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Dear Dean

Barangaroo South - Stage 1B Basement and Residential Towers, SEPP 55 Letter, Hickson Road, Millers Point. State Significant Development Applications SSD 6960, 6964, 6965 & 6966

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 State Significant Development Application (**SSD 6960**) submitted to the Minister for Planning pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and to respond to Condition 12 of the Secretary's Environmental Assessment Requirements (SEARs) for the **Stage 1B Basement, Barangaroo South** (dated 2 April 2015).

SSD 6960 seeks approval for construction of the Stage 1B Basement and associated works at Barangaroo South as described in **Section 3.0** (Overview of Proposed Development). The works associated with SSD 6960 also include the construction of services within the following areas.

- ORWN Services Zone;
- Block 4 Services Zone;
- ORWN Interim Public Domain (Roadway); and
- Hickson Road Infrastructure and Services Zone.

This letter also relates to Residential / Retail Buildings R4A, R4B and R5 which are currently proposed to be constructed above the footprint of the Stage 1B Basement (i.e. within the Stage 1B Basement Area) and which are the subject of development applications SSD 6964, SSD 6965 and SSD 6966 (refer to **Figure 3, Attachment 1**).

The above areas (hereafter referred to as 'the Site') are described further in **Section 3.0** and illustrated in the following figures provided in **Attachment 1**:

- **Figure 1** - based on Figure F5 from the *Remedial Action Plan (RAP), NSW EPA Declared Remediation Site 21122 and Block 4 (Stage 1b) Development Works, Barangaroo, Millers Point, NSW* (AECOM, 2013b) (hereafter referred to as the *VMP/Block 4 RAP*);
- **Figure 2** - Lend Lease drawing BB2_PA2_A003; and
- **Figure 3** - Lend Lease drawing BB2_PA2_A101.

2.0 Review of Available Documents

In preparing this letter, AECOM has reviewed the following Lend Lease development drawings provided to AECOM:

Table 1 Lend Lease Development Drawings (Stage 1B Basement SSD 6960)

Drawing No.	Revision	Drawing Title
BB2_PA2_A000	Rev A	Title Sheet
BB2_PA2_A001	Rev A	Aerial Location Plan
B1B_PA1_A002	Rev A	Survey Plan

Drawing No.	Revision	Drawing Title
B1B_PA1_A003	Rev A	Demolition Plan
BB2_PA2_A100	Rev A	BASEMENT PLAN LEVEL B0
BB2_PA2_A101	Rev A	BASEMENT PLAN LEVEL B1
BB2_PA2_A102	Rev A	BASEMENT PLAN LEVEL B2
BB2_PA2_A103	Rev A	BASEMENT PLAN LEVEL B3
BB2_PA2_A104	Rev A	BASEMENT PLAN LEVEL B4
BB2_PA2_A105	Rev A	BASEMENT PLAN LEVEL B5
BB2_PA2_A300	Rev A	SECTION 01
BB2_PA2_A301	Rev A	SECTION 02
BB2_PA2_A302	Rev A	SECTION 03
BB2_PA2_A303	Rev A	SECTION 04
BB2_PA2_A400	Rev A	BUILDING ELEMENTS - GROUND FLOOR
BB2_PA2_A401	Rev A	BUILDING ELEMENTS - PODIUM 1
BB2_PA2_A402	Rev A	BUILDING ELEMENTS - PODIUM 2
BB2_PA2_A501	Rev A	BUILDING ELEMENTS – ELEVATIONS

3.0 Overview of Proposed Development

The Stage 1B Basement Development Application (SSD 6960) seeks approval for construction of a four level basement to accommodate parking for the Stage 1B Residential Buildings (subject to separate SSD applications SSD 6964, SSD 6965 and SSD 6966, refer to **Figure 3**).

The works contemplated by SSD 6960 (here after referred to as the Stage 1B Basement and associated works) include (refer to **Figure 1** and **2, Attachment 1**):

- Stage 1B basement works:
 - rock excavation where required for the future Stage 1B basement; and
 - construction of the Stage 1B basement including common plant and services, loading docks, waste rooms and storage areas, as well as structural cores and associated building services for the Stage 1B Residential Buildings.
- Associated works within the ORWN Services Zone:
 - construction of services outside the Stage 1B Basement and within an area that is approximately 30 m wide and is bounded by:
 - the proposed Stage 1B basement retention wall and Block 4 Services Zone to the east;
 - the existing Stage 1A basement retention wall to the south; and
 - the potential future Crown basement retention wall to the north (which will be the subject of a separate Development Application approval).

It is understood that excavations within the ORWN Services Zone may extend to a depth of approximately 6.0 m below ground level (bgl).

- Associated works within the Block 4 Services Zone:
 - construction of services outside the Stage 1B Basement and within an area that is approximately 18 m wide and is bounded by:
 - the existing Stage 1A basement retention wall to the south;
 - the proposed Stage 1B basement retention wall to the north;
 - the Hickson Road Infrastructure and Services Zone to the east; and
 - the ORWN Services Zone to the west.

Excavations within the Block 4 Services Zone will extend to a depth of less than approximately 2.7 m bgl (as required for the provision of services from Stage 1A to the proposed Stage 1B basement).

- Associated works within the ORWN Interim Public Domain:
 - construction of the proposed ORWN Interim Public Domain (roadway):
 - in the area outside and immediately to the west of the Stage 1B basement; and
 - either above the basement proposed as part of the Crown hotel development or constructed at grade.

It is understood that excavations within the ORWN Interim Public Domain may extend to a depth of approximately 0.5 m bgl (involving removal of the existing concrete slab).

- Associated works within the Hickson Road Infrastructure and Services Zone:
 - Installation of underground service connections associated with the Stage 1B basement; and
 - Minor road works required to reinstate the existing public road and transition from the existing public road to new roads to be constructed within the footprint of the proposed Stage 1B basement.

It is understood that excavations within the Hickson Road Infrastructure and Services Zone may extend to a depth of approximately 2.0 m below ground level (bgl).

Importantly, the associated works proposed in the ORWN Interim Public Domain, ORWN Services Zone, Block 4 Services Zone and Hickson Road Infrastructure and Services Zone (collective referred to as the Associated Works Areas) may be undertaken prior to remediation of these areas.

The works contemplated by SSD 6964, SSD 6965 and SSD 6966 are construction of:

- residential / retail buildings R4A, R4B and R5 above the footprint of the Stage 1B Basement (i.e. within the Stage 1B Basement Area) (refer to **Figure 3 Attachment 1**); and
- associated open space areas, roads, car park ramps and risers and temporary public domain and landscaping works.

Finally, it is noted that site preparation works, including demolition, remediation and excavation of fill/soil for the Stage 1B basement works, are covered under the previously approved SSD 5897 and will be undertaken prior to the works proposed by this SSD 6960; and

4.0 Objectives

The objectives of this letter are to confirm that the proposed Stage 1B Basement works and associated works (in the ORWN Services Zone, Block 4 Services Zone, ORWN Interim Public Domain and Hickson Road Infrastructure and Services Zone and the Residential / Retail Buildings R4A, R4B and R5:

- are consistent with what was contemplated in the *VMP/Block 4 RAP* (AECOM, 2013b) and can be appropriately managed by that document; and
- will enable the relevant consent authority to comply with Clause 7 of *SEPP 55 - Remediation of Land* (1998) as required by Condition 12 of the SEAR's (2 April 2015) in relation to the proposed future use of the land as a Basement with Residential / Retail Buildings and associated open space areas above.

5.0 Site Location

Barangaroo is located on the north western edge of the Sydney Central Business District, bounded by: Sydney Harbour to the west and north; the historic precinct of Millers Point (for the northern half), the Rocks and the Sydney Harbour Bridge approach to the east; and, a range of new developments dominated by large CBD commercial tenants to the south.

The Barangaroo site has been divided into three distinct redevelopment areas (from north to south) - the Barangaroo Reserve, Barangaroo Central and Barangaroo South.

The area considered by SSD 6960 is located:

- within Barangaroo South as shown in **Figure 1 and 2, Attachment 1**; and
- on land generally known and identified in the approved Concept Plan MP06_0162 (as modified) as Blocks 4A and 4B and part of the public domain area between those Blocks and Block 5.

6.0 VMP / Block 4 Remedial Action Plan

The *VMP/Block 4 RAP* (AECOM, 2013b) was previously prepared to describe (among other things) remediation works required to facilitate the proposed Block 4 Development Works which include the Stage 1B Basement and associated Residential / Retail Buildings above the Basement.

The *VMP/Block 4 RAP* (AECOM, 2013b) also describes remediation works required to facilitate removal of the current EPA Declaration from (among other areas) Hickson Road, including the Hickson Road Infrastructure and Services Zone, and the Block 4 Services Zone. Notwithstanding, it is understood that remediation of these areas may not be completed prior to the proposed associated works.

The *VMP/Block 4 RAP* (AECOM, 2013b) was approved under delegation by the Minister of Planning as part of Development Application SSD 5897 (dated 10 November 2014).

6.1 Proposed Land Uses

6.1.1 Block 4 Development Area

Section 4.1 of the *VMP/Block 4 RAP* (AECOM, 2013b) describes the Block 4 development land uses as incorporating a *mixture of commercial, retail and high density residential and public open space (incorporating roads, community and related land uses)* overlying the Block 4 basement.

Therefore, the Stage 1B Basement (as proposed by SSD 6960) and Residential / Retail Buildings above the Basement (as proposed by SSD 6964, SSD 6965 and SSD 6966) are consistent with what was envisaged in the *VMP/Block 4 RAP* (AECOM, 2013b).

6.1.2 Associated Works Areas

As described above, the Hickson Road Infrastructure and Services Zone and Block 4 Services Zone (as proposed by SSD 6960) are within the area contemplated for VMP Remediation Works by the *VMP/Block 4 RAP* (AECOM, 2013b).

Section 1.6 of the *VMP/Block 4 RAP* (AECOM, 2013b) describes the land uses for which the areas that will be the subject of VMP Remediation Works will be made suitable as incorporating a mixture of commercial, retail and high density residential and public open space (incorporating roads, community and related land uses) overlying the Block 4 basement.

As such, the construction of services within the Hickson Road Infrastructure and Services Zone and the Block 4 Services Zone is consistent with what was envisaged in the *VMP/Block 4 RAP* (AECOM, 2013b) and the extent or remediation recommended by the *VMP/Block 4 RAP* (AECOM, 2013b) is also applicable to these areas.

The ORWN Services Zone and ORWN Interim Public Domain (as proposed by SSD 6960) are both outside the Area contemplated by the *VMP/Block 4 RAP* (AECOM, 2013b).

6.2 Stage 1B Basement Works

Section 4.2 of the *VMP/Block 4 RAP* (AECOM, 2013b) anticipates that construction of the Stage 1B Basement will require excavation to a depth of approximately Relative Level (RL) -5.6 m Australian Height Datum (AHD). It is noted that the Stage 1B basement works described by SSD 6960 will require excavation to a depth of approximately RL -13.5 m AHD and RL -16.9 m AHD (as required for tower lift pits, hydrostatic slabs and blinding) and further to facilitate piling works.

The depth of remediation required to facilitate the Block 4 Development was based on the considerations described by Section 8.5 of the *VMP/Block 4 RAP* (AECOM, 2013b). In particular:

“...the vertical extent of remediation was defined as remediation to the depth of the underlying natural bedrock to a maximum depth of 10 m below ground level (bgl) (approximately RL -7.5 m AHD). The vertical extent of remediation is based on consideration of:

- locations where SPGWT has been reported;*
- locations where exceedances of the groundwater Site-Specific Target Criteria (SSTC) and unsaturated soil SSTC have been reported;*
- the footprint of historical gasworks structures and infrastructure; and*
- the depth to bedrock (noting that the depth to bedrock steadily increases to the west beyond the 10 m bgl rock contour).”*

The potential for the depth of the basement to increase as a result of further design development was specifically contemplated by Section 23.12.1 of the *VMP/Block 4 RAP* (AECOM, 2013b) which states that:

“...the additional bulk excavation works that would be required to facilitate construction of basements to greater depths is not considered to affect the preferred remediation strategy. This is because the depth of identified Separate Phase Gasworks Waste and Tar (SPGWT)/Confirmed Impacted Material requiring remediation in the Block 4 area (typically present at depths shallower than 8 m bgl) is already less than the proposed basement depth.”

The depth of the excavation required by the proposed Stage 1B Basement works (approximately RL -13.5 m AHD) will result in excavation of bedrock to greater depths than envisaged by the *VMP/Block 4 RAP* (AECOM, 2013b). However, as noted above, the potential for deeper excavation was considered in Section 23.12.1 of the *VMP/Block 4 RAP* (AECOM, 2013b). Therefore, the proposed Stage 1B Basement works are consistent with the preferred remediation strategy detailed in the *VMP/Block 4 RAP* (AECOM, 2013b).

6.3 Staged Remediation Works

Section 1.8 of the *VMP/Block 4 RAP* (AECOM, 2013) anticipated that the development and construction sequence and methodology may require that:

- *remediation of key site areas (for example Block 4, Block 5 and Hickson Road) be completed and validated (including the preparation of Site Audit Statements) separately, in sequence; and*
- *remediation within key site areas (for example within the Hickson Road VMP Remediation Works area) may be staged.*

As described by **Section 7.6** below, parts of the Hickson Road Infrastructure and Services Zone are located within the extent of VMP Remediation Works recommended by the *VMP/Block 4 RAP* (AECOM, 2013b). As such, interim remediation within the Hickson Road Infrastructure and Services Zone is required to make the area suitable for potential future maintenance of the proposed services. Completion of these interim remediation works is considered to be consistent with the staged remediation works anticipated by the *VMP/Block 4 RAP* (AECOM, 2013b).

7.0 Consideration of the Presence of Contamination

7.1 Site History

Section 3.2 and 3.2.1 of the *VMP / Block 4 RAP* (AECOM, 2013b) provide a summary of the site history and historical land reclamation works in the vicinity of the Associated Works Areas.

Of note, the ORWN Services Zone and much of the Block 4 Services Zone are located within the footprint of the former Southern Cove. A review of the 1983 and 2004 aerial photographs provided in the ERM (2007) *Environmental Site Assessment* indicates that the historic Southern Cove is the most recent part of the Barangaroo South Development Area to have been infilled. Consequently, the ground conditions beneath the ORWN Services Zone differ from adjacent Barangaroo site areas and it is unlikely that the ORWN Services Zone has been backfilled with materials which originated from the former gasworks located within the Declaration Area (to the east).

7.2 Preliminary Conceptual Site Model

A preliminary Conceptual Site Model (CSM) has been developed for the Associated Works Areas based on the CSM presented in Section 2.0 of the *VMP / Block 4 RAP* (AECOM, 2013b) and the findings of the previous investigations (as summarised in the following sections). The preliminary CSM is summarised in the table below:

Table 2 Preliminary Conceptual Site Model

Consideration	Details
Contaminants of Potential Concern (CoPC)	Based on the findings of the previous investigations, the CoPC may comprise the following: - Heavy metals; - BTEX; - TRH C₆-C₁₀ and TRH C₁₀-C₄₀; - PAHs; and - Asbestos.
Groundwater conditions at the Site	Groundwater was generally encountered within fill material at 1.8 m bgl (based on MW40). The groundwater flow direction is likely to be towards the west (ultimately discharging to Darling Harbour). The soil analytical results discussed in relation to the ORWN Services Zone and ORWN interim Public Domain are not anticipated to be adversely affecting groundwater quality within these areas and are not likely to pose a significant risk to the intrusive maintenance worker. Contaminated shallow groundwater and SPGWT has been identified within the Hickson Road Tar Tank (monitoring wells MW7 and MW53).
Potential on-site receptors of contamination	- Construction workers currently using the Associated Works Areas as a staging area for the Stage 1A construction; - Public currently accessing Hickson Road; and - Intrusive maintenance workers installing and maintaining services to a depth of up to 6m bgl (refer to Section 3.0). It is assumed that intrusive maintenance workers will wear standard personal protective equipment during the excavation works which will be of a short time duration.
Potential off-site receptors of contamination	The nearest off-site ecological receptor is Darling Harbour (located approximately 30 m to the west of the ORWN Services Zone).

Consideration	Details
Potential transport mechanisms and exposure pathways for contaminants	- Dermal contact and ingestion with on-site soil and groundwater during intrusive works; - Due to the shallow depth of SPGWT in the groundwater within the Hickson Road Tar Tank (MW7 and MW53), there vapour migration pathway for a part of the Hickson Road area. Soil vapour migration is not likely to present a significant risk in other parts of the site as SPGWT is located at greater depths; - Off-site migration of dissolved phase contaminants (if present) in groundwater; and - Uptake or ingestion of contaminated groundwater or impacted surface water by on- or off-site ecological receptors. Based on the soil results and field observations reported in relation to the ORWN Services Zone and ORWN interim Public Domain, it is considered unlikely that a significant contaminant exposure pathway is present with the identified receptors. Soil vapour may present a risk to parts of Hickson Road due to the identified presence of SPGWT in the shallow groundwater in the former tar tank.

7.3 ORWN Services Zone

As the ORWN Services Zone is located outside the *VMP / Block 4 RAP* (AECOM, 2013b) site boundary, the results of historical investigations conducted within and in the vicinity of the proposed ORWN Services Zone have been reviewed in consideration of whether, or not, the land is likely to be contaminated.

7.3.1 Historical Investigations – ORWN Services Zone

Soil and groundwater investigations have been historically undertaken within the ORWN Area. These investigations were detailed in the *ORWN Data Gap Investigation* (AECOM, 2010) and summarised in Section 5.11 of the *VMP / Block 4 RAP* (AECOM, 2013b).

As illustrated in **Figure 2, Attachment 1**, the ORWN Services Zone is located directly adjacent to the proposed Stage 1B basement wall and extends approximately 30 m to the west.

Six sampling locations (BH01, BH38, BH39, BH40, BH047 and BH049) within the ORWN Area (refer to the attached **Figure 1, Attachment 1**) were advanced within and adjacent to the ORWN Services Zone as part of previous environmental site investigations and are considered to be representative of the materials likely to be present in this ORWN Services Zone.

Groundwater monitoring well MW40/BH40 is located adjacent to the Stage 1B western basement wall, in the vicinity of the ORWN Services Zone. However MW40/BH40 is screened between 14.3 to 20.5 m bgl and, therefore, is not considered to be representative of groundwater quality within the upper 6 m of the soil profile within which the proposed excavations are likely to occur.

Based on a review of the observations and sample analysis results from the six boreholes considered to be representative of the ORWN Services Zone, the following conclusions are made with respect to the presence or otherwise of contamination within the ORWN Services Zone:

- bedrock was not encountered at BH38 to the drilling depth of 20.7 m bgl. Therefore, bedrock is not anticipated to be encountered during the proposed excavation works within the ORWN Services Zone associated with SSD 6960;
- gasworks related wastes were not identified in the fill material. Some chemical odours were noted within the natural sandy clays at a depth of 16.5 m bgl at BH40. No odours were reported in the overlying fill materials. Given the depth of the discussed odorous materials and the comparatively low permeability of the natural sandy clays in which the odorous were reported (and the negligible contaminant flux from natural sandy clays to the overlying fill materials [refer to Section 5.12 of the *VMP/Block 4 RAP* (AECOM, 2013b)]), odorous materials are not anticipated to be encountered during the proposed excavation works;

- the concentrations of contaminants of potential concern (CoPC) reported in the 30 soil samples collected and analysed from the six boreholes were all less than the following soil assessment criteria from the ASC NEPM (1999 as amended 2013)¹ which are applicable to the proposed services construction works (refer to **Table T1, Attachment 2**):
 - Health Investigation Level 'D' as applicable to a commercial/industrial land use;
 - Health Screening Levels for petroleum hydrocarbons in soil (dermal contact); and
 - Ecological Investigation Levels given the proximity of the ORWN Services Zone to surface water bodies (Darling Harbour).
- PAH concentrations reported in the ten analysed samples were generally reported below the laboratory Limit of Reporting (LOR). The maximum Total PAH concentration (26.1 mg/kg) was reported at BH01_4.0-4.1m and is less than the adopted ASC NEPM (NEPC, 2013) criteria. BH01 is located south of the ORWN Services Zone (refer to **Table T1, Attachment 2**);
- TPH and BTEX concentrations reported in the eleven analysed samples were all reported below the laboratory Limit of Reporting (refer to **Table T1, Attachment 2**). Phenol concentrations were also less than the LOR in the six analysed soil samples;
- Asbestos was not detected in the soils at BH38_2.5-2.7. Bonded asbestos containing materials were not reported during the soil sampling works at the six boreholes;
- The low PAH and TPH/BTEX concentrations were consistent with field observations which indicate that gasworks related wastes are not likely to be present within the upper 6.0 m of the soil profile in the ORWN Services Zone; and
- The above soil analytical results are not anticipated to be adversely affecting groundwater quality within the ORWN Services Zone.

