



## **Supplementary Remediation Action Plan**

URBNSURF Sydney Project  
Corner Hill Road and Holker Busway, Sydney Olympic Park NSW  
URBNSURF Sydney Pty Ltd  
P034987.007  
Version D | December 2022

## Document Control

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# 1. Introduction

Progressive Risk Management Pty Ltd (PRM) were engaged by URBNSURF Sydney Pty Ltd (URBNSURF) to prepare a supplementary Remediation Action Plan (RAP) for the URBNSURF Sydney (USS) Project located at Pod B P5 Carpark, Hill Road, Sydney Olympic Park NSW ("the site" as shown in **Figure 1** and **Figure 2**).

The URBNSURF Sydney development consists of a 3.2 hectare area which will feature a 17,500 m<sup>2</sup> surfing lagoon with associated events facilities; ancillary services; landscaped areas; car parking and loading docks.

The project is a State Significant Development with development consent granted by the Minister of Planning (ref: SSD 7942, dated 20 December 2017). The development consent has an approved RAP prepared by WSP Australia Pty Ltd during October 2017, which continues to apply for planning purposes.

URBNSURF have requested the supplementary RAP to sit alongside the existing WSP planning RAP (October 2017) to inform the construction phase, validation requirement, and ongoing monitoring for the USS Project.

## 1.1. Objective

The objective of the supplementary RAP is to sit alongside the existing WSP planning RAP (October 2017) to provide additional documentation as required under the approved development consent conditions for SSD 7942.

The specific updates in the latest version of the supplementary RAP (version D, December 2022) are to facilitate an estimated surplus of approximately 6000m<sup>3</sup> of site-derived fill material to be retained onsite rather than being disposed to a licenced landfill. This includes:

- Raising of the proposed finish levels of perimeter portions of the site (maximum of 500mm).
- Reducing the capping thickness of the landscaped portions of the site.

The controls prescribed within this supplementary RAP and existing RAP (WSP 2017) are to be adopted by the appointed contractor (Lipman) within the Construction and Environmental Management Plan (CEMP). Implementation of the planning RAP, supplementary RAP, CEMP and all subplans is essential for demonstrating compliance with the development consent and applicable legislative provisions.

## 1.2. Regulatory Framework

The following legislation, regulations and industry guidance have been considered in the preparation of the supplementary RAP.

### *Environmental Planning*

- NSW Environmental Planning and Assessment Act (the EP&A Act 1979).
- State Environmental Planning Policy (Resilience and Hazards) 2021.

### *Site Contamination*

- NSW Contaminated Land Management Act (the CLM Act 1997).
- NSW EPA guidelines made or approved under section 105 of the CLM Act, including:
  - NSW EPA Guidelines for the NSW Site Auditor Scheme (3rd Edition), 2017.
  - NSW EPA Guidelines for Consultants Reporting on Contaminated Land, 2020.
  - NSW EPA Sampling Design Part 1 Application, 2022.
  - NSW EPA Guidelines for the Assessment and Management of Groundwater Contamination, 2007.

- NSW EPA Guidelines for Assessment and Management of Hazardous Ground Gases, 2020.
- National Environment Protection Council (1999, Revised 2013) National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 – Schedule B1 Guideline on Investigation levels for Soil and Groundwater (NEPC, 2013).
- Australian and New Zealand Governments Guidelines for Fresh and Marine Water Quality 2018.

#### **Acid Sulfate Soils**

- The Acid Sulfate Soil Management Advisory Committee (ASSMAC) Acid Sulfate Soils Assessment Guidelines 1998 (Also referred to as the “Acid Sulfate Soils Manual”).
- Queensland Acid Sulfate Soil Technical Manual (2014).

#### **Waste**

- NSW Protection of the Environment Operations Act (POEO Act) 1997.
- NSW Protection of the Environment Operations (Waste) Regulations 2014.
- NSW EPA Waste Classification Guidelines, Part 1 Classifying Waste, 2014.
- NSW EPA Resource Recovery Order, Excavated Natural Material Order under Part 9, Clause 93 of POEO Waste Regulation 2014 (the ENM Order 2014).

#### **Asbestos**

- NSW Work Health and Safety Act, 2011 (WHS Act 2011).
- NSW Work Health and Safety Regulations, 2017 (WHS Reg 2017), Chapter 8 Asbestos, 2017 (NSW WHS Reg 2017).
- NSW EPA Managing Asbestos in or on Soil, 2014 (NSW EPA 2014).
- Western Australia Department of Health Guidelines for the Assessment Remediation and Management of Asbestos Contaminated Sites in Western Australia 2009 (WA DoH, 2009) as referred to by NEPM 2013.

#### **SOPA Specific Guidance**

- NSW Government Sydney Olympic Park Authority Act 2001.
- State Environmental Planning Policy (State Significant Precincts) 2005.
- Sydney Olympic Park Master Plan 2030 (2018 Review).
- Sydney Olympic Park Authority (SOPA), Remediated Lands Management Policy, 2010 (amended February 2014).
- SOPA, Remediated Lands Management Plan (Section 3.6 and Section 8) 2009.
- SOPA, Parklands Plan of Management, November 2010.

### **1.3. Development Consent Conditions**

Specific to the USS Project, the supplementary RAP has been prepared in accordance with the requirements outlined in the development consent conditions for SSD 7942. An evaluation of the RAP compared to the development consent conditions is provided in **Table 1**.



**Table 1: Development Consent Condition Requirements**

Requirement	Response
<b>During Construction</b>	
<b>Remediation</b> Condition D3: All remediation works are to be undertaken under the supervision of a suitably qualified and experienced expert (or experts) in accordance with the Remedial Action Plan (dated October 2017) in Attachment 3 of the Response to Submission (RTS).	<b>Compliant and ongoing</b> Remediation works completed by the early works contractor (Ertech) were supervised by PRM. Ongoing remediation works by construction contractor (Lipman) will be supervised by PRM.
<b>Contamination</b> Condition D4: Suitable measures to protect the integrity of the contamination containment cell in the southern portion of the site must be implemented for the duration of works.	<b>Not Applicable</b> The pre-existing containment cell located ~70m south of proposed infrastructure development area will not be impacted or disturbed as a result of the works.
<b>Contamination</b> Condition D5: Should any new information come to light during demolition or construction works which has the potential to alter previous conclusions about site contamination then the Applicant must be immediately notified, and works must cease. Works must not recommence on site until the consultation is made with the Department.	<b>Compliant</b> The unexpected finds protocol within the CEMP and applicable subplans will be implemented throughout the remediation works and communicated to SOPA and Department of Planning, Infrastructure and Environment (DPIE).
<b>Asbestos</b> Condition D6: All works involving the removal, handling and/or disposal of asbestos must only be undertaken by a suitably qualified expert who holds a current Class A Asbestos Removal Licence from SafeWork NSW and removal must be carried out in accordance with Safe Work Australia's NOHSC: Code of Practice for the Safe Removal of Asbestos 2005 and the approved RAP (refer to Condition D3). Condition D7: An asbestos clearance certificate (or certificates) prepared by a suitably licenced asbestos removalist shall be provided to the Department and the Principal Certifying Authority upon completion of all asbestos removal works. The Applicant shall ensure the asbestos removal works comply with the relevant requirements of the Work, Health and Safety Regulation 2011 [sic]. Condition D8: All works involving the removal, handling and/or disposal of asbestos must be undertaken in accordance with the approved Asbestos Management Plan for the development (refer to Condition C7).	<b>Compliant</b> An Asbestos Management Plan (reference: P034987.005) prepared for the site must be implemented and complied with.
<b>Prior to Occupation or Commencement of Use</b>	
<b>Site Validation</b> Condition E2: Prior to the issue of any Occupation Certificate, the Applicant shall engage a suitably qualified and experienced contamination expert to submit a detailed Validation Report prepared in accordance with the Department of Urban Affairs and Planning's Managing Land Contamination Planning Guidelines SEPP 55 - Remediation of Land 1988 and the OEH's Guidelines for Consultants Reporting on Contaminated Sites 1997 to the EPA, SOPA, the Secretary, the Certifying Authority and the Council. The Validation Report must verify the site is suitable for the proposes uses and that any excavated material re-used on site or disposed off-site, has been appropriately classified, validated, managed and the relevant approvals obtained in accordance with the relevant legislation and any relevant approved materials management plan(s).	<b>Pending</b> As required in Section 6.4 of the supplementary RAP, a "Validation Report" must be prepared in accordance with NSW EPA's Guidelines for Consultants Reporting on Contaminated Sites (2020).

**Table 1: Development Consent Condition Requirements**

Requirement	Response
<p><b>Site Validation</b></p> <p>Condition E3: On completion of remediation works, the relevant requirements of clauses 17 and 18 of State Environmental Planning Policy No. 55 - Remediation of Land shall be complied with.</p>	<p><b>Pending</b></p> <p>A notice of completion shall be provided to SOPA upon completion of the works in accordance with clauses 17 and 18 of SEPP 55.</p>
<p><b>Long-Term Management of Contamination</b></p> <p>Condition E23: Prior to the issue of an Occupation Certificate, a Long-Term Environmental Monitoring and Management Plan prepared by a suitably qualified and experienced contamination expert shall be submitted to SOPA's Director, Environment and Planning and the EPA for information. The Plan must:</p> <ul style="list-style-type: none"> <li>• Be consistent with the recommendations outlined in Section 4.5 of the RAP (dated October 2017) in Attachment 3 of the RTS.</li> <li>• Incorporate the post-remediation asbestos management measures outlined in Section 2.5 of the CEMP in Attachment 3 of the RTS.</li> <li>• Document the surveying of capped areas of asbestos contamination on the site including maps or diagrams and monitoring locations.</li> <li>• Detail the protocol to be followed and remedial measures to be implemented should there be a breach of the cap during operations.</li> <li>• Include details for on-going management, monitoring and maintenance of the cap, including periodic inspections to evaluate the integrity of the cap.</li> <li>• Outline all measures to be implemented to prevent future users of the site from potential exposure to capped asbestos.</li> <li>• Frequency, monitoring and reporting requirements.</li> </ul>	<p><b>Pending</b></p> <p>An "Environmental Management Plan" will be prepared in accordance with NSW EPA's Guidelines for Consultants Reporting on Contaminated Sites 2020 and asbestos controls consistent with the provisions of the WHS Act 2017.</p> <p>Refer to Section 6.5 for further information.</p>

## 1.4. Consistency with Existing Documentation

This supplementary RAP was based upon the existing RAP regarding overall strategy, methodology and validation strategy. Adjustments have been made to address new information, current industry guidance and proposed civil methodologies where required. Departures from the existing RAP are summarised in **Table 2**.

