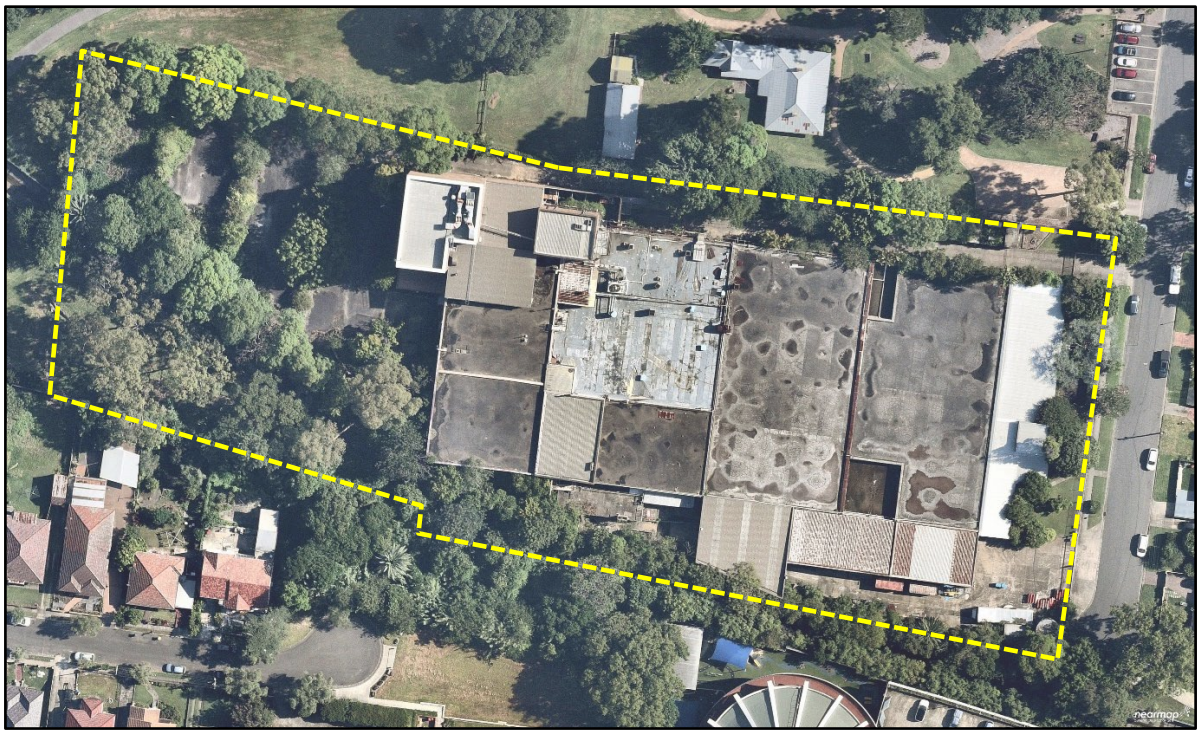

Remedial Action Plan (RAP)

2A Gregory Place Harris Park NSW

21 MARCH 2022

Prepared for:

2A Gregory Place Pty Ltd

2A Gregory Place
Harris Park NSW 2150

Project No. SES_617

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Executive Summary

Sullivan Environmental Sciences Pty Ltd was engaged by 2A Gregory Place Pty Ltd (the site Owner) to prepare a Remedial Action Plan for remediation of identified contamination on a property located at the 2A Gregory Place, Harris Park NSW, henceforth referred to as 'the site'.

The site is currently occupied by the site Owner and a small part of the main building is used as office space and storage, while the remaining site buildings are vacant and unused. The site is earmarked for future redevelopment understood to include predominantly high-rise residential buildings and landscaped ground surfaces overlying two layers of basement carparking.

Sullivans conducted a Phase 1 Preliminary Site Investigation (2015) and a Phase 2 Detailed Site Investigation (2022). Results of the Phase 2 showed asbestos impacted fill material beneath the former manufacturing and offices area of the main building, localised PAH impacts in fill material, detectable concentrations of chemicals beneath the former manufacturing/offices/laboratory area, adjacent to the Effluent Treatment Plant (ETP) tank and near the former chemical store. An Underground Storage Tank (UST) is suspected to remain under the old Boiler Room, while an additional UST may be located near the Loading Dock but could not be confirmed. The Phase 2 concluded the site can be made suitable for the proposed development subject to performing remediation works and recommended preparation of a Remedial Action Plan (RAP) to document site conditions and remedial requirements to make the site suitable for the proposed development.

The RAP was developed to provide a plan detailing the remedial work activities including delineating contamination, removal, validation, WH&S and environment management strategies associated with the remediation of localised impacted soil material at the site. The RAP has been prepared in accordance with relevant NSW EPA guidance documentation and industry standards, with sufficient detail to implement the preferred remedial strategy. The steps in remediating the site are:

- Decommission redundant UST and any remnant underground fuel dispensing infrastructure and remove from the site;
- Decommission the redundant ETP including liquids and associated infrastructure and remove from site; and,
- Delineation and excavation of impacted soil materials and transported to a licenced landfill for waste disposal.

The preferred remediation strategy presented above is considered appropriate for soil contamination onsite and is both technically feasible and practical to implement under the known site conditions.

Subject to the successful implementation of the remediation and validation measures detailed in this RAP, Sullivans considers the site can be rendered suitable for its intended future land use as for mixed use land comprising specialty residential high rise with associated basement carparking. This executive summary is subject to the Limitations of the report as stated in **Section 12**.

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1

Introduction

Sullivan Environmental Sciences Pty Ltd (Sullivans) was engaged by 2A Gregory Place Pty Ltd (the site Owner) to prepare a Remedial Action Plan (RAP) for remediation of identified contamination on the property located at the 2A Gregory Place, Harris Park NSW, henceforth referred to as 'the site'. The site location is shown on Figure 1 and the general site layout is shown on Figure 2 (**Appendix A**).

The site is currently occupied by the site Owner with a small part of the main building used as office space and storage, while the remaining site buildings are vacant and unused. The site is earmarked for future redevelopment understood to include predominantly high-rise residential buildings and landscaped ground surfaces overlying up to two layers of basement carparking.

Sullivans conducted a Phase 1 Preliminary Site Investigation (2015) and a Phase 2 Detailed Site Investigation (2022). Results of the Phase 2 showed asbestos impacted fill material beneath the former manufacturing and offices area of the main building, localised PAH impacts in fill material, detectable concentrations of chemicals beneath the former manufacturing/offices/laboratory area, adjacent to the Effluent Treatment Plant (ETP) tank and near the former chemical store. An Underground Storage Tank (UST) is suspected to remain under the old Boiler Room, while an additional UST may be located near the Loading Dock but could not be confirmed. The Phase 2 concluded the site can be made suitable for the proposed development subject to performing remediation works and recommended preparation of a Remedial Action Plan (RAP) to document site conditions and remedial requirements to make the site suitable for the proposed development.

The preparation of this RAP was conducted as a requirement under NSW state planning and development regulations (SEPP55[1]) for the consent authority to consider potential contamination when assessing a Development Application (DA). The RAP meets the requirements of the SEPP55 to demonstrate the land can be made suitable for the land uses permissible under the land zone in accordance with Parramatta Local Environmental Plan (LEP) 2011.

1.1 Purpose of RAP

The purpose of the RAP is to fulfil obligations under SEPP55 for site remediation by:

- documenting the contamination status of the site;
- summarising the contamination issues;
- examining suitable and compatible methods to remediate contamination; and
- documenting the procedures and protocols necessary to implement and validate the remediation to make the site suitable for its intended use.

1.2 Scope of Work

Our scope was to prepare a RAP in accordance with the Guidelines for Consultants Reporting on Contaminated Land (EPA 2020) and detail the following items:

- information from past reports and the contamination status of the site;
- the site setting and current conditions of the site;
- suitable and preferred remedial options for effective management of land contamination;
- establish validation criteria and methodology to verify that the remediation has been completed to meet the remediation objectives;

[1] On 1 March 2021 SEPP55 was repelled and replaced by Chapter 4 of State Environmental Planning Policy (Resilience and Hazards).

- regulatory compliance requirements for licensing and approvals, and an overview of worker and environmental safeguards to mitigate potential harm during the remediation; and
- establish contingency measures to address potential issues or failures of the remedial methods or safeguards.