Importantly, the ORWN Services Zone is outside the extent of remediation identified by the VMP / Block 4 RAP (AECOM, 2013b) in relation to both the VMP Remediation Works and the Block 4 Development Remediation Works (refer to **Figure 1, Attachment 1**). That is, remediation of the area was not considered required to facilitate removal of the NSW EPA Declaration or construction of the Block 4 Basement. The ORWN Services Zone is approximately 60 m south west of the extent of remediation recommended by the VMP / Block 4 RAP (AECOM, 2013b).

7.3.2 Conclusions – ORWN Services Zone

Data from within and in the vicinity of the ORWN Services Zone is considered to be adequate for the assessment of whether materials likely to be encountered as part of the proposed services construction works are suitable for continued commercial/industrial land use (which is consistent with the proposed excavation for construction and maintenance of services).

The materials likely to be encountered within the ORWN Services Zone are considered likely to be suitable for continued commercial/industrial land use including the proposed excavation for construction and maintenance of services.

It is considered that the information presented above will enable the relevant consent authority to comply with Clause 7 of SEPP 55 - *Remediation of Land* (1998) in relation to the proposed services construction works in the ORWN Services Zone.

7.4 ORWN Interim Public Domain

As the ORWN Interim Public Domain is located outside the VMP / Block 4 RAP (AECOM, 2013b) site boundary, the results of historical investigations conducted within and in the vicinity of the proposed ORWN Interim Public Domain have been reviewed in consideration of whether, or not, the land is likely to be contaminated.

7.4.1 Historical Investigations – ORWN Interim Public Domain

Soil and groundwater investigations have been historically undertaken within the ORWN Area. These investigations were detailed in the *ORWN Data Gap Investigation* (AECOM, 2010) and summarised in Section 5.11 of the VMP / Block 4 RAP (AECOM, 2013b).

¹ NEPC. 2013. *National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1)*.

As illustrated in **Figure 2, Attachment 1**, the ORWN Interim Public Domain is located directly adjacent to the proposed Stage 1B basement wall and extends approximately 20 m to the west.

Eight sampling locations within the ORWN Area (refer to the attached **Figure 1, Attachment 1**) were advanced within and adjacent to the ORWN Interim Public Domain as part of previous environmental site investigations and are considered to be representative of the materials likely to be present in this ORWN Interim Public Domain.

Based on a review of the observations and sample analysis results from the eight boreholes considered to be representative of the ORWN Interim Public Domain, the following conclusions are made with respect to the presence or otherwise of contamination within the ORWN Interim Public Domain:

- bedrock was encountered at BH48 at a depth of 14.5 m bgl. Therefore, bedrock is not anticipated to be encountered during the proposed excavation works within the ORWN Interim Public Domain associated with SSD 6960;
- gasworks related wastes were not identified in the fill material. Some chemical odours and tar were noted within the weathered upper surface of the underlying bedrock at a depth of 14.5 m bgl at BH48. No significant odours were reported in the overlying fill materials. Given the depth of the discussed odorous materials and the comparatively low permeability of the natural bedrock in which the odorous were reported (and the negligible contaminant flux from natural sandy clays to the overlying fill materials [refer to Section 5.12 of the *VMP/Block 4 RAP* (AECOM, 2013b)]), odorous materials are not anticipated to be encountered during the proposed excavation works (associated with SSD 6960);
- the concentrations of contaminants of potential concern (CoPC) reported in the 9 soil samples collected and analysed from the eight boreholes (within the upper 2.0 m of the soil profile) were all less than the adopted soil assessment criteria (refer to **Table T2, Attachment 3**);
 - PAH concentrations reported in the four analysed samples were generally reported below the laboratory LOR. One exceedance of the Carcinogenic PAHs criteria was reported at location BH063_1.5-1.65 (50.9 mg/kg) but is not considered to pose a significant risk to the construction worker due to the short term nature of these works;
 - TPH and BTEX concentrations reported in the 5 analysed samples were all reported below the laboratory Limit of Reporting (refer to **Table T2, Attachment 3**). Phenol concentrations were also less than the LOR in the 3 analysed soil samples; and
 - Asbestos was not detected in the soils at BH47_1.0-1.2. Bonded asbestos containing materials were not reported during the soil sampling works at the 8 boreholes.
- The low PAH and TPH/BTEX concentrations were consistent with field observations which indicate that gasworks related wastes are not likely to be present within the upper 2.0 m of the soil profile within the ORWN Interim Public Domain; and
- The above soil analytical results are not anticipated to be adversely affecting groundwater quality within the ORWN Interim Public Domain.

Importantly, the ORWN Interim Public Domain is outside the extent of remediation identified by the *VMP / Block 4 RAP* (AECOM, 2013b) in relation to both the VMP Remediation Works and the Block 4 Development Remediation Works (refer to **Figure 1, Attachment 1**). That is, remediation of the area was not considered required to facilitate removal of the NSW EPA Declaration or construction of the Block 4 Basement. At the closest point, the western portion of the ORWN Interim Public Domain is approximately 40 m south west of the extent of remediation recommended by the *VMP / Block 4 RAP* (AECOM, 2013b).

7.4.2 Conclusions – ORWN Interim Public Domain

Data from within and in the vicinity of the ORWN Interim Public Domain is considered to be adequate for the assessment of whether materials likely to be encountered as part of the proposed public domain construction works are suitable for continued commercial/industrial land use (which is consistent with the proposed excavation for roadway construction – if required).

The materials likely to be encountered within the ORWN Interim Public Domain are considered likely to be suitable for continued commercial/industrial land use including the proposed excavation for construction and maintenance of a roadway / interim public domain.

It is considered that the information presented above will enable the relevant consent authority to comply with Clause 7 of *SEPP 55 - Remediation of Land* (1998) in relation to the proposed services construction works in the ORWN Interim Public Domain.

7.5 Block 4 Services Zone

The Block 4 Services Zone is located within the footprint of Block 4 and therefore within the boundary contemplated by the *VMP / Block 4 RAP* (AECOM, 2013b).

An assessment of soil and groundwater conditions within Block 4, which includes the Block 4 Services Zone, and the requirement (or otherwise) for remediation is presented in Section 8.5.1 of the *VMP/Block 4 RAP* (AECOM, 2013b). The resultant VMP Remediation Extent is illustrated in **Figure 1, Attachment 1**.

With respect to the Block 4 Services Zone, a relatively small portion, toward the eastern end of the area, is located within the VMP Remediation Extent.

Based on this assessment, it is considered that:

- Soil and groundwater conditions in those portions of the Block 4 Services Zone that are located outside the VMP Remediation Extent (as defined in Figure 10 and 11 of the *VMP/Block 4 RAP* [AECOM, 2013b]) are considered likely suitable for continued commercial/industrial land use including the proposed excavation for construction and maintenance of below ground services; and
- Soil and groundwater conditions in those portions of the Block 4 Services Zone that are located within the VMP Remediation Extent are therefore further consideration of the soil and groundwater conditions in this area is required to determine whether remediation is required to facilitate the proposed excavation for construction and maintenance of below ground services.

Review of the soil and groundwater conditions within the Block 4 Services Zone indicates that:

- SPGWT was noted at depths below 8.0 m bgl at BH408 within natural clays located at the eastern end of the Block 4 Services Zone (where the proposed excavations will be shallower than 2.7 m bgl). SPGWT has not been identified within the shallow fill material; and
- Contaminated groundwater identified to be present at depth within the natural marine sediments where there is negligible contaminant flux to the overlying fill materials (refer to Section 5.12 of the *VMP/Block 4 RAP* [AECOM, 2013b])). Consequently, contaminated groundwater is not likely to be encountered during the proposed shallow excavation works.

In consideration of these observations it is concluded that

- the materials likely to be encountered within the Block 4 Service Zone are likely to be suitable for continued commercial/industrial land use including the proposed excavation for construction and maintenance of services; and
- the information presented above will enable the relevant consent authority to comply with Clause 7 of *SEPP 55 - Remediation of Land* (1998) in relation to the proposed services construction works in the ORWN Interim Public Domain.

7.5.1 Conclusions – Block 4 Services Zone

Data from within and in the vicinity of the ORWN Services Zone is considered to be adequate for the assessment of whether materials likely to be encountered as part of the proposed services construction works are suitable for continued commercial/industrial land use (which is consistent with the proposed excavation for construction of services).

It is considered that the information presented above will enable the relevant consent authority to comply with Clause 7 of *SEPP 55 - Remediation of Land* (1998) in relation to the proposed services construction works in the ORWN Services Zone.

7.6 Hickson Road Infrastructure and Services Zone

The Hickson Road Infrastructure and Services Zone is located within the EPA Declaration Area portion of Hickson Road and therefore within the boundary contemplated by the *VMP / Block 4 RAP* (AECOM, 2013b).

An assessment of soil and groundwater conditions within the EPA Declaration Area portion of Hickson Road, which includes the Hickson Road Infrastructure and Services Zone, and the requirement (or otherwise) for remediation is presented in Section 8.5.3 of the *VMP/Block 4 RAP* (AECOM, 2013b). The resultant VMP Remediation Extent is illustrated in **Figure 1, Attachment 1**.

As outlined in **Figure 1, Attachment 1**, the Hickson Road Infrastructure and Services Zone comprises two proposed excavation areas. Of these, the:

- **southern excavation area** (near BH43) which is not located within the VMP Remediation Extent (as detailed in the *VMP/Block 4 RAP* [AECOM, 2013b]); and
- **northern excavation area** (near BH6/MW6 and BH15/MW15) which is located within the VMP Remediation Extent and is located between two below ground features associated with the former gasworks (namely a former Tar Tank and Small Gas Holder as defined in Section 3.2.2 of the *VMP/Block 4 RAP* [AECOM, 2013b]).

Based on this assessment, it is considered that:

- the **southern excavation area** is not located within the VMP Remediation Extent (as defined in Figure 10 and 11 of the *VMP/Block 4 RAP* [AECOM, 2013b]), and therefore the soil and groundwater conditions in this area are considered likely to be suitable for continued commercial/industrial land use including the proposed excavation for construction and maintenance of below ground services and roadways.
 - It is also noted that the bedrock in this area (in the vicinity of BH43) was observed to be present at a depth of 0.57 m bgl; and
 - Consequently, significant volumes of fill material are not likely to be present in this area as the road base has been identified to be approximately 0.4 m thick.
- the **northern excavation area** is located within the VMP Remediation Extent and directly adjacent to historic gasworks related structures and therefore further consideration of the soil and groundwater conditions in this area is required to determine whether remediation is required to facilitate the proposed excavation for construction and maintenance of below ground services and roadways.

Review of the soil and groundwater conditions within the Hickson Road Infrastructure and Services Zone - northern excavation area as presented in Section 8.5.3 of the *VMP/Block 4 RAP* (AECOM, 2013b) indicates that:

- SPGWT and contaminated groundwater has been identified to be present within the former Tar Tank (locations MW7 and MW53); and
- there is a potential for soil vapour migration from shallow, contaminated groundwater likely to be present within the former Tar Tank and the Small Gas Holder to pose an unacceptable risk to intrusive maintenance workers.

In consideration of these observations it is concluded that the following interim remediation works are recommended within the northern excavation area:

- 1) the base of excavations within the vicinity of the historic gasworks infrastructure be lined with a High Density Polyethylene (HDPE) liner;
- 2) suitable, validated fill material be used to backfill around the stormwater pipes to the required finished level. The suitable fill material would need to be compacted appropriately to ensure the integrity of the below ground services and underlying HDPE liner;
- 3) the unexpected finds protocol described by **Section 8.0** be implemented; and
- 4) a Validation Report should be prepared for the remediation works to be undertaken within the northern excavation area in accordance with Section 19.12 of the *VMP/Block 4 RAP* (AECOM, 2013b). The Validation Report should be submitted to the NSW EPA Accredited Site Auditor for approval.

These interim remediation works are recommended on the assumption that remediation of that part of Hickson Road that is within the EPA Declared Area, including those areas adjacent to and below the northern excavation area, will subsequently be undertaken in accordance with *VMP/Block 4 RAP* (AECOM, 2013b).

It is considered that the information presented above will enable the relevant consent authority to comply with Clause 7 of SEPP 55 - *Remediation of Land* (1998) in relation to the proposed services construction works in the ORWN Interim Public Domain.

8.0 Unexpected Finds Protocol – Associated Works Areas

The following works will be undertaken to mitigate risks to human health and the environment in the event that contamination is found to be present in association with the associated works within the ORWN Services Zone, Block 4 Services Zone, the ORWN Interim Public Domain, and Hickson Road Infrastructure and Services Zone:

- excavations will be visually inspected by a qualified environmental engineer/scientist;
- if the subsurface soils encountered during the excavation are significantly different to those described in **Section 7.0** (i.e. based on visual and olfactory observations), validation soil sampling of the excavation base and walls will be conducted. If required, the validation soil samples will be collected as follows:
 - wall validation samples will be collected at 10 m lineal metre intervals in material identified to be the most impacted (either by visual observations of field screening of samples using a Photoionisation Detector);
 - base validation samples will be collected at 10 m lineal metres along the base of the trench;
 - the soil analytical results will be compared to the ASC NEPM (NEPC, 2013) soil criteria for commercial/industrial land use. If these criteria are exceeded a site specific risk assessment could be undertaken to assess the suitability of the material to remain *in situ*; and
 - based on the assessment of the above soil validation results, undertake additional remediation and validation works (as required).
- materials used to backfill the trenches will be validated to ensure they meet the ASC NEPM (NEPC, 2013) soil assessment criteria for a commercial/industrial land use;
- if Virgin Excavated Natural Material (VENM) is to be used for backfilling, a VENM validation certificate will be sought from the source quarry/site; and
- an Asbestos Management Plan will be prepared for the excavation works to ensure any asbestos impacted fill material is appropriately managed and disposed of to a licensed landfill facility.

9.0 Compliance with SEPP 55 (1998)

9.1 Stage 1B Basement Area

The presence, or otherwise, of contamination within the Stage 1B Basement area was considered by the soil and groundwater analytical data obtained by the environmental site investigations listed and summarised in Section 5.0 of the *VMP/Block 4 RAP* (AECOM, 2013b).

The *VMP/Block 4 RAP* (AECOM, 2013b) concluded that following implementation of the preferred remediation strategy described therein that Block 4 will have been “...remediated to a standard suitable for the proposed development (i.e. suitable for the proposed land uses including a mixture of commercial, retail and high density residential and public open space)”.

As described by **Section 6.1** and **7.0**, AECOM considers that the Stage 1B Basement and associated works are consistent with the land uses and development work (basement design) anticipated by the *VMP/Block 4 RAP* (AECOM, 2013b).

The *VMP/Block 4 RAP* (AECOM, 2013b) was approved under delegation by the Minister of Planning as part of SSD 5897 (dated 10 November 2014).

9.2 Stage 1B Residential and Retail Buildings

The Stage 1B Residential and Retail Buildings are located within the footprint of the Stage 1B basement. As such, the presence, or otherwise, of contamination within this area was considered in Section 5.0 of the *VMP/Block 4 RAP* (AECOM, 2013b) as described in **Section 9.1** above.

The *VMP/Block 4 RAP* (AECOM, 2013b) concluded that following implementation of the preferred remediation strategy described therein that Block 4 will have been “...remediated to a standard suitable for the proposed

development (i.e. suitable for the proposed land uses including a mixture of commercial, retail and high density residential and public open space)".

AECOM considers that the Stage 1B Residential and Retail Buildings are consistent with the land uses and development work anticipated by the *VMP/Block 4 RAP* (AECOM, 2013b).

The *VMP/Block 4 RAP* (AECOM, 2013b) was approved under delegation by the Minister of Planning as part of SSD 5897 (dated 10 November 2014).

9.3 Associated Works - ORWN Services Zone and Interim Public Domain

The presence of contamination in the ORWN Services Zone and Interim Public Domain has been considered in **Section 7.3** and **7.4**. As part of an assessment of compliance with SEPP 55, the presence, or otherwise, of contamination within and in the vicinity of the two areas was considered by reference to soil analytical results from historical investigations detailed in the *ORWN Data Gap Investigation* (AECOM, 2010) and summarised in the *VMP / Block 4 Remedial Action Plan* (AECOM, 2013b).

Data from within and in the vicinity of the ORWN Services Zone and Interim Public Domain and the preliminary Conceptual Site Model (as described by **Section 7.2**) is considered to be adequate for the assessment of whether materials likely to be encountered as part of the proposed services construction works are suitable for continued commercial/industrial land use (which is consistent with the proposed excavation for construction of services).

It is considered unlikely that the ORWN Services Zone and Interim Public Domain is contaminated such that it would be unsuitable for continued land use including the proposed services construction works. This conclusion is based on consideration of:

- the CoPC concentrations considered representative the ORWN Services Zone and Interim Public Domain were reported to be less than site assessment criteria relevant to the proposed land use;
- field observations which indicate that gasworks related waste are not likely to be excavated during the development works; and
- the remediation extent defined by the *VMP / Block 4 RAP* (AECOM, 2013b).

9.4 Block 4 Services Zone

The presence of contamination in the Block 4 Services Zone has been considered based on the assessment of soil and groundwater conditions as detailed in Section 8.5.1 of the *VMP/Block 4 RAP* (AECOM, 2013b).

Data from the *VMP/Block 4 RAP* (AECOM, 2013b) is considered to be adequate for the assessment of whether materials likely to be encountered as part of the proposed services construction works are suitable for proposed excavation for construction and maintenance of services.

It is considered unlikely that the soil and groundwater encountered during construction of services within the Block 4 Services Zone is contaminated such that it would be unsuitable for the proposed works. This conclusion is based on consideration of:

- the CoPC concentrations reported within the soils likely to be excavated as part of the proposed works;
- field observations which indicate that gasworks related waste are not likely to be excavated during the proposed works; and
- the remediation extent defined by the *VMP / Block 4 RAP* (AECOM, 2013b).

9.5 Hickson Road Infrastructure and Services Zones

The presence of contamination in the Hickson Road Infrastructure and Services Zones has been considered based on the assessment of soil and groundwater conditions as detailed in Section 8.5.3 of the *VMP/Block 4 RAP* (AECOM, 2013b).

Data from the *VMP/Block 4 RAP* (AECOM, 2013b) is considered to be adequate for the assessment of whether materials likely to be encountered as part of the proposed services construction works are suitable for proposed excavation for construction and maintenance of services.

As discussed in **Section 7.6**, it is recommended that interim remediation works will be required in the **northern excavation area** due to the proximity of the proposed excavation to former gasworks infrastructure which is known to contain contamination. It is considered that the recommended interim remediation works will make the area suitable for intrusive maintenance works associated with construction and maintenance of the proposed services and road works.

10.0 Conclusions

In conclusion, it is AECOM's opinion that:

- The Stage 1B Basement works (as proposed by SSD 6960) and Residential / Retail Buildings R4A, R4B and R5 (as proposed by SSD 6964, SSD 6965 and SSD 6966):
 - are consistent with the land uses and preferred remediation strategy detailed in the *VMP/Block 4 RAP* (AECOM, 2013b) and can be appropriately managed by that document; and
 - will enable the relevant consent authority to comply with Clause 7 of *SEPP 55 - Remediation of Land* (1998) as required by Condition 12 of the SEAR's (2 April 2015) in relation to the proposed future use of the land as a Basement with Residential / Retail Buildings and associated open space areas above.
- The Associated Works in the Block 4 Services Zone and Hickson Road Infrastructure Zone (as proposed by SSD 6960) are consistent with the land uses and preferred remediation strategy detailed in the *VMP/Block 4 RAP* (AECOM, 2013b) and can be appropriately managed by that document;
- The information presented in this letter in relation to the Associated Works proposed in the - ORWN Services Zone, ORWN Interim Public Domain and Block 4 Services Zone (as proposed by SSD 6960):
 - will enable the relevant consent authority to comply with Clause 7 of *SEPP 55 - Remediation of Land* (1998) in relation to the proposed services construction works. In particular:
 - based on the available information, the soil and groundwater within these areas are unlikely to be contaminated such that they are unsuitable for the proposed services construction;
 - in the unlikely event that contamination is identified as part of the proposed development works, implementation of the Unexpected Finds Protocol described by **Section 8.0** will mitigate against unacceptable risks to human health and the environment; and
 - A Remedial Action Plan is not considered to be required in relation to the proposed Associated Works in these areas.
- The information presented in this letter in relation to the Associated works proposed in the Hickson Road Infrastructure and Services Zone (as proposed by SSD 6960):
 - will enable the relevant consent authority to comply with Clause 7 of *SEPP 55 - Remediation of Land* (1998) in relation to the proposed services construction works. In particular:
 - with respect to the **northern excavation area**, based on the available information interim remediation works (as described by **Section 7.6**) will be required to mitigate the risk of soil vapour from underlying soil and groundwater contamination from impacting on future intrusive maintenance workers;
 - with respect to the **southern excavation area**, based on the available information, the soil and groundwater are unlikely to be contaminated such that they are unsuitable for the proposed services construction; and
 - in the unlikely event that contamination is identified as part of the proposed development works, implementation of the Unexpected Finds Protocol described by **Section 8.0** will mitigate against unacceptable risks to human health and the environment.