**Table 2: Departures from Existing Remediation Action Plan**

Item and Reference	Rationale and Amendments
<b>Regulatory Framework Section 1.2</b>	<p><b>Updated</b></p> <p>Clause 17(1)(b) requires all remediation work to be carried out in accordance with the guidelines in force under the CLM Act 1997.</p> <p>Section 1.3 includes references to several guidelines which have taken effect since the existing RAP and development consent were issued, including:</p> <ul style="list-style-type: none"> <li>• NSW EPA Sampling Design Part 1 Application, 2022.</li> <li>• NSW EPA Guidelines for Assessment and Management of Hazardous Ground Gases, 2020.</li> <li>• NSW EPA Guidelines for Consultants Reporting on Contaminated Sites, 2020.</li> <li>• NSW EPA Guidelines for the NSW EPA Site Auditor Scheme (3rd Edition), 2017. As referred to by the NSW EPA Reporting Guidelines.</li> <li>• CRC Care Technical Report 39 Risk-Based Management and Remediation Guidelines for benzo(a)pyrene.</li> <li>• Canadian Council of Ministers for the Environment (CCME) 2010, Canadian Soil Quality Guidelines: Carcinogenic and Other Polycyclic Aromatic Hydrocarbons (PAHs) Environmental and Human Health Effects, Scientist Criteria Document.</li> </ul>
<b>Remediation Criteria Section 3</b>	<p><b>Additional Section</b></p> <p>A remediation criteria section has been provided as a requirement of NSW EPA Reporting Guidelines. The remediation criteria are applicable to the proposed future land use and comply with the current statutory provisions. Deviations from the criteria adopted within the previous investigation (WSP 2017) include:</p> <ul style="list-style-type: none"> <li>• NEPM land use criteria for recreational/open space have been adopted.</li> <li>• Asbestos % weight for weight (%w/w) risk based criteria where further characterisation of asbestos in fill materials is required.</li> <li>• Ecological screening level (ESL) adopted from NEPM 2013 (with the exception of the benzo(a)pyrene ESL which are classified as 'low reliability').</li> <li>• BaP ESL adopted from CRC Care Technical Report No. 39 where CRC 'high reliability' BaP ESC have been presented from CRC Care and CCME (2010).</li> <li>• Hazardous ground gas criteria where unexpected finds may comprise of putrescible warranting assessment.</li> <li>• Water Quality Australia (2018) National Acid Sulfate Soils Guidance: Sampling and Identification Methods Manual.</li> <li>• Water Quality Australia (2018) National Acid Sulfate Soils Guidelines: Identification and Laboratory Methods Manual.</li> <li>• Acid Sulfate Soils Management Advisory Committee (ASSMAC) (1998) Acid Sulfate Soil Manual.</li> </ul>
<b>Site Characterisation Section 4</b>	<p><b>Additional Section</b></p> <p>Consideration to past reports, data gaps and conceptual site model has been provided as per the requirements of NSW EPA Reporting Guidelines.</p>
<b>Capping Design Section 5.4</b>	<p><b>Additional Detail</b></p> <p>This supplementary RAP provides additional interpretation, clarification, and detail to assist the remediation phase, including:</p> <ul style="list-style-type: none"> <li>• Reference to current landscaping detail and cut to fill plans provided by the engineering consultant.</li> <li>• Distinction of capping detail for buildings, the lagoon, paved/hardstand,</li> <li>• Specification of geofabric demarcation layer.</li> </ul>



**Table 2: Departures from Existing Remediation Action Plan**

Item and Reference	Rationale and Amendments
<b>Environmental Management Plan Section 5.6</b>	<p><b>Additional Detail</b></p> <p>An outline of the EMP has been provided as per the NSW EPA Reporting Guidelines including roles &amp; responsibilities, enforceability, and monitoring requirements.</p>

## 2. Site Information

### 2.1. Site Identification

A summary of site identification and surrounding area is provided in **Table 3**.

Table 3: Site Identification	
Detail	Information
<b>Site Address:</b>	Corner Hill Road and Holker Busway, Sydney Olympic Park NSW.
<b>Lot Parcel:</b>	Part Lot 71 in Deposited Plan 1191648.
<b>Site Area</b>	3.2 hectares.
<b>Site Owner:</b>	NSW Government under care of Sydney Olympic Park Authority.
<b>Local Council:</b>	City of Parramatta.
<b>Local Statutory Controls</b>	Sydney Olympic Park Authority Act 2001. State Environmental Planning Policy (State Significant Precincts) 2005 and amendments. Sydney Olympic Park Master Plan 2030 (2018 Review).
<b>Current Zoning:</b>	RE1 Public Recreation Zone, under the State Environmental Planning Policy (Major Developments) Amendment (Sydney Olympic Park) 2009.
<b>Current Site Use:</b>	Pod B P5 Carpark (refer to <b>Figure 1</b> ).
<b>Trigger for Assessment:</b>	Remediation required to satisfy Ministers Conditions of Consent for SSD 7942.
<b>Proposed Future Use:</b>	URBNSURF surf park (public recreation facility).
<b>Surrounding Land Use</b>	<b>North:</b> Hill Road, Millennium Parklands, the Newington Armory and a mixture of commercial and residential buildings. <b>South:</b> Haslams Creek, parklands, a conservation area, and Sydney Olympic Park facilities (including commercial buildings, stadiums and arenas). <b>East:</b> A carpark, recreational facilities (BMX track and archery centre) and wetland. <b>West:</b> Holker Busway, car park, vacant private land with some commercial operations beyond.

### 2.2. Environmental Setting

The environmental setting of the site is summarised in **Table 4**.

Table 4: Environmental Setting	
Detail	Information
<b>Soils and Geology:</b>	<p>The Department Industry, Resources and Energy, 1983, 1:100,000 Geological Series Sheet 9130 (Edition 1) indicates that the site comprises of man-made fill including dredged estuarine sand, demolition rubble, industrial and household waste. This material is underlain by silty to peaty quartz sand, silt and clay with ferruginous and humic cementation and common shell layers.</p> <p>The geology encountered during the Environmental Site Investigation (ESI) conducted by WSP (Reference: 2270060A-CLM-REP-001 RevB) comprised mixed fill material from beneath surface asphalt/concrete to the maximum depth of the investigation at 3 metres below ground level (mbgl). The most predominant fill material units observed were a brown gravelly sand and a brown gravelly clay. Fill material comprised of anthropogenic materials was also observed in the northeast portion of the site.</p> <p>A geotechnical investigation undertaken by Galt Geotechnics (Reference: J1601146 001 L Rev0, dated 11 April 2017) reported the following uncontrolled fill (3-9 mbgl) overlying estuarine deposits (0-5 m thickness), overlying alluvial deposits (3-5 m thickness).</p>

**Table 4: Environmental Setting**

Detail	Information
<b>Acid Sulfate Soils:</b>	<p><b>NSW Planning Portal</b></p> <p>A review of the City of Parramatta (Sydney Olympic Park) Local Environment Plan 2012 within the NSW Planning Portal indicated the site was in an area of “disturbed terrain” and did not prescribe any requirement for development consent (or controls) for carrying out work. However a Class 2 Area ~250 m west of site was noted.</p> <p><b>SEPP (State Significant Precincts) 2005 (Amended 2017)</b></p> <p>The Acid Sulfate Soil Map (SEPP_SSP_SOP_ASS_001_20170607) for Sydney Olympic Park documents the site is within an area of “disturbed terrain”.</p> <p>The Sydney Olympic Park Acid Sulfate Soil Risk Map describes “disturbed terrain” as filled areas of low-lying swamps for urban development. Other disturbed terrain includes areas which have been mined or dredged or have undergone heavy ground disturbance through urban development or construction of dams or levees. Soil investigations are required to assess these areas for acid sulphate potential.</p> <p>Additionally the following features in the vicinity of the site were noted:</p> <ul style="list-style-type: none"> <li>Haslams Creek ~100 m south is classed as “high probability at or near the ground surface” area.</li> <li>Nuwi Wetland ~200 m east is classed as “high probability within 1 m of the ground surface”.</li> </ul> <p><b>CSIRO ASRIS</b></p> <p>A review of the CSIRO Atlas of Australian Acid Sulfate Soils indicated that the site is within an area of “low probability of occurrence” of acid sulfate soils.</p> <p><b>Historical Image Review</b></p> <p>A review of historical aerial images provided in <b>Appendix B</b> confirmed the USS Project is sited within a low lying coastal area with mangroves apparent on the banks of Wentworth Bay. The site and surrounding area have since been filled; however it is likely the estuarine deposits (PASS) remain in their natural condition.</p>
<b>Hydrogeology:</b>	<p>The nearby Newington and Nuwi Wetlands (north and northeast of the site respectively) are nationally significant, although based on the NSW Planning Portal the site is not considered to include these wetlands. The site is surrounded by constructed drainage basins (Narawang Wetland to the north) and estuaries (Haslams Creek to the south) connecting to the tide-dominated Parramatta River (approximately 750 m east). Groundwater is likely to flow in a south easterly direction towards Haslams Creek and Parramatta River.</p> <p>Reported groundwater levels (Galt Geotechnics 2017) were between 3.6-7.6 mbgl equivalent to 1-2 mAHD elevation.</p>
<b>Topography / Drainage:</b>	<p>Surface elevation across the site ranges from approximately 9 meters Australian Height Datum (mAHD) in the south to 5 mAHD in the north, with an approximate 3% grade. Surface water is expected to drain towards the stormwater drainage channels located in the centre and north-west of the site. Surface water and groundwater is anticipated to then flow east towards Haslams Creek approximately 150 m east of the site and the Parramatta River 750 m east of the site, which ultimately discharge into Wentworth and Homebush Bay.</p>
<b>Sensitive Receptors:</b>	<p>Sensitive environmental receptors include the environmental conservation area that surrounds the site, threatened species habitat, Haslams Creek and Parramatta River.</p>

## 2.3. Site History

The Remediated Lands Management Plan (SOPA, 2009) documents the site as being within the Haslams Reach precinct where historical uncontrolled tipping of power station ash, demolition waste and small amounts of other waste occurred between the 1950’s and late 1980’s. Remediation of Haslams Reach took place between 1995 and 1997, which involved excavating and separating demolition waste into material ‘suitable for reuse’ (defined as hardfill including bricks, concrete, etc.) and ‘unusable’ material (defined as soft-fill including timbers, plastic, etc.).

The hardfill was reportedly crushed and placed in the northern region of the precinct<sup>1</sup> and a layer of geo-fabric was installed every 750 mm in the fill. The unusable material was placed with fly ash and other waste in a 4-5 m high disposal mound at the southeast corner of the precinct. An additional 5-6 m high disposal mound was constructed in the southwest corner of the precinct including contaminated soil imported from other Homebush Bay sites.

Both disposal mounds were capped with a 1–2 m thick layer of clean imported clay. A vertical cut-off wall and leachate collection drain were installed along the eastern and southern boundaries, with an additional clay barrier along the western boundary. The drain also receives leachate from nearby Archery Park. Leachate is pumped to a storage tank then discharged into a series of evaporation ponds located on the southern edge of the precinct. The depth of waste in the Haslams reach precinct reportedly ranges between 4-12 m.

A review of historical aerial images provided in **Appendix B** confirms the original site setting, key milestones and location of emplacement cells outside the site boundary.

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<sup>1</sup> Note the placement location of the aggregate recovered from remediation of demolition waste within the Haslams Reach precinct was not specified within the RLMP.

### 3. Remediation Criteria

The remediation criteria have been selected based on the future land use and environmental setting. The remediation criteria adopted for the project are summarised in **Table 5**.

Table 5: Remediation Criteria	
Media	Guidance
<b>Site fill material :</b>	<p>Health Investigation Levels (HILs) Recreational C.</p> <p>Health Screening Levels (HSLs) Commercial Industrial D– Soil Vapour<sup>1</sup>.</p> <p>Health Screening Levels (HSLs) Recreational C– Asbestos in Soil as per Table 7 Schedule B1 NEPM 2013:</p> <p>Bonded ACM – 0.02 %w/w.</p> <ul style="list-style-type: none"> <li>Friable Asbestos (FA) and Asbestos Fines (AF) – 0.001 %w/w.</li> <li>All forms of asbestos – no visible asbestos in surface soils (i.e. to 100 mm depth).</li> </ul> <p>Management Limits (MLs) Recreational C.</p> <p>Soil EILs/ESLs were not applicable on the basis source-pathway-receptor linkages were incomplete.</p>
<b>Underlying natural estuarine soils / pile risings:</b>	<ul style="list-style-type: none"> <li>Water Quality Australia (2018) National Acid Sulfate Soils Guidance: Sampling and Identification Methods Manual.</li> <li>Water Quality Australia (2018) National Acid Sulfate Soils Guidelines: Identification and Laboratory Methods Manual.</li> <li>Acid Sulfate Soils Management Advisory Committee (ASSMAC) (1998) Acid Sulfate Soil Manual.</li> </ul>
<b>Groundwater:</b>	<p>The criteria for 95% Protection of Marine Species have been adopted with consideration to the site setting and the receiving water body (Parramatta River and Sydney Harbour) being defined as “slightly to moderately disturbed ecosystems” in accordance with ANZG 2018.</p> <p>These remediation criteria are provided as a contingency should assessment of groundwater be required.</p>
<b>Aesthetics:</b>	<p>Assessment of the site aesthetics includes discolouration (staining), a malodorous nature (odours) and abnormal consistency (anthropogenic inclusions).</p>
<b>Hazardous Ground Gases:</b>	<p>Subsurface gas concentrations have been compared against threshold criteria and gas screening values (GSVs) provided in:</p> <ul style="list-style-type: none"> <li>NSW EPA Guidelines for Assessment and Management of Hazardous Ground Gases, 2019 (amended 2020).</li> <li>NSW EPA Environmental Guidelines: Solid Waste Landfills, 2016.</li> <li>World Health Organisation WHO Hydrogen Sulfide Human Health Aspects (2003).</li> </ul> <p>These remediation criteria are provided as a contingency should assessment of hazardous ground gases be required.</p>
<b>Imported Capping Topsoil Materials:</b>	<p>Imported topsoils to be used as the capping layer:</p> <ul style="list-style-type: none"> <li>Virgin Excavated Natural Materials (VENM) as defined under PoEO Act 1997.</li> <li>Materials that meet the Excavated Natural Material Exemption and Order 2014 (ENM Order).</li> </ul> <p>Imported materials unable to be classified as VENM or ENM (such as blended landscaping/topsoils) must meet the following:</p> <ul style="list-style-type: none"> <li>Human health criteria taken from NEPM 2013 criteria HSL/HIL C.</li> <li>Asbestos taken from NEPM 2013 and WA DoH: No asbestos in surface soils.</li> <li>Ecological criteria EIL /ESL adopted from NEPM 2013 with the exception of ‘low reliability’ BaP.</li> <li>Ecological BaP ESL adopted from CRC Care Technical Report No. 39 where CRC ‘high reliability’ BaP ESC have been presented in Table 11 from CRC Care and CCME (2010).</li> </ul>