1.3 Regulatory Framework

The RAP has been prepared with consideration to the following regulatory framework:

- Contaminated Land Guidelines: Consultants Reporting on Contaminated Land, 2020 (NSW EPA 2020).
- Contaminated Land Management Act 1997 (NSW) (CLM Act).
- Guidelines for the NSW Site Auditor Scheme (3rd Edition), 2017 (NSW EPA 2017).
- Guidelines for implementing the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019.
- Guidelines for the NSW Site Auditor Scheme (3rd Edition), 2017 (NSW EPA 2017).
- National Environment Protection (Assessment of Site Contamination) Measure 2013 (ASC NEPM 2013).
- Parramatta Local Environmental Plan (LEP) 2011.
- Protection of the Environment Operations Act 1997 (POEO Act).
- Protection of the Environment Operations (Waste) Regulations 2014 (POEO – Waste Regulations).
- Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019.
- State Environmental Planning Policy No.55 – Remediation of Land 1998 (SEPP55).
- State Environmental Planning Policy (Resilience and Hazards) 2021.
- Waste Classification Guidelines – Part 1: Classifying Waste 2014 (NSW EPA 2014)

A full list of reference documents is presented in **Section 11**.

1.4 Consultants Certification and Competency

All contamination assessment work and reporting were conducted by the professionally trained team at Sullivans. The Project Team consisted of the following members:

1. Adam Sullivan is the Principal Scientist at Sullivans and has over 23 years of experience in contaminated land assessment and remediation. Adam has achieved tertiary qualifications in Science and Environmental Law. Adam is a certified Site Contamination Specialist (CEnvP-SC) under the Certified Environmental Practitioner Scheme (www.cenvp.org), a scheme recognised by the NSW Environment Protection Authority, and approved this report in the capacity as a CEnvP-SC and Principal Scientist.
2. Sean Guenther who has over 20 years of experience in contaminated land assessment and remediation and has reviewed this report in his capacity as Senior Associate.
3. Michael Edwards has over 25 years of experience in contaminated land assessment and remediation and has prepared this this report in the capacity as a CEnvP-SC and Principal Scientist. Michael is a certified Site Contamination Specialist (CEnvP-SC) under the Certified Environmental Practitioner Scheme (www.cenvp.org).

2 Site and Environmental Setting

2.1 Site Description

The site location and site layout is shown on Figure 1 (**Appendix A**).

The following information, taken from the Phase 2 (Sullivans, 2022), identifies the site.

Table 2-1 Site Identification Details

Information	Details
Address	2A Gregory Place, Harris Park NSW 2150
Title Identification	Lot 2 in DP 802801
Property Area	Approximately 19,480m^2 (1.95 hectares)
Owner/operator	2A Gregory Place Pty Ltd
Local Government	City of Parramatta Council
Land use zone	IN1 – General Industrial (Parramatta LEP 2011)
Land uses	Past: manufacture baby food products and prior to that presumably pharmaceutical products. Current: Main building is used as office space and storage for the site owner while the remaining site buildings are vacant and unused. Future: high density residential apartments with surrounding landscaping and underlying basement level parking. Refer to **Appendix C**.
Geographic Coordinates	-33.819496, 151.014809 (site centre)

2.2 Existing, Proposed and Surrounding Land

The site is currently zoned IN1 – General Industrial (Parramatta LEP 2011) and currently used by the owner as their central office base and equipment storage site. The site is proposed for high density residential apartments with basement level parking as shown in the attached design drawings (**Appendix C**). The southwest portion of the site across Clay Cliff Creek canal is not proposed for future development and will remain vegetated englobo land. Land surrounding the site consists of:

North: Hambledon Cottage Reserve (RE1), Hassall Road then R3 medium density residential.

South: Clay Cliff Creek stormwater channel enters the site from the western boundary then exits the site off the southern boundary. Public recreation (RE1) then R2 - Low Density and R4 High Density residential properties of Harris Park.

East: Gregory Place then low to high density residential properties and Elizabeth Farm Reserve (RE1).

West: Experiment Farm Reserve (open space land use and listed as a heritage item by the Parramatta local government).

Site and Environmental Setting

2.3 Regional Soil and Geology

A review of the geological map[2] shows the site is located on Quaternary period sediments consisting of silty to peaty quartz sand, silt and clay with ferruginous and humic cementation in places and common shell layers. The sites paleo-environment is documented as stream alluvial and estuarine sediment.

The soil landscape map[3] shows that the underlying soils across the site are characterised as the Disturbed Terrain soil landscape group. This type of soil group has the following traits:

- Landscape – level plain to hummocky terrain, extensively disturbed by human activity, including complete disturbance, removal or burial of soil. Local relief <10 m, slopes <30%. Landfill includes soil, rock, building and waste materials. Original vegetation completely cleared, replaced with turf or grassland.
- Soils – turfed fill areas commonly capped with up to 40 cm of sandy loam or up to 60 cm of compacted clay over fill or waste materials.
- Limitations – dependent on nature of fill material. Mass movement hazard, unconsolidated low wet strength materials, impermeable soil, poor drainage, localised very low fertility and toxic materials.

2.4 Topography and Drainage

The site is situated between approximately 4.5 m to 6.5 m above sea level (AHD – Australian Height Datum) and comprises the main building and surrounding relatively flat concrete or asphalt sealed surfaces. Much of the site is covered by the main building. Any surface water presumably drains from the roof guttering and the ground surface directly into stormwater inlet pits and into to the adjoining stormwater channel known as Clay Cliff Creek.

2.5 Regional Groundwater & Hydrology

The site is located within the Parramatta Georges River Hydrogeological Landscape[4] and characterised by the following traits:

- Aquifer Type: Unconfined in unconsolidated alluvial sediments. Vertical and lateral flow components. Local perching above clay-rich layers (seasonal).
- Depth to Watertable: Shallow to intermediate (range 0-8m).
- Hydraulic Conductivity: Moderate to high (range: 10^{-2}m to 10m/day).
- Salinity: Brackish to saline (range: 1.6 to >4.8 dS/m).

There 1 registered groundwater bore within 500m of the site, located to the north on Hassall Street, refer to table below.

Table 2-2 Registered Groundwater Bores Information

Bore ID	Date	Distance/Direction	Depth and SWL[1]	Purpose
GW024667	1966	Approx. 100m/N	4.5m / 2.4m	Domestic

(1) Standing Water Level

[2] Sydney 1:100,000 Geological Series Sheet 9130 Edition 1 1983 Geological Survey of NSW, Department of Mineral Resources.
[3] www.environment.nsw.gov.au/eSpade2WebApp.
[4] www.environment.nsw.gov.au/eSpade2WebApp.

Site and Environmental Setting

2.6 Acid Sulfate Soils

The site is situated on the boundary of land classified as Class 4 and Class 5 works in accordance with the Parramatta LEP 2011[5]. The north-eastern half is situated on Class 4 land while the south-western half is situated on Class 5 land.

Development consent is required for Class 4 works for carrying out works that are more than 2 metres below the natural ground surface, and for works by which the water table is likely to be lowered more than 2 metres below the natural ground surface. The proposed development would trigger this requirement given the proposed two basement levels.

Development consent is required for Class 5 works for carrying out works that are within 500m of adjacent Class 1, 2, 3 or 4 land that is below 5m Australian Height Datum (AHD) by which the water table is likely to be lowered below 1m Australian Height Datum on adjacent Class 1, 2, 3 or 4 land.

[5] https://www.planningportal.nsw.gov.au/spatialviewer/

3

Background and Site History

3.1 Site History

The following information is sourced from the Preliminary Site Investigation[6] (Sullivans 2015). Site history information is accurate up to the time of Sullivans 2015. In summary, the site has been utilised for commercial/industrial activities since the early 1940s, prior to this time it was part of farming or agricultural lots. Between the early 1940 and 2001 the site was utilised for the manufacture of various pharmaceutical products. In 2001 the current site owner, 2A Gregory Place Pty Ltd purchased the site from Wyeth Pharmaceuticals Pty Ltd where it has been largely vacant with only a small portion of the main building being used for office space and storage of small-scale equipment.

3.2 NSW EPA Records

A review of the NSW EPA list of sites declared under the CLM Act 1997 as well as the list of sites notified to the EPA under the duty to report requirements (section 60) was undertaken as part of the PSI, showing that the site is not registered as a significantly contaminated site and the site is not notified as a potentially contaminated site.

Similarly, a review of the NSW EPA public register of Environment Protection Licences (EPL), applications and environmental notices shows that the site does not or has not possessed an EPL nor has the site been issued with a penalty notice.

