

Mark Robertson
Senior Project Manager, Barangaroo
Lend Lease
30 The Bond, 30 Hickson Road, Millers Point

15 May 2014

Dear Mark

Barangaroo South - Stage 1a Public Domain Works (SSD 6303), Hickson Road, Millers Point

1.0 Introduction

This letter has been prepared by AECOM Australia Pty Limited (AECOM) for Lend Lease Pty Ltd to support the State Significant Development (SSD) 6303 works being completed in the Stage 1a Public Domain. The footprint of the Site is shown on the attached **Figure 1** (denoted by dashed red line).

The objective of this letter is to confirm that the proposed Stage 1a Public Domain development works are consistent with the *Amended Remedial Action Plan (RAP), Barangaroo - ORWS Area* (AECOM, 7 July 2011, herein referred to as the *ORWS Amended RAP*).

To this end, this letter considers whether the proposed Stage 1a Public Domain development (which may include the works also contemplated by the application to modify the approval issued in respect of MP10_0023 for Bulk Excavation and Basement Car Parking [here-in referred to as MP10_0023 MOD 6] for temporary public domain works):

- is consistent with the land uses contemplated in the *ORWS Amended RAP* (AECOM, 2011);
- is located within the footprint covered by the *ORWS Amended RAP* (AECOM, 2011); and
- will, in the opinion of AECOM, enable the relevant consent authority to comply with Clause 7(1) of the *State Environmental Planning Policy (SEPP 55) - Remediation of Land*.

In preparing this letter, AECOM has reviewed the following drawings and information:

Table 1 Reviewed Lend Lease Development Plans

AECOM Figure No.	Drawing No./Date	Revision	Drawing Title
Figure 1	LA_MP_AO_DA204	K	Grading Plan
Figure 2	Dated 1 May 2014	F	RAP Boundary
Figure 4	BB1_ASK_SC_O594	01	Section through high voltage electrical conduits combined plant

AECOM also consulted with the NSW EPA Accredited Site Auditor in relation to the contents of this letter (excepting the works contemplated by MP10_0023 MOD 6) by telephone on 7 February 2014 and again on 3 March 2014.

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

- 'Stage 1a development area' – refers to the first development stage of Barangaroo South (refer to the attached **Figure 1**). This general area is also referred to by other documents, including the *ORWS Amended RAP* as the Other Remediation Area (South) (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 (refer to the attached **Figure 1**). It is noted that the commercial and retail building footprints have been approved under a separate development application);

- '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]).

2.0 Remedial Action Plans

The following Remedial Action Plans (RAPs) have been approved in relation to the Stage 1a development area and associated areas:

- *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); and
- *Addendum to the Amended ORWS RAP, Harbour Heat Rejection (HHR) Inlet Area, Barangaroo South* (AECOM, 10 October 2012) - prepared to facilitate the excavation of a trench associated with the Harbour Heat Rejection (HHR) inlet system to be constructed immediately adjacent to the Stage 1a development area (at the northwest corner of the Stage 1a basement, refer to the attached **Figure 2**). The *Addendum to the Amended ORWS RAP* (AECOM, 2012) was approved by the Minister of Planning and Infrastructure as part of Major Project MP10_0023 MOD 5 (dated 8 August 2013).

3.0 Land Use

The footprint of the Stage 1a Public Domain includes portions of both the:

- ORWS Development Area; and
- ORWS Public Domain.

Based on the information provided by Lend Lease (refer to **Table 1**), it is understood that the proposed landuse within the Stage 1a Public Domain will include:

- Within the ORWS Development Area - overlying the Stage 1a basement: various roadways, walkways and associated paved open space areas.
- Within the ORWS Development Area - outside the alignment of the Stage 1a basement: Hickson Place - the paved gateway entry point to the Stage 1a development site and the future transport hub. This area is referred to as Area D by the *ORWS Amended RAP* (AECOM, 2011); and
- Within the ORWS Public Domain - located west of the Stage 1a basement:
 - Open space areas including:
 - Unpaved park areas associated with Globe Harbour (at the northern end) and the R1 Terrace Lawn (at the southern end); and
 - Paved areas, including timber structures (to be used as outdoor dining areas) and trees planted in buried concrete boxes filled with suitable fill (refer to Section 3.4.14 of the *ORWS Amended RAP* [AECOM, 2011]).

Section 1.3.1 of the *ORWS Amended RAP* (AECOM, 2011), states that the proposed landuse within the ORWS Public Domain will incorporate *open space with community, mixed commercial and retail land use, and landscaping (planter boxes¹, paved areas and parkland)*.

Section 1.3.1 of the *ORWS Amended RAP* (AECOM, 2011) states that the proposed landuse within the ORWS Development Area will incorporate high density residential and commercial multi storey towers, together with associated open space areas overlying the basement car parking.

The land uses described by the proposed Stage 1a Public Domain development are considered to be consistent with those contemplated by the *ORWS Amended RAP* (AECOM, 2011).

¹ The Stage 1a Public Domain development plans provide for planting trees in buried concrete boxes filled with Suitable Fill (refer to Section 3.4.14 of the *ORWS Amended RAP* [AECOM, 2011]).

4.0 Extent of Development

4.1 Surface Elevation

Section 3.2.5 of the *ORWS Amended RAP* (AECOM, 2011) anticipates that the level of the ORWS Public Domain would be *raised by approximately 1 m*. The original surface level within the ORWS Public Domain was at a Relative Level (RL) of approximately 2.2 m above Australian Height Datum (m AHD).

As detailed in the attached **Figure 1** the post-development level of the Stage 1a Public Domain is generally proposed to be in the order of RL 2.9 m AHD which is consistent with that contemplated by the *ORWS Amended RAP* (AECOM, 2011).

It is understood that the existing concrete slab will be removed in some localised areas of the ORWS Public Domain to facilitate construction of various underground services. The *ORWS Amended RAP* (AECOM, 2011) assumes that the existing concrete slab will remain in place but be perforated to allow drainage of surface water infiltration through the existing slab. This is consistent with the design as proposed by the Stage 1a Development Works.

4.2 Northern Stage 1a Public Domain Boundary

The development plans indicate that the northern extent of the Stage 1a Public Domain development extends slightly beyond the alignment of the Stage 1a basement groundwater retention wall in a limited area at the north west corner of the Stage 1a development area boundary (refer to the attached **Figure 2**). The *ORWS Amended RAP* (AECOM, 2011) was prepared on the basis that the alignment of the Stage 1a groundwater retention wall would correspond with the ORWS Development Area. However, it is considered that the area of work that falls outside the Stage 1a groundwater retention wall can be appropriately managed by the provisions of the *ORWS Amended RAP* (AECOM, 2011). This conclusion is based on the following lines of evidence:

- The area is located outside the Stage 1a basement groundwater retention wall and in potential hydraulic contact with Darling Harbour - this is consistent with the material to remain *in situ* within the ORWS Public Domain (referred to as Area A by the *ORWS Amended RAP* [AECOM, 2011]);
- Soil analytical data relevant to the discussed area is presented on **Table T1** and **Figure 3**, attached (taken from Figure F3 of the *Addendum to the Amended ORWS RAP* [AECOM, 2012]). Particular locations considered to be representative of the area are BH01, BH04, BH035, BH049, BH047 and BH37. Review of the available soil analytical results (both saturated and unsaturated material) indicates that Chemicals of Potential Concern (CoPC) concentrations are generally less than the 'Area A' Site Specific Target Criteria (SSTC) and relevant Site Specific Ecological Screening Criteria (SSESC, as detailed in Table T1 of the *ORWS Amended RAP* (AECOM, 2011). The only exceptions to this are:
 - Total Petroleum Hydrocarbons (TPH, C₆-C₉ fractionated group) and naphthalene concentrations at depth (between 21 and 22.2 m below the current ground level) in BH04 and BH37 exceeded the SSTC-A. As described by the *ORWS Amended RAP* (AECOM, 2011), SSTC-A are only applicable to unsaturated soil, therefore these results do not represent an unacceptable risk;
 - TPH (C₆-C₉ fractionated group) concentrations at depth at BH04 (between 21 and 22.2 m below the current ground level) exceeded the SSESC-A. These samples were collected from within natural marine sediments, from which contaminant flux is negligible. Therefore, these results are not considered to represent an unacceptable risk to the environment; and
 - Heavy metal concentrations (specifically copper [4 out of 39 samples] and zinc [1 out of 39 samples]) exceeded the SSESC-A in some of the samples analysed. These results are consistent with those reported within the ORWS Public Domain. As described by Section 6.1 and 7.3 of the *ORWS Amended RAP* (AECOM, 2011), the concentrations of copper and zinc reported are not considered to represent a risk to human health or the environment and are not considered to warrant remediation.
- The surface soil in the north west corner of the Stage 1a Public Domain development area will be excavated during the excavation works required for the HHR system inlet works which will be undertaken in accordance with the *Addendum to ORWS Amended RAP* (AECOM, 2012);
- As shown in the attached **Figure 4** cross section, the area will be excavated to a depth of approximately 600 mm below the current ground level to facilitate construction of the overlying roadway. This is consistent with the limited excavation anticipated by the *ORWS Amended RAP* (AECOM, 2011) in relation to Area A. This excavation can be suitably managed as per the validation requirements detailed in Section 16.3.1 ('Area A - Validation of Limited Excavation Areas');

- The volume of soil that will remain *in situ* within this area following the Stage 1a Public Domain development is small, particularly when considered in the context of volume of material that has been removed as part of the Stage 1a basement construction. Therefore, it is considered unlikely to represent an unacceptable risk to human health or the environment; and
- Section 20.9 of the *ORWS Amended RAP* (AECOM, 2011) presents contingency measures that are applicable in the event that the basement groundwater retention wall system design is refined as a result of the Lend Lease design process. In particular, it states that *minor lateral movement (i.e. by less than 5 m) of the retention wall system (i.e. to the east or west) will not affect the proposed management strategy of retaining material in this Area (i.e. in Area A behind the retention wall system) and its suitability for the proposed landuse.* The lateral movement of the retention wall system is less than 5 m and is therefore not considered to impact the strategy described by the *ORWS Amended RAP* (AECOM, 2011).

It is noted that a small portion of the ORWS diaphragm wall (the northwest corner) extends north of the alignment anticipated by the *ORWS Amended RAP* (2011) (refer to the attached **Figure 2**). It is considered that this outcome will result in a reduced risk to the environment and human health because:

- material remaining *in situ* within the retention wall will be retained within the alignment of the wall and not in hydraulic contact with Darling Harbour; and
- additional material will have been removed as part of the Stage 1a basement excavation.

4.3 Southern Boundary

The development plans indicate that the extent of the Stage 1a Public Domain development extends beyond the alignment of the Stage 1a basement groundwater retention wall in an area along the southern Stage 1a development area boundary (refer to the attached **Figure 2**). The *ORWS Amended RAP* (AECOM, 2011) was prepared on the basis that the southern alignment of the Stage 1a groundwater retention wall would correspond with the southern boundary of the ORWS Development Area. However, it is considered that the area of work that falls outside the Stage 1a groundwater retention wall can be appropriately managed by the provisions of the *ORWS Amended RAP* (AECOM, 2011). This conclusion is based on the following lines of evidence:

- The area is located outside the Stage 1a basement groundwater retention wall and in potential hydraulic contact with Darling Harbour - this is consistent with the material to remain *in situ* within the ORWS Public Domain (referred to as Area A by the *ORWS Amended RAP* [AECOM, 2011]);
- Review of the available soil analytical results (both saturated and unsaturated material) in the vicinity of the discussed area (i.e. boreholes BH21/22, BH093, BH312 and BH322, refer to Figure 5 in the *ORWS Amended RAP* [AECOM, 2011]) indicates that Chemicals of Potential Concern (CoPC) concentrations are less than the 'Area A' Site Specific Target Criteria (SSTC) and relevant Site Specific Ecological Screening Criteria (SSESC, as detailed in Table T1 of the *ORWS Amended RAP* (AECOM, 2011). This suggests that the material within the area does not represent an unacceptable risk to human health or the environment;
- The volume of soil that will remain *in situ* within this area following the Stage 1a Public Domain development is small, particularly when considered in the context of volume of material that has been removed as part of the Stage 1a basement construction. Therefore, it is considered unlikely to represent an unacceptable risk to human health or the environment; and
- Section 20.9 of the *ORWS Amended RAP* (AECOM, 2011) presents contingency measures that are applicable in the event that the basement groundwater retention wall system design is refined as a result of the Lend Lease design process. In particular, it states that *minor lateral movement (i.e. by less than 5 m) of the retention wall system (i.e. to the east or west) will not affect the proposed management strategy of retaining material in this Area (i.e. in Area A behind the retention wall system) and its suitability for the proposed landuse.* The lateral movement of the retention wall system is less than 5 m and is therefore not considered to impact the strategy described by the *ORWS Amended RAP* (AECOM, 2011).

5.0 Public Domain Works in the C6 Area, R1 Area and Temporary Public Domain Works (MP10_0023 MOD 6)

It is understood that Lend Lease has made an application pursuant to Section 75W of the *Environmental Planning and Assessment Act* (1979) to modify the approval issued in respect of MP10_0023 for Bulk Excavation and Basement Car Parking. The Section 75W application sought the Minister's approval for construction of above ground building elements associated with the basement within the footprint of buildings C1, C2, C6, R1 and R7 including egress stairs, carpark entries/exits, service risers, etc such that the basement can be completed and commissioned.

The above works were considered in the letter *Barangaroo South. Section 75W – Bulk Excavation and Basement Car Parking - Modification 6, Amended Remedial Action Plan - Other Remediation Works (South) Area* (AECOM, 11 July 2013).

Of note, the scope of works proposed by MP10_0023 (MOD 6) include a proposed temporary public domain for the Basement Risers extending outside of the ORWS basement area at (refer to **Figure 1**):

- the south side of C6 (here-in referred to as the C6 Area); and
- the west side of R1 (here-in referred to as the R1 Area).

If required, these temporary public domain works will include some minor excavation and slab construction within areas outside the approved ORWS basement area. The new concrete slab will be finished with paint and furnished with planter boxes, umbrellas and similar street furniture.

