAP* (AECOM, 2011) was approved by the Minister of Planning and Infrastructure as part of Major Project MP10\_0023 MOD 1 (dated 17 August 2011). The *ORWS Amended RAP* (AECOM, 2011) defined the area to the west of the Stage 1A basement as 'Area A'.

Based on the information provided by Lend Lease, it is understood that Building R1:

- is intended to be used for retail (likely food and drink premises) in the future; and
- will be constructed predominantly over a basement car park.

As shown in **Figure 1**, a small portion of the Building R1 footprint at ground floor level will extend approximately 2.0 m to the west of the Stage 1a basement groundwater retention wall. A public domain/ground floor slab will also extend a further approximately 12 m westwards of the Building R1 façade (i.e. approximately 14 m west of the basement groundwater retention wall, refer to **Figure 1**). In this area, Building R1 will be slab on grade construction.

As shown in **Figure 2**, the southern extent of Building R1 is located on the alignment of the groundwater retention wall system and is therefore located above the Stage 1A basement.

### 4.1 Proposed Building R1 Land Use

As discussed in **Section 4.0**, the Lend Lease development plans indicate that:

- The majority of Building R1 will be constructed over the Stage 1A basement (that is within ORWS Development Area); and
- The western extent of Building R1 will extend beyond the Stage 1A basement groundwater retention wall by approximately 2 m (into the *ORWS Public Domain*) (refer to the attached **Figure 1**).

#### 4.1.1 Land Use within the ORWS Development Area

Section 1.3.1 of the *ORWS Amended RAP* (AECOM, 2011) states that the proposed land use within the ORWS Development Area (that is the area within the Stage 1A basement groundwater retention wall) will incorporate *high density residential and commercial multi storey towers, together with associated open space areas overlying the basement car parking.*

Consequently, the proposed commercial use of Building R1 is considered to be consistent with that contemplated by the *ORWS Amended RAP* (AECOM, 2011) within the ORWS Development Area.

#### 4.1.2 Land Use within the ORWS Public Domain

Section 1.3.1 of the *ORWS Amended RAP* (AECOM, 2011) states that the proposed land use within the ORWS Public Domain (i.e. including the area west of the Stage 1a basement groundwater retention wall) '*will incorporate open space with community, mixed commercial and retail land use, and landscaping (planter boxes, paved area and parking)*'. The maximum height of development within the ORWS Public Domain was also defined to be '*limited to two storeys*'.

Building R1 will be constructed to 3 storeys and will extend into the ORWS Public Domain where it will be constructed as 'slab on grade'. This land use (that is a slab on grade building with a height of greater than 2 storeys) was not specifically provided for by the *ORWS Amended RAP* (AECOM, 2011).

Notwithstanding, it is considered that the land use in that part of Building R1 that falls outside the Stage 1a groundwater retention wall (within the ORWS Public Domain) is generally consistent with the range of land uses envisaged by the *ORWS Amended RAP* (AECOM, 2011) and will not present an unacceptable risk to human health. This conclusion is based on the following considerations:

- The portion of Building R1 that will be located west of the Stage 1a basement groundwater retention wall (as slab on grade construction) is narrow and in the order of 5% of the total building ground floor footprint (refer to **Figure 1**);
- The *ORWS Human Health and Ecological Risk Assessment HHERA* (AECOM 2011b) included development of Site Specific Target Criteria (SSTC) for a multi-storey slab on grade construction (referred to as Scenario 8). This land use scenario included an assumption that soil vapour could move from the unsaturated soils below the ground floor slab into the building by advection. The portion of Building R1 that will be located within the ORWS Public Domain is consistent with land use Scenario 8.
- Comparison of the soil analytical data from boreholes located within the Building R1 footprint (i.e. sampling locations BH23, BH104, BH343, BH344, BH355 and BH356, refer to Figure 3 of the *ORWS Amended RAP* [AECOM, 2011]) against the SSTC for Scenario 8 unsaturated soils (refer to Table T1 of the *ORWS Amended RAP* [AECOM, 2011]) indicate that:
  - Benzene, naphthalene, Total Petroleum Hydrocarbons (TPH) C<sub>6</sub>-C<sub>9</sub> fractionated group are the key drivers for vapour intrusion risks associated the Scenario 8 unsaturated soils SSTC;
  - Benzene, naphthalene, TPH C<sub>6</sub>-C<sub>9</sub> concentrations in the unsaturated soils were all below the laboratory Limit of Reporting (LOR) and less than the Scenario 8 unsaturated soils SSTC; and
  - All other potential contaminants of concern in the unsaturated soils were generally below the laboratory LOR and significantly less than the Scenario 8 unsaturated soils SSTC.
- Comparison of the groundwater analytical data from the monitoring well located within the Building R1 footprint (i.e. MW18, refer to Figure 3 of the *ORWS Amended RAP* [AECOM, 2011]) against the SSTC for Scenario 8 (refer to Table T2 of the *ORWS Amended RAP* [AECOM, 2011]) indicates that:
  - Benzene, naphthalene, TPH C<sub>6</sub>-C<sub>9</sub> concentrations (the key drivers for vapour intrusion risks) were all below the laboratory (LOR) and less than the Scenario 8 groundwater SSTC; and
  - All other potential contaminants of concern in the MW18 groundwater were generally below the laboratory LOR and significantly less than the Scenario 8 groundwater SSTC.