3.3 SafeWork Database Search - Hazardous Chemicals on Premises

As part of the Phase 1 (2015), Sullivans carried out a request of information on the storage of hazardous chemicals to SafeWork NSW for the Site. The search found the following information:

1999 - Dangerous Goods Licence #35/015959

- Depot 1: Class 3 Maximum storage 5,000L in total
    - Acetone, acetonitrile, butyl-methyl-ether, diethyl ether, ethanol, hexanes, ethyl acetate, isopropanol, petroleum distillates, toluene, octanes, xylenes, methanol, benzene, di-isopropyl ether, cyclohexane, pentanes, extracts flavouring liquid.
- Depot 2: Aboveground Tank Class 2.2
    - Nitrogen, compressed 4,250L
- Depot 3: Aboveground Tank Class 8
    - Aluminium chloride 3,000L
- Depot 4: Class 8
    - Hydrochloric acid (600L), sodium hydroxide (2,000L), ferric chloride (2,000L)
- Depot 5: Class 8
    - Caustic alkali (800L), corrosive liquid (400L), hydrochloric acid (800L), sodium hydroxide (400L)
- Depot 6: Class 8
    - Caustic alkali (1,000L), corrosive liquid (600L), phosphoric acid (600L), sodium hydroxide (200kg), sodium hydroxide (2,200L)
- Depot 7: Class 8
    - Ammonia solution (2,000L)
- Depot 9a and 9b: Class 3

[6] Preliminary Site Investigation, 2A Gregory Place Harris Park NSW, Sullivan Environmental Sciences Pty Ltd, August 2015.

- Extracts, flavouring, liquid (500L)

August 1995

Records of abandonment of a 5,000L UST underneath the Boiler Room floor by filling with concrete.

January 1995

Correspondence record of identification of a UST beneath the Boiler Room floor and the kerosene odour and clear liquid contents.

April 1987

Dangerous Goods Licence #35/015959.9

- Depot 1: Flammable liquids (5,000L)
- Depot 2: Aboveground tank liquid nitrogen (3,000L)

August 1986

Dangerous Goods Licence (number not clear)

- Depot 1: Underground tank, mineral spirit (13,500L)
- Depot 2: Solvents (4,500L)
- Depot 3: Aboveground tank, liquid nitrogen (3,000L)

February 1977

Dept. of Industrial Relations - Record of goods (Licence # 2840bs (?))

- Depot 1: Underground storage tank, mineral spirit (13,500L)
- Depot 2: Mineral oils (4,500L) stored in a brick, iron and concrete structure

November 1972

- Depot 1: Underground tank, mineral spirit (3,000gal)
- Depot 2: Mineral oils (1,000gal) stored in a brick, iron and concrete structure

September 1972

Explosives Dept. record of UST and pump installation location and equipment.

3.4 Previous Contamination Assessments

Contamination Report (Dames & Moore 2000)

The property report prepared for the Contract of Sale in 2000 provided the executive summary of a previous contamination report (Dames and Moore, July 2000) confirming that previous contamination assessments have been conducted at the site. The information stated that:

- *"…Baby food and adult nutritional products are manufactured onsite.*
- *Groundwater is approximately 2.0 metres below ground level (mbgl) and flows to the south.*
- *Four (4) groundwater wells were sampled during the assessment.*
- *There was an 18,000L UST present at the site.*
- *Two of the four groundwater wells showed hydrocarbon results above the threshold criteria at the time of the report.*
- *Continued groundwater monitoring was recommended.*
- *Fatty sheen material was observed to be seeping from the stormwater channel wall.*

- *Observations of stormwater impacts were made on the north side of the factory building from overflows of formulation vessels, and a greyish silty substance draining into the stormwater channel of unknown material or origin…"*

Phase 1 Assessment August 2015 (Sullivans, 2015)

Sullivans was engaged by 2a Gregory Place Pty Ltd to conduct an appraisal of the current and historical site activities, assess the potential for contamination from those activities, and assess the need for further investigation.

The following conclusions and recommendations are drawn from the PSI (Sullivans, 2015):

"…conclude that the historic activities at the site may have caused potential site contamination and may pose a potential health risk to future human and environmental receptors. The following issues were identified that warrant further investigation:

- *USTs: It is not known if the UST located under the Boiler room or the UST near the loading dock along the southern boundary have been appropriately decommissioned or if localised impacts to soil and groundwater have occurred.*
- *Bulk storage of chemicals: Various types and quantities have been used and stored at the site in various areas (e.g. the tank farm area) at some time or another. It is not known if this practise has caused localised impacts.*
- *Boiler room: It is likely that the contents of the old UST located under the floor of the Boiler room was the fuel source for the boiler. Other types of chemicals may also have been used in the past in this area and may have caused localised impacts.*
- *Pharmaceutical products: Historical manufacturing in general is likely to have impacted soils beneath manufacturing areas.*
- *Vehicle parking: Historical parking along the southern boundary may have subjected localised surface soils to oil and fuel leaks.*
- *11kV Transformer – It is not known if transformer oils have leaked into the surrounding surface soils.*
- *Effluent Treatment Plant (ETP): Effluent treatment operations would have produced effluent sludge as a waste stream. It is not known how this material was historically managed or if localised impacts have occurred around treatment tanks and the network of sewerage pipes across the site.*
- *Groundwater impacts: Previous sampling (Dames and Moore, July 2000) has shown that the groundwater onsite is impacted by petroleum hydrocarbons. It is not known if impacts have increased or decreased since that time.*

Subject to investigating the identified issues listed above, and if required, managing contamination and obtaining regulatory consent in consideration of State Environmental Planning Policy 55 – Remediation of Land 1998 (SEPP55), the site could be made suitable for other uses including residential land use.

We recommend that the contamination issues identified in this Phase 1 should be investigated as part of a Phase 2 Contamination Investigation to assess whether the identified issues have caused impacts to soils and groundwater such that health risks to onsite and offsite receptors can be quantified…"

Phase 2 Assessment March 2022 (Sullivans, 2022)

Sullivans was engaged by 2A Gregory Place Pty Ltd to conduct a detailed Phase 2 contamination investigation on the site. The objectives for the Phase 2 were to address issues identified in the Phase 1, investigate for the presence of soil and groundwater contamination, to assess potential health risks for

Background and Site History

future use of the land under a high-density residential land use setting, and provide recommendations for additional investigations or remediation, if required.

The following conclusions are made based on the findings of the Phase 2:

- *"…Asbestos containing fibre cement fragments were observed in gravelly ash fill at sample locations BH13, BH14, BH25 and HA01 clustered together and sealed under concrete slabs beneath the former manufacturing and offices area of the main building. While there are no health risks to current site users as the area is sealed under concrete, there is a potential risk to future site users by the asbestos impacted fill that requires remediation prior to or during site development.*
- *The gravelly sandy fill soils represented by results for sampling locations HA04 and BH06, are impacted by carcinogenic PAHs in concentrations that exceed the human health criterion. While there are no health risks to current site users as the areas are sealed under concrete slabs, there is a potential risk to future site users by contaminated soils at HA04 and BH06 that requires remediation prior to or during site development.*
- *Volatile and semi-volatile compounds were detected in fill soils beneath the former manufacturing/offices/laboratory area of the building, adjacent to the ETP tank and near the former chemical store. Concentrations were below adopted health screening levels and considered relatively low level in soils and were not detectable in groundwater. However these chemicals are not naturally occurring which indicates either there are residues of these chemicals causing low level concentrations in soils or there is a potential unknown contamination source (hotspot) underneath the structures which may present a potential health risk for the proposed development.*
- *Preliminary assessment shows that potential acid sulfate soils exist onsite and will require management if disturbed. PASS results indicate potential acid generation of soils deeper than 1.5 m may not require treatment, however shallower soils at boreholes BH05 and BH19 recorded results that were up to 89% of the action criteria which is considered significant in the context of the planned development. An Acid Sulfate Soils Management Plan (ASSMP) is to be prepared that documents verification sampling and management of potential acid generation during soil disturbance.*
- *The exact position of the suspected UST near the loading dock could not be verified during the investigation and may not exist, however there is likely to be a UST under the Boiler Room floor. No soil or groundwater impacts were detected at either location. In accordance with current legislation, if not used in a two-year period or temporarily abandoned, all USTs present onsite must be decommissioned in accordance with POEO (Underground Petroleum Storage Systems) Regulation 2019.*
- *Groundwater onsite is of relatively good quality with no exceedances of the adopted human health screening levels for vapour intrusion or the adopted GILs for ecological receptors except for PFAS.*
- *PFAS compounds in groundwater were not significant to warrant any further consideration. Site history shows there is no current or historical credible onsite source of PFAS, and the concentrations of PFAS detected in groundwater are most likely ambient background concentrations in the area.*
- *The liquid contained within the ETP tank was not found to be contaminated from a human health perspective. The liquid was found to have some heavy metal and PFAS detections above the ecological criterion. Liquid contained within the tank is a waste and requires disposal offsite to a licenced liquid waste treatment facility during decommissioning of the ETP…*"