**Table 5: Remediation Criteria**

Media	Guidance
<b>Imported DGB20; sand; blue metal:</b>	<p>Imported certified materials:</p> <ul style="list-style-type: none"> <li>• VENM.</li> </ul> <p>Certified under NSW EPA Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014:</p> <ul style="list-style-type: none"> <li>• Excavated Natural Material Exemption and Order (2014).</li> <li>• Recovered Aggregate Exemption and Order (2014).</li> </ul>
<b>Waste:</b>	<ul style="list-style-type: none"> <li>• NSW Protection of the Environment Operations Act (POEO Act) 1997.</li> <li>• NSW Protection of the Environment Operations (Waste) Regulations 2014.</li> <li>• NSW EPA – Waste Classification Guidelines, Part 1 Classifying Waste, 2014.</li> </ul>

Note: Amended remediation criteria considers commercial industrial land use for assessing vapour intrusion into site buildings.

## 4. Site Characterisation

### 4.1. Previous Environmental Reports

A summary of previous environmental report undertaken at the project site which were considered relevant to this supplementary RAP are provided in **Table 6**.

<b>Table 6: Previous Environmental Reports</b>	
<b>Environmental Site Investigation (WSP PB 2016)</b>	
<b>Report Name:</b>	Environmental Site Investigation
<b>Prepared by:</b>	Parsons Brinckerhoff Australia Pty Ltd (trading as WSP   Parsons Brinckerhoff)
<b>Prepared for:</b>	Wave Park Group
<b>Date:</b>	22 August 2016
<b>Reference:</b>	2270060A-CLM-REP-001 RevB
<b>Purpose:</b>	The objective of the ESI was evaluate the commercial terms of the long-term lease should significant contamination affect the proposed land use or remediation requirements beyond provisional allowances made by the client (Wave Park Group at the time).
<b>Scope:</b>	<p>The scope of works comprised the following:</p> <ul style="list-style-type: none"> <li>• Desktop study (review of published documents related to environmental setting and documents held by SOPA including previous environmental investigations and construction details of the landfill cells).</li> <li>• Initial site investigation including intrusive sampling at 30 boreholes.</li> <li>• Additional site assessment to delineate asbestos encountered during the initial soil sampling (additional 51 boreholes in a grid across the site with selected samples analysed for asbestos).</li> </ul>
<b>Results:</b>	<p><b>Site History</b></p> <p>The site history review (of available information provided by SOPA) indicated the site was subject to uncontrolled tipping of power station ash, demolition waste and other waste from the late 1950's until the late 1980's. Containment works were undertaken in the 1990's. The site was not considered to be located within one of the containments cells, assumed to be located ~70 m south of the proposed development area.</p> <p><b>Intrusive Investigations</b></p> <p>Initially 30 boreholes were advanced to a maximum depth of 3 metres below ground level (mbgl) or prior refusal. Subsequently, an additional 51 boreholes (to 3 mbgl) were advanced to delineate asbestos impacts identified by the initial drilling works and achieve the necessary sampling density for sites with known asbestos contamination in accordance. Additionally, two geotechnical boreholes (to 10.45 mbgl) were logged and sampled for environmental purposes.</p> <p><b>Laboratory Analysis</b></p> <p>Selected soil samples were analysed for contaminants of concern typically encountered in fill including total recoverable hydrocarbons (TRH), benzene, toluene ethylbenzene &amp; xylenes (BTEX), metals, polycyclic aromatic hydrocarbons (PAH), organochlorine pesticides (OCP), polychlorinated biphenyls (PCB) and asbestos identification. Summarised as:</p> <ul style="list-style-type: none"> <li>• TRH, BTEX, metals and PAH- 30 samples (and 4 quality control samples).</li> <li>• OCP and PCB - 10 samples.</li> <li>• Asbestos identification - 87 (30 initially then 57 additional samples).</li> </ul> <p><b>Laboratory Results</b></p> <p>Most results were either non-detect or below the adopted criteria except for asbestos detected in 6 samples.</p>
<b>Conclusions:</b>	<p>Public recreation zoning (RE1) remained applicable to the proposed future use.</p> <p>Asbestos impacts correlated to a soil type comprising of black clayey sand, with organic odour and foreign materials inclusions. Regardless of laboratory results, potential asbestos impacts were assumed to be present in this soil type and inferred</p>

**Table 6: Previous Environmental Reports**

	<p>across three areas based on the soil profile (bore logs) observed during fieldwork:</p> <p>Area A – 6,825 m2.</p> <p>Area B – 1,125 m2.</p> <p>Area C – 1,500 m2.</p> <p>Asbestos in soils were considered to present a potential risk during construction but could be managed long-term underneath landscaping or structures.</p>
<b>Recommendations:</b>	<ul style="list-style-type: none"> <li>A class B (bonded) asbestos removalist be present during remediation works in areas of both known and inferred asbestos in soil impacts. The concept design (at that time) estimated 3,457 m3 of soil would be disturbed through the earthworks program.</li> <li>The material be stockpiled and resampled for waste classification and re-use onsite i.e. filling at depth.</li> <li>A construction environmental management plan (CEMP) be developed to manage potential impacts during construction works.</li> </ul>
<b>Remediation Action Plan (WSP 2017)</b>	
<b>Report Name:</b>	Remediation Action Plan
<b>Prepared by:</b>	WSP Australia Pty Ltd (WSP)
<b>Prepared for:</b>	Wave Park Group
<b>Date:</b>	13 October 2017
<b>Reference:</b>	2270089A-CLM-REP-RAP RevA
<b>Purpose:</b>	The objective of the RAP was to provide the planning and regulatory framework to manage the remediation and validation methodologies relating to asbestos impacted soil.
<b>Results:</b>	<p>The RAP documented procedures for remediation and validation of the site including, preferred remedial strategy, specification of capping layer, safety controls, waste classifications, importing material, soil sampling, reporting and contingencies.</p> <p>The remediation strategy involved containing asbestos impacted soil underneath landscaped areas or structures.</p> <p>The RAP assumes that asbestos (both bonded and friable) are randomly present in fill across the entire site.</p>
<b>Conclusions:</b>	Overall the RAP provided appropriate planning and regulatory framework for the remediation and evaluation of preferred remedial approach (cap and containment) and validation of asbestos in soils to render the site suitable for the proposed use with requirements for an ongoing Environmental Management Plan (EMP)
<b>Recommendations:</b>	No specific recommendations.
<b>Baseline Groundwater Data (SOPA 2020)</b>	
<b>Report Name:</b>	Not applicable (excel spreadsheets provided)
<b>Prepared by:</b>	Sydney Olympic Park Authority
<b>Date:</b>	Provided to PRM during March 2021
<b>Reference:</b>	-
<b>Purpose:</b>	Sydney Olympic Park Authority undertake routine monitoring of groundwater quality within the Haslams Reach precinct biennially. The monitoring involves the collection of groundwater/leachate samples from the leachate drain and groundwater cut-off wall encompassing the precinct.
<b>Results:</b>	Data from the June 2020 monitoring event reported concentrations of total suspended solids (TSS), metals, hydrocarbons, naphthalene, ammonia, and cyanide above ecological criteria for 95% protection of marine species.
<b>Conclusions:</b>	SOPA advised the groundwater concentrations are assumed to be comparable to leachate on the basis the Haslams Reach landfills is unlined (i.e. residual clay base) and hydraulically connected to groundwater.

**Table 6: Previous Environmental Reports**

	SOPA have advised the groundwater within the USS site may be further affected by isolated pockets of waste potentially present within the fill.
<b>Recommendations:</b>	-

## 4.2. Contamination Status

The ESI (WSP 2016) detected asbestos in 6 of 87 soil samples above the adopted criteria (of “no asbestos detected”). Asbestos in soil was comprised of small fragments of bonded asbestos sheeting, friable asbestos fibreboard and fibre bundles detected by laboratory analysis.

Asbestos impacted soil was detected at borehole locations BH01, BH02, A7, B8, E2, F6 and D7 at depths between 1-3 mbgl. Any detection of asbestos was considered to warrant remediation and correlated to all soil types with anthropogenic inclusions (e.g. cloth, brick, tile, etc.) and extrapolated across the site to define three areas warranting remediation.

- Area A – 6,825 m<sup>2</sup>.
- Area B – 1,125 m<sup>2</sup>.
- Area C – 1,500 m<sup>2</sup>.

Notwithstanding the findings of the ESI, the subsequent RAP (WSP|PB 2016) noted that asbestos (both bonded and friable) could be randomly present in fill materials across the entire site and the remedial approach presented was a ‘cap and containment’ strategy across the entire site.

## 4.3. Data Gap Analysis

The previous investigations were limited in some respects due to available information, investigation methodology, proposed design and statutory provisions at the time of the works. Apparent data gaps have been evaluated and address in **Table 7**.