It should be noted that if the works are not completed as part of the temporary public domain works contemplated by MP10_0023 (MOD 6), they will be included and completed as part of the Stage 1a Public Domain application (SSD 6303).

It is considered that the works proposed by MP10_0023 (MOD 6) are within the scope of the *Amended RAP* (AECOM, 2011). The following points are noted in support of this statement:

- the temporary landuse proposed by MP10_0023 (MOD 6) is consistent with Scenario 4 (Paved Recreation) considered by the *Amended RAP* (AECOM, 2011);
- C6 area:
 - The C6 area is located within the area referred to as Area D by the *Amended RAP* (AECOM, 2011). The future landuse considered by the *Amended RAP* (AECOM, 2011) in relation to Area D includes Scenario 4 (Paved Recreation). Therefore, the remediation and validation strategy described by the *Amended RAP* (AECOM, 2011) is consistent with the temporary landuse proposed by the proposed Section 75W Application; and
 - It is noted that, as described by Section 16.3.4 of the *Amended RAP* (AECOM, 2011), additional soil sampling works are required to validate that the area is suitable for the proposed future landuse;
- R1 area:
 - The R1 area is located within the area referred to as Area A by the *Amended RAP* (AECOM, 2011). The future landuse considered by the *Amended RAP* (AECOM, 2011) in relation to Area A includes Scenario 4 (Paved Recreation). Therefore, the remediation and validation strategy described by the *Amended RAP* (AECOM, 2011) is consistent with the temporary landuse proposed by the proposed Section 75W Application; and
 - It is noted that, as described by Section 16.3.1 of the *Amended RAP* (AECOM, 2011), if small scale excavation works are to be conducted in this area, additional soil validation works may be required to validate that the area is suitable for the proposed landuse.

6.0 Compliance with SEPP 55

The presence, or otherwise, of contamination within the ORWS Public Domain and ORWS Development Areas (collectively referred to as the ORWS 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 (which largely includes the footprint of the proposed Stage 1a Public Domain) did not require remediation to render the Site suitable for the proposed land uses.

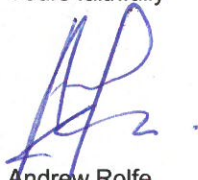
As described by **Section 4.2** and **4.3**, it is the opinion of AECOM that minor differences between the boundary of the ORWS Area and that of the Stage 1a Public Domain can be managed in accordance with the *ORWS Amended RAP* (AECOM, 2011).

7.0 Conclusions

In conclusion, it is AECOM's opinion that the proposed development of the Stage 1a Public Domain (which may include the works contemplated by MP10_0023 MOD 6 [as described by **Section 1**]) as described by the Drawings summarised in **Table 1**:


- Is generally consistent with what was contemplated with the *ORWS Amended RAP* (AECOM, 2011) and the *Addendum to the Amended ORWS RAP* (AECOM, 2012) and can be appropriately managed by those documents;
- Will not require amendment of the *ORWS Amended RAP* (AECOM, 2011) and *Addendum to the Amended ORWS RAP* (AECOM, 2012); and
- Will enable the relevant consent authority to comply with Clause 7(1) of *SEPP 55 - Remediation of Land*.

Yours faithfully



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Attached:

- Figure 1 - Lend Lease Grading Plan
- Figure 2 - Lend Lease RAP Boundary
- Figure 3 - Sample Locations
- Figure 4 - Section Through High Voltage Electrical Conduits Combined Plant
- Table T1 - Soil Analytical Results, North West ORWS Site Boundary, ORWS Barangaroo

Figure 1



KEY

- SITE BOUNDARY
- TEMPORARY LANDSCAPE FOR FUTURE DEVELOPMENT
- (+0.00) SPOT HEIGHT
- 1:20 GRADE

NOTES:

Buildings C1, C2, C6, R1 and R7 are shown as indicative only.

Buildings A and B are subject to further design development and form part of future planning applications.

Building A sits within the existing building envelope for C6.

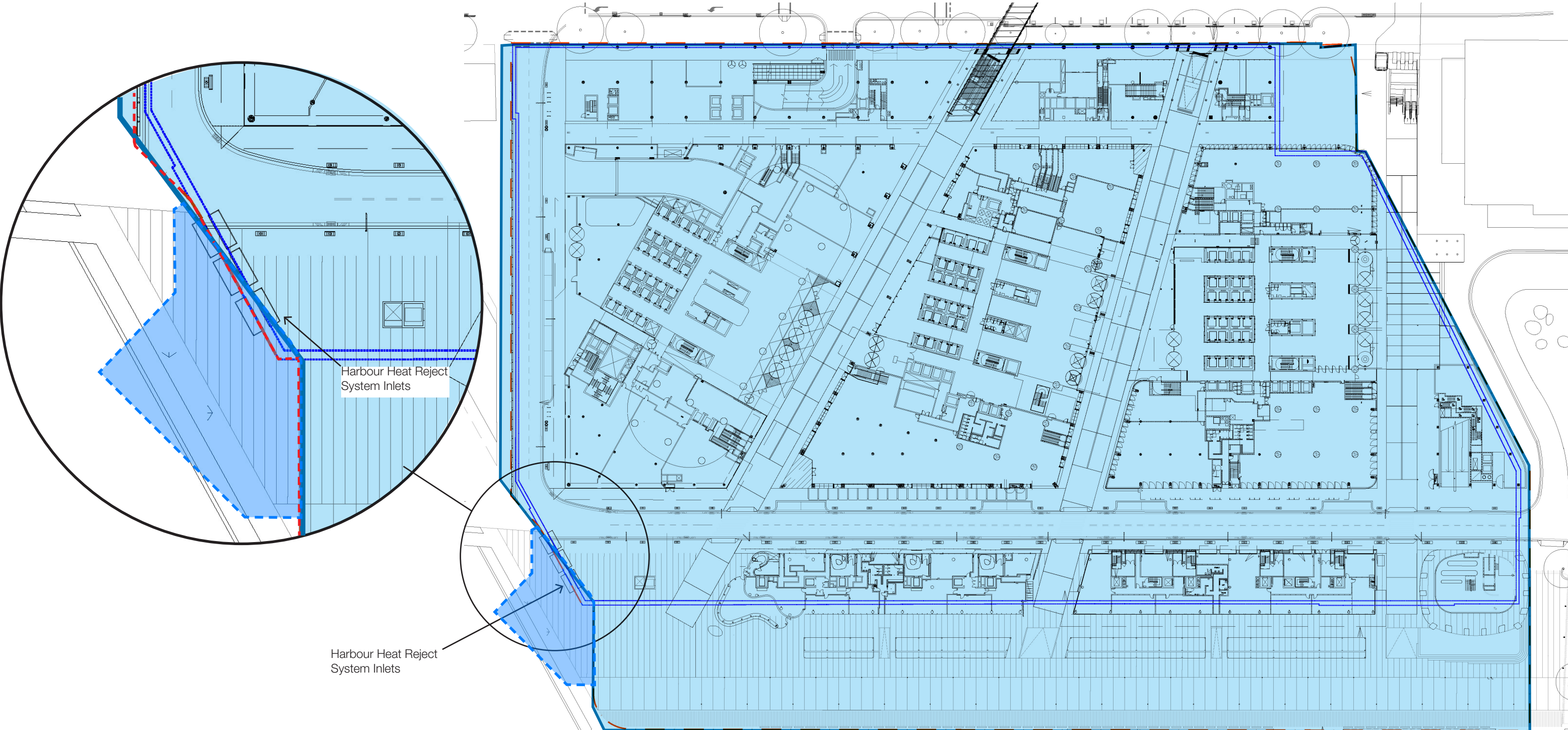
Proposed works shown outside the Stage 1a boundary are shown as indicative only for information. These works will form part of a future planning application.