Background and Site History

3.5 Outcomes from Previous Assessments

Sullivans concluded the site can be made suitable for the proposed development subject to performing remediation works within the identified impacted areas. The preparation of a Remedial Action Plan (RAP) was recommended to document:

- *"…Decommissioning of USTs in* accordance with the *POEO (Underground Petroleum Storage Systems) Regulation 2019.*
- *Remediation of impacted fill materials for asbestos fragments in and around BH13, BH14, BH25 and HA01 including any additional delineation sampling to refine localised remediation extent(s).*
- *Remediation of impacted fill materials for carcinogenic PAHs at HA04 and BH06 including any additional delineation sampling to refine localised remediation extents.*
- *Data gap closure including additional sampling to characterise contamination status associated with:*
    - *former manufacturing/offices/laboratory areas of the building, adjacent to the EFT and former chemical store for volatile and semi volatile organic compounds.*
    - *beneath current office and storage building footprints which were not accessible during the Phase 2 investigation.*
- *Disposal of the remnant liquids in the ETP and subsequent decommissioning of the ETP and all associated pipes and pits.*
- *Materials management, classification, handling requirements and disposal.*
- *Unexpected finds protocol - paying particular attention to potential contamination issues relating to the network of pipes and pits associated with the ETP, ashy fill materials under various locations of the main building, fill quality in the vicinity of locations HA02 and HA03, and the underground water tank and pumphouse outside the Boiler Room along the north entrance driveway…"*

3.6 Site Characterisation and Conceptual Site Model

A Conceptual Site Model (CSM) is a representation of the site to show if and how human or environmental receptors can be exposed to contamination. A revised CSM has been developed for the site in consideration of the current results and field observations. The CSM takes into account the future use of the land. Based on the proposed development design, basement excavations will extend effectively to the site boundaries with a limited deep soil zone setback off the site/development boundary. As such, minimal original soils will remain following site development and protection of terrestrial ecological receptors is not warranted under this scenario.

3.6.1 Contamination Sources, Media and Contaminants of Concern

Overall, the main sources and contaminants of concern within the site are as follows:

- USTs onsite - hydrocarbons (petroleum), PAHs and Lead.
    - Suspected UST located under the boiler room, north central sector of the building, and
- Asbestos contaminated fill soil within the central western sector of the building (BH13, BH14, BH25, HA01)
- Gravelly sandy fill soils impacted with PAH in south west corner of building (HA04) and south east corner of the site adjacent to the loading dock (BH06).
- Former ETP including remnant liquids and associated network of pipes and pits - hydrocarbons, heavy metals, volatile and semi volatile organic compounds and potentially PFAS.
- Former bulk storage of chemicals area - hydrocarbons, heavy metals, volatile and semi volatile organic compounds.

- Former pharmaceutical products manufacturing and storage areas - hydrocarbons, heavy metals, volatile and semi volatile organic compounds.

3.6.2 Receptors and Exposure Pathway

Potential Receptors and Exposure pathways are considered to be as follows:

- Construction/site worker – acute exposure
    - direct contact/ingestion of soil impacted with carcinogenic PAH and potential hydrocarbons.
    - inhalation of asbestos dust.
    - vapour inhalation in excavation pit from contaminated soil or groundwater.
    - direct contact/ingestion of potentially contaminated groundwater.
- Future onsite worker/residents/other users – chronic exposure
    - direct contact/ingestion of soil impacted with carcinogenic PAH.
    - inhalation of asbestos dust.
    - vapour intrusion/inhalation in basement(s) from contaminated soil or groundwater.
    - aesthetic impact at ground surface.
- Terrestrial organisms – Chronic exposure
    - Soil - there will be limited terrestrial ecosystems to protect given the design of the proposed development containing basements.
    - Contact with groundwater.

3.6.3 Source-Pathway-Receptor Linkages

The following Source-Pathway-Receptor linkages are considered to exist:

- Potential link between asbestos associated with fill in central west of building (BH13, BH14, BH25, HA01) and asbestos fibre inhalation risk to construction / excavation workers and future human receptors which requires intervention.
- Potential link between carcinogenic PAH contaminated soils in two areas (HA04 and BH06) and construction / excavation workers and future human receptors (ingestion and vapour inhalation risks) which requires intervention.
- There is a potential linkage between current/future users and the volatile and semi-volatile compounds detected (1,2,4-trimethylbenzene, n-propylbenzene and pentachloroethane) in fill soils beneath the former manufacturing/offices/laboratory areas of the main building, adjacent to the former ETP and former chemical store (potential vapour intrusion risk) which requires further consideration during decommissioning.
- Aesthetic issues relating to ash contaminated fill generally across the site residing above natural soils:
    - Inside beneath the warehouse areas (BH01 – BH04, BH11, BH12, & BH21 – BH25); and,
    - Outside in the carparking area (BH15 & BH18).

3.6.4 Data Gaps

Sufficient data was gathered in the Phase 2 to assess the potential health risks identified in the PSI (Sullivans, 2015) associated with USTs, the ETP, manufacture and bulk storage of chemicals/pharmaceuticals and unknown fill quality; however, the extent of the identified impacted areas requires delineation for the purpose of remediation. The following areas should be delineated and/or further assessed during site redevelopment:

Background and Site History

- The extent of ACM impacted fill materials identified at sampling locations BH13, BH14, BH25 and HA01.
- The extent of Carcinogenic PAH impacted gravelly clay fill identified at sampling locations HA04 and BH06.
- The extent of volatile and semi-volatile compounds (1,2,4-trimethylbenzene, n-propylbenzene and pentachloroethane) identified in fill soils at sampling locations HA05, HA07 and HA08.
- Potential contamination beneath building footprints of the existing offices and storage areas that were not accessible for sampling during the Phase 2 investigation.
- Fill materials around the southwest portion of the main building at locations HA02 and HA03 where hand auger sampling could not penetrate through ballast gravels.
- Additional assessment for PASS/ASS to verify the findings in this Phase 2.

4

Remediation Works

4.1 Remedial Goals

Remediation goals should mitigate exposure of humans or the environment to sources of contamination. The remediation goals for this site are to:

- decommission the redundant suspected USTs and associated infrastructure;
- address any impacted UST tank pit sands;
- decommission and demolish the redundant ETP and associated infrastructure including any liquid waste disposal;
- address asbestos and PAH impacted surface and subsurface soils;
- address aesthetic issues associated with ash contaminated fill across the site;
- address data gaps within difficult or inaccessible sub floor areas during the Phase 2 with regard to asbestos, PAH, heavy metals, volatile and semi-volatile compounds.

The remediation goal for this site is to address these items to render the site suitable for high density residential land use such that there are no long-term health risks.

4.2 Regulatory Policy on Remediation

The remediation policy adopted for this RAP follows the hierarchy of order adopted by the NSW EPA. The preferred order of options for remediation are:

- On-site treatment (of the soil) so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level.
- Off-site treatment (of excavated soil) which, depending on the residual levels of contamination in the treated material, is then either returned to the site, removed to an approved waste disposal facility, or used as landfill, and replaced with clean fill.

Should it not be possible for these options to be implemented, then other options that should be considered include:

- Removal (of contaminated soil) to an appropriate site or facility, followed where necessary by replacement with clean fill.
- Isolation (of the soil) on the site by covering and containing within a properly designed barrier.
- Choosing a less sensitive land use to minimise the need for remedial works, which may include partial remediation.

When considering the remediation options for the active exposure pathways in the CSM, remediation options will be considered which achieves the following outcomes:

- Treats the source – removes the contaminant, either fully or partially;
- Breaks the pathway – mitigates the risk to the receptor(s) from source(s); or
- Controls the receptor to avoid exposure – to mitigate the potential for the exposure scenario to occur.

If remediation is likely to cause a greater adverse effect on any aspect of the site or surrounds than what would occur if the site was left undisturbed, then remediation should not proceed.

4.3 Assessment of Remediation Options

The table below presents a comparison of possible remediation options for contaminated soils at the site.