11.0 References

AECOM, 2013ba. *VMP Remediation Extent, VMP Remediation Work Area, (Parts of Barangaroo and Hickson Road), Millers Point, NSW*. 23 July.

AECOM, 2013b. *Remedial Action Plan, NSW EPA Declared Remediation Site 21122 and Block 4 (Stage 1b) Development Works, Barangaroo, Millers Point, NSW*. 24 July.

AECOM, 2015. *Draft RAP, Barangaroo South Stage 1B Waterfront Public Domain*. 23 July.

ERM, 2007. *Environmental Site Assessment, East Darling Harbour, Sydney, NSW, Final Report. Environmental Resources Management*. 21 June 2007.

Yours faithfully,



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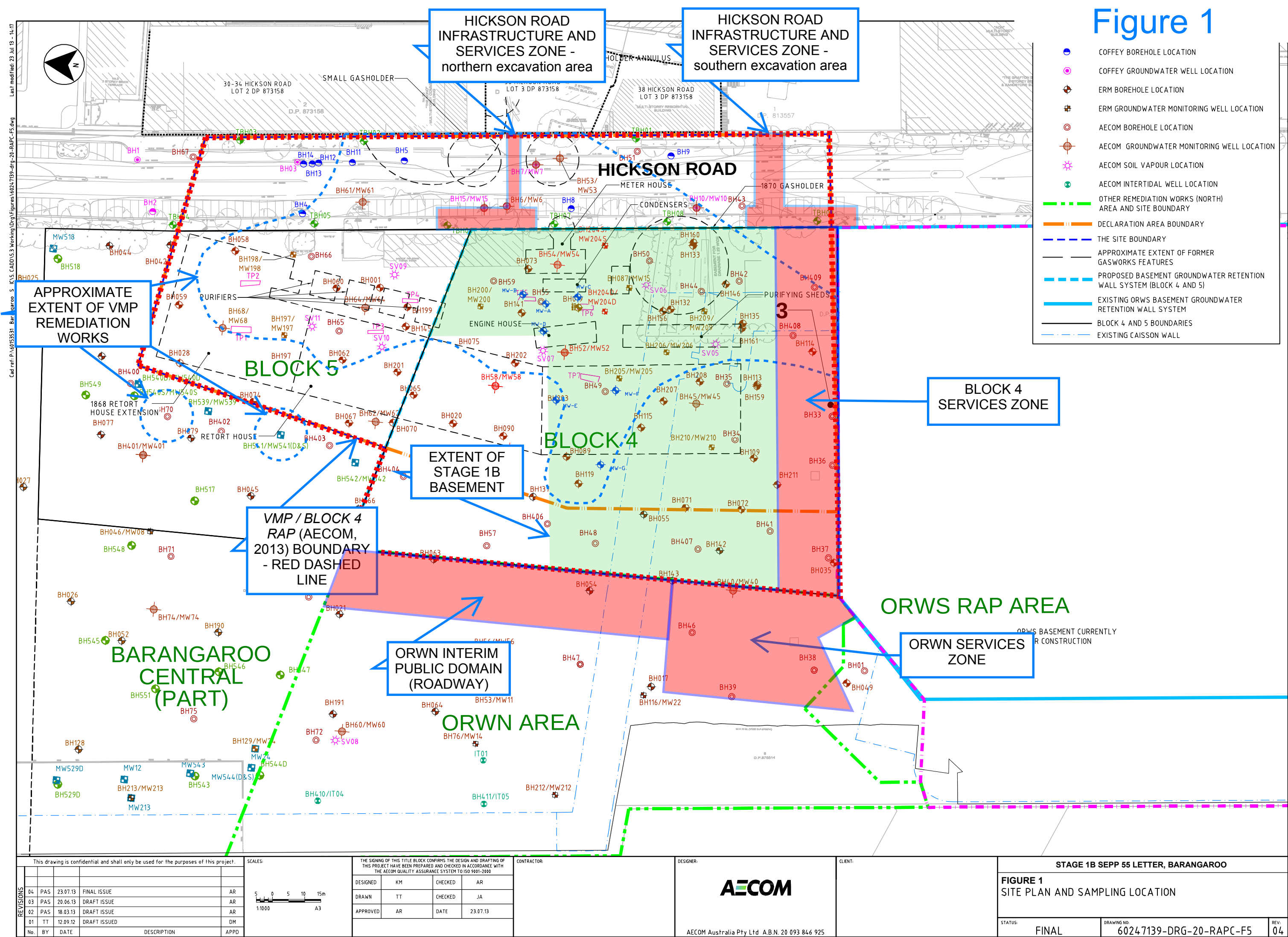
Attachment 1: Site Plans

Attachment 2: Table T1 - Applicable ORWN Services Zone and Block 4 Services Zone Soil Analytical Results

Attachment 3: Table T2 - Applicable ORWN Interim Public Domain Soil Analytical Results

Attachment 1: Site Plans

Figure 1



ONE SYDNEY HARBOUR

BARANGAROO SOUTH

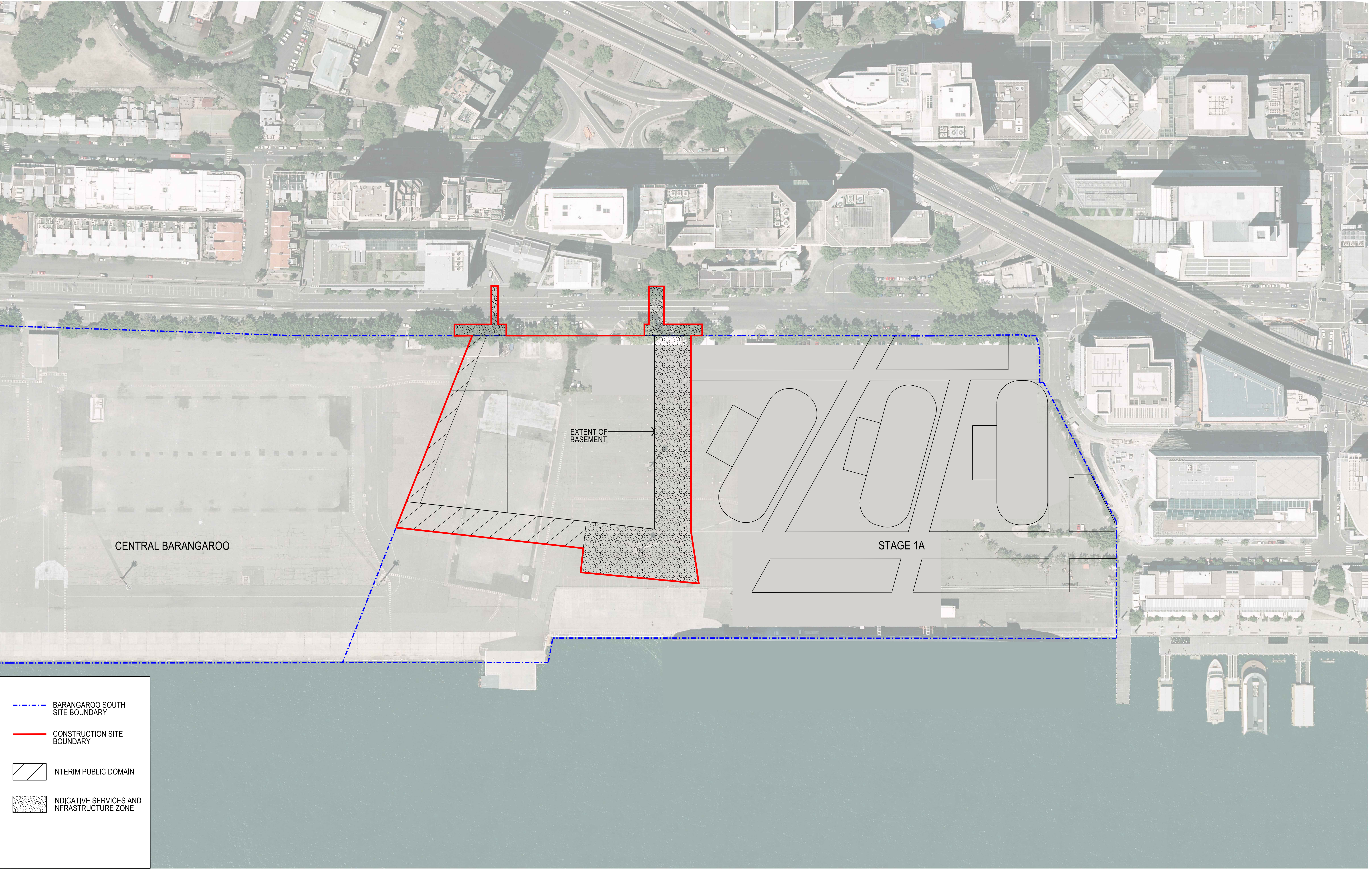


Stage 1B Basement SSD6960

Development Application

ARCHITECTURAL DRAWINGS

- BB2 _PA2_A000 TITLE SHEET
- BB2 _PA2_A001 AERIAL LOCATION PLAN - NOT USED
- BB2 _PA2_A002 SURVEY PLAN - NOT USED
- BB2 _PA2_A003 DEMOLITION, EXCAVATION & SERVICES ZONE PLAN
- BB2 _PA2_A100 BASEMENT PLANT LEVEL B0
- BB2 _PA2_A101 BASEMENT PLANT LEVEL B1
- BB2 _PA2_A102 BASEMENT PLANT LEVEL B2
- BB2 _PA2_A103 BASEMENT PLANT LEVEL B3
- BB2 _PA2_A104 BASEMENT PLANT LEVEL B4
- BB2 _PA2_A105 BASEMENT PLANT LEVEL B5
- BB2 _PA2_A300 SECTION 01
- BB2 _PA2_A301 SECTION 02
- BB2 _PA2_A302 SECTION 03
- BB2 _PA2_A303 SECTION 04
- BB2 _PA2_A400 BUILDING ELEMENTS - GROUND FLOOR
- BB2 _PA2_A401 BUILDING ELEMENTS - PODIUM P1
- BB2 _PA2_A402 BUILDING ELEMENTS - PODIUM P2
- BB2 _PA2_A501 BUILDING ELEMENTS - ELEVATIONS



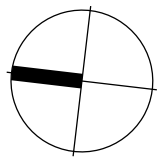
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- CONSTRUCTION SITE BOUNDARY
- INTERIM PUBLIC DOMAIN
- INDICATIVE SERVICES AND INFRASTRUCTURE ZONE

STAGE 1B BASEMENT SSD6960 AERIAL LOCATION PLAN

Scale 1:1000 @ A1 Scale 1:2000 @ A3



Checked:
Graham Jones
10.08.2015
Approved:
Stephanie Smith
10.08.2015



Drawing: BB2_PA2_A001
Date: 10 August 2015 Revision: A
DEVELOPMENT APPLICATION

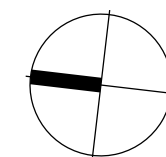
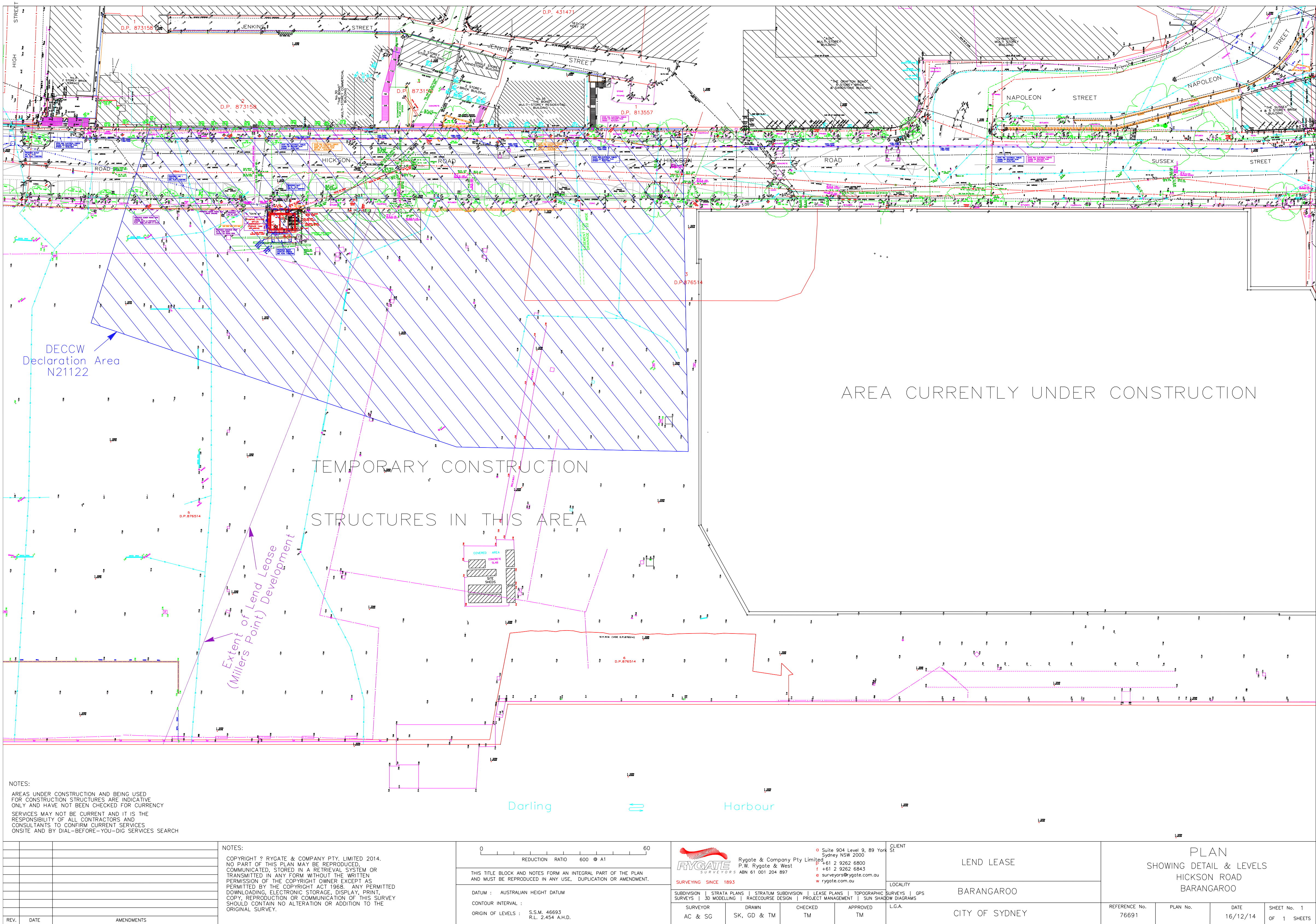
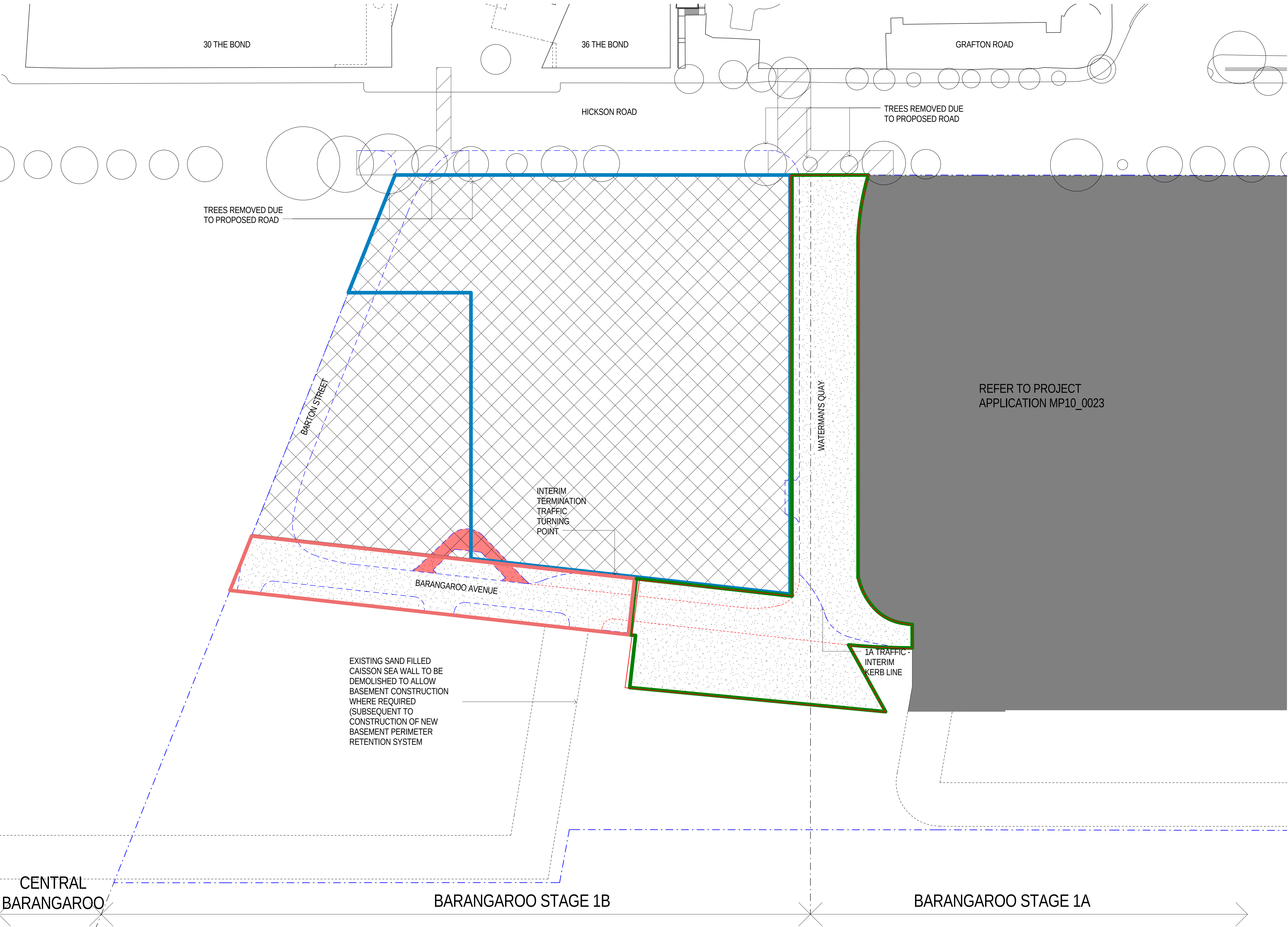


Figure 2





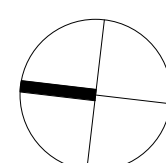
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- SHARED INFRASTRUCTURE & FACILITIES
- VOID
- BASEMENT GFA

FITOUT OF ROOMS SUBJECT TO DESIGN DEVELOPMENT PRIOR TO ISSUE CC.

PARKING IS INDICATIVE & SUBJECT TO FUTURE BUILDING APPROVALS.

ALL STRUCTURE IS FOR APPROVAL. LAYOUT IS INDICATIVE AND SUBJECT TO CHANGE.