**Table 7: Data Gap Analysis**

Item	Evaluation of Existing Data	Proposed Actions
<b>Asbestos in Soil</b>	<p>The remedial approach presented in the existing WSP planning RAP (October 2017) considers that asbestos (both bonded and friable) could be present throughout the fill material across the site.</p> <p>It is noted that the asbestos investigation undertaken by WSP utilised the borehole methodology (rather than testpits) and relied on the asbestos 'presence/absence' laboratory method rather than asbestos quantification laboratory method and % weight for weight (w/w) risk-based approach recommended by NEPM 2013.</p>	<p><b>During Construction</b></p> <p>The CEMP and Asbestos Management Plan (provided CEMP Appendix C2(n)) prescribes controls for managing asbestos during the construction works.</p> <p>For the first 10 weeks of the construction phase and/or while piling works are undertaken (considered to have the highest risk in relation to asbestos), the entire site will be managed under Class A asbestos controls by a SafeWork NSW Licensed Class A removalist. Further, an accredited SafeWork NSW Licensed Asbestos Assessor will be on-site conducting air monitoring and readily available to assess controls and compliance. After that time, depending on the findings of the daily asbestos air monitoring (AAM) including personnel exposure monitoring, a decision will be made as to whether Class A controls should remain or whether Class B controls can be implemented. The AAM data will form part of the risk assessment to determine Class B controls.</p> <p><b>Post Remediation</b></p> <p>Controls for the long-term management of asbestos beneath the capping layers will be prescribed in the EMP to ensure the safety of future site users and any maintenance workers.</p>
<b>Vertical Extent of Investigation</b>	<p>The previous investigations were based on an earlier design and did not obtain samples from &gt;3 mbgl.</p> <p>The maximum depth of bulk excavations is less than 3 mbgl.</p> <p>Spoil arising from piling works extending to 20 mbgl warrant consideration.</p>	<p><b>During Piling Works:</b></p> <p>Spoil arising from piling operations &gt;3 m depth can be sampled/characterised to assess suitability for reuse onsite or offsite waste disposal classification.</p>
<b>Other Contaminants</b>	<p>The ESI did not analyse soil samples for volatile contaminants despite elevated field screening (PID) readings noted in several samples.</p> <p>Per- and Polyfluoroalkyl Substances (PFAS) have not been assessed and warrant consideration where uncontrolled filling is encounter within the site boundary.</p>	<p><b>During Piling Works:</b></p> <p>A data-gap investigation considering potential volatile contamination should be undertaken prior to construction of site buildings.</p>
<b>Sampling Density</b>	<p>The ESI selected 30 soil samples for analysis for most contaminants of concern, which does not definitively meet the minimum number of sampling locations (42) for a 3.2 Ha site prescribed by the NSW EPA Sampling Design Guidelines that were applicable at the time of the investigation (now superseded).</p>	<p><b>No Action Required</b></p> <p>Additional sampling of TRH, BTEX, PAH and meals is unlikely to change the overall characterisation of the site i.e. regarding common contaminants.</p>



**Table 7: Data Gap Analysis**

Item	Evaluation of Existing Data	Proposed Actions
<b>Acid Sulfate Soils</b>	<p>Publicly available information presented inconsistent information. As a result, investigation of ASS has not been completed.</p> <p>Further review of ASS planning maps has confirmed investigation is required.</p>	<p><b>Prior to Construction (completed)</b></p> <p>An acid sulfate soil investigation targeting natural estuarine deposits below 1 mAHD should be undertaken to inform treatment/neutralising requirements of PASS arising from piling works and civil requirements, as necessary.</p> <p>Depending on the findings of the ASS investigation, an Acid Sulfate Soil Management Plan will be prepared.</p>
<b>Hazardous Ground Gases</b>	<p>The NSW EPA Guideline released since the ESI requires consideration of hazardous ground gases.</p> <p>Factors to consider when assessing HGG at the site include condition of the fill, depth of estuarine depots below structures and location of the emplacement cell south of the development area.</p>	<p><b>During Construction</b></p> <p>A contingency has been made to assess hazardous ground gases in the event significant quantities (e.g. more than 50 m<sup>3</sup>) of putrescible waste are observed or malodorous odours are encountered during bulk earthworks.</p> <p>This would be managed under the Unexpected Finds Protocol provided provided in Appendix C2(o) of the CEMP and in general accordance with the Air Quality Management Plan (provided in Appendix C2I) of the CEMP).</p> <p><b>Post Remediation</b></p> <p>If HGG are identified, then controls for the long-term management will be prescribed in the EMP to ensure the safety of future site users and any maintenance workers.</p>

Generally the previous investigations have provided sufficient information to plan for the remediation phase and appropriately inform validation following civil works.

In the event that the data gap analysis outlined in Table 7 identifies any significant variation from the identified contamination across the site, then the Supplementary RAP would be required to be updated to manage the contamination source/s during civil works and/or post remediation.

#### 4.4. Conceptual Site Model

This updated conceptual site model (CSM) provides an understanding of potential exposure for known/potential contaminants and associated impacts on the proposed recreation land use. The revised CSM has considered known and potential source-pathway-receptor linkages both during to and post remediation.

**Table 8: Conceptual Site Model**

Area of Concern	Source - Pathway - Receptor	During Construction / Remediation	Post Remediation Construction / Remediation
<b>Asbestos in Soil</b> <i>Site wide</i>	<ul style="list-style-type: none"> <li>ACMs and asbestos fibre bundles in soil.</li> <li>Potential for respirable asbestos fibres to become airborne if disturbed.</li> <li>Potential exposure to public and site users.</li> </ul>	<p>Potential for public and site workers to be exposed to asbestos during construction works (that disturb fill).</p> <p>Construction works to be undertaken in accordance with the AMP (provided in Appendix C2(n) of the CEMP).</p> <p>This will include such measures as dust suppression on exposed soils; covering stockpiles or aggregate layer until civil works are complete.</p>	<p>The exposure "pathway" to receptors will be controlled by containing asbestos impacted soil beneath capping layers and long-term management (EMP).</p> <p>The various prescriptions for the capping layer designs are outlined in <b>Section 5.4</b>.</p>
<b>Acid Sulfate Soils</b> <i>Site wide</i>	<ul style="list-style-type: none"> <li>PASS potentially present in natural estuarine deposits at depth.</li> <li>Potential for sulfuric acid and leaching contaminants.</li> <li>Leaches contaminants from soil and aggressive to structures. Potential to impact surface water quality and aquatic species.</li> </ul>	<p>An ASS data gap investigation will be completed as outlined in Table 7.</p> <p>The Waste Management Plan includes provisions for ASS, (provided Appendix C2(m) of CEMP).</p> <p>Design of concrete structures below the watertable should consider effects of PASS.</p>	<p>No further action where natural soils remain at depth and are unlikely to be disturbed.</p> <p>Controls for ASS to be included in long-term EMP.</p>
<b>Groundwater</b> <i>Site wide</i>	<ul style="list-style-type: none"> <li>Elevated concentrations of contaminants (including TSS, metals, hydrocarbons, naphthalene, ammonia and cyanide).</li> <li>Migrates through groundwater.</li> <li>Ecological receptors in nearby waterbodies and site occupants.</li> </ul>	<p>Exposure will be prevented by implementing the groundwater and leachate management plan (provided in Appendix C2(h) of the CEMP).</p>	<p>The EMP will make reference to ongoing management of remediated landfills and leachate collection system for the Haslams Reach precinct as outlined in the existing Remediated Land Management Plan which is administered by SOPA.</p>
<b>Hazardous Ground Gas</b> <i>Isolated Areas</i>	<ul style="list-style-type: none"> <li>Potential for HGG sources exist in uncontrolled fill and estuarine deposits.</li> <li>Present in the subsurface and potential to migrate via services into buildings.</li> <li>Building occupants or vegetation.</li> </ul>	<p>Although unlikely to be present, if HGG are encountered, these will be managed in accordance with the Principal Contractor's Unexpected Finds Protocol (provided in Appendix C2(o) of the CEMP and in general accordance with the Air Quality Management Plan (provided in Appendix C2(l) of the CEMP).</p>	<p>A contingency has been made to assess HGG in the event putrescible waste is observed or odours encountered in the vicinity of site buildings or plant rooms.</p> <p>If HGG are encountered, these will be managed in the long-term EMP.</p>

## 5. Remediation Strategy

The objective of the remediation is to ensure the site is suitable for the proposed recreation land use as a wave park use.

### 5.1. Preferred Remediation Approach

The preferred remediation strategy evaluated within the existing planning RAP (WSP 2017) documented the media to be remediated (asbestos in soil) with consideration to available treatment technologies, waste hierarchy and NEPM 2013 guidance, which selected the preferred remediation strategy using the following rationale:

1. Onsite treatment of the contaminant so that it is destroyed or the associated risk is reduced to an acceptable level **No viable treatment options.**
2. Offsite treatment of excavated soil, so that the contamination is destroyed or the associated risk is reduced to an acceptable level, after with the soil is returned to the site. **No viable treatment options.**
3. Isolation of the impacted soil by consolidation beneath a properly designed capping system. **Preferred remediation option.**
4. Removal of contaminated material to an approved site or facility, followed, where necessary, by replacement with appropriate material. **Least preferred due to waste generated and economic constraints.**

Capping and containment asbestos impacted soil was the preferred remediation strategy to enable the proposed development and minimise environmental impact. Remediation of groundwater or land outside the site boundary is excluded from the RAP, which is controlled through the existing Remediated Lands Management Plan administered by SOPA.

### 5.2. Soils Requiring Management

The existing planning RAP (WSP 2017) reported asbestos impacted soils requiring management during in bulk excavation (cut-to-fill), building footings, service trenches and landscaping (namely deeper tree planting sites). An asbestos management plan was recommended due to asbestos (in both bonded and friable condition) which could randomly present throughout the fill across the entire site.

The construction phase (Lipman) will include 363 solid flight auger piles of varying diameter ranging from 600 to 900mm which will be terminated in sandstone bedrock (notionally 20m bgl). An estimated volume of 2,100m<sup>3</sup> of pile risings will be required to be managed.

#### Bulk Earthworks

Bulk earthworks completed during the early works (Ertech) included recontouring of the site to the required RLs for the lagoon footprint and placement of materials from service trenches and geotechnically unsuitable materials in the perimeter areas such as Events Hill.

At the time of preparing this Supplementary RAP (version D, December 2022), an excess of 6,000m<sup>3</sup> of materials have been realised during the early works.

A DA modification is proposed to allow for these materials to be retained onsite by raising some of the perimeter landscape areas up to 500m and by reducing the proposed capping thicknesses (as detailed in **Section 5.3**).

### 5.3. Approved Capping Strategy

The currently approved strategy to manage asbestos impacted soils as outlined in the supplementary RAP (PRM, 2021 Ref: P034987.007\_VerC) is provided in **Table 9**.

**Table 9: Approved Capping Strategy**

Capping Detail	Updated Capping Design
<b>Hardstand Areas</b>	<p>Geofabric from surrounding areas will be required to be appropriately pinned to the hardstands to ensure appropriate demarcation between impacted fill and overlying imported clean materials. A clear survey plan will be required that shows all areas that have geofabric marker layer.</p> <p>The EMP will be prepared with measures and contingencies in place for any works that breach the hardstand.</p>
<b>Grassed Landscaped Areas</b>	<p>Grassed landscaped areas will have geofabric marker layer which will be capped with minimum 300mm compacted clay, crushed sandstone or other suitable imported capping layer.</p> <p>The compacted 300mm capping layer will be overlayed with imported certified growing media ranging in thickness from 150mm to 200mm that will support grass root establishment to prevent erosion and maintain the capping.</p> <p>The EMP will include provision for regular inspections of the grassed areas as well as measures for any works in the grassed areas that have the potential to breach the capping layer.</p>
<b>Planted Landscaped Areas</b>	<p>Prior to landscaping, a tree specialist will be consulted regarding the root volumes of clean fill required to sustain the proposed tree species.</p> <p>Planted landscape areas will be covered with geofabric marker layer which will be capped with a minimum of 500mm in areas of tree planting (300mm compacted clay, crushed sandstone or other suitable imported capping layer covered with 200mm topsoils).</p> <p>The long-term EMP will control future exposure to landscaping works.</p>
<b>Service Trenches</b>	<p>Excavated service trenches to be lined with geofabric marker layer to demarcate any underlying/surrounding impacted fill. The geofabric-lined trench will then be filled with normal imported materials (eg. clean bedding sands).</p> <p>For shallow services that have the top of the trench in clean imported soils, no geofabric marker layer will be required across the top of the service.</p> <p>For all other services (deeper services installed beneath the capping layer and those that are beneath hardstands) the top of the service trench will be covered with geofabric marker layer.</p>
<b>Service Pits</b>	<p>The EMP will be prepared with measures and contingencies in place for any works that penetrate the concrete service pits that extend below the clean capping layer.</p>

## 5.4. Alternative Capping Designs

The proposed revised capping strategy that will be applicable for the DA Modification is provided in **Table 10** (refer to **Figure 4** for plan view):