Remediation Works

Decommissioning of the UST is a standard code of practice under the UPSS Regulations, 2019, and as such no evaluation of suitable options for decommissioning is required. Due to the unknown quantity and hydrocarbon impact, soil and sand (from around tanks) impacted with hydrocarbons shall have to be classified prior to removal from site after stockpiling. Asbestos impacted soil is to be removed as Special Waste Asbestos (General Solid Waste).

Table 4-1 Comparison of Soil Remediation Options

Option	Strategy	Advantages	Disadvantages	Option Comparison
(1) No action	No action	Little to no remediation costs. Creates minimal disturbance to the Site. Retains contaminated material within the Site	Contamination remains on-site and would preclude the construction of the Proposed Development. Ongoing management through a passive EMP. Contamination and requirement of an EMP be noted on Planning Certificate 10.7 Consent Authority is unlikely to approve.	Not suitable Current situation. Most environmentally sustainable option. However, all contamination remains onsite with the risk to site occupiers (long term) and construction workers (short term) remains.
(2) Excavation and off-site disposal to a waste management facility lawfully permitted to accept the materials.	Source Removal	USTs and impacted soil need removal as per EPA regulations. Removes future liability. Mitigates exposure pathways to Site users and construction/maintenance workers. No ongoing management in the form of a passive EMP required.	Soil requires further sampling to delineate and support waste classification. Non-environmentally sustainable, use of landfill space and a large carbon footprint from haulage trucks. Potential to generate dust. High up-front cost.	**Suitable option.** Impacted / contaminated material (soil and sand) is removed from site to an EPA licensed facility. Validation required after removal. No EMP required on successful validation of remaining material.
(3) Capping and containment of soil in-situ.	Receptor and pathway control	No off-site disposal of soil to landfill. Mitigates exposure pathways to future Site users. Environmentally sustainable.	No or limited available onsite space to build/construct containment cell to store contaminated materials. Site soils potentially not suitable geotechnically. Ongoing management required in the form of a passive EMP. Contamination and requirement of an EMP must be noted on Section 10.7 planning certificate. No certainty of Consent Authority approving remediation approach. High up-front cost.	Not suitable A moderately environmentally sustainable option with mitigation of exposure pathways however constructability limitations and authority approval uncertainty make this option unsuitable.

4.4 Preferred Remedial Option

The preferred remedial approach to address the identified contamination is **Option 2**:

- Decommission USTs and any remnant underground fuel dispensing infrastructure and remove from the site;
- Manage remnant liquid waste in ETP;
- Decommission and demolish the ETP and any remnant underground pipework and pit infrastructure and remove from the site; and
- Excavation of PAH and asbestos impacted soil and disposal to an EPA licenced waste facility.

Remediation Works

The following table presents estimated excavation quantities of contaminated material. The estimated quantities are considered conservative and may require adjustment to account for additional delineation sampling, existing hardstand and varying surface levels as these items may increase the volume.

Table 4-2 Estimated Remediation Quantities

Remediation Area	Investigation Locations	Contaminant	Approx. Remediation Depth (m bgl)	Approx. Remediation Area (m^2)	Approx. Remediation Quantity (m^3)
Underground Storage Tank (UST)	BH21, BH22, BH23 & BH24. Under boiler room	Hydrocarbons (aesthetic)	Tank depth 3.0+m	One tank (unknown dimensions). 4x5m Approx. 20m^2	TBD
South western corner of the building	HA01, BH13, BH14, BH25	Asbestos (fibres and fragments)	~0.5m	Est. <1,000sqm	TBD
Area within building – central west sector	HA04	Polyaromatic Hydrocarbons	<1m	Est. <500sqm	TBD
Outside building – south of loading dock	BH06	Polyaromatic Hydrocarbons	<1m	Est. <100sqm	TBD
Ash impacted fill material	BH01 – BH04, BH11, BH12, BH15, BH18 & BH21 – BH25	Aesthetics	<1m	TBD – requires visual confirmation and may be managed during bulk excavation.	
Effluent Treatment Plant – remnant Liquids	ETP01 and ETP02	Heavy metal and PFAS	TBD - quantity of remnant liquids within ETP is unknown		

TBD – to be determined - considered to include the delineation of all nominated contamination areas, including the land immediately surrounding the known contamination areas.

4.5 Overview of Remediation Methodology

The following method presents as a guide for a qualified environmental consultant and specialist civil works contractor(s) engaged to undertake the remediation work. The following sections do not provide sufficient detail to be used as specification for civil work undertakings. A specific Remediation Works Plan should be prepared by the Contractor undertaking all remediation work.

All remediation works should be performed under the onsite guidance of a contaminated land consultant with sufficient experience in soil remediation activities. The following sections outline the remediation works required to be completed for the:

- UST and ETP Remediation Areas shown on Figure 2 and Figure 3 (**Appendix A**).

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- Asbestos, PAH and aesthetics remediation areas on shown on Figure 4 and Figure 5 (**Appendix A**).

Demolition and removal of buildings, concrete slab surfaces and footings have been excluded from the remediation scope overview.

4.5.1 Decommissioning Underground Storage Systems

Decommissioning of the UST and any remnant fuel dispensing infrastructure must be in accordance with Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019 (UPSS Regs 2019) and the Guidelines for Implementing the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019 (UPSS Guidelines 2019).

The decommissioning process will involve the following:

- Cutting the concrete surface to expose the UST tank pit extent and service lines.
- Removing with an excavator or similar the UST(s) and any remnant fuel dispensing infrastructure in accordance with:
    - *Australian Standard AS 1940–2017, The Storage and Handling of Flammable and Combustible Liquids.*
    - *AS 4976–2008: The removal and disposal of underground petroleum storage tanks.*
- Excavating and stockpiling residual tank pit materials and service line bedding sands for classification.

Stockpile(s) will be sampled in accordance with *Section 7.5 - Schedule B2 of the NEPM 2013* and a waste classification certificate prepared in accordance with *NSW EPA Waste Classification Guidelines 2014* for disposal offsite to a licenced landfill.

Concrete or hardstand materials shall be segregated from the impacted fill materials and stockpiled separately.

4.5.2 Decommissioning Effluent Treatment Plant

Remnant Liquids Remediation

Any liquid requiring removal and disposal offsite to a licenced facility, is waste and requires an appropriately prepared waste classification certificate in accordance with *NSW EPA Waste Classification Guidelines, 2014.*

Liquid in the ETP tank is considered an accumulation of rainwater that has become impacted by copper and zinc perhaps from residues within the tank itself. During decommissioning, the liquids should be contained so that direct discharges do not pose a risk to offsite aquatic environments. The remnant liquid residues will need to be removed/pumped out via vacuum truck (or similar) for offsite disposal as “liquid waste” to licenced liquid waste facility.

Remnant ETP Tank and pipe and pit network

The concrete tank and associated infrastructure are to be decommissioned, demolished and removed from site. in accordance with:

- WH&S Act 2011,
- WH&S Regulation 2017,
- AS/NZS 2601-2001 Demolition of Structures,
- SafeWork NSW Code of Practice – Demolition Work 2019

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All wastes generated as part of the demolition of the ETP and associated infrastructure must be classified in accordance with NSW EPA Waste Classification Guidelines, 2014 and disposed offsite to a licenced landfill. The footprint of the demolished ETP and any associated infrastructure network will require validation in accordance with **Section 4.7**.

4.5.3 Asbestos Impacted Soil - Removal and Delineation

Asbestos containing fibre cement fragments were observed in gravelly/ashy fill at sample locations BH13, BH14, BH25 and HA01 clustered together and sealed under concrete slabs beneath the former manufacturing and offices area of the main building.

Once the warehouse building has been demolished and removed, the concrete slab from across the entire building footprint should be carefully demolished and segregated from the underlying ash fill materials. There is no apparent plastic moisture barrier under the slab, therefore careful segregation is necessary. It is advisable that the Contractor undertaking these works conducts this work in such a manner to achieve minimal disturbance to the underlying gravels during slab demolition.

Once the concrete hardstand has been removed, a thorough inspection of the underlying gravelly ashy fill is required around the perimeter of BH13, BH14, BH25 and HA01 shall be conducted to verify the presence and extent of bonded asbestos fragments or any visual indication of buried asbestos waste.