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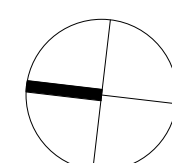
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SERVICES ZONE REFER TO CIVIL ENGINEERING CONSULTANTS





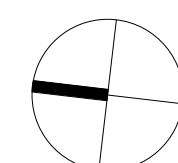
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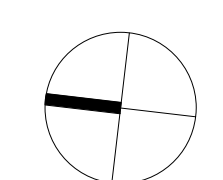
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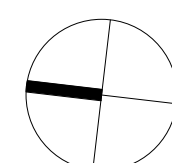
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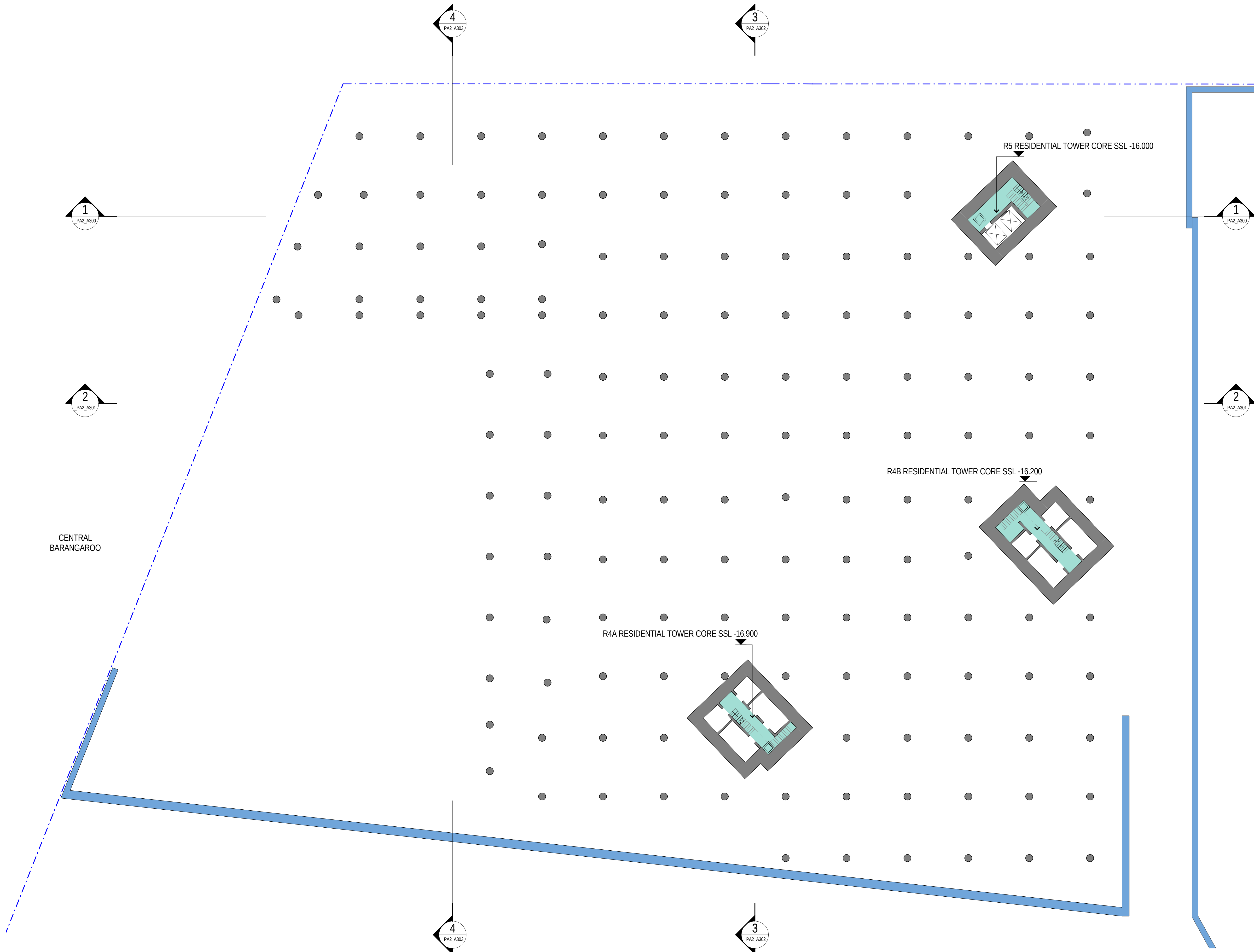
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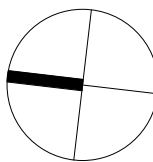
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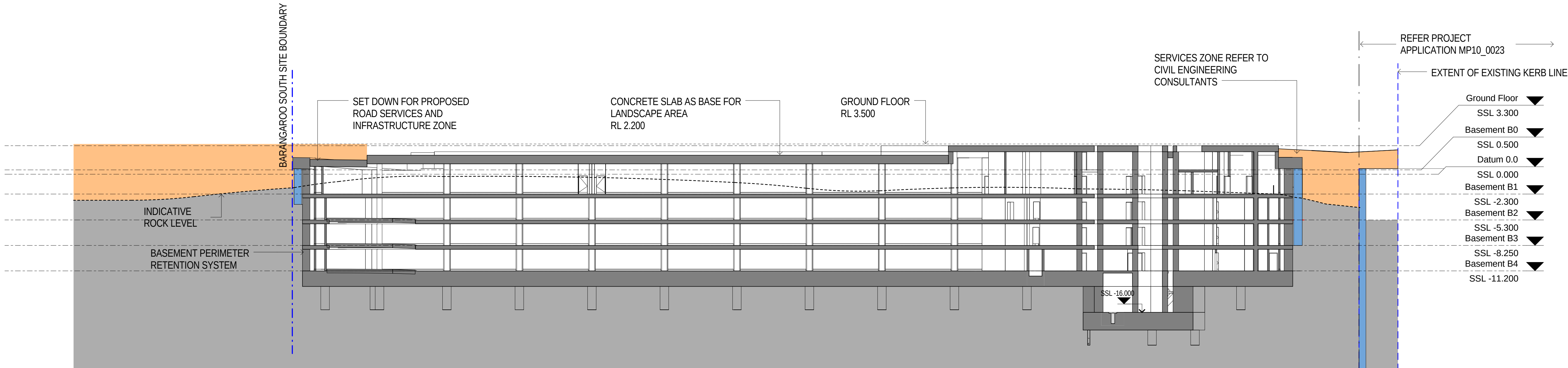
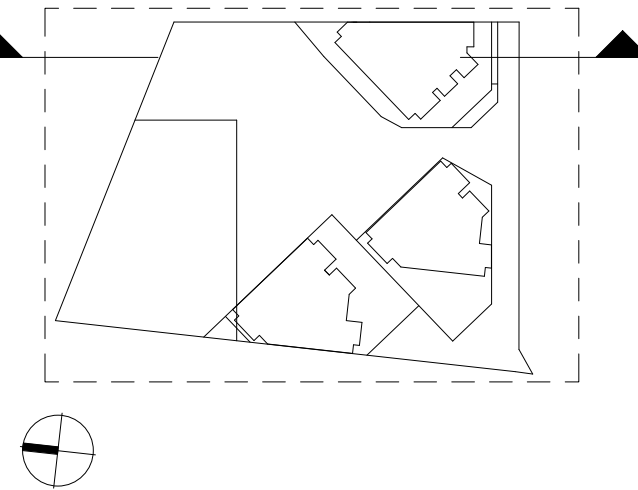
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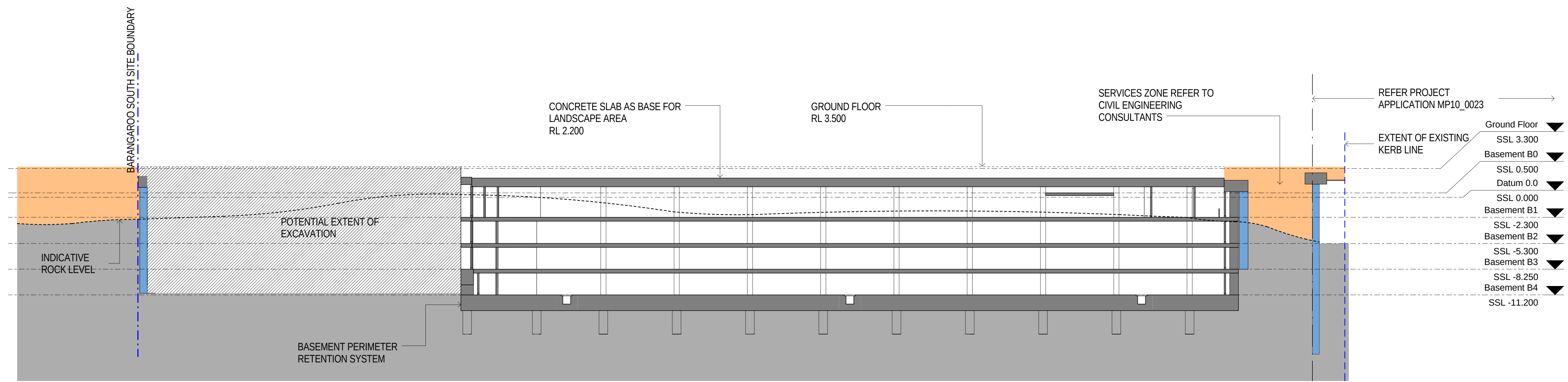
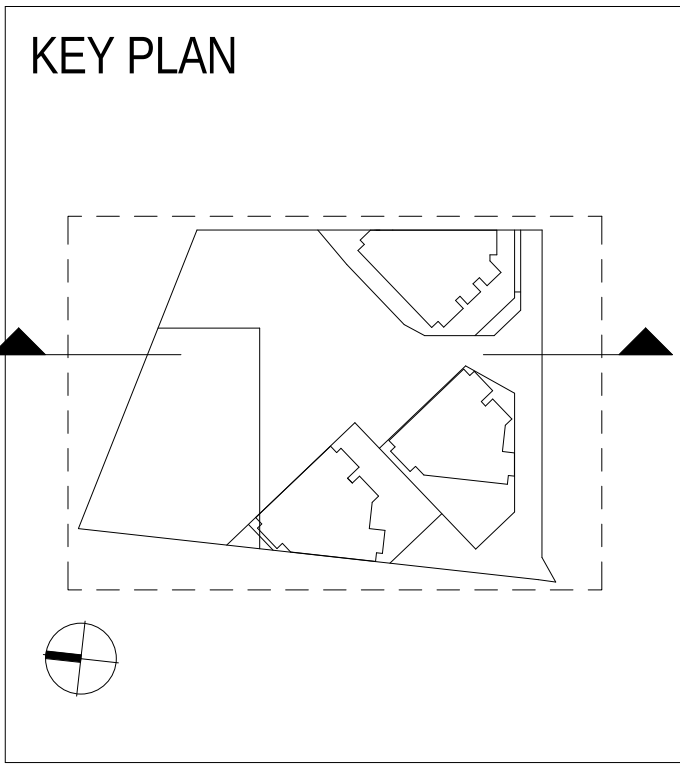
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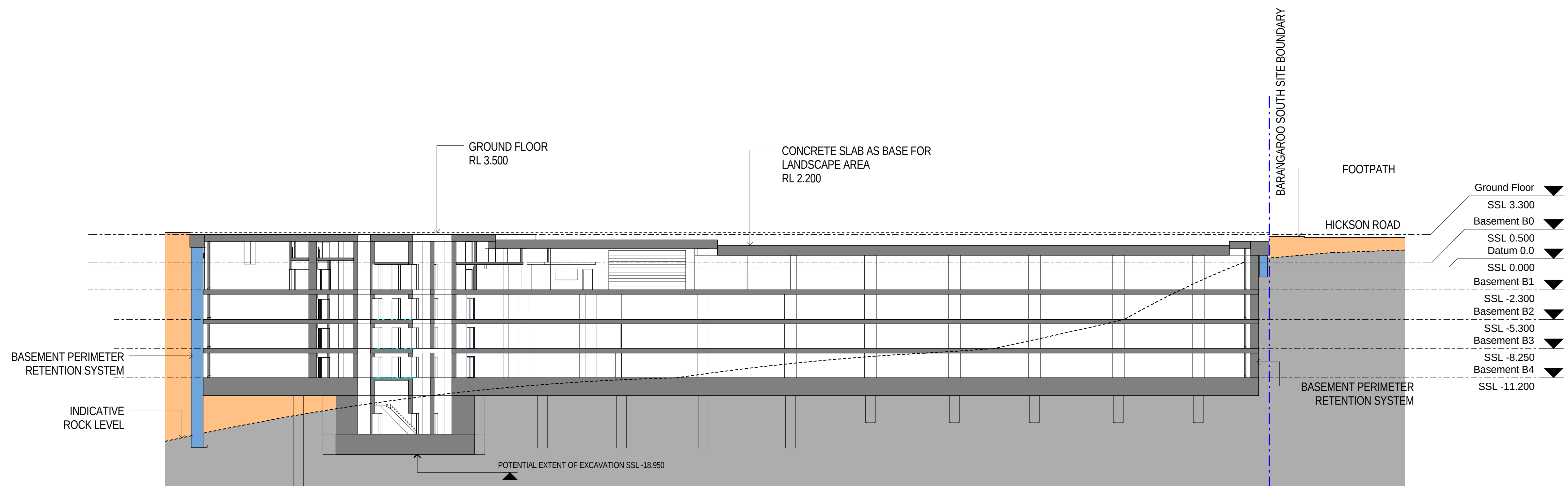
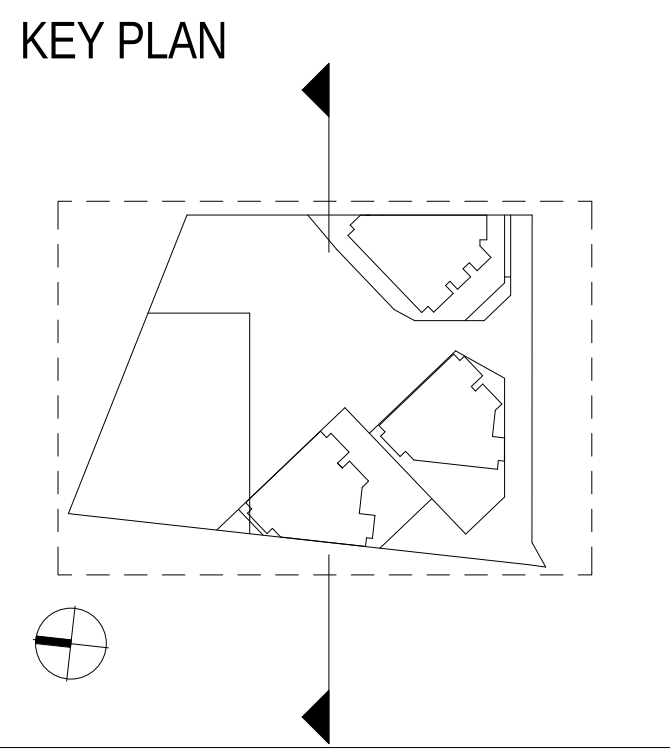
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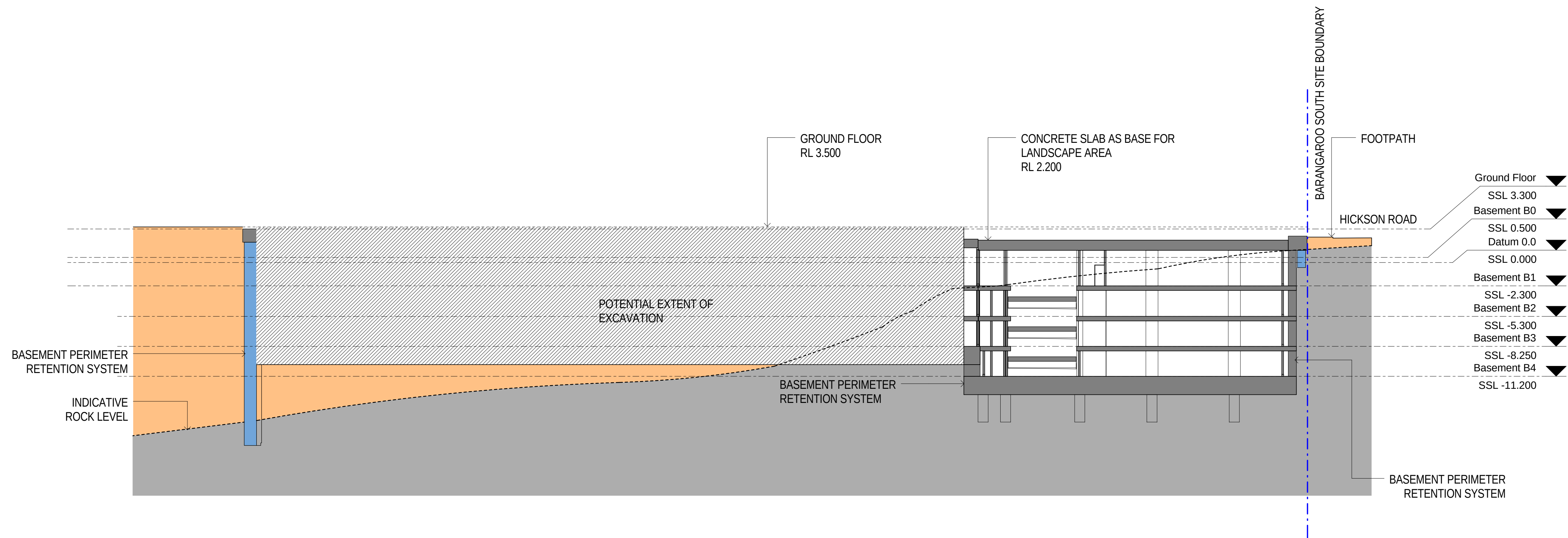
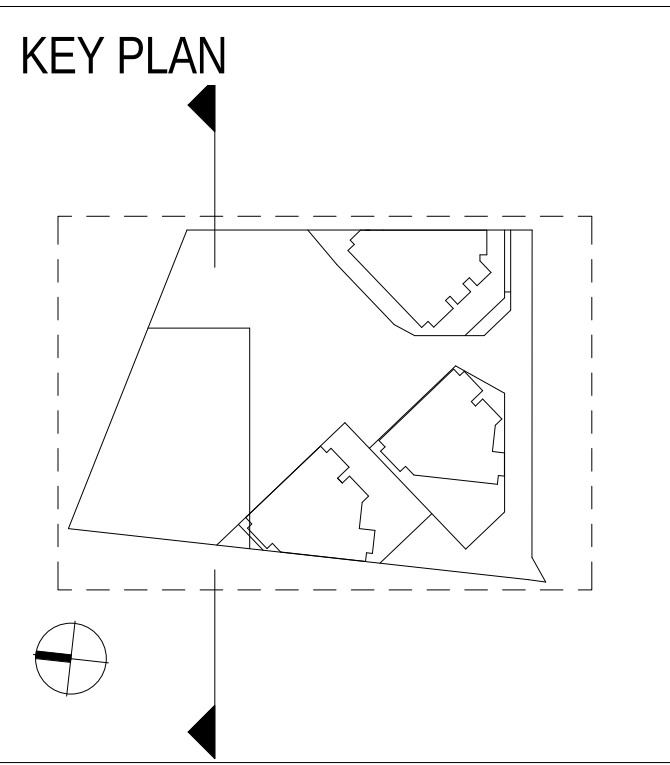