**Table 10: Alternative Capping Design**

Capping Detail	Updated Capping Design	Proposed Long Term Management Provisions
<b>Hardstand Areas (lagoon footprint and buildings/structures)</b>	Installation of surveyed geofabric demarcation layer beneath all hardstand areas. No set minimum thickness of overlying imported materials as these areas will be capped with hardstands.	The EMP will be prepared with measures and contingencies in place for any works that breach the hardstands.
<b>Perimeter landscape areas – Natural Turf</b>	Surveyed geofabric marker layer over site derived fill material; 300mm VENM certified turf underlay materials (VENM Certified from SoilCo or Benedict); covered with natural turf (capping profile shown on <b>Figure 5</b> ).	<p>The EMP will be prepared with measures and contingencies in place for any works that breach the geofabric marker layer.</p> <p>It is noted that the reduced capping thickness (to 300mm) and the nature of the capping materials (VENM turf underlay and soil planting mix) will be required to be considered in relation to durability as a capping material.</p> <p>To mitigate the potential for reduced durability, the alternative design proposed includes for a leveling off of the landscape areas to a maximum slope of 1:3 (as shown in <b>Figure 6.b</b> cross section 2).</p> <p>In order to increase the durability of the proposed capping, sandstone blocks are proposed to be strategically used to reduce slope gradients (refer to <b>Figure 6.a</b> and <b>Figure 6.c</b>).</p>
<b>Perimeter landscape areas – Artificial Turf</b>	Surveyed geofabric marker layer over site derived fill material; minimum VENM certified materials and compacted DGB20 to a total of 300mm covered; covered by 15mm drainage sand and artificial turf (capping profile shown on <b>Figure 5</b> ).	
<b>Perimeter landscape areas – Mass Planting</b>	Surveyed geofabric marker layer over site derived fill material; 300mm VENM certified turf underlay materials (VENM Certified from SoilCo or Benedict); covered by mulch and shallow plantings (capping profile shown on <b>Figure 5</b> ).	
<b>Perimeter landscape areas – Trees and Mass Planting</b>	Surveyed geofabric marker layer over site derived fill material; 300mm VENM certified turf underlay materials (VENM Certified from SoilCo or Benedict); covered by mulch and shallow plantings; where tree plantings are proposed where roots may breach the capping payer, a tree specialist will be consulted (capping profile shown on <b>Figure 5</b> ).	
<b>Service Trenches and service pits installed beneath the geofabric marker layer</b>	Lined with geofabric marker layer and backfilled with clean imparted certified materials.	<p>PRM consider that service trenches installed beneath the geofabric marker layer to date as part of the early works have potential to contain fill impacted with asbestos.</p> <p>Subsequently, all service trenches beneath the geofabric marker layer across the site beneath the geofabric marker layer will be managed under the long-term EMP.</p>
<b>Service trenches installed above the capping layer</b>	No requirement for geofabric marker layer as these services will be installed within clean imported materials within the capping layer and above the geofabric marker layer.	The EMP will have no specific requirements for services above the geofabric marker layer.

Note: Alternative capping designs are subject to acceptance by the planning authority.



## 6. Implementing Remediation Measures

Control measures will be required for any work disturbing asbestos impacted soil until appropriately contained under the relevant capping layer and waste disposed as necessary. The following sections provide the framework to enable successful validation of the site.

### 6.1. Construction Environmental Management Plan

Condition C2-C14 of the development consent requires a Construction Environmental Management Plan (CEMP) to be prepared in accordance with the Departments [Guideline for the Preparation of Environmental Management Plans 2004](#).

The CEMP is the overarching document that for the implementation of remedial measures. Environmental planning and environmental control requirements for the CEMP are outlined in the planning RAP (WSP 2017) and updated remediation and validation requirements for the CEMP are provided in the supplementary RAP. PRM have prepared the following environmental subplans that will feed into the CEMP:

- Soil and Water Management Plan (provided in CEMP Appendix C2(g)).
- Groundwater and Leachate Management Plan (provided in CEMP Appendix C2(h)).
- Noise and Vibration Management Plan (provided in CEMP Appendix C2(k)).
- Air Quality Management Plan (provided in CEMP Appendix C2(l)).
- Waste Management Plan which includes Acid Sulfate Soil requirements (provided in CEMP Appendix C2(m)).
- Asbestos Management Plan (provided in CEMP Appendix C2(n)).
- Principal Contractor's Unexpected Find Protocol (provided in CEMP Appendix C2(o)).

The controls prescribed within these subplans are to be adopted within the CEMP and administered by the appointed Principal Contractor.

### 6.2. Validation Approach

To confirm the remediation has been completed in accordance with the approved documents and statutory provisions, the environmental consultant will be responsible for:

- Technical review of existing information and data gap investigations.
- Summarising findings of Asbestos Air Monitoring.
- Routine site inspections and witness placement of geofabric marker layer (including photographic records) by an accredited SafeWork NSW Licensed Asbestos Assessors (LAA) environmental consultant; this will include issue of an Asbestos Surface Clearance Certificate (ASCC) that will confirm that that portion of the site can be capped with clean certified imported materials (subsequently no asbestos-impacted fill may be stored/stockpiled/placed in these areas).
- Complete routine inspections on certified imported materials to be used as capping materials and review associated documentation to confirm that imported materials match the descriptions.
- Ensure that certified imported materials are not cross-contaminated by being stored on asbestos-impacted materials (imported materials to be separately stored on plastic/covered until final capping placement).
- Responding to unexpected finds and investigating as required.
- Review construction documentation provided by Principal Contractor, including:
  - Updated construction environmental management plan.
  - Asbestos licenses and SafeWork NSW notification.
  - VENM certificates, ENM certificates, resource recovery exemptions and/or quarry dockets of imported material (i.e. from the source site) incl. tracking documents of volumes imported from each source and placement location.

- Waste disposal dockets, waste classifications and statement of compliance with the POEO (Waste) Regulation and Waste Classification Guidelines 2014.
- Final survey demonstrating top of fill and finish levels to confirm adequate thickness of respective capping layers.
- Preparation of a Validation Report in accordance with Condition E2 of the development consent, SEPP55 and NSW EPA Reporting Guidelines.

### 6.3. Sampling Analysis and Quality Plan

The environmental consultant is to undertake necessary testing in accordance with the DQO process within Schedule B2 of NEPM 20013 and NSW EPA Guidelines. The necessary sampling and assessments to inform the validation report are summarised in **Table 11**.

In the event that there is exceedance of adopted site criteria for any of the works outlined in **Table 11**, these will be managed in accordance with the Unexpected Finds Protocol provided in Appendix C2(o) of the CEMP (this includes unexpected finds in deep fill, acid sulfate soils, hazardous ground gas, imported material or groundwater leachate).

Table 11: Sampling Analysis and Quality Plan		
Item	Sampling Requirement	Proposed Sampling Strategy
<b>Fill &gt;3m Deep</b>	Pile spoil arising >3m depth to be sampled/characterised to assess/confirm suitability for reuse onsite.	Soil sampling may be undertaken ex-situ from stockpiles: <ul style="list-style-type: none"> <li>Sampling density of 1:250 m<sup>3</sup> Analysis of soil samples for COPCs commonly encountered in fill incl. TRH, BTEX, PAH, metals, VOCs others as necessary.</li> </ul>
<b>Acid Sulfate Soils</b>	An acid sulfate soil investigation targeting natural estuarine deposits below 1 mAHD should be undertaken to inform treatment/neutralising requirements of PASS arising from piling works and civil requirements, as necessary.	As per Acid Sulfate Soil Manual 1998, including: <ul style="list-style-type: none"> <li>Sampling density of 10 locations for a 3.2 Ha site.</li> <li>Soil samples screened using pH<sub>FIELD</sub> and pH<sub>FOX</sub> analysis.</li> <li>Selected samples to assess chromium reducible sulfur and liming rates as required.</li> </ul>
<b>Hazardous Ground Gases</b>	Provisional assessment in the event significant quantities (e.g. more than 50 m <sup>3</sup> ) of putrescible waste are observed during bulk earthworks.	As per NSW EPA Guidelines included screening of methane, carbon dioxide, carbon monoxide and hydrogen sulfide in the subsurface
<b>Imported Materials</b>	Any material being imported to site must be accompanied by an appropriated certificate e.g. VENM, ENM or other Resource Recovery Order (e.g. tunnel spoil) currently in force.	PRM will prepare an Imported Materials Sampling Protocol to provide certainty that the certified capping materials proposed to be used in the alternative capping strategy presented in <b>Table 9</b> are suitable and do not pose a risk to human health or the environment under the proposed land use.
<b>Waste Classifications</b>	Excess spoil requiring offsite disposal must be disposed of to an appropriately licensed facility.	The Waste Management Plan Waste Management Plan (provided in CEMP Appendix C2(m)) specifies all material proposed for offsite disposal will be classified in accordance with NSW EPA Waste Classification Guidelines 2014.

**Table 11: Sampling Analysis and Quality Plan**

Item	Sampling Requirement	Proposed Sampling Strategy
<b>Groundwater Leachate</b>	Excess groundwater arising from piling operations requiring off-site disposal.	<p>As per the Groundwater and Leachate Management Plan, including:</p> <ul style="list-style-type: none"> <li>One groundwater sample per batch/tank will be analysed for the constituents in Table 4 of the GLMP.</li> <li>Results will be compared in terms of ANZG 2018 criteria and requirements of the nominated receiving facility (e.g. Cleanaway).</li> </ul>

## 6.4. Validation Report

Following completion of physical remediation works and receipt of necessary information; the environmental consultant shall prepare a Validation Report in accordance with Condition E2 of the development consent and NSW EPA Reporting Guidelines (specially Section 1.6 and applicable information prescribed within the reporting checklist in Table 2.6).

The Validation Report will incorporate:

- Summary of data gap works carried out at the site outlined in Table 7 and Table 10).
- A summary of all capping works completed at the site.
- Surveys showing the lateral and vertical depth of the geofabric marker layer and capping layers across the site.
- Confirm the materials used to cap the site are VENM/ENM or other certified materials.
- Provide a summary of asbestos air monitoring conducted at the site.
- Provide a summary of visual asbestos surface clearance.
- Details of any unexpected finds that are uncovered during the site works (including analytical results).
- Waste classification of any materials that may require offsite disposal.
- A clear conclusion of whether the site is in a suitable condition for the proposed development from a contamination perspective, subject to the implementation of a EMP.

The Validation Report will be provided to the appointed NSW EPA accredited Site Auditor and SOPA.

## 7. Long Term Environmental Management Plan

Following completion of remediation and validation works the environmental consultant will prepare a long-term environmental management plan in accordance with Condition E23 of the development consent, existing RAP and NSW EPA Reporting Guidelines.

The EMP will include:

- A summary of residual contamination encapsulated underneath the capping layer.
- Accurate site figures and survey records documenting the location of residual contamination.
- Procedures for future site users (e.g. contractors; maintenance workers) for activities/works that may potentially disturb the capping layer.

A framework on who is responsible for implementing the requirements of the EMP into the future.

The EMP will not allow for extraction or disturbance of groundwater and will make reference to the existing Remediated Lands Management Plan which relates to containment cells that encroach the site; the RLMP is administered by SOPA to manage groundwater in the Haslams Reach precinct.

The EMP must be provided to SOPA as the landowner and will be required to be implemented as a condition of the lease.

## 8. Conclusions and Recommendations

This supplementary RAP has been prepared with consideration to available information, existing reports (most notably the WSP planning RAP), development consent conditions and applicable regulatory provisions. The remediation strategy has been based on the documented site condition and considers asbestos in soil as the primary contaminant of concern warranting remediation.

Appropriate contingencies and controls have been made to accommodate data gaps and unexpected finds during the remediation phase. Validation will be subject to successful implementation of the final CEMP for the project and requirements prescribed within

### **Section 6.**

The RAP includes suitable capping design and strategy for long term management of residual confirmation to reduce the risk of exposure to future site users. The proposed remediation is considered appropriate to render the site suitable for the proposed development and ongoing recreational land use.

These conclusions are made with the limitations included in **Section 9** of this report.



## 9. Limitations

This report is confidential and has been prepared by Progressive Risk Management (PRM) for URBNSURF Sydney Pty Ltd (the client) in accordance with the terms and conditions provided within the Consultancy Agreement between the client and PRM. This report may only be used and relied upon by the client and must not be copied to, used by or relied upon by any person other than the client. If a third party (limited to only the owner of the property from the client) wishes to rely on this report, they will need to enter a Third-Party Reliance Deed with PRM.

This report is limited to the observations made by PRM and information available and was limited to a desktop study only.

All results, conclusions and recommendations presented should be reviewed by a competent person before being used for any other purpose. PRM accepts no liability for use of, interpretation of or reliance upon this report by any person or body other than the client. Third parties must make their own independent inquiries.