Future levels of Hickson Road are yet to be confirmed. As such access arrangements to Hickson Road are indicative and will be subject to detailed design in accordance with the BCA and relevant Australian Standards, and consistent with DDA and CPTED principles.

Wharf Delivery By Others. Shown indicative only



Figure 2



KEY

- Stage 1A Site Boundary
- ==== D Wall Extent
- ORWS Amended RAP (AECOM, 2011) boundary
- Addendum to the Amended ORWS RAP (AECOM, 2012) boundary

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RAP BOUNDARY
SCALE
1:500@A1 1:1000@A3

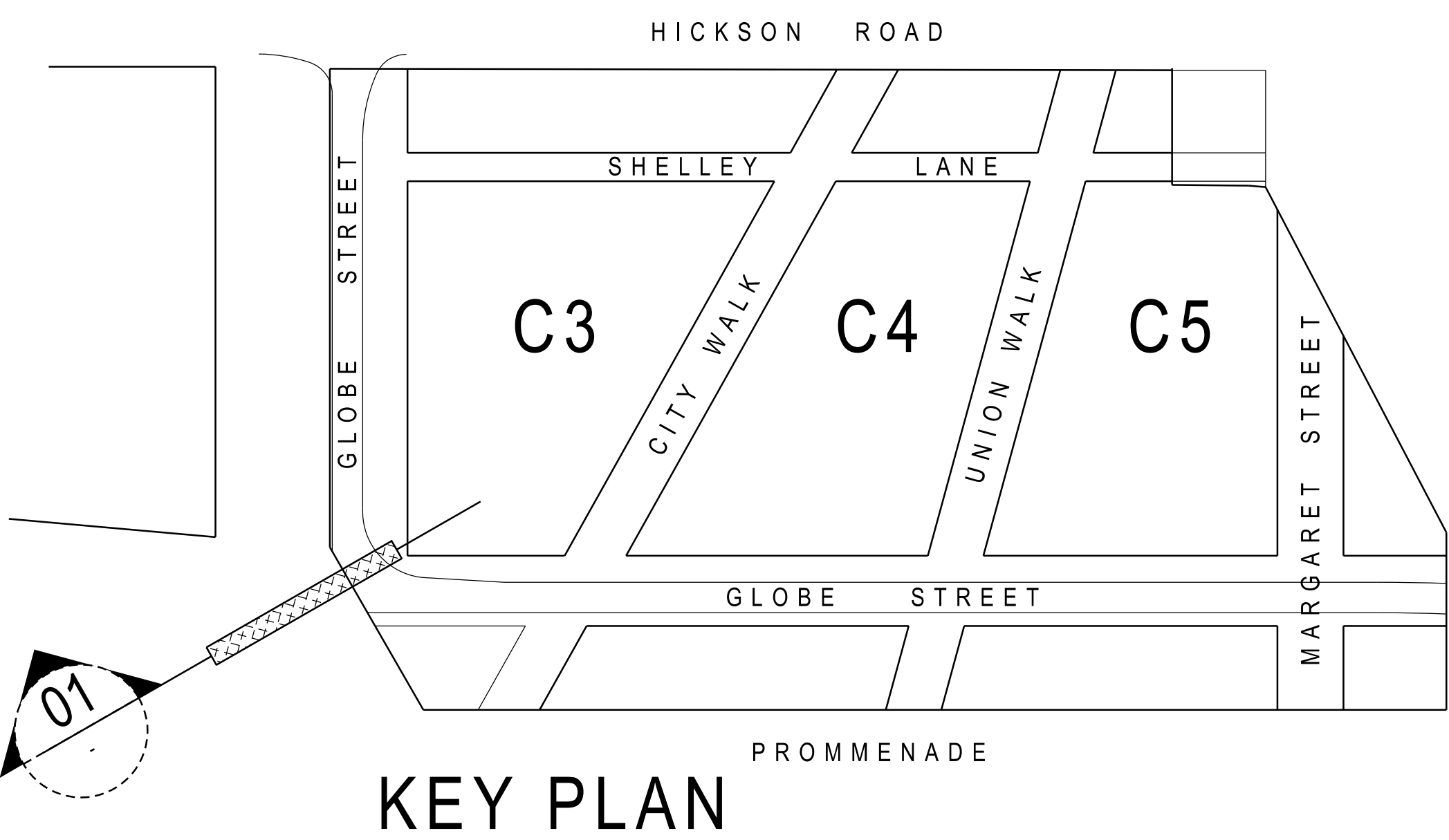
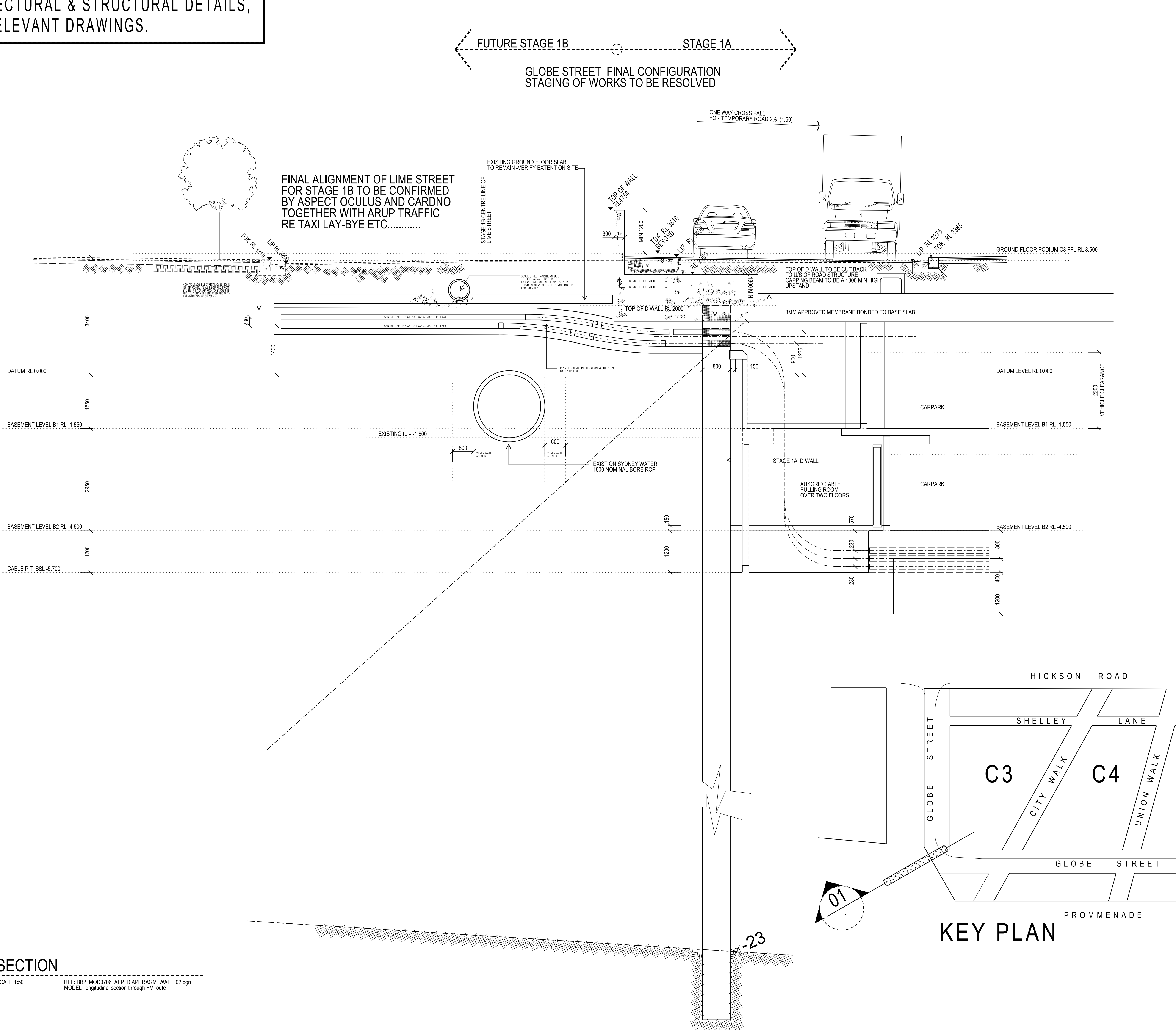