KEY PLAN









HICKSON ROAD

BARTON STREET

BARANGAROO AVENUE

WATERMAN'S QUAY

BASEMENT
EXIT

LIFT LOBBY
LIFT SHAFT
CAR PARK
AIR SUPPLY

LIFT LOBBY
LIFT SHAFT

BASEMENT EXIT 2
BASEMENT EXIT 1
LOADING DOCK
AIR EXHAUST

CAR PARK
AIR EXHAUST

LIFT LOBBY
LIFT SHAFT

FIRE BOOSTER VALVES
BASEMENT EXIT
FIRE CONTROL ROOM

CAR PARK AIR
SUPPLY

CAR PARK
ROLLER SHUTTER

SUBSTATION 10 EXIT 2
SUBSTATION 10 EXIT 1

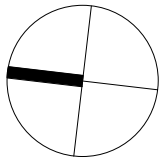
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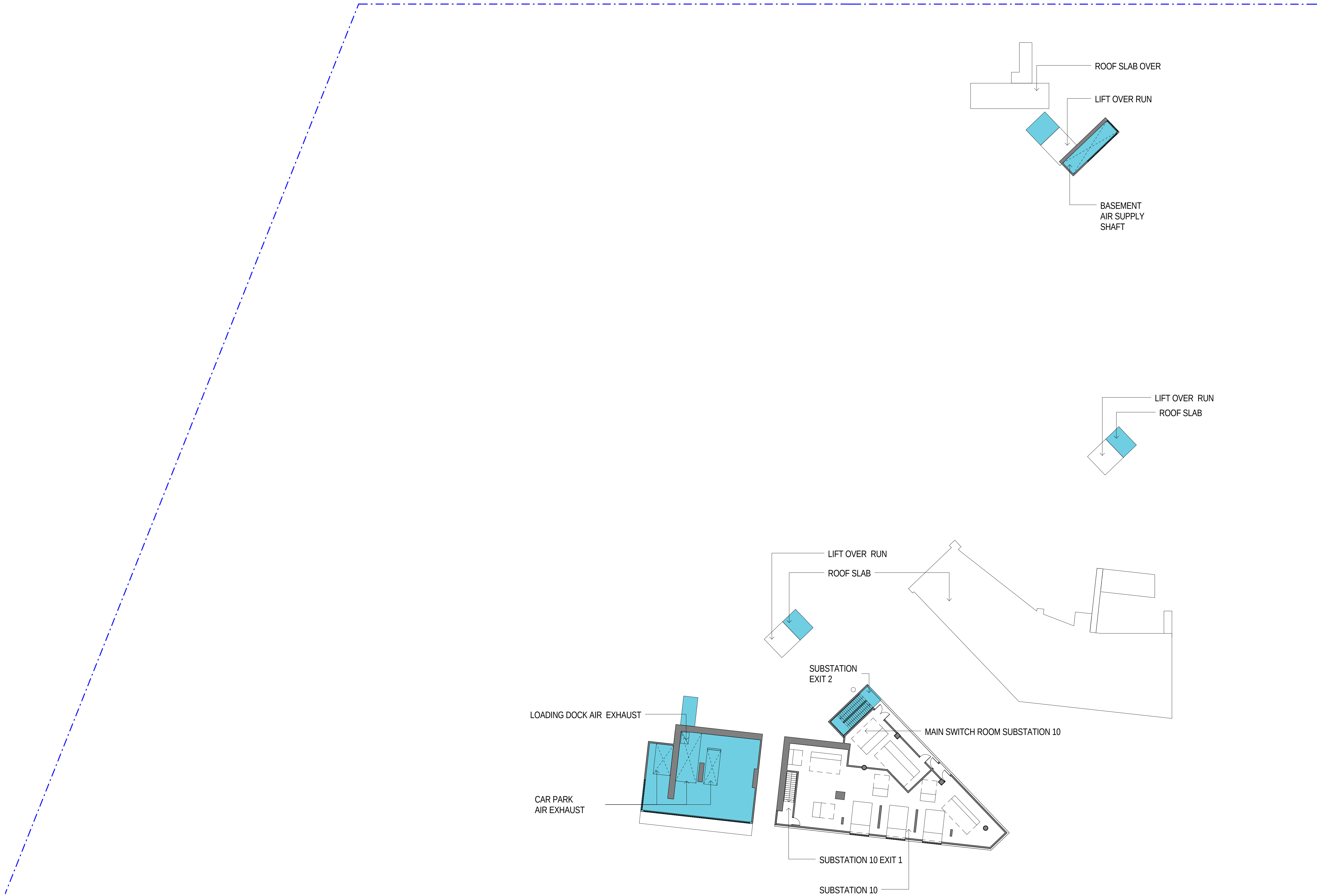


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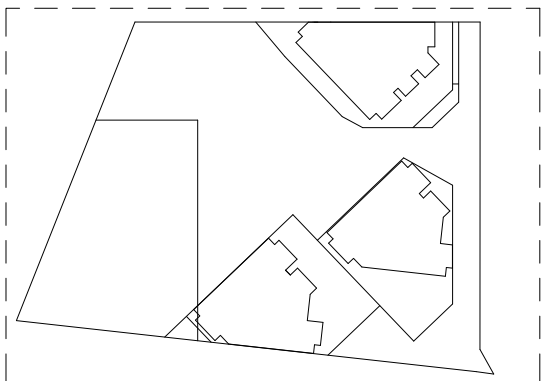
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- TEMPORARY BUILDING ELEMENTS

ROAD LAYOUT INDICATIVE ONLY





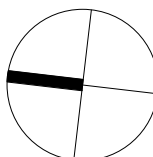
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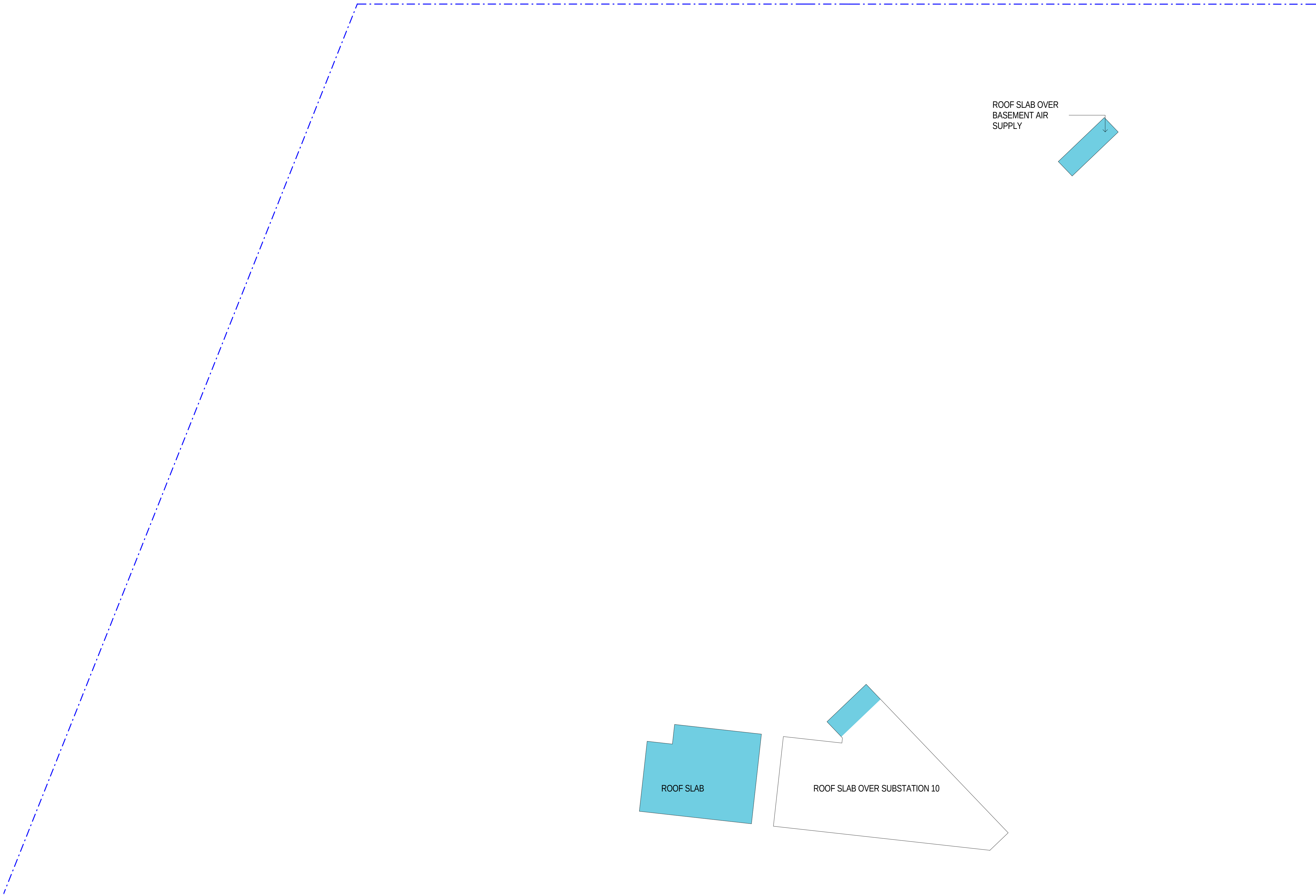


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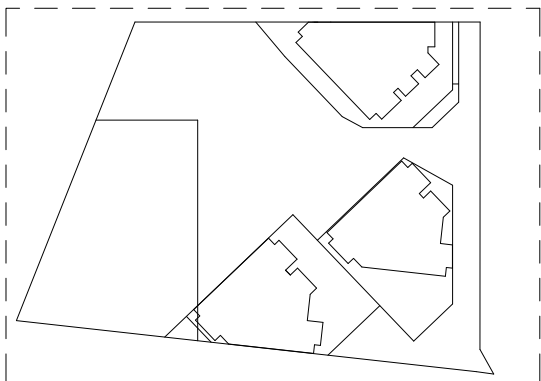
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ROAD LAYOUT INDICATIVE ONLY





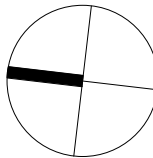
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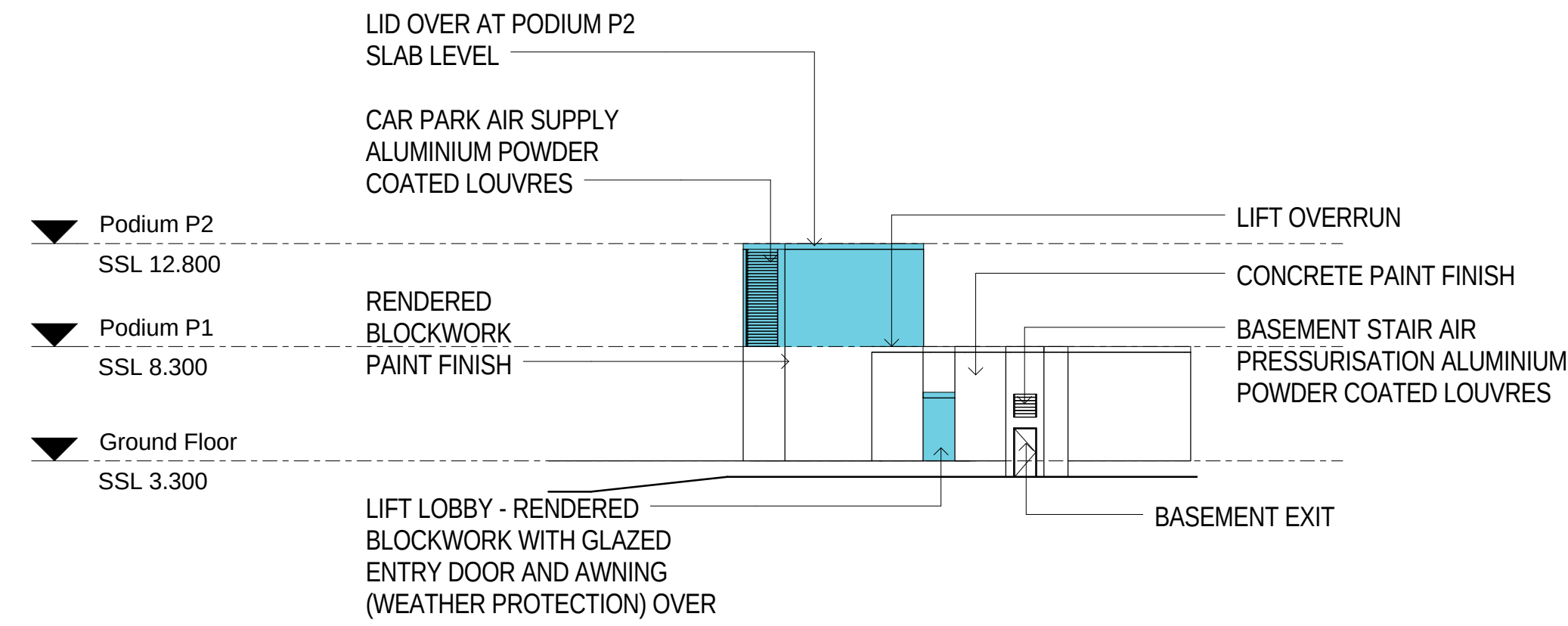


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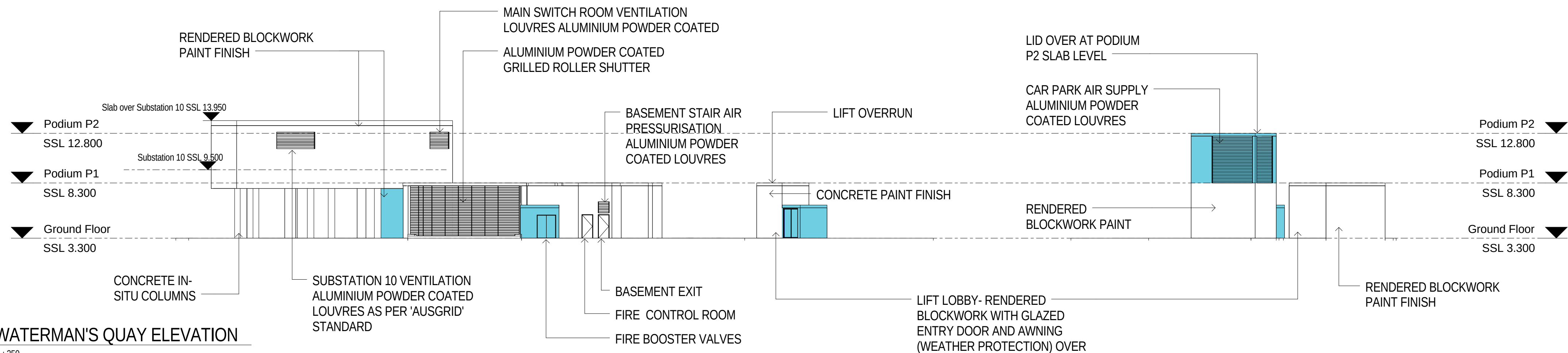
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- INTERIM KERB / ROAD LINES
- ULTIMATE KERB LINE OF CONTINUED BARANGAROO AVENUE
- R4A PORTE CONCHERE ENTRY DOCUMENTED BY SEPARATE DA SUBMISSION
- TEMPORARY BUILDING ELEMENTS

ROAD LAYOUT INDICATIVE ONLY

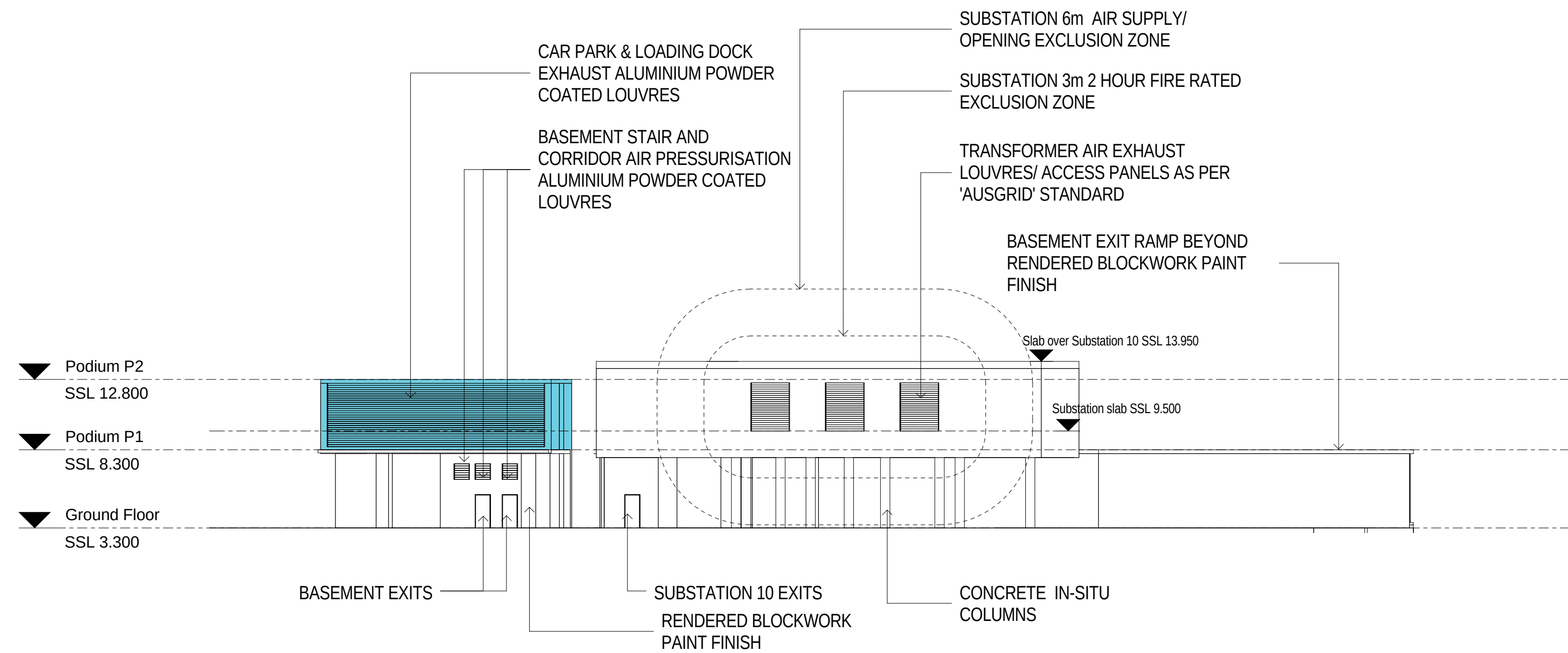




1 HICKSON ROAD ELEVATION
1 : 250

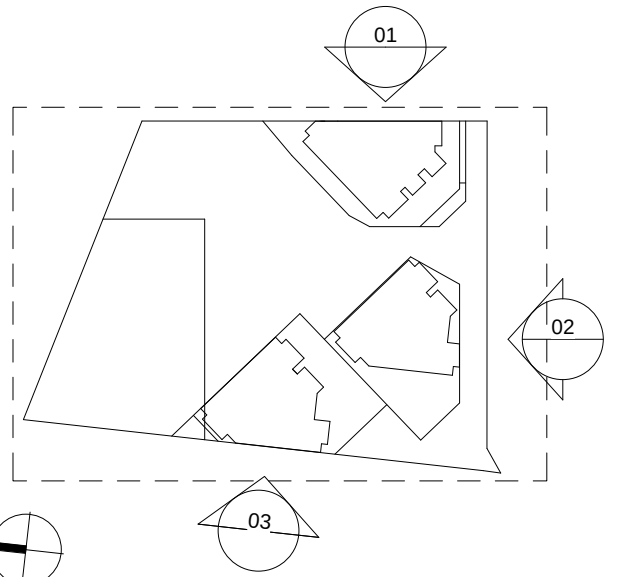


2 WATERMAN'S QUAY ELEVATION
1 : 250



3 BARANGAROO AVENUE ELEVATION
1 : 250

KEY PLAN



LEGEND

- BARANGAROO SOUTH SITE BOUNDARY
- INTERIM KERB / ROAD LINES
- ULTIMATE KERB LINE OF CONTINUED BARANGAROO AVENUE
- R4A PORTE CONCHERE ENTRY DOCUMENTED BY SEPARATE DA SUBMISSION
- TEMPORARY BUILDING ELEMENTS

ROAD LAYOUT INDICATIVE ONLY

**Attachment 2: Table T1 - Applicable ORWN Services
Zone and Block 4 Services Zone Soil
Analytical Results**

Location	AECOM BH01	AECOM BH01	AECOM BH01	AECOM BH01	AECOM BH01	AECOM BH01	AECOM BH01	AECOM BH33	AECOM BH33	AECOM BH36	AECOM BH36	AECOM BH36
Sample Field ID	BH01_0.3-0.4	BH01_1.0-1.2	BH01_2.0-2.2	BH01_4.0-4.1	QC01	QC02		BH33_0.75-0.85	BH33_5.0-5.2	BH36_1.0-1.2	BH36_2.5-2.9	BH36_4.0-4.4
Sample Depth (m)	0.3-0.4	1-1.2	2-2.2	4-4.1	1-1.2	1-1.2		0.75-0.85	5-5.2	1-1.2	2.5-2.9	4-4.4
Matrix	Fill	Fill	Fill	Fill	Fill	Fill		Fill	Fill	Fill	Fill	Fill
Sample Type	Normal	Normal	Normal	Normal	Field D	Interlab D		Normal	Normal	Normal	Normal	Normal
Area	ORWN Services	ORWN Services	ORWN Services	ORWN Services	ORWN Services	ORWN Services		Block 4 Services	Block 4 Services	Block 4 Services	Block 4 Services	Block 4 Services
Sample Date	12/02/2009	12/02/2009	12/02/2009	12/02/2009	12/02/2009	12/02/2009		2/12/2010	2/12/2010	3/03/2010	3/03/2010	3/03/2010