Sampling and inspections will be carried out by a suitably qualified and experienced professional in accordance with WA DOH 2021 guidelines for the presence of fragments of bonded asbestos. The location and quantity of any ACM shall be systematically recorded. Verification sampling shall be carried out on asbestos in bulk materials as required. Once the extent of impacted soils has been established:

- A small excavator shall be used to excavate the impacted soil to the nominated depth of impact defined by the underlying natural silty clay material and stockpiled together for waste characterisation.
- All soil excavated shall be stockpiled close to the excavation works. The stockpile shall be checked (visually) on a regular basis to ascertain its status with regard to asbestos content.
- Any stockpile shall be covered during the works (or overnight if not removed that day) with plastic sheeting. Any loose pieces of asbestos cement sheeting shall be placed in plastic bags. It is recommended that a maximum bag size of 1200mm (length) x 900mm (width) be observed. Bags should be filled to no more than 50% capacity. The bags shall be marked, Caution - Asbestos: Do Not Inhale Dust, Do Not Open Bag. The top of the bag when full shall be twisted, folded down and taped. The bag shall then be place in the plastic lined skip bin or alternatively 'doubly bagged'. Workers overalls and masks shall also be bagged after use, within an appropriately licenced asbestos bag as described above. The contaminated soil and bags shall be transported to an appropriate disposal facility

Any stockpile containing asbestos materials shall be provisionally classified as Special Waste – Asbestos (General Solid Waste) pending the results of formal stockpile classification in accordance with *Section 7.5 - Schedule B2 of the NEPM 2013* and a waste classification certificate in accordance with *NSW EPA Waste Classification Guidelines, 2014* must be prepared for disposal offsite to a licenced landfill.

The analytical suite for stockpile classification of material should include as a minimum the following analytes:

- Heavy metals, PAHs, TPHs and Asbestos.

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Considering the potential for friable asbestos (loose fibres) to be present, the excavation contractor shall have a Class A Asbestos Removal experienced worker/supervisor on site at all times. Air monitoring in accordance with **Section 4.6** shall be carried out during all removal of asbestos. This is usually interpreted as one shift per day during removal operations. Dust suppression shall occur during the entire removal operations. A work method procedure may be presented to the client by the removal contractor prior to commencement of operations.

4.5.4 PAH Impacted Soil - Removal and Delineation

The gravelly sandy fill soils represented by results for sampling locations HA04 and BH06, are impacted by carcinogenic PAHs in concentrations that exceed the human health criterion. While there are no health risks to current site users as the areas are sealed under concrete slabs, there is a potential risk to future site users by contaminated soils at HA04 and BH06 that requires remediation prior to or during site development.

- Delineation sampling is required to verify the volume of PAH within the soil at the two locations.
- A minimum of four (4) delineation sampling locations will be positioned at 5.0m intervals around each location at HA04 and BH06. Verification sampling shall include;
    - surface in gravelly fills, then
    - each vertical 0.5 metre depth. Each sample will be thoroughly inspected for the presence of asbestos
- Once the vertical and horizontal extent of the impact soils has been established then the impacted soils shall be excavated using an excavator, or similar, to the nominated depth of impact and stockpiled together for waste characterisation.

The resulting stockpile(s) must be sampled in accordance with *Section 7.5 - Schedule B2 of the NEPM 2013* and a waste classification certificate in accordance with *NSW EPA Waste Classification Guidelines, 2014* must be prepared for disposal offsite to a licenced landfill. The analytical suite for stockpile classification of material for aesthetic considerations shall include as a minimum the following analytes: heavy metals, PAHs, BTEXN, TPHs and asbestos.

4.5.5 Aesthetic Considerations - Ash Contaminated Fill

The fill soils beneath the warehouse (BH01 – BH04, BH11, BH12, & BH21 – BH25) and in the outside asphalted carpark area (BH15 & BH18) are impacted with ash and ash waste like materials from historical poor filling activities. While the ash in the fill was not impacted causing a potential human health risk, the ashy materials/soils are considered an aesthetic issue requiring remediation and validated (refer **Section 4.8**).

Noting the known presence of asbestos waste buried under the building (refer **Section 4.5.3**), once the concrete/asphalt hardstand has been carefully removed from the warehouse and carpark, a thorough inspection of the underlying gravelly fill is required verify the extent of ash and ash waste in the fill. Inspections will be carried out by a suitably qualified and experienced professional.

Following delineation, ash impacted soils shall be excavated using an excavator, or similar, to the nominated depth of impact (nominal 0.5 m depth) and stockpiled together.

The resulting stockpile(s) must be sampled in accordance with *Section 7.5 - Schedule B2 of the NEPM 2013* and a waste classification certificate in accordance with *NSW EPA Waste Classification Guidelines, 2014* must be prepared for disposal offsite to a licenced landfill. The analytical suite for stockpile classification of material for aesthetic considerations shall include as a minimum the following analytes: heavy metals, PAHs, BTEXN, TPHs and asbestos.

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4.5.6 Data Gaps - Inaccessible Building Footprints

Some areas of the site underneath the building were inaccessible or encountered refusal for assessing soil materials in the Phase 2. These areas should be targeted after the building has been demolished by sampling soils generally across each building footprint.

The following areas should be delineated and/or further assessed during site demolition:

- The extent of volatile and semi-volatile compounds (1,2,4-trimethylbenzene, n-propylbenzene and pentachloroethane) identified in fill soils at sampling locations HA05, HA07 and HA08. Assess for a general suite of chemicals including VOC/SVOC.
- Potential contamination beneath building footprints of the existing offices and storage areas that were not accessible for sampling during the Phase 2 investigation. Assess for a general suite of chemicals including VOC/SVOC.
- Fill materials around the southwest portion of the main building at locations HA02 and HA03 where hand auger sampling could not penetrate through ballast gravels. Assess for a general suite of chemicals including VOC/SVOC.

4.6 Asbestos Regulations for Safe Removal

The removal of asbestos contaminated soils must only be conducted by a SafeWork NSW Class A licenced person in accordance with the Work Health and Safety Act 2011 and Work Health and Safety Regulation 2017 and the SafeWork NSW Code of Practice 2016 requirements.

NOTE: Fragments of asbestos cement that have been located in the soil for some time, not 'fresh' from demolition activities, have a potential to release fibres into the surrounding soil due to cement matrix breakdown. Friability analysis on a selection of fragments should be performed to confirm whether asbestos cement pieces in soils would be classed as friable or bonded. Assessment of the type of asbestos 'bonded' or 'friable' shall be undertaken by a Safework NSW approved consultant (eg: Certified Occupational Hygienist, Licenced Asbestos Assessor or similar).

Asbestos removal/remediation work must be conducted under relevant requirements, including but not limited to:

- Reference to SafeWork NSW Code of Practice 2016.
- SafeWork NSW permits.
- An Asbestos Removal Control Plan (ARCP).
- Air monitoring.
- PPE.

If any materials onsite are confirmed to be friable then all regulations applying to friable asbestos removal will apply. SafeWork NSW (2016) defines 'friable' asbestos as:

"…material that is in a powder form or that can be crumbled, pulverised or reduced to a powder by hand pressure when dry, and contains asbestos."

Site Establishment

All safety and environmental controls are to be implemented as the first stage of remediation works. These controls will include, but not be limited to:

- Locate and isolate all required utilities in the proximity of the works;
- If required, erection of work area security fencing;
- Site signage and contact numbers; and
- Where required, environmental controls as specified in **Section 8**.

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Air Monitoring

It is advisable and prudent to undertake air monitoring during the removal of any asbestos or asbestos contaminated soil, to provide assurance that the removal is being undertaken in accordance with the regulations and that the public or nearby workers are not impacted with asbestos fibre.

Air monitoring should be conducted in accordance with the requirements of the National Occupational Health and Safety Commission (NOHSC) Asbestos Code of Practice and Guidance Notes in particular the Guidance note for the estimation of airborne asbestos dust [NOHSC 3002:2005].

4.7 Site Validation Post Excavation

The residual soils from excavation of impacted soils in remediated areas and stockpile removal areas, will require validation to confirm remediation extent has been achieved and therefore successful.