This report should not be altered amended or abbreviated, issued in part or issued incomplete without prior checking and approval by PRM. PRM accepts no liability that may arise from the alteration, amendment, abbreviation or part-issue or incomplete issue of this report. To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by PRM and this report are expressly excluded (save as agreed otherwise with the client).

PRM shall bear no liability in relation to any change to site conditions after the date of this report. This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope and limitations defined herein (Scope of Works). Should information become available regarding conditions at the site including previously unknown sources of contamination, PRM reserves the right to review the report in the context of the additional information.

## ***Appendix A – Figures***

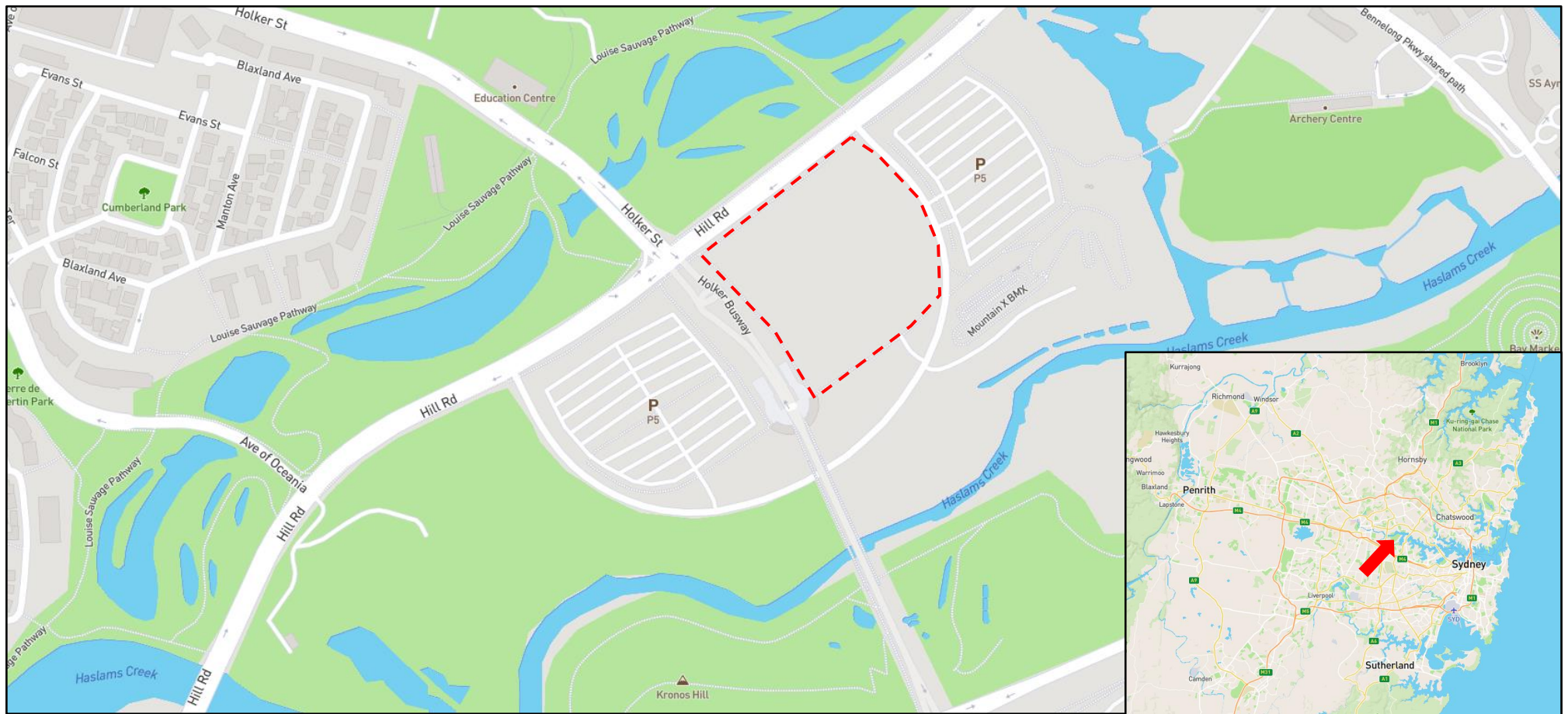


Image courtesy of www.metromap.com.au, 2022

Not to Scale



#### LEGEND



Approximate Location



Approximate Area of Works

**Report Name:** Supplementary Remediation Action Plan

**Site Details:** Corner Hill Road and Holker Busway, Sydney Olympic Park NSW

**Client Name:** URBNSURF Sydney Pty Ltd

**Project Reference:** P034987.007

**Figure Number:** 1

**Figure Name:** Site Locality Map



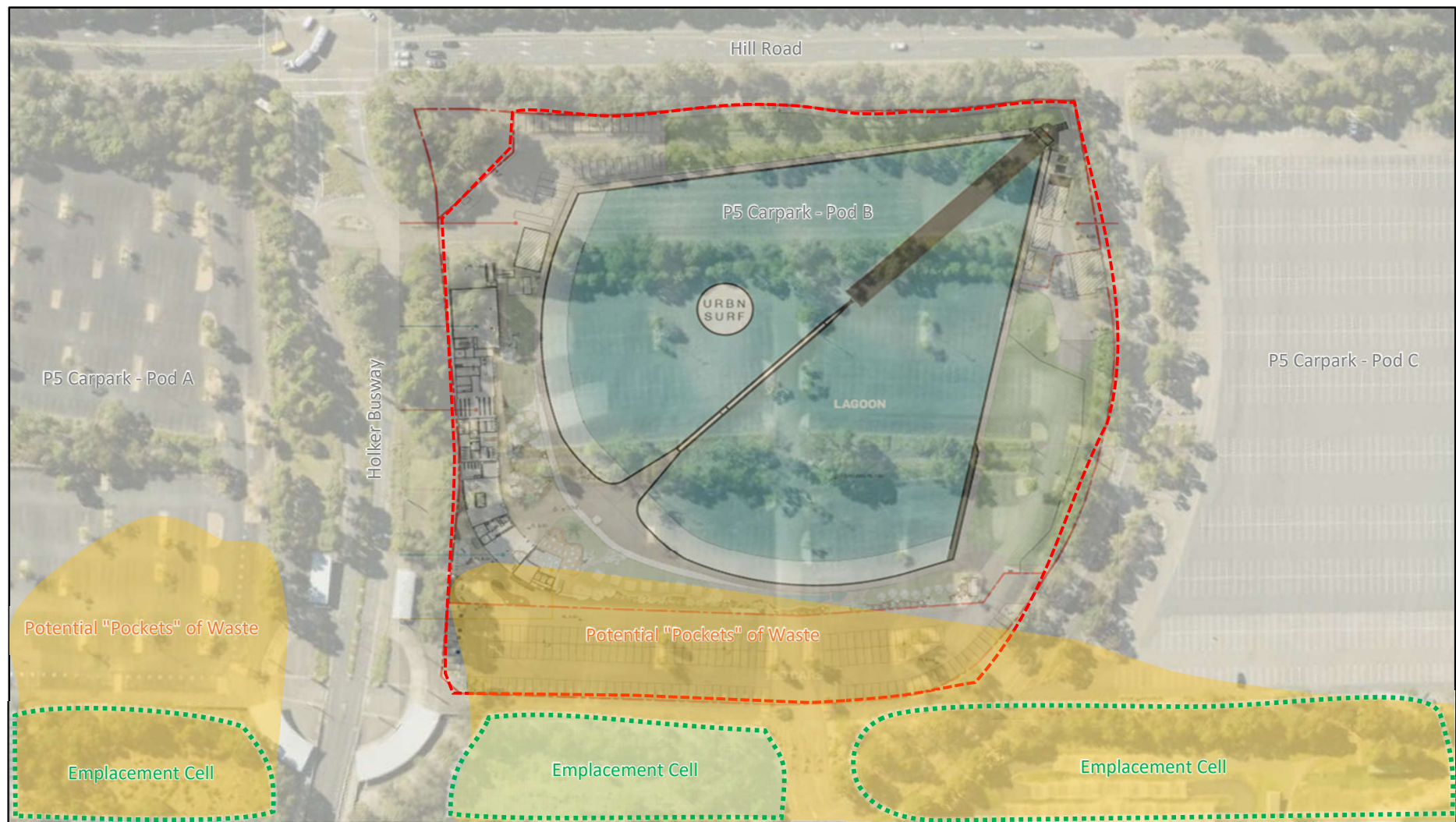


Image source: Metromaps.com (accessed 18 February 2021)

~30 m



#### LEGEND

	Approximate Site Boundary
	Inferred Area of Potential Waste (SOPA 2020)
	Inferred Area of Waste / Emplacement Cell (PB 2016)

**Report Name:** Supplementary Remediation Action Plan

**Site:** Corner Hill Road and Holker Busway, Sydney Olympic Park NSW

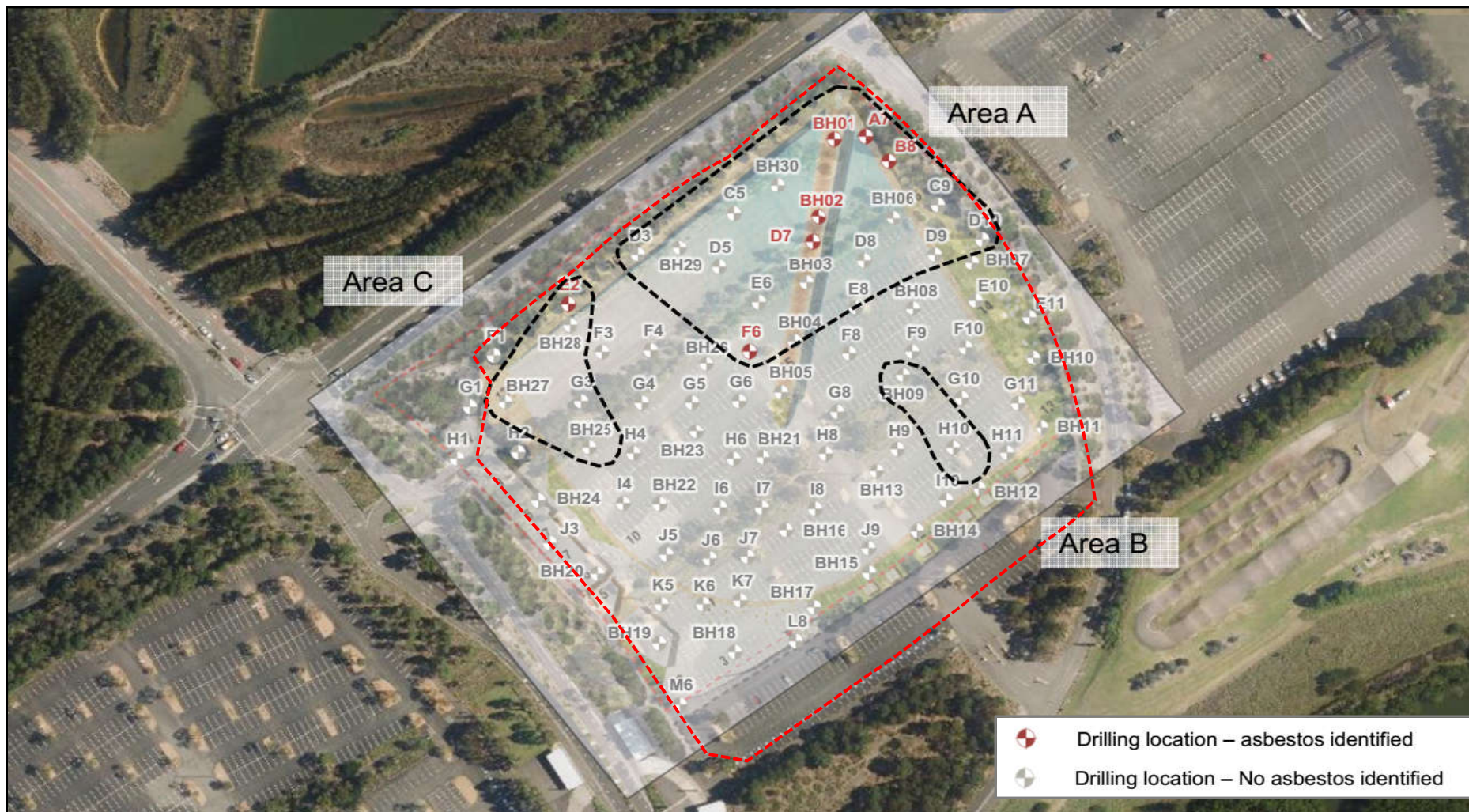
**Client Name:** URBNSURF Sydney Pty Ltd