Chem_Group	ChemName	output unit	EQL	ASC NEPM (NEPC, 2013) EIL	ASC NEPM (NEPC 2013) HILD D											
Metals	Arsenic	mg/kg	4	160	3000	<5	<5	<5	<5	<5	<1	<5	6	<5	-	<5
	Barium	mg/kg	10			20	40	70	40	30	15	-	-	10	-	30
	Beryllium	mg/kg	1			1	<1	<1	<1	<1	<1	-	-	<1	-	<1
	Cadmium	mg/kg	0.5		900	<1	<1	<1	<1	<1	<0.1	<1	<1	<1	-	<1
	Chromium	mg/kg	1			2	7	18	10	6	6	8	10	8	-	7
	Chromium (hexavalent)	mg/kg	0.5		3600	-	-	-	-	-	-	-	-	-	-	-
	Cobalt	mg/kg	2		4000	12	3	5	6	2	1	-	-	<2	-	<2
	Copper	mg/kg	1		240,000	331	17	44	92	11	6	264	12	<5	-	<5
	Iron	mg/kg	50			-	-	-	-	-	-	-	-	-	-	-
	Lead	mg/kg	1	1800	1500	6	19	30	16	14	11	6	36	17	-	9
	Manganese	mg/kg	5		60,000	725	152	329	355	105	78	-	-	43	-	73
	Mercury	mg/kg	0.1		730	<0.1	-	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	-	<0.1
	Nickel	mg/kg	1		6000	6	4	8	5	2	2	10	12	<2	-	2
PAHs	Vanadium	mg/kg	5			106	16	32	51	16	11	-	-	12	-	12
	Zinc	mg/kg	1		400,000	46	38	2070	42	26	16	50	77	14	-	17
	2-chloronaphthalene	mg/kg	0.5			-	-	-	-	-	-	-	-	-	-	<0.5
	2-methylnaphthalene	mg/kg	0.5			-	-	-	-	-	-	-	-	<0.5	-	<0.5
	3-methylcholanthrene	mg/kg	0.5			-	-	-	-	-	-	-	-	-	-	<0.5
	Acenaphthene	mg/kg	0.1			-	-	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5
	Acenaphthylene	mg/kg	0.1			-	-	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5
	Acetophenone	mg/kg	0.5			-	-	-	-	-	-	-	-	-	-	<0.5
	Anthracene	mg/kg	0.1			-	-	-	1.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5
	Benz(a)anthracene	mg/kg	0.1			-	-	-	1.9	<0.5	<0.5	-	<0.5	<0.5	-	<0.5
	Benzo(a) pyrene	mg/kg	0.05			-	-	-	1.2	<0.5	<0.5	-	<0.5	<0.5	-	<0.5
	Benzo(b)&(k)fluoranthene	mg/kg	0.2			-	-	-	-	-	<1	-	-	-	-	<1
	Benzo(b)fluoranthene	mg/kg	0.5			-	-	-	1.2	<0.5	-	-	<0.5	<0.5	-	-
	Benzo(g,h,i)perylene	mg/kg	0.1			-	-	-	0.6	<0.5	<0.5	-	<0.5	<0.5	-	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5			-	-	-	0.7	<0.5	-	-	<0.5	<0.5	-	-
	Chrysene	mg/kg	0.1			-	-	-	1.4	<0.5	<0.5	-	<0.5	<0.5	-	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.1			-	-	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5
	Fluoranthene	mg/kg	0.1			-	-	-	4.9	<0.5	<0.5	-	<0.5	<0.5	-	<0.5
	Fluorene	mg/kg	0.1			-	-	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.1			-	-	-	0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5
	Naphthalene	mg/kg	0.1	370	1900*	-	-	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5
	CPAH (ESDAT)	mg/kg			40	-	-	-	7.5	<4	<3	-	<4	<4	-	<3
	PAHs (Sum of total)	mg/kg	0.5		4000	-	-	-	-	-	0	-	-	<0.5	-	-
	Phenanthrene	mg/kg	0.1			-	-	-	5.3	<0.5	<0.5	-	<0.5	<0.5	-	<0.5
	Pyrene	mg/kg	0.1			-	-	-	4.4	<0.5	<0.5	-	<0.5	<0.5	-	<0.5
Phenols	2,4-dimethylphenol	mg/kg	0.01			-	-	-	-	-	-	-	<0.5	<0.5	-	<0.5
	2-methylphenol	mg/kg	0.01			-	-	-	-	-	-	-	<0.5	<0.5	-	<0.5
	2-nitrophenol	mg/kg	0.01			-	-	-	-	-	-	-	<0.5	<0.5	-	<0.5
	3-&4-methylphenol	mg/kg	0.5			-	-	-	-	-	-	-	<1	<1	-	<0.5
	3-Methylphenol	mg/kg	0.01			-	-	-	-	-	-	-	-	-	-	-
	4-chloro-3-methylphenol	mg/kg	0.01			-	-	-	-	-	-	-	<0.5	<0.5	-	<0.5
	4-methylphenol	mg/kg	0.01			-	-	-	-	-	-	-	-	-	-	-
	4-nitrophenol	mg/kg	0.01			-	-	-	-	-	-	-	-	-	-	-
	Phenol	mg/kg	0.01			-	-	-	-	-	-	-	<0.5	<0.5	-	<0.5
TPH	Phenolics Total	mg/kg				-	-	-	-	-	-	-	-	-	-	-
	TPH C6 - C9	mg/kg	2		5100*	-	-	-	<10	<10	<10	<10	<10	<10	-	<10
	TPH C10 - C14	mg/kg	50		3800*	-	-	-	<50	<50	<50	<50	<50	<50	-	<50
	TPH C15-C28	mg/kg	100		5300*	-	-	-	<100	<100	<100	<100	<100	<100	-	<100
	TPH C29-C36	mg/kg	100		7400*	-	-	-	<100	<100	<100	<100	<100	<100	-	<100
Asbestos	Asbestos fibres	-	0.1			-	-	-	-	-	-	-	-	-	-	-
	weight of sample	g	0.01			-	-	-	-	-	-	-	-	-	-	-
BTEx	Total Xylene (ESDAT)	mg/kg	0.15			-	-	-	<1	<1	<1.5 - 0	<1	<1	<1	-	<1
	Benzene	mg/kg	0.2		120*	-	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2
	Ethylbenzene	mg/kg	0.2		5300*	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5
	Toluene	mg/kg	0.2		18000*	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5
	Xylene (m & p)	mg/kg	0.2		15000*	-	-	-	<0.5	<0.5	<1	<0.5	<0.5	<0.5	-	<0.5
	Xylene (o)	mg/kg	0.2			-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5

NOTES: EIL - Ecological Investigation Level
HIL - Health Investigation Level
* CRC Care (2011) Health Screening Level - Direct Contact

Location	AECOM BH36	AECOM BH37	AECOM BH37	AECOM BH37	AECOM BH38	AECOM BH38	AECOM BH39	AECOM BH39	AECOM BH39	AECOM BH39	AECOM BH40
Sample Field ID	BH36-0.07-0.1	BH37 0.06-0.1	BH37 2.5-2.7	BH37 5.5-5.7	BH38 0.15-0.25	BH38 2.5-2.7	BH39 0.15-0.25	BH39-2.5-2.7	BH39-20.5-20.7	BH39-4.0-4.2	BH40 1.0-1.2
Sample Depth (m)	0.7-0.1	0.06-0.1	2.5-2.7	5.5-5.7	0.15-0.25	2.5-2.7	0.15-0.25	2.5-2.7	20.5-20.7	4-4.2	1-1.2
Matrix	Fill	Fill	Fill	Fill	Fill	Fill	Fill	Fill	Fill	Fill	Fill
Sample Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Area	Block 4 Services	Block 4 Services	Block 4 Services	Block 4 Services	ORWN Services	ORWN Services	ORWN Services	ORWN Services	ORWN Services	ORWN Services	ORWN Services
Sample Date	19/02/2010	17/02/2010	17/02/2010	18/02/2010	18/02/2010	19/02/2010	18/02/2010	23/02/2010	24/02/2010	24/02/2010	18/02/2010

Chem_Group	ChemName	output unit	EQL	ASC NEPM (NEPC, 2013) EIL	ASC NEPM (NEPC 2013) HILD D											
Metals	Arsenic	mg/kg	4	160	3000	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Barium	mg/kg	10			20	20	<10	30	30	30	20	110	10	110	20
	Beryllium	mg/kg	1			<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Cadmium	mg/kg	0.5		900	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Chromium	mg/kg	1			2	2	5	8	4	6	2	8	4	10	9
	Chromium (hexavalent)	mg/kg	0.5		3600	-	-	-	<0.5	-	-	-	-	-	-	-
	Cobalt	mg/kg	2		4000	12	12	<2	3	13	<2	13	3	<2	3	3
	Copper	mg/kg	1		240,000	256	225	23	<5	231	15	247	<5	<5	<5	<5
	Iron	mg/kg	50			-	-	-	8730	-	-	-	-	-	-	-
	Lead	mg/kg	1	1800	1500	6	6	9	20	11	31	6	6	<5	7	10
	Manganese	mg/kg	5		60,000	753	768	9	125	864	185	819	156	<5	206	181
	Mercury	mg/kg	0.1		730	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Nickel	mg/kg	1		6000	7	7	<2	5	7	3	7	3	<2	3	4
	Vanadium	mg/kg	5			119	125	8	15	128	14	139	10	<5	11	13
	Zinc	mg/kg	1		400,000	51	47	11	28	50	57	52	18	<5	16	20
PAHs	2-chloronaphthalene	mg/kg	0.5			-	-	-	-	-	-	-	-	<0.5	-	-
	2-methylnaphthalene	mg/kg	0.5			-	-	-	-	-	-	-	-	<0.5	-	-
	3-methylcholanthrene	mg/kg	0.5			-	-	-	-	-	-	-	-	<0.5	-	-
	Acenaphthene	mg/kg	0.1			-	-	-	<0.5	-	-	-	-	<0.5	<0.5	-
	Acenaphthylene	mg/kg	0.1			-	-	-	<0.5	-	-	-	-	<0.5	<0.5	-
	Acetophenone	mg/kg	0.5			-	-	-	-	-	-	-	-	<0.5	-	-
	Anthracene	mg/kg	0.1			-	-	-	<0.5	-	-	-	-	<0.5	<0.5	-
	Benz(a)anthracene	mg/kg	0.1			-	-	-	<0.5	-	-	-	-	<0.5	<0.5	-
	Benzo(a) pyrene	mg/kg	0.05			-	-	-	<0.5	-	-	-	-	<0.5	<0.5	-
	Benzo(b)&(k)fluoranthene	mg/kg	0.2			-	-	-	-	-	-	-	-	<1	-	-
	Benzo(b)fluoranthene	mg/kg	0.5			-	-	-	<0.5	-	-	-	-	-	<0.5	-
	Benzo(g,h,i)perylene	mg/kg	0.1			-	-	-	<0.5	-	-	-	-	<0.5	<0.5	-
	Benzo(k)fluoranthene	mg/kg	0.5			-	-	-	<0.5	-	-	-	-	-	<0.5	-
	Chrysene	mg/kg	0.1			-	-	-	<0.5	-	-	-	-	<0.5	<0.5	-
	Dibenz(a,h)anthracene	mg/kg	0.1			-	-	-	<0.5	-	-	-	-	<0.5	<0.5	-
	Fluoranthene	mg/kg	0.1			-	-	-	<0.5	-	-	-	-	<0.5	<0.5	-
	Fluorene	mg/kg	0.1			-	-	-	<0.5	-	-	-	-	<0.5	<0.5	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.1			-	-	-	<0.5	-	-	-	-	<0.5	<0.5	-
	Naphthalene	mg/kg	0.1	370	1900*	-	-	-	<0.5	-	-	-	-	<0.5	<0.5	-
	CPAH (ESDAT)	mg/kg			40	-	-	-	<4	-	-	-	-	<3	<4	-
	PAHs (Sum of total)	mg/kg	0.5		4000	-	-	-	-	-	-	-	-	-	-	-
	Phenanthrene	mg/kg	0.1			-	-	-	<0.5	-	-	-	-	<0.5	<0.5	-
	Pyrene	mg/kg	0.1			-	-	-	<0.5	-	-	-	-	<0.5	<0.5	-
Phenols	2,4-dimethylphenol	mg/kg	0.01			-	-	-	<0.5	-	-	-	-	<0.5	<0.5	-
	2-methylphenol	mg/kg	0.01			-	-	-	<0.5	-	-	-	-	<0.5	<0.5	-
	2-nitrophenol	mg/kg	0.01			-	-	-	<0.5	-	-	-	-	<0.5	<0.5	-
	3-&4-methylphenol	mg/kg	0.5			-	-	-	<1	-	-	-	-	<0.5	<1	-
	3-Methylphenol	mg/kg	0.01			-	-	-	-	-	-	-	-	-	-	-
	4-chloro-3-methylphenol	mg/kg	0.01			-	-	-	<0.5	-	-	-	-	<0.5	<0.5	-
	4-methylphenol	mg/kg	0.01			-	-	-	-	-	-	-	-	-	-	-
	4-nitrophenol	mg/kg	0.01			-	-	-	-	-	-	-	-	-	-	-
	Phenol	mg/kg	0.01			-	-	-	<0.5	-	-	-	-	<0.5	<0.5	-
TPH	Phenolics Total	mg/kg				-	-	-	-	-	-	-	-	-	-	-
	TPH C6 - C9	mg/kg	2		5100*	-	-	-	<10	-	-	-	-	<10	<10	-
	TPH C10 - C14	mg/kg	50		3800*	-	-	-	<50	-	-	-	-	<50	<50	-
	TPH C15-C28	mg/kg	100		5300*	-	-	-	<100	-	-	-	-	<100	<100	-
	TPH C29-C36	mg/kg	100		7400*	-	-	-	<100	-	-	-	-	<100	<100	-
Asbestos	Asbestos fibres	-	0.1			-	-	-	-	-	0	-	-	-	-	-
	weight of sample	g	0.01			-	-	-	-	-	20.2	-	-	-	-	-
BTEx	Total Xylene (ESDAT)	mg/kg	0.15			-	-	-	<1	-	-	-	-	<1	<1	-
	Benzene	mg/kg	0.2		120*	-	-	-	<0.2	-	-	-	-	<0.2	<0.2	-
	Ethylbenzene	mg/kg	0.2		5300*	-	-	-	<0.5	-	-	-	-	<0.5	<0.5	-
	Toluene	mg/kg	0.2		18000*	-	-	-	<0.5	-	-	-	-	<0.5	<0.5	-
	Xylene (m & p)	mg/kg	0.2		15000*	-	-	-	<0.5	-	-	-	-	<0.5	<0.5	-
	Xylene (o)	mg/kg	0.2			-	-	-	<0.5	-	-	-	-	<0.5	<0.5	-

NOTES: EIL - Ecological Investigation Level
HIL - Health Investigation Level
* CRC Care (2011) Health Screening Level - Direct Contact

Location	AECOM BH41	AECOM BH41	AECOM BH41	AECOM BH46	AECOM BH46	AECOM BH46	BH017	BH017	BH017	BH049	BH049
Sample Field ID	BH41_ 0.07-0.1	BH41_ 1.0-1.4	BH41_ 4.0-4.4	BH46-1.0-1.2	BH46-4.0-4.2	QC56	BH017 0.5-0.6	BH017 1.5-1.95	BH017 3.0-3.45	BH049_ 0.3-0.5	BH049_ 3.0-3.45
Sample Depth (m)	0.07-0.1	1-1.4	4-4.4	1-1.2	4-4.2	1-1.2	0.5-0.6	1.5-1.95	3-3.45	0.3-0.5	3-3.45
Matrix	Fill	Fill	Fill	Fill	Fill		Fill	Fill	Fill	Fill	Fill
Sample Type	Normal	Normal	Normal	Normal	Normal	Field_D	Normal	Normal	Normal	Normal	Normal
Area	Block 4 Services	Block 4 Services	Block 4 Services	ORWN Services	ORWN Services	ORWN Services	ORWN Services	ORWN Services	ORWN Services	ORWN Services	ORWN Services
Sample Date	19/02/2010	4/03/2010	4/03/2010	23/02/2010	23/02/2010	23/02/2010	8/05/2006	8/05/2006	8/05/2006	25/05/2006	25/05/2006

Chem_Group	ChemName	output unit	EQL	ASC NEPM (NEPC, 2013) EIL	ASC NEPM (NEPC 2013) HILD D											
Metals	Arsenic	mg/kg	4	160	3000	<5	7	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Barium	mg/kg	10			20	510	20	270	50	300	-	-	-	-	-
	Beryllium	mg/kg	1			<1	1	<1	<1	<1	<1	-	-	-	-	-
	Cadmium	mg/kg	0.5		900	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Chromium	mg/kg	1			2	11	7	20	8	11	5	35	19	3	3
	Chromium (hexavalent)	mg/kg	0.5		3600	-	<0.5	-	-	-	-	-	-	-	-	-
	Cobalt	mg/kg	2		4000	13	13	4	5	5	5	-	-	-	-	-
	Copper	mg/kg	1		240,000	356	11	<5	7	8	5	150	49	32	262	<5
	Iron	mg/kg	50			-	38,400	-	-	-	-	-	-	-	-	-
	Lead	mg/kg	1	1800	1500	7	17	8	11	6	12	30	21	18	6	8
	Manganese	mg/kg	5		60,000	852	682	215	285	130	352	-	-	-	-	-
	Mercury	mg/kg	0.1		730	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Nickel	mg/kg	1		6000	11	21	5	6	6	6	6	6	5	6	2
	Vanadium	mg/kg	5			127	22	10	13	11	14	-	-	-	-	-
	Zinc	mg/kg	1		400,000	54	94	34	29	24	34	71	56	40	54	10
PAHs	2-chloronaphthalene	mg/kg	0.5			-	-	-	-	-	-	-	-	-	-	-
	2-methylnaphthalene	mg/kg	0.5			-	<0.5	<0.5	-	-	-	-	-	-	-	-
	3-methylcholanthrene	mg/kg	0.5			-	-	-	-	-	-	-	-	-	-	-
	Acenaphthene	mg/kg	0.1			-	<0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	Acenaphthylene	mg/kg	0.1			-	<0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	Acetophenone	mg/kg	0.5			-	-	-	-	-	-	-	-	-	-	-
	Anthracene	mg/kg	0.1			-	<0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	Benz(a)anthracene	mg/kg	0.1			-	<0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	Benzo(a) pyrene	mg/kg	0.05			-	<0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	Benzo(b)&(k)fluoranthene	mg/kg	0.2			-	-	-	-	-	-	-	-	-	-	-
	Benzo(b)fluoranthene	mg/kg	0.5			-	<0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	Benzo(g,h,i)perylene	mg/kg	0.1			-	<0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	Benzo(k)fluoranthene	mg/kg	0.5			-	<0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	Chrysene	mg/kg	0.1			-	<0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	Dibenz(a,h)anthracene	mg/kg	0.1			-	<0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	Fluoranthene	mg/kg	0.1			-	<0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	Fluorene	mg/kg	0.1			-	<0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.1			-	<0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	Naphthalene	mg/kg	0.1	370	1900*	-	<0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	CPAH (ESDAT)	mg/kg			40	-	<4	<4	<4	-	<4	-	-	-	-	-
	PAHs (Sum of total)	mg/kg	0.5		4000	-	<0.5	<0.5	-	-	-	-	-	-	-	-
	Phenanthrene	mg/kg	0.1			-	<0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	Pyrene	mg/kg	0.1			-	<0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
Phenols	2,4-dimethylphenol	mg/kg	0.01			-	<0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	2-methylphenol	mg/kg	0.01			-	<0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	2-nitrophenol	mg/kg	0.01			-	<0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	3-&4-methylphenol	mg/kg	0.5			-	<1	<1	<1	-	<1	-	-	-	-	-
	3-Methylphenol	mg/kg	0.01			-	-	-	-	-	-	-	-	-	-	-
	4-chloro-3-methylphenol	mg/kg	0.01			-	<0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	4-methylphenol	mg/kg	0.01			-	-	-	-	-	-	-	-	-	-	-
	4-nitrophenol	mg/kg	0.01			-	-	-	-	-	-	-	-	-	-	-
	Phenol	mg/kg	0.01			-	<0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
	Phenolics Total	mg/kg				-	-	-	-	-	-	-	-	-	-	-
TPH	TPH C6 - C9	mg/kg	2		5100*	-	<10	<10	<10	-	<10	-	-	-	<2	-
	TPH C10 - C14	mg/kg	50		3800*	-	<50	<50	<50	-	<50	-	-	-	<50	-
	TPH C15-C28	mg/kg	100		5300*	-	<100	<100	<100	-	<100	-	-	-	<100	-
	TPH C29-C36	mg/kg	100		7400*	-	<100	<100	<100	-	<100	-	-	-	<100	-
Asbestos	Asbestos fibres	-	0.1			-	-	-	-	-	-	-	-	-	-	-
	weight of sample	g	0.01			-	-	-	-	-	-	-	-	-	-	-
BTEx	Total Xylene (ESDAT)	mg/kg	0.15			-	<1	<1	<1	-	<1	-	-	-	<0.4	-
	Benzene	mg/kg	0.2		120*	-	<0.2	<0.2	<0.2	-	<0.2	-	-	-	<0.2	-
	Ethylbenzene	mg/kg	0.2		5300*	-	<0.5	<0.5	<0.5	-	<0.5	-	-	-	<0.2	-
	Toluene	mg/kg	0.2		18000*	-	<0.5	<0.5	<0.5	-	<0.5	-	-	-	<0.2	-
	Xylene (m & p)	mg/kg	0.2		15000*	-	<0.5	<0.5	<0.5	-	<0.5	-	-	-	<0.2	-
	Xylene (o)	mg/kg	0.2			-	<0.5	<0.5	<0.5	-	<0.5	-	-	-	<0.2	-