Validation sampling will be in general accordance with the Guidelines for the UPSS Regs 2019 in reference to the ASC NEPM (2013):

- UST Pits and, PAH and asbestos impacted soil excavation pits:
    - 1 x floor/base soil sample per 10m^2 (minimum 1 sample per remediated area if less).
    - 1x wall soil sample per 10m lineal (minimum 1 sample per wall if less).
    - Vertical wall samples of the UST pit should be collected at the bottom third of the vertical wall or at the interface layers of different soil types (i.e. fill and natural soil layer, etc).
    - Vertical wall samples of all other excavation should be collected every 0.5m depth interval (i.e. 0.0m – 0.5m, then 0.6m-1.0m, etc).
- ETP and infrastructure footprint:
    - 1x footprint soil sample per 10m^2 (minimum 1 sample per remediated area if less).
    - 1x soil sample per pipe line per 20m lineal pipe (minimum 1 sample per pipeline).
    - 1x soil sample per ETP pit.
- Validation of Stockpile areas - 1 x soil sample per 10m^2 under base of stockpile (minimum 1 sample per remediated stockpile area if less).
- 1 x soil duplicate QA/QC for every 10 primary soil samples collected.

The validation analytical suite for each area will be based on the contaminant of concern identified and may include all or a combination of heavy metals, TRH, BTEXN, PAHs, Pesticides, PCBs and Asbestos.

In the event validation sampling results from excavated areas fail validation criteria then further excavation vertically/horizontally will be required. The proposed protocol for chasing out identified contamination is as follows:

- Failed Floor/Base Sample: Excavation within the pit is extended vertically a further 500mm below the failed validation surface and revalidated.
- Failed Wall Sample: Excavation is extended 500mm horizontally and 5m either side of the failed wall sample and revalidated.

4.8 Backfilling

Once validation data shows contaminated soil has been removed to the required levels, then imported soil sourced from reputable suppliers, certified as *Virgin Excavated Natural Material* or *Excavated Natural Material* as defined by the POEO Act 1997, will be used to backfill areas to original levels or specified finished levels as required. Prior to the importation of fill materials onto the site the following will be undertaken by the Environmental Consultant engaged for the project:

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- Obtain material characterisation reports/certification showing the material being supplied sourced from reputable suppliers is virgin excavated natural material (VENM) / excavated natural material (ENM) or
- Carry out soil validation of the imported material in accordance with NSW EPA guidelines (under the POEO Act) as *Virgin Excavated Natural Material* or *Excavated Natural Material.*
- Each truck entry should be visually checked and documented to confirm only approved materials consistent with the environmental approvals are allowed to enter the site.
- All documentation on imported fill material will be included in the validation report.

4.9 Remediation Contingency Measures

The following table presents a general list of potential issues and contingency measures that can be employed should they arise during the remediation.

Table 4-3 Remediation Contingency Measures

Issue	Contingency
Identification of additional areas of ACM (under sites buildings or concrete hardstand)	If ACM is identified in additional areas during the remediation, these will be collected and placed within the designated asbestos disposal receptacle (i.e. bag) and the location noted on the daily validation field sheets. However, should an area of ACM > 10 m^2 be identified during remedial works this will constitute an unexpected find which will require further assessment as described in **Section 9.0**. **NOTE:** Fragments of asbestos cement that have been located in the soil for some time, not 'fresh' from demolition activities, have a potential to release fibres into the surrounding soil due to cement matrix breakdown. Friability of asbestos pieces in soils should be confirmed through analytical tests.
Additional quantities of material over the expected quantity requiring excavation.	Immediately inform the Owner to discuss approach to remove additional material. Conduct additional delineation sampling to define the extent of impacted areas.
Remedial Methodology Failure	In the event the proposed remediation works do not meet the validation criteria, or if the selected remedial strategy is not able to proceed, the following action will be considered to ensure firstly the safety and health of people and the environment and secondly that the overall project objectives are achieved. Reassessment of the remedial and validation options.
Unexpected underground structures UST found near Loading Dock	If additional underground structures are discovered during the remediation works, including additional USTs, pipes or pits, then sampling work should be targeted around these locations to characterise potential soil contamination. Subsequent remediation work must include removal of all additional underground structures and appropriate decommissioning (i.e., UPSS Regs 2019) in the case of USTs and fuel pipes.
Unexpected findings	Where unexpected finds are identified, detected through visual or olfactory means (odours, stains or waste materials) the find will be managed in accordance with **Section 9.0.** It is acknowledged that previous investigations of the site have been undertaken to assess contaminants of potential concern. However, ground conditions between

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Issue	Contingency
	sampling points may vary, and further hazards may arise from unexpected sources and/or in unexpected locations during remediation or development.

4.10 Work Hours

Site work hours are only to be undertaken in accordance with a Council issued DA, generally:

- Monday to Friday 7am-5pm
- Saturday 8am-1pm
- Sunday and Public Holidays No work

5 Site Validation

5.1 Data Quality Objectives

Data quality objectives (DQOs) have been developed for site validation to confirm remediation meets the required objective.

5.1.1 State the Problem

As a result of previous site activities and filling materials; the site contains the following contamination sources:

- At least one (potentially two) UST tanks and service lines requires decommissioning.
- The tank pit sands used to back fill around the USTs may be contaminated.
- Redundant ETP, remnant liquids and infrastructure required decommissioning
- Two areas are impacted by PAH.
- One large area is impacted by asbestos cement fragments.
- Ash containing fill requires management for aesthetic considerations
- Other areas need further delineation (data gap investigation).

Contaminated soils pose a potential health risk for future users of the site and require removal offsite, refer to Figures 2 - 5 (**Appendix A**).

The preferred remediation option is:

- Decommission redundant suspected USTs and any remnant underground fuel dispensing infrastructure and remove from the site;
- Decommission the redundant ETP including liquids and associated infrastructure and remove from site; and,
- Delineation and excavation of impacted soil materials and transported to a licenced landfill for waste disposal.

Validation data is required to be collected to verify the effectiveness of the remediation works and document the condition of the site as being suitable for the proposed land use.

5.1.2 Identify the Decision

The following decisions are required to be made during the validation works:

- Was the remnant UST and infrastructure decommissioned in accordance with relevant NSW EPA Guidelines and Australian Standards?
- Are there any unacceptable risks to future on-site or off-site receptors from contaminated media following removal of impacted materials?
- Were the tank pit soils impacted and if so, disposed off-site to a facility licensed to accept the classified waste?
- Were all impacted soils disposed off-site to a facility licensed to accept the classified waste?
- Were imported backfill materials appropriately classified as VENM or ENM in accordance with the POEO Act 1997?

5.1.3 Identify Inputs to the Decision

The inputs to the decisions are:

- Physical observations reported during site activities.

Site Validation

- Documentation to verify appropriate removal and disposal of waste.
- Characterisation and validation sampling results.
- Visual inspection of excavation area to verify successful removal of materials exhibiting staining, discolouration, odours or foreign materials (waste).
- Documentation to verify appropriate removal and disposal of waste.

5.1.4 Define the Study Boundaries

The lateral and vertical extent of areas subject to remediation is discussed in **Section 4** and shown on Figures 2 - 5 (**Appendix A**).

Temporal boundaries are dictated by the timing of remediation and validation sampling activities.

5.1.5 Develop a Decision Rule

The decision rules adopted to answer the decisions identified in **Section 5.1.2** are summarised in **Table 5.1**.

Table 5-1 Summary of Decision Rules

Decision Required to be Made	Decision Rule
1. Are there any unacceptable risks to future on-site or off-site receptors from any fill contamination following the removal of impacted soil?	Do validation sampling results comply with site validation criteria within remediation areas? Does field screening and visual/olfactory indicators of contamination from site inspection show only non-impacted soils present? If not, then… Has all UST and infrastructure been removed? Has all tank pit backfill materials been removed? Has all ETP liquids been removed and disposed offsite? Has the ETP and associated infrastructure been decommissioned, demolished and removed for offsite disposal? Has all impacted surface and subsurface soils been removed and characterised? Have all stockpiles been characterised for offsite disposal? If the criteria stated above are satisfied, the decision is yes, and the site is suitable for use without further remediation. If the criteria are not satisfied, the decision is No, and the site is not suitable for use and subject to further management.
2. Were all soil materials suitably classified and disposed off-site to a facility licensed to accept the classified waste?	Soil analytical data will be compared against the guidelines as specified in **Section 5.2**. If the criteria stated above are satisfied, the decision is Yes, or if receipts are provided recording the disposal of material to an off-site licensed facility, the decision is Yes.

Site Validation

Decision Required to be Made	Decision Rule
	If the material fails the criteria, or no classification is provided, and no disposal receipts are provided, the answer is No.
4. Are there any unacceptable risks to future on-site or off-site receptors from any remaining impacted soils?	Do validation sampling results comply with site validation criteria? If the criteria stated above is satisfied, the decision is Yes, and the site is suitable for use without further remediation. If the criteria are not satisfied, the decision is No and it's not suitable for use and subject to further remediation/management.
3 Was imported material validated as either VENM or ENM?	Imported soil analytical data will be compared against the guidelines as specified in **Section 5.2** and supported by documentation from supplier verifying material classification. If the criteria stated above are satisfied, the decision is Yes. If the material fails the criteria, and no verification documentation is provided, the answer is No.