**Project Reference:** P034987.007

**Figure Number:** 2

**Figure Name:** Site Layout





Source: Environmental Site Investigation, WSP|PB, Ref:2270060A-CLM-REP-001 RevB, dated 22 August 2017

~40 m



#### LEGEND

	Approximate Site Boundary
	Inferred Areas of Asbestos Impacted Soil

**Report Name:** Supplementary Remediation Action Plan

**Site:** Corner Hill Road and Holker Busway, Sydney Olympic Park NSW

**Client Name:** URBNSURF Sydney Pty Ltd

**Project Reference:** P034987.007

**Figure Number:** 3

**Figure Name:** Remediation Areas

### LEGEND

#### NATURAL TURF

#### ARTIFICIAL TURF

#### MASS PLANTING

#### TREES & MASS PLANTING

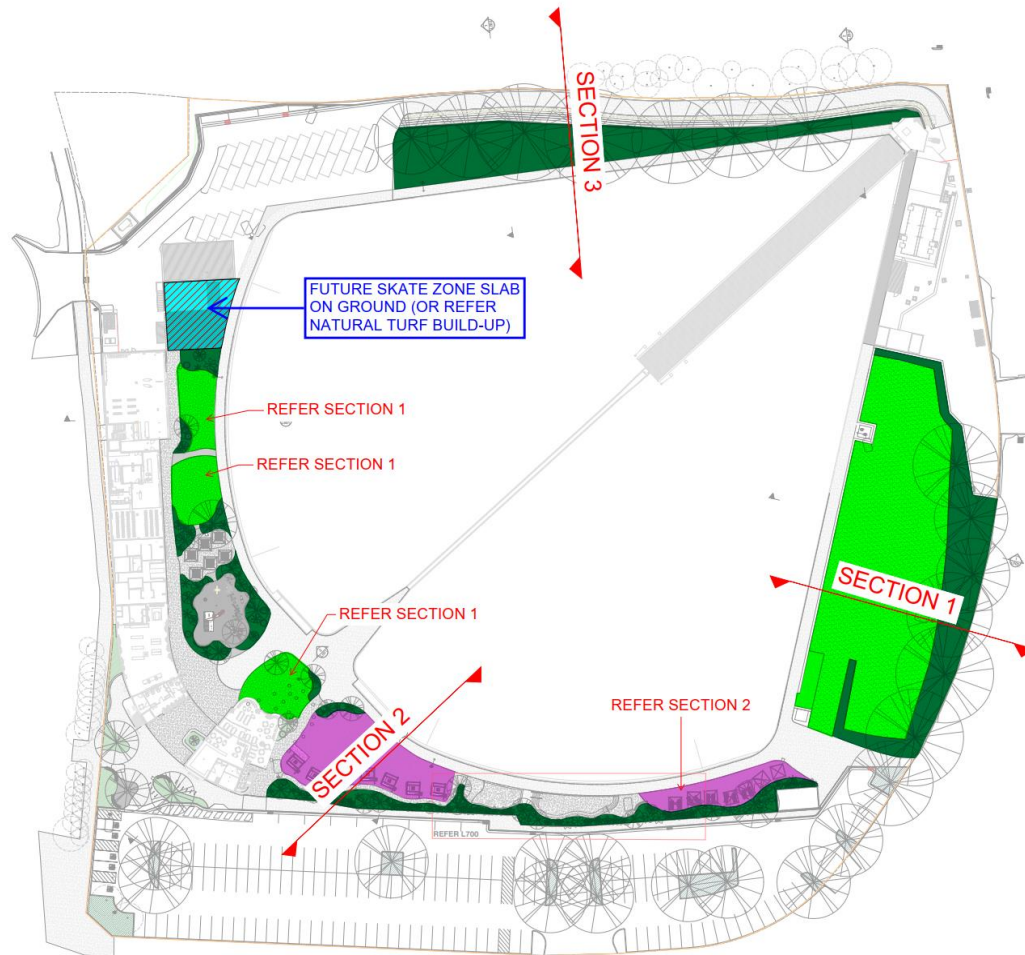
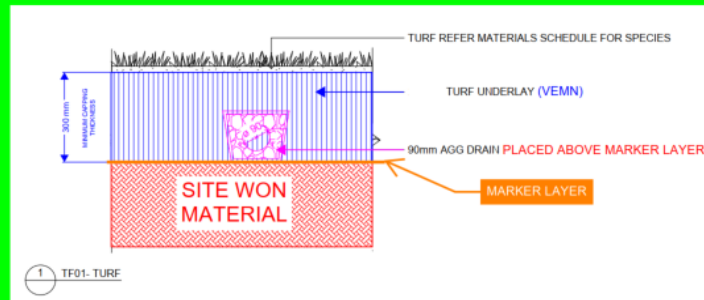


Image courtesy of Oculus, 2022

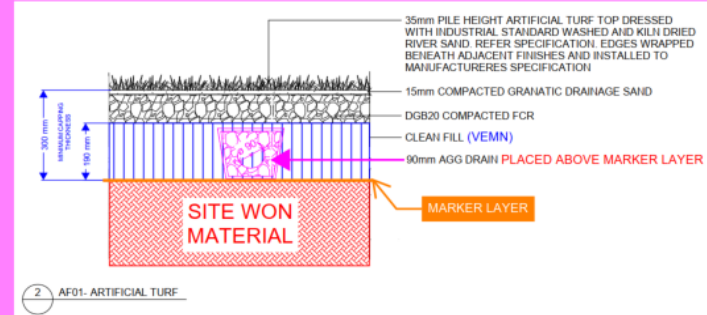
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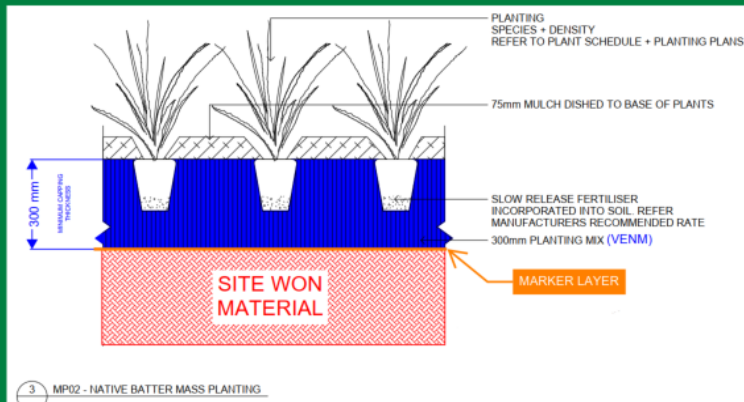
## NATURAL TURF