NOTES: EIL - Ecological Investigation Level
HIL - Health Investigation Level
* CRC Care (2011) Health Screening Level - Direct Contact

Location	BH109	BH109	BH113	BH113	BH114	BH114	BH116	BH116	BH116	BH116	BH143
Sample Field ID	BH109 0.3 0.5	BH109 3.0 3.45	BH113 1.5 1.95	BH113 3.0 3.45	BH114 0.3 0.5	BH114 3.0 3.45	BH116 1.5 1.95	BH116 1.5 1.95	BH116 3.0 3.45	BH116 3.0 3.45	BH143 1.5 1.95
Sample Depth (m)	0.3-0.5	3-3.45	1.5-1.95	3-3.45	0.3-0.5	3-3.45	1.5-1.95	1.5-1.95	3-3.45	3-3.45	1.5-1.95
Matrix	Fill	Fill	Fill	Fill	Fill	Fill	Fill	Fill	Fill	Fill	Fill
Sample Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Area	Block 4 Services	Block 4 Services	Block 4 Services	Block 4 Services	Block 4 Services	Block 4 Services	ORWN Services	ORWN Services	ORWN Services	ORWN Services	ORWN Services
Sample Date	27/06/2006	27/06/2006	27/06/2006	27/06/2006	28/06/2006	28/06/2006	27/06/2006	28/06/2006	27/06/2006	28/06/2006	10/07/2006

Chem_Group	ChemName	output unit	EQL	ASC NEPM (NEPC, 2013) EIL	ASC NEPM (NEPC 2013) HILD D											
Metals	Arsenic	mg/kg	4	160	3000	<5	<5	<5	5	<5	6	-	<5	-	<5	<5
	Barium	mg/kg	10			-	-	-	-	-	-	-	-	-	-	-
	Beryllium	mg/kg	1			-	-	-	-	-	-	-	-	-	-	-
	Cadmium	mg/kg	0.5		900	<1	<1	<1	<1	<1	<1	-	<1	-	<1	<1
	Chromium	mg/kg	1			3	41	10	33	4	37	-	9	-	31	8
	Chromium (hexavalent)	mg/kg	0.5		3600	-	-	-	-	-	-	-	-	-	-	-
	Cobalt	mg/kg	2		4000	-	-	-	-	-	-	-	-	-	-	-
	Copper	mg/kg	1		240,000	225	20	<5	12	198	12	-	30	-	18	11
	Iron	mg/kg	50			-	-	-	-	-	-	-	-	-	-	-
	Lead	mg/kg	1	1800	1500	12	14	9	17	15	15	-	23	-	14	6
	Manganese	mg/kg	5		60,000	-	-	-	-	-	-	-	-	-	-	-
	Mercury	mg/kg	0.1		730	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-	<0.1	<0.1
	Nickel	mg/kg	1		6000	6	8	4	8	5	7	-	4	-	4	4
	Vanadium	mg/kg	5			-	-	-	-	-	-	-	-	-	-	-
PAHs	Zinc	mg/kg	1		400,000	53	34	21	52	54	47	-	38	-	28	18
	2-chloronaphthalene	mg/kg	0.5			-	-	-	-	-	-	-	-	-	-	-
	2-methylnaphthalene	mg/kg	0.5			-	-	-	-	-	-	-	-	-	-	-
	3-methylcholanthrene	mg/kg	0.5			-	-	-	-	-	-	-	-	-	-	-
	Acenaphthene	mg/kg	0.1			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	-
	Acenaphthylene	mg/kg	0.1			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	-
	Acetophenone	mg/kg	0.5			-	-	-	-	-	-	-	-	-	-	-
	Anthracene	mg/kg	0.1			<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	-	<0.5	-	-
	Benz(a)anthracene	mg/kg	0.1			<0.5	<0.5	<0.5	0.9	1.2	<0.5	<0.5	-	0.6	-	-
	Benzo(a) pyrene	mg/kg	0.05			<0.5	<0.5	<0.5	0.7	1.7	<0.5	<0.5	-	<0.5	-	-
	Benzo(b)&(k)fluoranthene	mg/kg	0.2			-	-	-	-	-	-	-	-	-	-	-
	Benzo(b)fluoranthene	mg/kg	0.5			<0.5	<0.5	<0.5	0.8	2	<0.5	0.7	-	0.7	-	-
	Benzo(g,h,i)perylene	mg/kg	0.1			<0.5	<0.5	<0.5	<0.5	1.3	<0.5	<0.5	-	<0.5	-	-
	Benzo(k)fluoranthene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	0.9	<0.5	<0.5	-	<0.5	-	-
	Chrysene	mg/kg	0.1			<0.5	<0.5	<0.5	0.8	1.2	<0.5	<0.5	-	<0.5	-	-
	Dibenz(a,h)anthracene	mg/kg	0.1			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	-
	Fluoranthene	mg/kg	0.1			<0.5	<0.5	<0.5	1.8	2.3	<0.5	0.9	-	1.3	-	-
	Fluorene	mg/kg	0.1			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.1			<0.5	<0.5	<0.5	<0.5	0.9	<0.5	<0.5	-	<0.5	-	-
	Naphthalene	mg/kg	0.1	370	1900*	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	-
	CPAH (ESDAT)	mg/kg			40	<4	<4	<4	3.2	9.2	<4	0.7	-	1.3	-	-
	PAHs (Sum of total)	mg/kg	0.5		4000	-	-	-	-	-	-	-	-	-	-	-
	Phenanthrene	mg/kg	0.1			<0.5	<0.5	<0.5	1.8	1	<0.5	<0.5	-	1	-	-
	Pyrene	mg/kg	0.1			<0.5	<0.5	<0.5	1.8	2.5	<0.5	0.9	-	1.1	-	-
Phenols	2,4-dimethylphenol	mg/kg	0.01			-	-	-	-	-	-	<0.5	-	-	-	-
	2-methylphenol	mg/kg	0.01			-	-	-	-	-	-	<0.5	-	-	-	-
	2-nitrophenol	mg/kg	0.01			-	-	-	-	-	-	<0.5	-	-	-	-
	3-&4-methylphenol	mg/kg	0.5			-	-	-	-	-	-	<1	-	-	-	-
	3-Methylphenol	mg/kg	0.01			-	-	-	-	-	-	-	-	-	-	-
	4-chloro-3-methylphenol	mg/kg	0.01			-	-	-	-	-	-	<0.5	-	-	-	-
	4-methylphenol	mg/kg	0.01			-	-	-	-	-	-	-	-	-	-	-
	4-nitrophenol	mg/kg	0.01			-	-	-	-	-	-	-	-	-	-	-
	Phenol	mg/kg	0.01			-	-	-	-	-	-	<0.5	-	-	-	-
	Phenolics Total	mg/kg				-	-	-	-	-	-	-	-	-	-	-
TPH	TPH C6 - C9	mg/kg	2		5100*	<2	<2	<2	<2	<2	<2	-	<2	-	-	-
	TPH C10 - C14	mg/kg	50		3800*	<50	<50	<50	70	<50	60	-	<50	-	-	-
	TPH C15-C28	mg/kg	100		5300*	<100	<100	<100	540	130	620	-	350	-	-	-
	TPH C29-C36	mg/kg	100		7400*	<100	130	<100	470	210	360	-	410	-	-	-
Asbestos	Asbestos fibres	-	0.1			-	-	-	-	-	-	-	-	-	-	-
	weight of sample	g	0.01			-	-	-	-	-	-	-	-	-	-	-
BTEx	Total Xylene (ESDAT)	mg/kg	0.15			<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	-	<0.4	-	-	-
	Benzene	mg/kg	0.2		120*	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	-	-	-
	Ethylbenzene	mg/kg	0.2		5300*	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	-	-	-
	Toluene	mg/kg	0.2		18000*	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	-	-	-
	Xylene (m & p)	mg/kg	0.2		15000*	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	-	-	-
	Xylene (o)	mg/kg	0.2			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	-	-	-

NOTES: EIL - Ecological Investigation Level
HIL - Health Investigation Level
* CRC Care (2011) Health Screening Level - Direct Contact

Location	BH143	BH159	BH159	BH408	BH409	BH409	TBH01	TBH01	TBH01
Sample Field ID	BH143 3.0 3.45	BH159 0.25-0.35	D1408-8	BH408 2.0-2.4	BH409 3.7-4.0	BH409 5.0-5.3	DUP 01	TBH01 0.43-0.5	TRIP01
Sample Depth (m)	3-3.45		0.25-0.35	2-2.4	3.7-4	5-5.3	0.43-0.5	0.43-0.5	0.43-0.5
Matrix	Fill	Fill	Fill	Fill	Fill	Natural Sand		Fill	
Sample Type	Normal	Normal	Interlab D	Normal	Normal	Normal	Field D	Normal	Interlab D
Area	ORWN Services	Block 4 Services	Block 4 Services	Block 4 Services	Block 4 Services	Block 4 Services	Block 4 Services	Block 4 Services	Block 4 Services
Sample Date	10/07/2006	14/08/2006	14/08/2006	14/02/2011	14/02/2011	14/02/2011	5/02/2011	5/02/2011	5/02/2011

Chem_Group	ChemName	output unit	EQL	ASC NEPM (NEPC, 2013) EIL	ASC NEPM (NEPC 2013) HILD D									
Metals	Arsenic	mg/kg	4	160	3000	<5	-	-	<5	<5	22	<5	<5	2.4
	Barium	mg/kg	10			-	-	-	-	-	-	-	-	-
	Beryllium	mg/kg	1			-	-	-	-	-	-	-	-	-
	Cadmium	mg/kg	0.5		900	<1	-	-	<1	<1	<1	<1	<1	<0.5
	Chromium	mg/kg	1			10	-	-	8	15	7	16	12	10
	Chromium (hexavalent)	mg/kg	0.5		3600	-	-	-	-	-	-	-	-	-
	Cobalt	mg/kg	2		4000	-	-	-	-	-	-	-	-	-
	Copper	mg/kg	1		240,000	6	-	-	36	<5	<5	12	11	31
	Iron	mg/kg	50			-	-	-	-	-	-	-	-	-
	Lead	mg/kg	1	1800	1500	14	-	-	10	6	<5	71	103	120
	Manganese	mg/kg	5		60,000	-	-	-	-	-	-	-	-	-
	Mercury	mg/kg	0.1		730	<0.1	-	-	<0.1	<0.1	<0.1	<0.1	0.2	<0.1
	Nickel	mg/kg	1		6000	8	-	-	8	<2	3	4	4	<5
	Vanadium	mg/kg	5			-	-	-	-	-	-	-	-	-
Zinc	mg/kg	1		400,000	43	-	-	30	8	7	24	30	25	
PAHs	2-chloronaphthalene	mg/kg	0.5			-	-	-	-	-	-	-	-	-
	2-methylnaphthalene	mg/kg	0.5			-	-	-	-	-	-	-	-	-
	3-methylcholanthrene	mg/kg	0.5			-	-	-	-	-	-	-	-	-
	Acenaphthene	mg/kg	0.1			<0.5	<0.5	<0.5	<0.5	<0.5	5.6	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.1			<0.5	<0.5	<0.5	2.2	<0.5	2.8	<0.5	<0.5	<0.5
	Acetophenone	mg/kg	0.5			-	-	-	-	-	-	-	-	-
	Anthracene	mg/kg	0.1			<0.5	<0.5	<0.5	3.5	<0.5	1.9	<0.5	0.5	<0.5
	Benz(a)anthracene	mg/kg	0.1			<0.5	<0.5	<0.5	6.2	<0.5	0.6	<0.5	1.9	0.8
	Benzo(a) pyrene	mg/kg	0.05			<0.5	<0.5	<0.5	6.3	<0.5	<0.5	<0.5	1.7	1
	Benzo(b)&(k)fluoranthene	mg/kg	0.2			-	-	<1	-	-	-	-	-	1.7
	Benzo(b)fluoranthene	mg/kg	0.5			<0.5	<0.5	-	7.1	<0.5	<0.5	<0.5	1.8	-
	Benzo(g,h,i)perylene	mg/kg	0.1			<0.5	<0.5	<0.5	4.5	<0.5	<0.5	<0.5	0.6	0.7
	Benzo(k)fluoranthene	mg/kg	0.5			<0.5	<0.5	-	3.1	<0.5	<0.5	<0.5	0.7	-
	Chrysene	mg/kg	0.1			<0.5	<0.5	<0.5	5.2	<0.5	<0.5	<0.5	1.4	0.7
	Dibenz(a,h)anthracene	mg/kg	0.1			<0.5	<0.5	<0.5	0.7	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.1			<0.5	<0.5	<0.5	12.6	<0.5	1.2	0.7	3.1	1.3
	Fluorene	mg/kg	0.1			<0.5	<0.5	<0.5	<0.5	<0.5	2.2	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.1			<0.5	<0.5	<0.5	3.6	<0.5	<0.5	<0.5	0.6	0.6
	Naphthalene	mg/kg	0.1	370	1900*	<0.5	<0.5	<0.5	<0.5	<0.5	33.8	<0.5	<0.5	<0.5
	CPAH (ESDAT)	mg/kg			40	<4	<4	<3	36.7	<4	0.6	<4	8.7	3.8
	PAHs (Sum of total)	mg/kg	0.5		4000	-	-	0	-	-	-	-	-	7.9
	Phenanthrene	mg/kg	0.1			<0.5	<0.5	<0.5	6.6	<0.5	6.8	<0.5	1.2	<0.5
	Pyrene	mg/kg	0.1			<0.5	<0.5	<0.5	12.9	<0.5	1.8	0.7	3	1.1
	Phenols	2,4-dimethylphenol	mg/kg	0.01			-	-	-	0.03	<0.01	-	-	-
2-methylphenol		mg/kg	0.01			-	-	-	0.02	<0.01	-	-	-	-
2-nitrophenol		mg/kg	0.01			-	-	-	<0.01	<0.01	-	-	-	-
3-&4-methylphenol		mg/kg	0.5			-	-	-	-	-	-	-	-	-
3-Methylphenol		mg/kg	0.01			-	-	-	0.02	<0.01	-	-	-	-
4-chloro-3-methylphenol		mg/kg	0.01			-	-	-	<0.01	<0.01	-	-	-	-
4-methylphenol		mg/kg	0.01			-	-	-	0.02	<0.01	-	-	-	-
4-nitrophenol		mg/kg	0.01			-	-	-	<0.01	<0.01	-	-	-	-
Phenol		mg/kg	0.01			-	-	-	<0.01	0.01	-	-	-	-
Phenolics Total		mg/kg				-	-	-	-	-	-	-	-	-
TPH	TPH C6 - C9	mg/kg	2		5100*	<2	<2	<10	<10	<10	12	<10	<10	<10
	TPH C10 - C14	mg/kg	50		3800*	<50	<50	<50	<50	<50	150	<50	<50	<50
	TPH C15-C28	mg/kg	100		5300*	<100	270	<100	190	<100	180	<100	<100	<100
	TPH C29-C36	mg/kg	100		7400*	<100	960	280	260	<100	<100	<100	<100	<100
Asbestos	Asbestos fibres	-	0.1			-	-	-	-	-	-	-	-	-
	weight of sample	g	0.01			-	-	-	-	-	-	-	-	-
BTEx	Total Xylene (ESDAT)	mg/kg	0.15			<0.4	0.3	<1.5 - 0	<1	<1	2.9	<1	<1	<0.15
	Benzene	mg/kg	0.2		120*	<0.2	<0.2	<0.2	<0.2	<0.2	1.8	<0.2	<0.2	<0.5
	Ethylbenzene	mg/kg	0.2		5300*	<0.2	<0.2	<0.5	<0.5	<0.5	3.5	<0.5	<0.5	<0.5
	Toluene	mg/kg	0.2		18000*	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Xylene (m & p)	mg/kg	0.2		15000*	<0.2	0.3	<1	<0.5	<0.5	1.1	<0.5	<0.5	<1
	Xylene (o)	mg/kg	0.2			<0.2	<0.2	<0.5	<0.5	<0.5	1.8	<0.5	<0.5	<0.5

NOTES: EIL - Ecological Investigation Level
HIL - Health Investigation Level
* CRC Care (2011) Health Screening Level - Direct Contact

Location
Sample Field ID
Sample Depth (m)
Matrix
Sample Type
Area
Sample Date

Chem_Group	ChemName	output unit	EQL	ASC NEPM (NEPC, 2013) EIL	ASC NEPM (NEPC 2013) HILD D
Metals	Arsenic	mg/kg	4	160	3000
	Barium	mg/kg	10		
	Beryllium	mg/kg	1		
	Cadmium	mg/kg	0.5		900
	Chromium	mg/kg	1		
	Chromium (hexavalent)	mg/kg	0.5		3600
	Cobalt	mg/kg	2		4000
	Copper	mg/kg	1		240,000
	Iron	mg/kg	50		
	Lead	mg/kg	1	1800	1500
	Manganese	mg/kg	5		60,000
	Mercury	mg/kg	0.1		730
	Nickel	mg/kg	1		6000
	Vanadium	mg/kg	5		
	Zinc	mg/kg	1		400,000
PAHs	2-chloronaphthalene	mg/kg	0.5		
	2-methylnaphthalene	mg/kg	0.5		
	3-methylcholanthrene	mg/kg	0.5		
	Acenaphthene	mg/kg	0.1		
	Acenaphthylene	mg/kg	0.1		
	Acetophenone	mg/kg	0.5		
	Anthracene	mg/kg	0.1		
	Benz(a)anthracene	mg/kg	0.1		
	Benzo(a) pyrene	mg/kg	0.05		
	Benzo(b)&(k)fluoranthene	mg/kg	0.2		
	Benzo(b)fluoranthene	mg/kg	0.5		
	Benzo(g,h,i)perylene	mg/kg	0.1		
	Benzo(k)fluoranthene	mg/kg	0.5		
	Chrysene	mg/kg	0.1		
	Dibenz(a,h)anthracene	mg/kg	0.1		
	Fluoranthene	mg/kg	0.1		
	Fluorene	mg/kg	0.1		
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.1		
	Napthalene	mg/kg	0.1	370	1900*
	CPAH (ESDAT)	mg/kg			40
	PAHs (Sum of total)	mg/kg	0.5		4000
	Phenanthrene	mg/kg	0.1		
	Pyrene	mg/kg	0.1		
Phenols	2,4-dimethylphenol	mg/kg	0.01		
	2-methylphenol	mg/kg	0.01		
	2-nitrophenol	mg/kg	0.01		
	3-&4-methylphenol	mg/kg	0.5		
	3-Methylphenol	mg/kg	0.01		
	4-chloro-3-methylphenol	mg/kg	0.01		
	4-methylphenol	mg/kg	0.01		
	4-nitrophenol	mg/kg	0.01		
	Phenol	mg/kg	0.01		
	Phenolics Total	mg/kg			
TPH	TPH C6 - C9	mg/kg	2		5100*
	TPH C10 - C14	mg/kg	50		3800*
	TPH C15-C28	mg/kg	100		5300*
	TPH C29-C36	mg/kg	100		7400*
Asbestos	Asbestos fibres	-	0.1		
	weight of sample	g	0.01		
BTEx	Total Xylene (ESDAT)	mg/kg	0.15		
	Benzene	mg/kg	0.2		120*
	Ethylbenzene	mg/kg	0.2		5300*
	Toluene	mg/kg	0.2		18000*
	Xylene (m & p)	mg/kg	0.2		15000*
	Xylene (o)	mg/kg	0.2		