REV
F
DRAWING DATE
01/05/2014

Figure 3



ISSUED FOR CO-ORDINATION PURPOSES ONLY.
FOR ARCHITECTURAL & STRUCTURAL DETAILS,
REFER TO RELEVANT DRAWINGS.



01	Road edge condition revised	17/01/14
Rev	Description	Date

Dwg. No. BB1_ASK_SC_0594
Date 07 January 2014 Revision 01

GRAHAM W JONES
Principal Architect
FRAIA NSW ARB 4005

SECTION THROUGH HIGH VOLTAGE ELECTRICAL
CONDUITS COMBINED PLANT

Scale 1:50 @ B1 1:125 @ A3

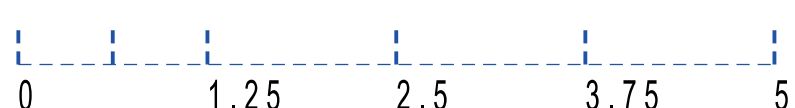




Table T1 - Soil Analytical Results, North West ORWS Site Boundary,
ORWS Barangaroo

Lend Lease
ORWS Barangaroo

Field_ID	BH01_0.3-0.4	BH01_1.0-1.2	QC01	QC02	BH01_2.0-2.2	BH01_4.0-4.1	BH01_7.0-7.1	BH01_9.0-9.1	BH01_10.0-10.2	QC03	BH01_12.0-12.1
Sample_Type	Normal	Normal	Field_D	Interlab_D	Normal	Normal	Normal	Normal	Normal	Field_D	Normal
Lab_Report_Number	ES0918573	ES1001619	ES0918573	45989	ES0918573	ES0918573	ES0918573	ES0918573	ES0918573	ES0918573	ES0918573
Sample_Depth_Range	0.3-0.4	1-1.2	1-1.2	1-1.2	2-2.2	4-4.1	7-7.1	9-9.1	10-10.2	10-10.2	12-12.1
Sampled_Date_Time	12/02/2009	12/02/2009	12/02/2009	12/02/2009	12/02/2009	12/02/2009	12/02/2009	12/02/2009	12/02/2009	12/02/2009	12/02/2009

Chem_Group	ChemName	output unit	EQL	SSTC-A	SSESC-A ^{Unsat}											
PAHs	CPAH (TEF)	mg/kg		67		-	-	<1.21	<1.11	-	1.65	1.641	-	-	-	-
	2-methylnaphthalene	mg/kg	0.5	1100		-	-	-	-	-	-	-	-	-	-	-
	Naphthalene	mg/kg	0.5	41		-	-	<0.5	<0.5	-	<0.5	<0.5	-	-	-	-
Phenols	3-&4-methylphenol	mg/kg	0.5	5400		-	-	-	-	-	-	-	-	-	-	-
TRH (NEPM, 1999)	TPH C6 - C9	mg/kg	2	3400	40	-	-	<10	<10	-	<10	<10	-	-	-	-
	TPH C10 - C14	mg/kg	50	13,000	50	-	-	<50	<50	-	<50	<50	-	-	-	-
BTEX	Benzene	mg/kg	0.2	15		-	-	<0.2	<0.2	-	<0.2	<0.2	-	-	-	-
	Ethylbenzene	mg/kg	0.2	600		-	-	<0.5	<0.5	-	<0.5	<0.5	-	-	-	-
Metals	Arsenic	mg/kg	1		20	<5	<5	<5	<1	<5	<5	12	14	6	<5	<5
	Chromium	mg/kg	1	180,000		2	7	6	6	18	10	7	5	7	13	7
	Chromium (hexavalent)	mg/kg	0.5	950		-	-	-	-	-	-	-	-	-	-	-
	Copper	mg/kg	2		170	331	17	11	6	44	92	44	21	13	16	30
	Lead	mg/kg	2	15,000	1800	6	19	14	11	30	16	132	74	104	59	47
	Vanadium	mg/kg	5	22,000		106	16	16	11	32	51	8	13	14	15	19
VOCs	Zinc	mg/kg	5		220	46	38	26	16	2070	42	115	47	47	57	96
	1,2,4-trimethylbenzene	mg/kg	0.5	14		-	-	-	-	-	-	-	-	-	-	-

NOTES: Soil samples collected from natural marine sediments.