## 4.2 Limited Excavation Works

### 4.2.1 Pile Construction

As discussed in Section 16.3.1 of the *ORWS Amended RAP* (AECOM, 2011) it was envisaged that limited excavation works (for example in relation to service trenches) would be required in Area A. Area A is defined by the *ORWS Amended RAP* (AECOM, 2011) as the area between the Stage 1A Basement and Darling Harbour (also referred to as the ORWS Public Domain). Area A corresponds within the area in which the four piles that will support the western edge of Building R1 will be constructed (refer to **Figure 1**).

Construction of the piles is considered to be consistent with the limited excavation works anticipated by the *ORWS Amended RAP* (AECOM, 2011).

With respect to limited excavation works, the *ORWS Amended RAP* (AECOM, 2011) requires that validation samples be collected and analysed if, based on visual and olfactory observations, the soils encountered are significantly different to those observed during previous investigations at the Site.

Given the nature of the piling works described in **Section 3.2**, it will be difficult to make visual and olfactory observations of the soils encountered during the limited excavation works. However, because all pile risings will be removed from the Site, waste classification testing will be required in accordance with Section 12.7.10 of the *ORWS Amended RAP* (AECOM, 2011) and the NSW DECCW (2009) *Waste Classification Guidelines*. Therefore, the waste classification sample results can be used to confirm whether the conditions encountered are consistent with those observed during previous investigations.

### 4.2.2 Ground Beam Works (west side of Building R1)

As discussed in **Section 3.2**, shallow excavation works will be required to facilitate construction of the proposed ground beam that will support the western edge of Building R1 (refer to **Figure 1**).

Excavation works required for construction of the ground beam is considered to be consistent with the limited excavation works anticipated by the *ORWS Amended RAP* (AECOM, 2011).

These excavation works should be managed in accordance with the approach described in **Section 4.2.1** and as detailed in Section 16.3.1 ('Area A - Validation of Limited Excavation Areas'). In particular, materials exposed by the limited excavations which, based on visual and olfactory observations, are observed to be significantly different from those observed during the historic ORWS site investigations will be subject to validation sampling. Validation samples would be collected and analysed from the walls and base of the excavation (as required). The reported Chemicals of Potential Concern concentrations would be assessed against the relevant soil SSTCs to confirm suitability.

If unexpected contamination is encountered during these limited excavation works, the provisions of Section 20 (Contingency Planning) of the *ORWS Amended RAP* (AECOM, 2011) would be implemented in consultation with the NSW EPA accredited site auditor (as required). These contingency provisions may include over-excavation to remove the identified unexpected contamination and validation of the resultant excavation.

### 4.2.3 Proposed Structural Slab (south side of Building R1)

Shallow excavation works may be required along the southern edge of Building R1 to prepare the ground (involving compaction of sub grade materials, etc) for the 'proposed structural slab' (refer to **Figure 2**). These minor excavation works will also be managed in accordance with Section 16.3.1 ('Area A - Validation of Limited Excavation Areas') of the *ORWS Amended RAP* (AECOM, 2011) as summarised by **Section 4.2.2**.

## 5.0 Compliance with SEPP 55

The presence, or otherwise, of contamination within the ORWS Development Area was considered by the soil and groundwater analytical data obtained by the environmental site investigations listed in Section 3.4 of the *ORWS Amended RAP* (AECOM, 2011).

The *ORWS Amended RAP* (AECOM, 2011) concluded that the concentrations of contamination reported within the ORWS Area (Stage 1A development area) did not require remediation to render the Site suitable for the proposed land uses (including the proposed commercial land use associated with Building R1). The *ORWS Amended RAP* (AECOM, 2011) was approved by the Minister of Planning and Infrastructure as part of Major Project MP10\_0023 MOD 1 (dated 17 August 2011).

As described by **Section 4.1**, AECOM considers that the Building R1 land use is generally consistent with the land uses anticipated by the *ORWS Amended RAP* (AECOM, 2011). The only exception to this is the western

2m of Building R1 that will be constructed as slab on grade outside the Stage 1A basement groundwater retention wall (i.e. within the ORWS Public Domain). As described by **Section 4.1**, it is considered that this land use will not represent an unacceptable risk to human health. This opinion is based on the limited extent of the building that will extend beyond the Stage 1A groundwater retention wall (approximately 5%) and comparison of the available soil and groundwater analytical data from within the Building R1 footprint to the Scenario 8 SSTC presented in the *ORWS Amended RAP* (AECOM, 2011) and which is consistent with the proposed landuse in this area.

As described by **Section 4.2.1**, **Section 4.2.2** and **Section 4.2.3**, it is the opinion of AECOM that spoil generated from the limited excavation works to be undertaken in association with the pile, ground beam and structural slab construction within the ORWS Public Domain can be managed in accordance with the *ORWS Amended RAP* (AECOM, 2011).

## 6.0 Conclusions

In conclusion, it is AECOM's opinion that the Building R1 development works (as described by **Section 3.2**):


- are consistent with the works contemplated with the *ORWS Amended RAP* (AECOM, 2011) and can be appropriately managed by the provisions of that document;
- will not require amendment of the *ORWS Amended RAP* (AECOM, 2011); and
- the information presented in this letter will enable the relevant consent authority to comply with Clause 7(1), 7(2) and 17(1) of *SEPP 55 - Remediation of Land*.

Yours faithfully



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