NOTES: EIL - Ecological Investigation Level
HIL - Health Investigation Level
* CRC Care (2011) Health Screening Level - Direct Contact

Statistical Summary

Number of Results	Number of Detects	Minimum Concentration	Minimum Detect	Maximum Concentration	Maximum Detect	Average Concentration	Median Concentration	Standard Deviation	Number of Guideline Exceedances	Number of Guideline Exceedances
48	6	<1	2.4	22	22	3.2	2.5	3	0	0
25	24	<10	10	510	510	73	30	118	0	0
25	2	<1	1	1	1	0.54	0.5	0.14	0	0
48	0	<0.1	ND	<1	ND	0.49	0.5	0.074	0	0
48	48	2	2	41	41	11	8	9.6	0	0
2	0	<0.5	ND	<0.5	ND		0.25		0	0
25	20	1	1	13	13	5.6	4	4.7	0	0
48	36	<5	5	356	356	69	12	104	0	0
2	2	8730	8730	38400	38400		23565		0	0
48	46	<5	6	120	120	18	11.5	23	0	0
25	24	<5	9	864	864	338	206	298	0	0
47	1	<0.05	0.2	0.2	0.2	0.053	0.05	0.022	0	0
48	43	<2	2	21	21	5.4	5	3.5	0	0
25	24	<5	8	139	139	42	14	48	0	0
48	47	<5	7	2070	2070	78	34	294	0	0
2	0	<0.5	ND	<0.5	ND		0.25		0	0
5	0	<0.5	ND	<0.5	ND	0.25	0.25	0	0	0
2	0	<0.5	ND	<0.5	ND		0.25		0	0
30	1	<0.5	5.6	5.6	5.6	0.43	0.25	0.98	0	0
30	2	<0.5	2.2	2.8	2.8	0.4	0.25	0.58	0	0
2	0	<0.5	ND	<0.5	ND		0.25		0	0
30	5	<0.5	0.5	3.5	3.5	0.48	0.25	0.68	0	0
30	8	<0.5	0.6	6.2	6.2	0.65	0.25	1.1	0	0
30	6	<0.5	0.7	6.3	6.3	0.62	0.25	1.2	0	0
5	1	<1	1.7	1.7	1.7	0.74	0.5	0.54	0	0
25	7	<0.5	0.7	7.1	7.1	0.75	0.25	1.4	0	0
30	5	<0.5	0.6	4.5	4.5	0.47	0.25	0.79	0	0
25	4	<0.5	0.7	3.1	3.1	0.43	0.25	0.58	0	0
30	6	<0.5	0.7	5.2	5.2	0.56	0.25	0.94	0	0
30	1	<0.5	0.7	0.7	0.7	0.27	0.25	0.082	0	0
30	10	<0.5	0.7	12.6	12.6	1.2	0.25	2.4	0	0
30	1	<0.5	2.2	2.2	2.2	0.32	0.25	0.36	0	0
30	5	<0.5	0.5	3.6	3.6	0.42	0.25	0.62	0	0
30	1	<0.5	33.8	33.8	33.8	1.4	0.25	6.1	0	0
30	9	0.6	0.6	36.7	36.7	3.7	2	6.6	0	0
6	3	0	7.9	7.9	7.9	1.4	0.25	3.2	0	0
30	7	<0.5	1	6.8	6.8	0.98	0.25	1.8	0	0
30	10	<0.5	0.7	12.9	12.9	1.2	0.25	2.4	0	0
13	1	<0.01	0.03	<0.5	0.03	0.21	0.25	0.087	0	0
13	1	<0.01	0.02	<0.5	0.02	0.21	0.25	0.089	0	0
13	0	<0.01	ND	<0.5	ND	0.21	0.25	0.092	0	0
11	0	<0.5	ND	<1	ND	0.45	0.5	0.1	0	0
2	1	<0.01	0.02	0.02	0.02		0.0125		0	0
13	0	<0.01	ND	<0.5	ND	0.21	0.25	0.092	0	0
2	1	<0.01	0.02	0.02	0.02		0.0125		0	0
2	0	<0.01	ND	<0.01	ND		0.005		0	0
13	1	<0.01	0.01	<0.5	0.01	0.21	0.25	0.091	0	0
0	0	99999	ND	0	ND				0	0
31	1	<2	12	12	12	3.9	5	2.4	0	0
31	3	<50	60	150	150	32	25	24	0	0
31	7	<100	130	620	620	112	50	144	0	0
31	8	<100	130	960	960	136	50	194	0	0
1	1	0	ND	0	ND		0		0	0
1	1	20.2	20.2	20.2	20.2		20.2		0	0
31	4	<0.15	0.3	2.9	2.9	0.46	0.5	0.48	0	0
31	1	<0.2	1.8	1.8	1.8	0.16	0.1	0.31	0	0
31	1	<0.2	3.5	3.5	3.5	0.31	0.25	0.6	0	0
31	0	<0.2	ND	<0.5	ND	0.2	0.25	0.071	0	0
31	2	<0.2	0.3	1.1	1.1	0.26	0.25	0.19	0	0
31	1	<0.2	1.8	1.8	1.8	0.25	0.25	0.3	0	0

**Attachment 3: Table T2 - Applicable ORWN Interim
Public Domain Soil Analytical Results**

Location	AECOM_BH46	AECOM_BH46	AECOM_BH47	AECOM_BH56	AECOM_BH73	BH021	BH054	BH063	BH143
Sample Field ID	BH46-1.0-1.2	QC56	BH47-1.0-1.2	BH56_2.5-2.7	BH73_2.5-2.7	BH021 1.5-1.95	BH054-1.5-1.6	BH063-1.5-1.65	BH143 1.5_1.95
Sample Depth (m)	1-1.2	1-1.2	1-1.2	2.5-2.7	2.5-2.7	1.5-1.95	1.5-1.6	1.5-1.65	1.5-1.95
Matrix	Fill		Fill	Fill	Fill	Fill	Fill	Fill	Fill
Sample Type	Normal	Field_D	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Area									
Sample Date	23/02/2010	23/02/2010	22/02/2010	4/03/2010	2/03/2010	9/05/2006	29/05/2006	1/06/2006	10/07/2006

Chem_Group	ChemName	output unit	EQL	ASC NEPM (NEPC, 2013) EIL	ASC NEPM (NEPC, 2013) HIL D									
Metals	Arsenic	mg/kg	5	160	3000	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Barium	mg/kg	10			270	300	120	80	20	-	-	-	-
	Beryllium	mg/kg	1			<1	<1	<1	<1	<1	-	-	-	-
	Cadmium	mg/kg	1		900	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Chromium	mg/kg	2			20	11	8	11	8	22	8	8	8
	Chromium (hexavalent)	mg/kg	0.5		3600	-	-	-	-	-	-	-	-	-
	Cobalt	mg/kg	2		4000	5	5	3	3	<2	-	-	-	-
	Copper	mg/kg	5		240,000	7	5	19	25	<5	24	6	6	11
	Iron	mg/kg	50			-	-	-	-	-	-	-	-	-
	Lead	mg/kg	5	1800	1500	11	12	164	290	26	70	24	46	6
	Manganese	mg/kg	5		60,000	285	352	137	214	28	-	-	-	-
	Mercury	mg/kg	0.1		730	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1
	Nickel	mg/kg	2		6000	6	6	4	5	2	21	4	3	4
	Vanadium	mg/kg	5			13	14	21	13	8	-	-	-	-
PAHs	Zinc	mg/kg	5		400,000	29	34	177	118	18	65	20	30	18
	2-chloronaphthalene	mg/kg	0.5			-	-	-	-	-	-	-	-	-
	2-methylnaphthalene	mg/kg	0.5			-	-	-	-	-	-	-	-	-
	3-methylcholanthrene	mg/kg	0.5			-	-	-	-	-	-	-	-	-
	Acenaphthene	mg/kg	0.5			<0.5	<0.5	-	<0.5	-	-	-	1.1	-
	Acenaphthylene	mg/kg	0.5			<0.5	<0.5	-	<0.5	-	-	-	1.1	-
	Acetophenone	mg/kg	0.5			-	-	-	-	-	-	-	-	-
	Anthracene	mg/kg	0.5			<0.5	<0.5	-	<0.5	-	-	-	3.2	-
	Benzo(a)anthracene	mg/kg	0.5			<0.5	<0.5	-	0.5	-	-	-	8.1	-
	Benzo(a) pyrene	mg/kg	0.5			<0.5	<0.5	-	<0.5	-	-	-	8.8	-
	Benzo(b)&(k)fluoranthene	mg/kg	1			-	-	-	-	-	-	-	-	-
	Benzo(b)fluoranthene	mg/kg	0.5			<0.5	<0.5	-	0.6	-	-	-	10.4	-
	Benzo(g,h,i)perylene	mg/kg	0.5			<0.5	<0.5	-	<0.5	-	-	-	6.3	-
	Benzo(k)fluoranthene	mg/kg	0.5			<0.5	<0.5	-	<0.5	-	-	-	3.6	-
	Chrysene	mg/kg	0.5			<0.5	<0.5	-	<0.5	-	-	-	7.8	-
	Dibenz(a,h)anthracene	mg/kg	0.5			<0.5	<0.5	-	<0.5	-	-	-	1.1	-
	Fluoranthene	mg/kg	0.5			<0.5	<0.5	-	0.9	-	-	-	18.3	-
	Fluorene	mg/kg	0.5			<0.5	<0.5	-	<0.5	-	-	-	1.6	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5			<0.5	<0.5	-	<0.5	-	-	-	4.8	-
	Naphthalene	mg/kg	0.5	370	1900*	<0.5	<0.5	-	<0.5	-	-	-	0.7	-
	CPAH (ESDAT)	mg/kg			40	<4	<4	-	1.1	-	-	-	50.9	-
	PAHs (Sum of total)	mg/kg			4000	-	-	-	-	-	-	-	-	-
	Phenanthrene	mg/kg	0.5			<0.5	<0.5	-	0.6	-	-	-	9.1	-
	Pyrene	mg/kg	0.5			<0.5	<0.5	-	1	-	-	-	18.9	-
Phenols	2,4-dimethylphenol	mg/kg	0.5			<0.5	<0.5	-	<0.5	-	-	-	-	-
	2-methylphenol	mg/kg	0.5			<0.5	<0.5	-	<0.5	-	-	-	-	-
	2-nitrophenol	mg/kg	0.5			<0.5	<0.5	-	<0.5	-	-	-	-	-
	3-&4-methylphenol	mg/kg	0.5			<1	<1	-	<1	-	-	-	-	-
	4-chloro-3-methylphenol	mg/kg	0.5			<0.5	<0.5	-	<0.5	-	-	-	-	-
	Phenol	mg/kg	0.5			<0.5	<0.5	-	<0.5	-	-	-	-	-
	Phenolics Total	mg/kg				-	-	-	-	-	-	-	-	-
TPH	TPH C6 - C9	mg/kg	2		5100*	<10	<10	-	<10	-	-	<2	<2	-
	TPH C10 - C14	mg/kg	50		3800*	<50	<50	-	<50	-	-	<50	<50	-
	TPH C15-C28	mg/kg	100		5300*	<100	<100	-	<100	-	-	<100	420	-
	TPH C29-C36	mg/kg	100		7400*	<100	<100	-	<100	-	-	<100	400	-
Asbestos	Asbestos fibres	-	0.1			-	-	0	-	-	-	-	-	-
	weight of sample	g	0.01			-	-	49.9	-	-	-	-	-	-
BTEX	Total Xylene (ESDAT)	mg/kg				<1	<1	-	<1	-	-	<0.4	<0.4	-
	Benzene	mg/kg	0.2		120*	<0.2	<0.2	-	<0.2	-	-	<0.2	<0.2	-
	Ethylbenzene	mg/kg	0.2		5300*	<0.5	<0.5	-	<0.5	-	-	<0.2	<0.2	-
	Toluene	mg/kg	0.2		18000*	<0.5	<0.5	-	<0.5	-	-	<0.2	<0.2	-
	Xylene (m & p)	mg/kg	0.2		15000*	<0.5	<0.5	-	<0.5	-	-	<0.2	<0.2	-
	Xylene (o)	mg/kg	0.2			<0.5	<0.5	-	<0.5	-	-	<0.2	<0.2	-

NOTES: EIL - Ecological Investigation Level
HIL - Health Investigation Level
* CRC Care (2011) Health Screening Level - Direct Contact

Location
Sample Field ID
Sample Depth (m)
Matrix
Sample Type
Area
Sample Date

Chem_Group	ChemName	output unit	EQL	ASC NEPM (NEPC, 2013) EIL	ASC NEPM (NEPC, 2013) HIL D
Metals	Arsenic	mg/kg	5	160	3000
	Barium	mg/kg	10		
	Beryllium	mg/kg	1		
	Cadmium	mg/kg	1		900
	Chromium	mg/kg	2		
	Chromium (hexavalent)	mg/kg	0.5		3600
	Cobalt	mg/kg	2		4000
	Copper	mg/kg	5		240,000
	Iron	mg/kg	50		
	Lead	mg/kg	5	1800	1500
	Manganese	mg/kg	5		60,000
	Mercury	mg/kg	0.1		730
	Nickel	mg/kg	2		6000
	Vanadium	mg/kg	5		
	Zinc	mg/kg	5		400,000
PAHs	2-chloronaphthalene	mg/kg	0.5		
	2-methylnaphthalene	mg/kg	0.5		
	3-methylcholanthrene	mg/kg	0.5		
	Acenaphthene	mg/kg	0.5		
	Acenaphthylene	mg/kg	0.5		
	Acetophenone	mg/kg	0.5		
	Anthracene	mg/kg	0.5		
	Benz(a)anthracene	mg/kg	0.5		
	Benzo(a) pyrene	mg/kg	0.5		
	Benzo(b)&(k)fluoranthene	mg/kg	1		
	Benzo(b)fluoranthene	mg/kg	0.5		
	Benzo(g,h,i)perylene	mg/kg	0.5		
	Benzo(k)fluoranthene	mg/kg	0.5		
	Chrysene	mg/kg	0.5		
	Dibenz(a,h)anthracene	mg/kg	0.5		
	Fluoranthene	mg/kg	0.5		
	Fluorene	mg/kg	0.5		
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5		
	Naphthalene	mg/kg	0.5	370	1900*
	CPAH (ESDAT)	mg/kg			40
	PAHs (Sum of total)	mg/kg			4000
	Phenanthrene	mg/kg	0.5		
	Pyrene	mg/kg	0.5		
Phenols	2,4-dimethylphenol	mg/kg	0.5		
	2-methylphenol	mg/kg	0.5		
	2-nitrophenol	mg/kg	0.5		
	3-&4-methylphenol	mg/kg	0.5		
	4-chloro-3-methylphenol	mg/kg	0.5		
	Phenol	mg/kg	0.5		
	Phenolics Total	mg/kg			
TPH	TPH C6 - C9	mg/kg	2		5100*
	TPH C10 - C14	mg/kg	50		3800*
	TPH C15-C28	mg/kg	100		5300*
	TPH C29-C36	mg/kg	100		7400*
Asbestos	Asbestos fibres	-	0.1		
	weight of sample	g	0.01		
BTEX	Total Xylene (ESDAT)	mg/kg			
	Benzene	mg/kg	0.2		120*
	Ethylbenzene	mg/kg	0.2		5300*
	Toluene	mg/kg	0.2		18000*
	Xylene (m & p)	mg/kg	0.2		15000*
	Xylene (o)	mg/kg	0.2		

NOTES: EIL - Ecological Investigation Level
HIL - Health Investigation Level
* CRC Care (2011) Health Screening Level - Direct Contact

Statistical Summary

Number of Results	Number of Detects	Minimum Concentration	Minimum Detect	Maximum Concentration	Maximum Detect	Average Concentration	Median Concentration	Standard Deviation	Number of Guideline	Number of Guideline
9	0	<5	ND	<5	ND	2.5	2.5	0	0	0
5	5	20	20	300	300	158	120	122	0	0
5	0	<1	ND	<1	ND	0.5	0.5	0	0	0
9	0	<1	ND	<1	ND	0.5	0.5	0	0	0
9	9	8	8	22	22	12	8	5.5	0	0
0	0	99999	ND	0	ND				0	0
5	4	<2	3	5	5	3.4	3	1.7	0	0
9	8	<5	5	25	25	12	7	8.6	0	0
0	0	99999	ND	0	ND				0	0
9	9	6	6	290	290	72	26	95	0	0
5	5	28	28	352	352	203	214	127	0	0
9	1	<0.1	0.1	0.1	0.1	0.056	0.05	0.017	0	0
9	9	2	2	21	21	6.1	4	5.7	0	0
5	5	8	8	21	21	14	13	4.7	0	0
9	9	18	18	177	177	57	30	55	0	0
0	0	99999	ND	0	ND				0	0
0	0	99999	ND	0	ND				0	0
0	0	99999	ND	0	ND				0	0
4	1	<0.5	1.1	1.1	1.1	0.46	0.25	0.43	0	0
4	1	<0.5	1.1	1.1	1.1	0.46	0.25	0.43	0	0
0	0	99999	ND	0	ND				0	0
4	1	<0.5	3.2	3.2	3.2	0.99	0.25	1.5	0	0
4	2	<0.5	0.5	8.1	8.1	2.3	0.375	3.9	0	0
4	1	<0.5	8.8	8.8	8.8	2.4	0.25	4.3	0	0
0	0	99999	ND	0	ND				0	0
4	2	<0.5	0.6	10.4	10.4	2.9	0.425	5	0	0
4	1	<0.5	6.3	6.3	6.3	1.8	0.25	3	0	0
4	1	<0.5	3.6	3.6	3.6	1.1	0.25	1.7	0	0
4	1	<0.5	7.8	7.8	7.8	2.1	0.25	3.8	0	0
4	1	<0.5	1.1	1.1	1.1	0.46	0.25	0.43	0	0
4	2	<0.5	0.9	18.3	18.3	4.9	0.575	8.9	0	0
4	1	<0.5	1.6	1.6	1.6	0.59	0.25	0.68	0	0
4	1	<0.5	4.8	4.8	4.8	1.4	0.25	2.3	0	0
4	1	<0.5	0.7	0.7	0.7	0.36	0.25	0.23	0	0
4	2	1.1	1.1	50.9	50.9	14	2	25	1	1
0	0	99999	ND	0	ND				0	0
4	2	<0.5	0.6	9.1	9.1	2.6	0.425	4.4	0	0
4	2	<0.5	1	18.9	18.9	5.1	0.625	9.2	0	0
3	0	<0.5	ND	<0.5	ND	0.25	0.25	0	0	0
3	0	<0.5	ND	<0.5	ND	0.25	0.25	0	0	0
3	0	<0.5	ND	<0.5	ND	0.25	0.25	0	0	0
3	0	<1	ND	<1	ND	0.5	0.5	0	0	0
3	0	<0.5	ND	<0.5	ND	0.25	0.25	0	0	0
3	0	<0.5	ND	<0.5	ND	0.25	0.25	0	0	0
0	0	99999	ND	0	ND				0	0
5	0	<2	ND	<10	ND	3.4	5	2.2	0	0
5	0	<50	ND	<50	ND	25	25	0	0	0
5	1	<100	420	420	420	124	50	165	0	0
5	1	<100	400	400	400	120	50	157	0	0
1	1	0	ND	0	ND		0		0	0
1	1	49.9	49.9	49.9	49.9		49.9		0	0
5	0	<0.4	ND	<1	ND	0.38	0.5	0.16	0	0
5	0	<0.2	ND	<0.2	ND	0.1	0.1	0	0	0
5	0	<0.2	ND	<0.5	ND	0.19	0.25	0.082	0	0
5	0	<0.2	ND	<0.5	ND	0.19	0.25	0.082	0	0
5	0	<0.2	ND	<0.5	ND	0.19	0.25	0.082	0	0
5	0	<0.2	ND	<0.5	ND	0.19	0.25	0.082	0	0