Table T1 - Soil Analytical Results, North West ORWS Site Boundary,
ORWS Barangaroo

Lend Lease
ORWS Barangaroo

Field_ID	BH01_17.65-17.75	BH01_17.65-17.75	BH01_20.5-20.6	BH01_25.0-25.1	BH035_0.3-0.5	BH035_1.5-1.95	D1805-1	BH035_4.0-4.5	D1805-2	BH04_1.0-1.1	BH04_8.0-8.1
Sample_Type	Normal	Normal	Normal	Normal	Normal	Normal	Field_D	Normal	Field_D	Normal	Normal
Lab_Report_Number	ES0918573	ES0918575	ES0918573	ES0918573	ES0606393	ES0606393	ES0606393	ES0606393	ES0606393	ES0919030	ES0919030
Sample_Depth_Range	17.65-17.75	17.65-17.75	20.5-20.6	25-25.1	0.3-0.5	1.5-1.95	1.5-1.95	4-4.5	4-4.5	1-1.1	8-8.1
Sampled_Date_Time	12/03/2009	12/02/2009	12/03/2009	12/10/2009	18/05/2006	18/05/2006	18/05/2006	18/05/2006	18/05/2006	12/09/2009	12/09/2009

Chem_Group	ChemName	output unit	EQL	SSTC-A	SSESC-A ^{Unsat}											
PAHs	CPAH (TEF)	mg/kg		67		<1.21	-	-	<1.21	-	-	-	-	-	-	-
	2-methylnaphthalene	mg/kg	0.5	1100		-	-	-	-	-	-	-	-	-	-	-
	Naphthalene	mg/kg	0.5	41		<0.5	-	-	<0.5	-	-	-	-	-	-	-
Phenols	3-&4-methylphenol	mg/kg	0.5	5400		-	-	-	-	-	-	-	-	-	-	-
TRH (NEPM, 1999)	TPH C6 - C9	mg/kg	2	3400	40	<10	-	-	<10	<2	-	<2	<2	-	-	-
	TPH C10 - C14	mg/kg	50	13,000	50	<50	-	-	<50	<50	-	<50	<50	-	-	-
BTEX	Benzene	mg/kg	0.2	15		<0.2	-	-	<0.2	<0.2	-	<0.2	<0.2	-	-	-
	Ethylbenzene	mg/kg	0.2	600		<0.5	-	-	<0.5	<0.2	-	<0.2	<0.2	-	-	-
Metals	Arsenic	mg/kg	1		20	<5	-	<5	27	<5	<5	<5	<5	<5	<5	<5
	Chromium	mg/kg	1	180,000		31	-	3	37	2	11	12	16	15	8	6
	Chromium (hexavalent)	mg/kg	0.5	950		-	-	-	-	-	-	-	-	-	-	-
	Copper	mg/kg	2		170	<5	-	<5	8	212	9	19	10	10	<5	<5
	Lead	mg/kg	2	15,000	1800	28	-	<5	13	7	20	27	18	18	13	10
	Vanadium	mg/kg	5	22,000		118	-	6	57	-	-	-	-	-	14	11
VOCs	Zinc	mg/kg	5		220	<5	-	<5	10	48	31	38	38	34	24	14
	1,2,4-trimethylbenzene	mg/kg	0.5	14		-	-	-	-	-	-	-	-	-	-	-

NOTES: Soil samples collected from natural marine sediments.



Table T1 - Soil Analytical Results, North West ORWS Site Boundary,
ORWS Barangaroo

Lend Lease
ORWS Barangaroo

Field_ID	BH04_16.0-16.2	BH04_20.0-20.2	BH04_21.0-21.2	BH04_22.0-22.2	BH047_0.3-0.5	BH047_1.5-1.95	BH049_0.3-0.5	BH049_3.0-3.45	BH37_0.06-0.1	BH37_2.5-2.7
Sample_Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Lab_Report_Number	ES0919030	ES0919030	ES0919030	ES0919030	ES0606484	ES0606484	ES0606484	ES0606484	ES1003391	ES1003391
Sample_Depth_Range	16-16.2	20-20.2	21-21.2	22-22.2	0.3-0.5	1.5-1.95	0.3-0.5	3-3.45	0.06-0.1	2.5-2.7
Sampled_Date_Time	12/09/2009	12/09/2009	12/10/2009	12/10/2009	24/05/2006	24/05/2006	25/05/2006	25/05/2006	17/02/2010	17/02/2010

Chem_Group	ChemName	output unit	EQL	SSTC-A	SSESC-A ^{Unsat}										
PAHs	CPAH (TEF)	mg/kg		67		-	-	3.369	0.085	-	-	-	-	-	-
	2-methylnaphthalene	mg/kg	0.5	1100		-	-	37.5	-	-	-	-	-	-	-
	Naphthalene	mg/kg	0.5	41		-	-	80.8	14.3	-	-	-	-	-	-
Phenols	3-&4-methylphenol	mg/kg	0.5	5400		-	-	<0.5	<1	-	-	-	-	-	-
TRH (NEPM, 1999)	TPH C6 - C9	mg/kg	2	3400	40	-	79	121	51	<2	-	<2	-	-	-
	TPH C10 - C14	mg/kg	50	13,000	50	-	<50	<50	<50	<50	-	<50	-	-	-
BTEX	Benzene	mg/kg	0.2	15		-	5.6	9.7	8	<0.2	-	<0.2	-	-	-
	Ethylbenzene	mg/kg	0.2	600		-	2.9	4.1	1.3	<0.2	-	<0.2	-	-	-
Metals	Arsenic	mg/kg	1		20	<5	<5	<5	<5	6	<5	<5	<5	<5	<5
	Chromium	mg/kg	1	180,000		8	4	4	2	7	10	3	3	2	5
	Chromium (hexavalent)	mg/kg	0.5	950		-	-	-	-	-	-	-	-	-	-
	Copper	mg/kg	2		170	<5	<5	<5	<5	127	15	262	<5	225	23
	Lead	mg/kg	2	15,000	1800	6	6	9	<5	15	23	6	8	6	9
	Vanadium	mg/kg	5	22,000		8	<5	7	7	-	-	-	-	125	8
VOCs	Zinc	mg/kg	5		220	<5	<5	<5	<5	53	47	54	10	47	11
	1,2,4-trimethylbenzene	mg/kg	0.5	14		-	-	12.7	-	-	-	-	-	-	-

NOTES: Soil samples collected from natural marine sediments.

Field_ID	BH37_5.5-5.7	BH37_5.5-5.7	BH37_8.3-8.5	QC67	QC68	BH37_15.8-16.0	QC69	BH37_20.4-20.5	BH37_22.2-AUGER
Sample_Type	Normal	Normal	Normal	Field_D	Interlab_D	Normal	Field_D	Normal	Normal
Lab_Report_Number	ES1003391	ES1003432	ES1003391	ES1003391	47060	ES1003391	ES1003391	ES1003391	ES1003391
Sample_Depth_Range	5.5-5.7	5.5-5.7	8.3-8.5	8.3-8.5	8.3-8.5	15.8-16	15.8-16	20.4-20.5	22.2
Sampled_Date_Time	18/02/2010	18/02/2010	18/02/2010	18/02/2010	18/02/2010	18/02/2010	18/02/2010	18/02/2010	18/02/2010