## ARTIFICIAL TURF



## MASS PLANTING



## TREES & MASS PLANTING

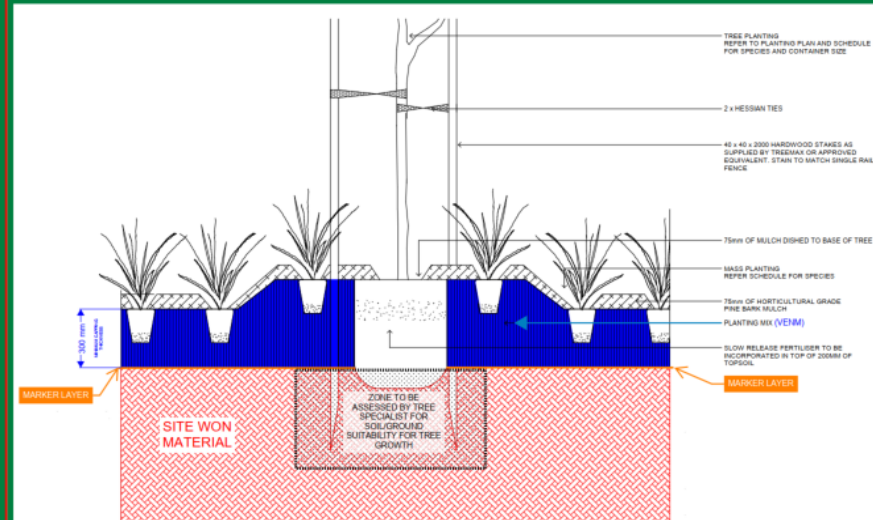


Image courtesy of Oculus, 2022

Not to Scale

### LEGEND

**Report Name:** Supplementary Remediation Action Plan

**Site Details:** Corner Hill Road and Holker Busway, Sydney Olympic Park NSW

**Client Name:** URBNSURF Sydney Pty Ltd

**Project Reference:** P034987.007

**Figure Number:** 5

**Figure Name:** Typical Capping Details



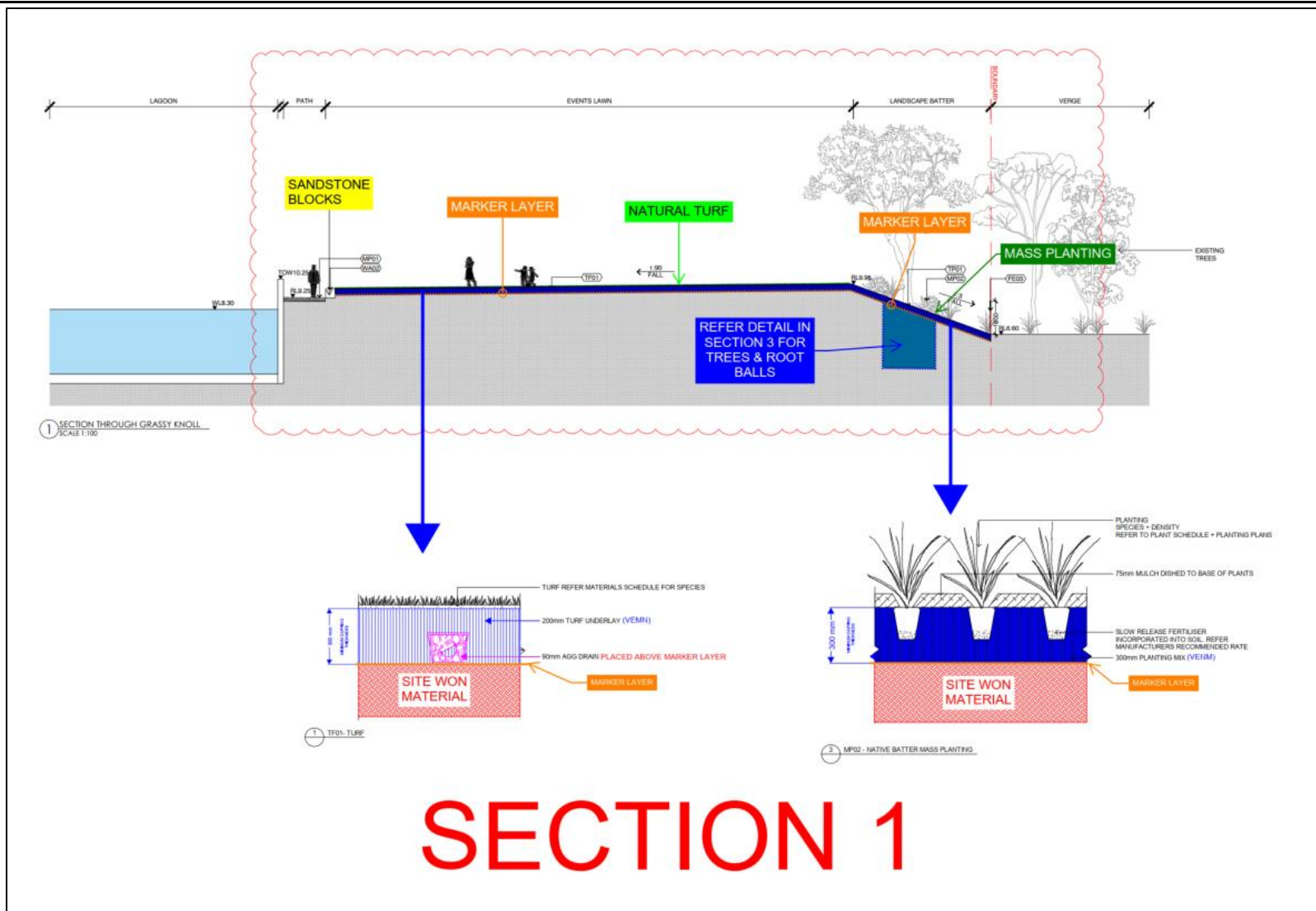


Image courtesy of Oculua, 2022, Drawing L602

Not to Scale

**LEGEND**

Refer to Figure 4

**Report Name:** Supplementary Remediation Action Plan

**Site Details:** Corner Hill Road and Holker Busway, Sydney Olympic Park NSW -

**Client Name:** URBNSURF Sydney Pty Ltd

**Project Reference:** P034987.007

**Figure Number:** 6a

**Figure Name:** Cross Section of Section 1

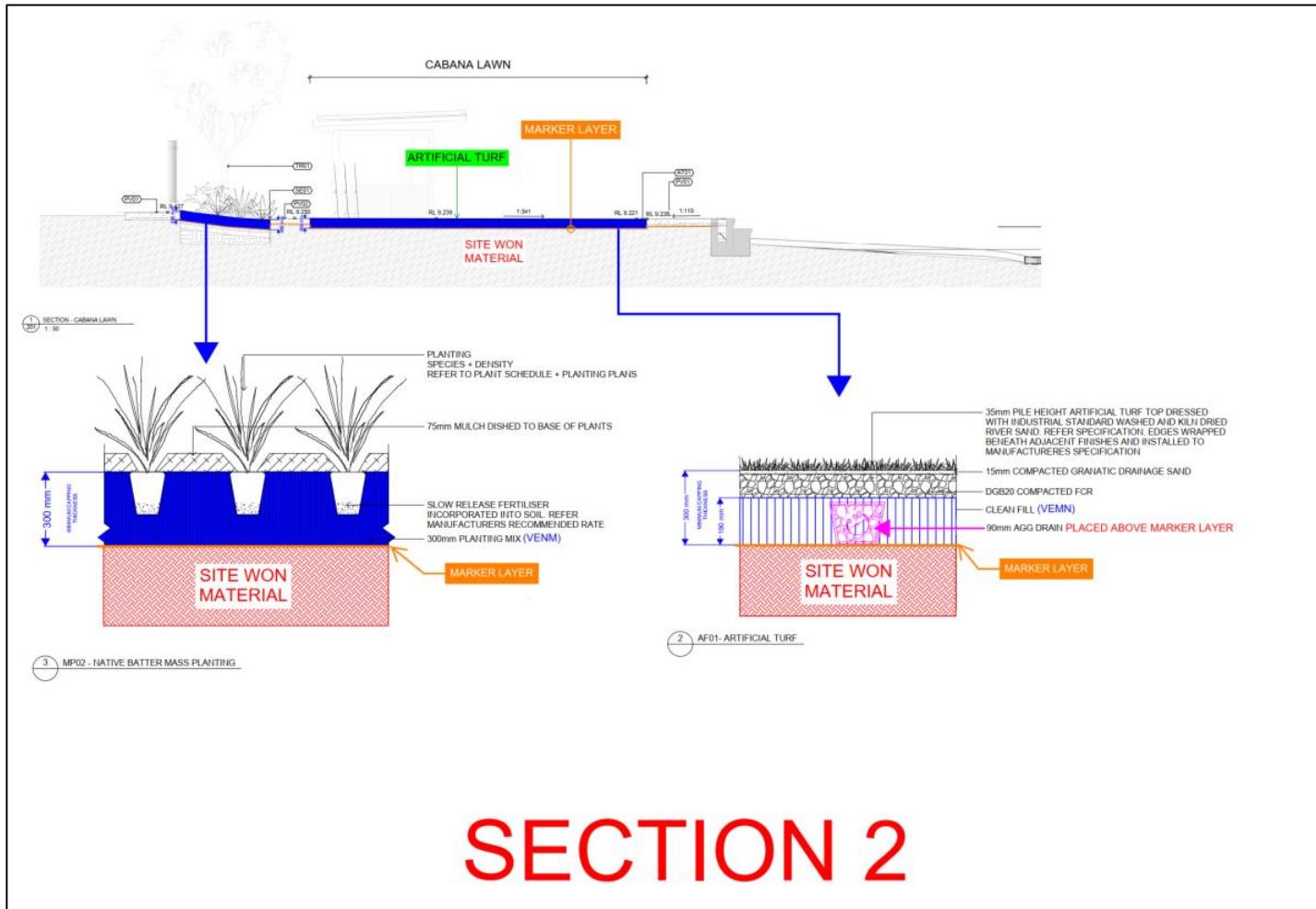


Image courtesy of Oculus, 2022

Not to Scale

**LEGEND**

Refer to Figure 4

**Report Name:** Supplementary Remediation Action Plan

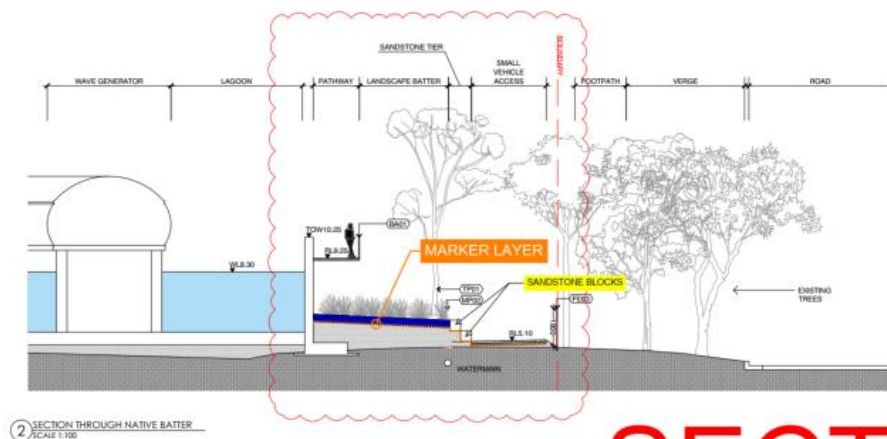
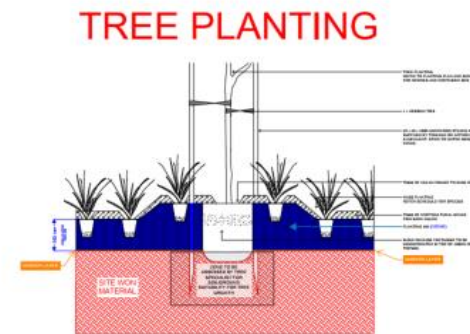
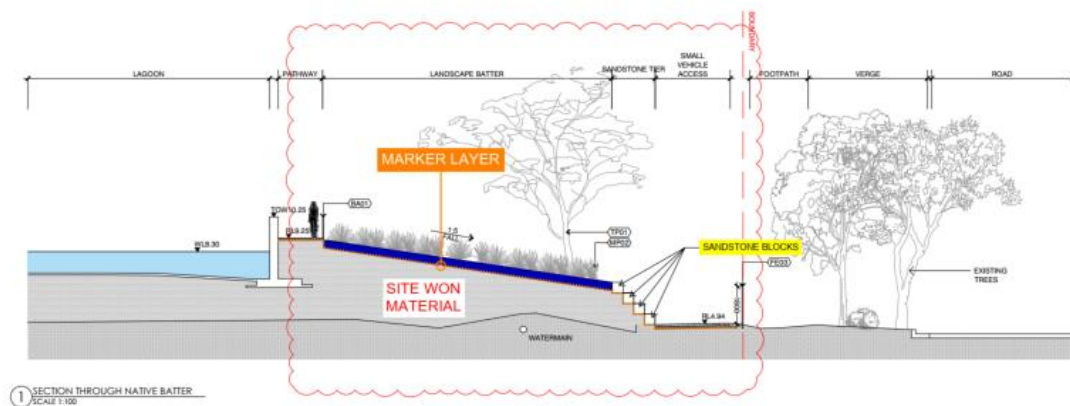
**Site Details:** Corner Hill Road and Holker Busway, Sydney Olympic Park NSW -

**Client Name:** URBNSURF Sydney Pty Ltd

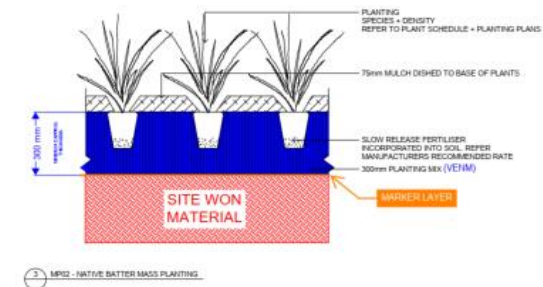
**Project Reference:** P034987.007

**Figure Number:** 6b

**Figure Name:** Cross Section of Section 2



## MASS PLANTING (GENERAL)



# SECTION 3

Image courtesy of Oculus, 2022, Drawing L603

Not to Scale

### LEGEND

Refer to Figure 4

**Report Name:** Supplementary Remediation Action Plan

**Site Details:** Corner Hill Road and Holker Busway, Sydney Olympic Park NSW -

**Client Name:** URBNSURF Sydney Pty Ltd

**Project Reference:** P034987.007

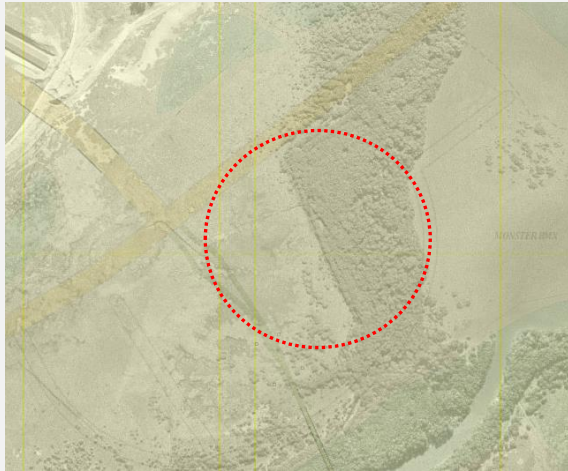
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**Figure Name:** Cross Section of Section 3

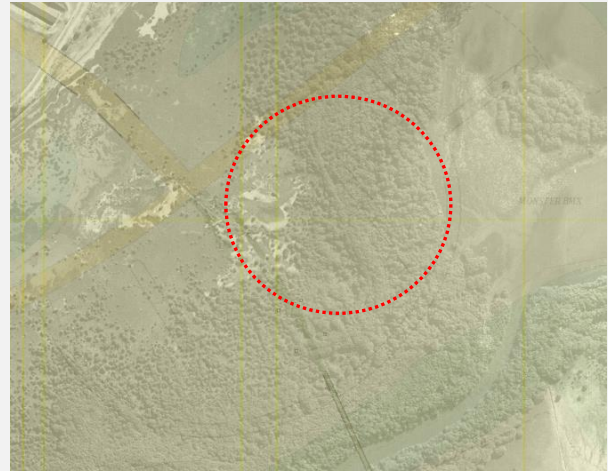
## ***Appendix B – Historical Aerial Images***



## Historical Aerial Images



**1943:** Undeveloped low-lying coastal land.



**1955:** No discernible changes.



**1970:** Land reclamation works apparent.



**1986:** Land reclamation works and uncontrolled tipping apparent.



**1996:** Imported fill to raise the ground level during the remediation of Haslam's Reach.



**2004:** P5 Carpark, Holker Busway, Hill Road and Narawang Wetlands were completed at this time.