Chem_Group	ChemName	output unit	EQL	SSTC-A	SSESC-A ^{Unsat}									
PAHs	CPAH (TEF)	mg/kg		67		<1.21	-	<1.21	<1.21	<1.11	0.05	<1.21	0.929	29.156
	2-methylnaphthalene	mg/kg	0.5	1100		-	-	-	-	-	-	-	14.4	396
	Naphthalene	mg/kg	0.5	41		<0.5	-	<0.5	<0.5	<0.5	3.3	1	31.1	948
Phenols	3-&4-methylphenol	mg/kg	0.5	5400		<1	-	<1	<1	<1	<1	<1	<0.5	<1.2
TRH (NEPM, 1999)	TPH C6 - C9	mg/kg	2	3400	40	<10	-	<10	<10	<10	53	<10	-	-
	TPH C10 - C14	mg/kg	50	13,000	50	<50	-	<50	<50	<50	<50	<50	-	-
BTEX	Benzene	mg/kg	0.2	15		<0.2	-	<0.2	<0.2	<0.2	0.6	0.4	3.1	-
	Ethylbenzene	mg/kg	0.2	600		<0.5	-	<0.5	<0.5	<0.5	2.6	<0.5	2.9	-
Metals	Arsenic	mg/kg	1		20	<5	-	<5	<5	3	<5	<5	<5	<5
	Chromium	mg/kg	1	180,000		8	-	10	9	8	11	12	2	7
	Chromium (hexavalent)	mg/kg	0.5	950		<0.5	-	-	<0.5	<1	<0.5	<0.5	<0.5	<0.5
	Copper	mg/kg	2		170	<5	-	<5	6	4	<5	<5	<5	<5
	Lead	mg/kg	2	15,000	1800	20	-	11	15	14	10	9	6	10
	Vanadium	mg/kg	5	22,000		15	-	16	17	13	9	9	10	15
VOCs	Zinc	mg/kg	5		220	28	-	46	46	41	<5	<5	<5	6
	1,2,4-trimethylbenzene	mg/kg	0.5	14		-	-	-	-	-	-	-	6.8	-

NOTES: Soil samples collected from natural marine sediments.

16 May 2014

Our Ref: AS121111

Lend Lease (Millers Point) Pty Ltd
Attn: Mark Burns
Level 4, 30 The Bond
Hickson Road
Millers Point NSW 2000

By email: Mark.Burns@lendlease.com

Dear Mark

Re: Barangaroo South - Stage 1a Public Domain Works (SSD 6303), Hickson Road, Millers Point

As a NSW-EPA accredited Contaminated Sites Auditor, I am conducting a contamination audit in relation to the southern portion of the site known as "Barangaroo", at Millers Point, NSW on behalf of Lend Lease (Millers Point) Pty Ltd (Lend Lease).

I previously prepared a Site Audit Report and accompanying Site Audit Statement GN439B-1 dated 14 July 2011 regarding the Remediation Action Plan (RAP, dated 7 July 2011) for the Other Remediation Works (South) area (ORWS) (relates to Major Project approval MP10_0023 MOD 1 dated 17 August 2011).

I also prepared a letter (dated 15 October 2012) regarding an Addendum to the ORWS RAP (dated 10 October 2012), relating to an area adjoining ORWS to the northwest, comprising the Harbour Heat Rejection System Inlet area (HHR) (this relates to Major Project approval MP10_0023 MOD 5 dated 8 August 2013).

Lend Lease is seeking approval for State Significant Development (SSD) works for an area known as the Stage 1a Public Domain works area which occupies the majority of the area considered in the ORWS RAP and also part of the HHR area. The relevant areas are shown on Attachment 1.

Lend Lease has provided me with the following letter, and has requested that I comment on whether the existing approved documentation is adequate for the proposed Stage 1a Public Domain works area:

- "Barangaroo South – Stage 1a Public Domain Works (SSD 6303), Hickson Road, Millers Point" dated 15 May 2014, by AECOM Australia Pty Ltd (AECOM).

A previous version of the AECOM letter was provided to me dated 12 March 2014 on which I prepared a letter dated 17 March 2014. I have reissued my letter to address the updated AECOM letter which includes consideration of potential temporary Public Domain works. The temporary works were described in a letter by AECOM titled "Barangaroo South. Section 75W – Bulk Excavation and Basement Car Parking – Modification 6, Amended Remedial Action Plan – Other Remediation Works (South) Area" dated 11 July 2013. Approval for these works was originally sought as a modification (MOD6) to MP10_0023 for Bulk

Excavation and Basement Car Parking. However, since the works may be required to be completed as permanent works, the Department of Planning recommended that the works be included with the Stage 1a Public Domain works approval.

The proposed Stage 1a Public Domain development is shown on Attachment 2. The footprint covers areas within the previously identified ORWS Development area (within and partially outside the groundwater retention wall system) and ORWS Public Domain area (to the west of the groundwater retention wall). Stage 1a Public Domain works include:

- ORWS Development area: Hickson Place the paved gateway entry point (outside the groundwater retention wall system, including MOD6 works to the south of C1), various roadways, walkways and associated paved open space areas (overlying basement)
- ORWS Public Domain area: two unpaved park areas, paved areas including timber structures for outdoor dining and trees planted in buried concrete boxes (including MOD6 works to the west of R1).

The MOD 6 works comprise above ground building elements associated with the basement including egress stairs, carpark entries/ exist, service risers etc that extend outside the ORWS basement area. If required, these temporary public domain works will include some minor excavation and slab construction. The new concrete slab will be finished with paint and furnished with planter boxes, umbrellas and similar street furniture.

The proposed land uses are considered to be consistent with the land uses contemplated in the ORWS RAP for the ORWS Development area and Public Domain area.

Other features of the development, changes to previous development plans and the Auditor's comments on the significance of these changes and the suitability of the existing approved documentation for management of contamination issues are summarised in Table 1, below.

Table 1: Consideration of Stage 1a Public Domain works		
Aspect	Details	Auditor Comments
Elevation	ORWS RAP contemplated raising of levels on ORWS Public Domain by approximately 1m. Proposed development ground levels (refer Attachment 2) are generally 0.7m higher than previous ground level.	Works adequately consistent with ORWS RAP.
Unpaved parkland areas	ORWS RAP contemplated retention of original pavement with perforations underneath unpaved parkland areas to allow surface water infiltration. Original pavement will be removed from some localised areas of the Stage 1a Public Domain to facilitate construction of various underground services.	Works adequately consistent with ORWS RAP.
Northern boundary (east portion)	Stage 1a boundary aligns with groundwater retention wall and falls inside ORWS RAP boundary.	Considered acceptable given that final Auditor sign-off relates to Stage 1a boundary, not ORWS RAP boundary area.

Table 1: Consideration of Stage 1a Public Domain works

Aspect	Details	Auditor Comments
Northern boundary (west portion/ HHR area)	<p>East: Stage 1a boundary falls outside groundwater retention wall but inside ORWS RAP boundary. Maximum distance of 2.5m beyond the groundwater retention wall. This adjustment has resulted in additional material being retained outside the groundwater retention wall.</p> <p>Quantity of soil to be retained outside the groundwater retention wall considered by AECOM to be small.</p> <p>Surface soil in this area will be excavated for construction of the HHR system and excavation to 0.6m will be performed under the proposed roadway, to be managed as a 'limited excavation' as contemplated in the ORWS RAP.</p> <p>No data available from this specific area. AECOM presented previous data from nearby locations and compared to Area A criteria from ORWS RAP (criteria relevant to retained fill).</p>	<p>Considered acceptable based on analytical results and quantity of material involved, noting that Auditor sign-off will relate to Stage 1a boundary which is not consistent with the groundwater retention wall boundary at this location.</p> <p>HHR and ORWS RAPs to apply to works.</p>
	<p>West: Stage 1a boundary aligns with groundwater retention wall and falls outside ORWS RAP boundary but inside HHR area. This adjustment has resulted in less material being retained outside the groundwater retention wall.</p>	<p>Considered acceptable noting that retention of less material outside the groundwater retention wall is more conservative.</p>
Northwest corner	Stage 1 boundary is curved and falls inside the angular ORWS RAP boundary.	Considered acceptable.
Southeast corner	Stage 1 boundary cuts the corner and falls inside the ORWS RAP boundary.	Considered acceptable.
Southern boundary (east portion)	<p>Stage 1a boundary coincides with the ORWS RAP boundary but falls outside the groundwater retention wall which was constructed in a different position to proposed. This adjustment has resulted in additional material being retained outside the groundwater retention wall. Quantity of soil to be retained outside the groundwater retention wall reported by AECOM as small.</p> <p>No data available from this specific area. AECOM referenced previous data from nearby locations and compared to Area A criteria from ORWS RAP (criteria relevant to retained fill).</p>	<p>Quantity of material retained outside the groundwater retention wall not considered by the Auditor to be 'small', noting a maximum distance of 2.5m from the groundwater retention wall over a distance of nearly 100m and fill depth of over 15m. ORWS RAP aspects for Area A should apply to the area outside the groundwater retention wall. Auditor sign-off will relate to Stage 1a boundary which is not consistent with the groundwater retention wall boundary at this location.</p>

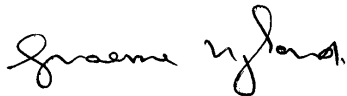
AECOM concluded "...that the proposed development of the Stage 1a Public Domain (which may include the works contemplated by MP10_0023 MOD 6)...:

- *Is generally consistent with what was contemplated with the ORWS Amended RAP (AECOM, 2011) and the Addendum to the Amended ORWS RAP (AECOM, 2012) and can be appropriately managed by those documents;*
- *Will not require amendment of the ORWS Amended RAP (AECOM, 2011) and Addendum to the Amended ORWS RAP (AECOM, 2012); and*
- *Will enable the relevant consent authority to comply with Clause 7(1) of SEPP 55 - Remediation of Land".*

Based on review of the letter provided by AECOM (dated 12 March 2014) and consideration of the previously approved RAP (July 2011) and Addendum RAP (October 2012), I agree with the conclusions made by AECOM and consider the existing documentation to be relevant to the proposed Stage 1a Public Domain, including the works contemplated in MOD 6.

It is noted that the Section A site audit to be prepared certifying suitability of the Stage 1a Public Domain area will be based on the Stage 1a Public Domain boundaries identified in this letter, not the previous ORWS RAP boundaries.

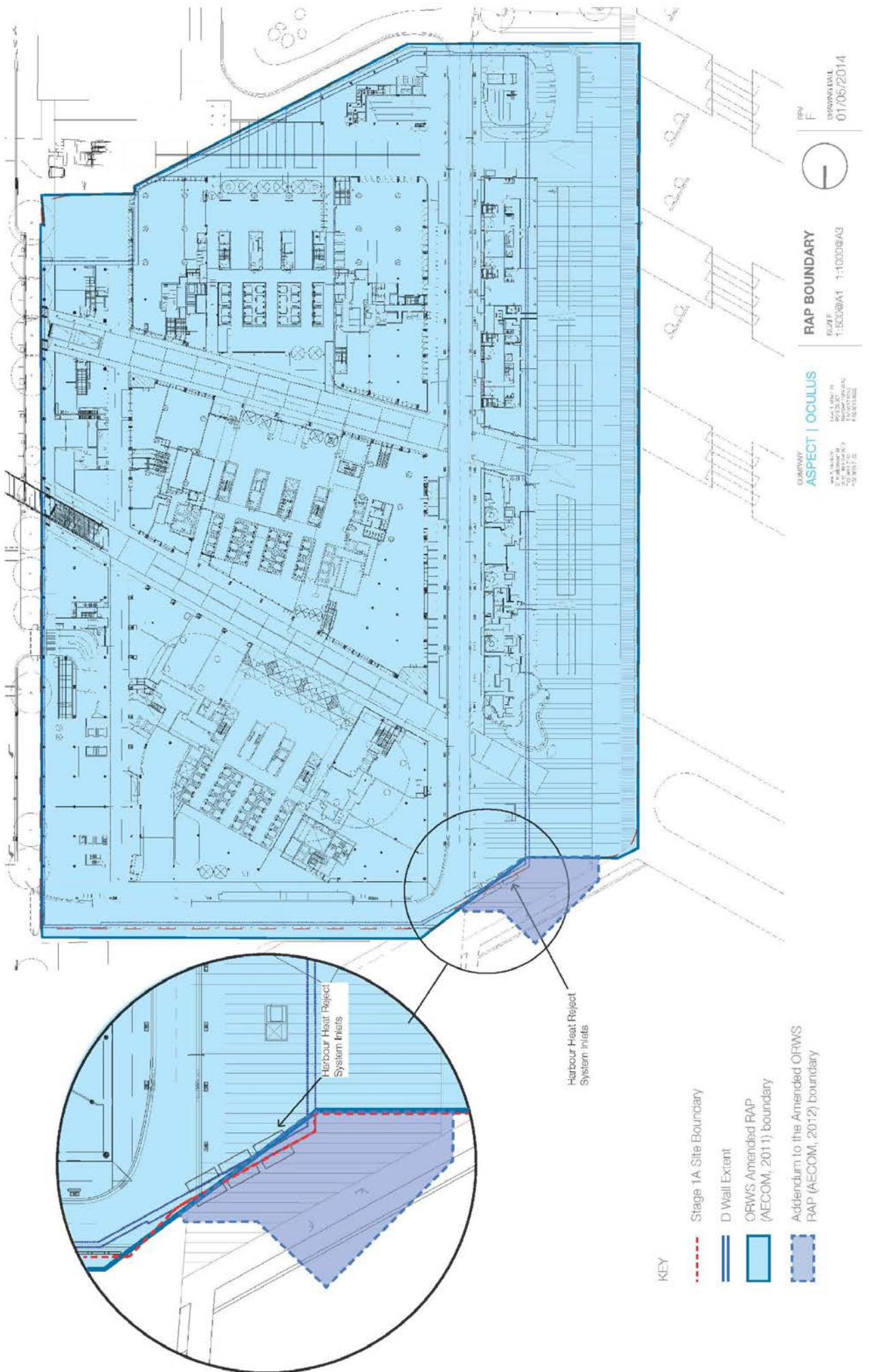
Yours faithfully
ENVIRON Australia Pty Ltd



Graeme Nyland
Accredited Auditor 9808

Attachment 1: Stage 1a Public Domain, ORWS RAP and HHR boundaries and Groundwater Retention Wall (D Wall) Alignment
Attachment 2: Stage 1a Public Domain Proposed Development

Figure 2



KEY

- SITE BOUNDARY
- TEMPORARY LANDSCAPE FOR FUTURE DEVELOPMENT
- OPMENT
- SPOT HEIGHT
- GRADE

NOTES:

Buildings C1, C2, C6, R1 and R7 are shown as indicative only.

Buildings A and B are subject to further design development and form part of future planning applications.

Building A sits within the existing building envelope for C6.

Proposed works shown outside the Stage 1a boundary are shown as indicative only for information. These works will form part of a future planning application.