The following presents the validation criteria for the project which will be used to answer the questions in **Section 5.1.2**.

Validation of Soils

The excavated areas will be validated based on laboratory sampling as detailed in **Section 4.7** and visual inspection and other field screening methods including PID and olfactory assessment when non-impact soils are encountered.

The systematic validation sampling and inspection will be supported by photographic evidence across all areas of the site showing the presence of natural soils or sufficient depth has been reached.

Validation criteria for soils will be adopted from ASC NEPM 2013 under a high density residential land use or Commercial/industrial (in accordance with Table 1A(3), table note (1) of Schedule B1 of ASC NEPM 2013) setting as specified in **Section 5.2**.

The proposed statistical methodology for comparison of the soil validation data to criteria is based on NSW EPA 1995 and ASC NEPM 2013, including:

- Comparison of the 95% UCL of each contaminant of concern to their respective criterion; and
- Comparison of standard deviations to a value of 50% of the nominated criteria.

Areas subject to asbestos contamination removal must be inspected and cleared in accordance with SafeWork NSW requirements as outlined in **Section 6.2**.

Waste Classification

Stockpiled soils/wastes and other materials will be assessed and managed in accordance *Section 7.5 - Schedule B2 of the NEPM 2013* and a waste classification certificate prepared in accordance with *NSW EPA Waste Classification Guidelines 2014* for disposal offsite to a licenced landfill.

Site Validation

Imported Fill

Where backfill is required, imported fill materials will need to be validated in accordance with **Section 4.8**.

5.1.6 Specify Limits of Decision Error

This step is to establish the decision maker's tolerable limits on decision errors, which are used to establish performance goals for limiting uncertainty in the data. Validation data, photos, site notes, survey reports generated during this project must be appropriate to allow decisions to be made with confidence including a statement of the level of error in the data.

5.1.7 Optimise the Design for Obtaining Data

The purpose of this step is to identify a resource-effective field investigation and validation design that generates data that is expected to satisfy the decision performance criteria, as specified in the preceding steps of the DQO Process. The output of this step is a validation design that will guide development of the field sampling and analysis plan as required. This step provides a general description of the activities necessary to generate and select data collection designs that satisfy decision performance criteria.

5.2 Validation Criteria

The site is proposed for mixed use land specialty high rise residential with associated basement carparking; therefore, the following criteria is to be adopted for validation:

Soils

- HIL B: Residential with minimal opportunity for soil access: includes dwellings with fully or permanently paved yard space such as high-rise buildings and apartments.
- HSL D – Commercial/industrial including premises such as shops, offices, factories and industrial sites (in accordance with Table 1A(3), table note (1) of Schedule B1 of ASC NEPM 2013).
- Management Limits – Residential.
- Asbestos HSLs: Asbestos Containing Material (ACM), Fibrous Asbestos (FA) and Asbestos Fines (AF) – Residential with minimal opportunity for soil access.
- Aesthetics: Discolouration (staining), a malodorous nature (odours) or abnormal consistency.
- USEPA Regional Screening Levels (RSLs) – Residential Soil (in the absence of either Australian Federal or State guidance on health screening values).

HSLs criteria will be adopted for the top 1.0m of soil with a sandy consistency.

HSLs for direct contact will be adopted from Table 4 of CRC CARE Technical Report No. 10 by Friebel and Nadebaum (2011).

5.3 Quality Assurance and Quality Control Program

Field Samples and Quality

Field data quality samples should be collected as part of the QA/QC program. Field data quality samples that should be collected include:

- Field Duplicates:
    - Intra-Laboratory Duplicates at a frequency of 1/20 primary samples.
    - Inter-Laboratory Duplicates at a frequency of 1/20 primary samples.

- Equipment Rinsate Blanks (not for disposable items) at a frequency of 1/piece of equipment/sampling day.
- Trip Blanks at a frequency of 1/sample batch.
- Spiked Trip Blanks at a frequency of 1/sample batch (where volatile analysis is requested only).

The combination of Inter-laboratory and Intra-laboratory field duplicates corresponds to a field QA/QC program that consist of 10% of the total primary samples.

Laboratory Samples and Quality

The analytical laboratories undertaking the chemical analysis of samples must be accredited by the National Association of Testing Authorities (NATA) for each analytical method.

The following is a summary of the laboratory quality control samples that will be analysed by the selected laboratory and reported with the chemical analysis results:

- Method Blanks.
- Laboratory Duplicates.
- Laboratory Control Samples.
- Matrix Spikes.
- Surrogate Spikes.

The testing laboratories will undertake the analyses utilising their own internal procedures and their test methods (for which they are NATA, or equivalent, accredited) and in accordance with their own quality assurance system which forms part of their accreditation.

The analytical methodologies must be consistent with Schedule B4 of the ASC NEPM 2013 and in accordance with Australian Standards.

Fieldwork Quality

Soil samples of excavated surfaces will be sampled directly from the soil surface or excavator bucket or the bulk of the soil stockpile by hand or hand tool whilst wearing disposable nitrile gloves and placed into either acid-washed glass jars with Teflon® lids or suitable sample containers for analysis as provided by the laboratory.

All equipment to be used for soil and water sampling will be decontaminated prior to field work. Specifically, re-useable equipment, such as pumps, trowels, spatulas and hand augers will be decontaminated between sampling events by removing encrusted materials by scraping, followed by scrubbing with brushes and potable water, and rinsed with potable water. Nitrile gloves will be changed between each sample.

Sampling Documentation

Field data and observations will be recorded on field data sheets or in field logbooks. Field logbooks and field data sheets will be prepared in blue or black permanent ink.

Field logbooks will provide the means for recording field activity records and observations. Items that will be recorded into the field logbook include:

- All aspects of sample collection (including sample and duplicate sample IDs).
- Field measurements.
- Health and safety documentation.
- Equipment calibration documentation.

- Site diary detailing activities undertaken during the day.

Chain of Custody Documentation

Chain of custody (CoC) procedures shall be carried out in accordance with standard procedures. A CoC record will be utilised by field personnel to document possession of samples collected for chemical analysis. The CoC record will include the following information:

- Project name and number
- Name(s) of sampler(s).
- Sample type, identification number and location.
- Date and time of collection.
- Number, type and size of containers.
- Required analyses.

Sample containers will be packed in ice from the time of collection and transported under chain of custody procedures to the analytical laboratory. Copies of the chain of custody documents will be reproduced in the Validation Report.

Data Quality Assessment

An assessment of data quality and validity should be undertaken based on an evaluation of the Data Quality Indicators (DQIs). A decision on the acceptance of the analytical data will be made based on the Data Quality Indicators (DQI) in the context of the PARCC parameters as follows:

- Precision: A quantitative measure of the variability (or reproducibility) of data.
- Accuracy: A quantitative measure of the closeness of reported data to the “true” value.
- Representativeness: The confidence (expressed qualitatively) that data are representative of each media present on site.
- Completeness: A measure of the amount of useable data from a data collection activity.
- Comparability: The confidence (expressed qualitatively) that data may be considered to be equivalent for each sampling and analytical event. (i.e., precision, accuracy, representativeness, completeness, and comparability).

The validation data set will be required to be assessed against the DQIs for both field and laboratory procedures and documented in the Validation Report.

5.4 Validation Report

Once the remediation end point has been reached and the remedial goal has been achieved, a validation report will be compiled detailing the remediation works and any additional remediation/assessment works undertaken to address soil impacts identified above the validation criteria. The report is to be prepared in general accordance with the Consultants reporting on Contaminated Land Guidelines (NSW EPA 2020).

The validation report is to be reviewed and/or approved by a Certified Environmental Practitioner specialising in Site Contamination (under a scheme recognised by the NSW EPA).

6 Legislation and Approvals

6.1 Legislative Requirements

6.1.1 SEPP (Resilience & Hazards) 2021 - Category 2 Remediation

In accordance with Chapter 4 Clause 4.11 of SEPP (Resilience & Hazards) 2021, the remediation work is considered Category 2 remediation work for the following reasons. The remediation work is:

- Not designated development.
- Not being carried out or to be carried out on land declared to be a critical habitat.
- Not likely to have a significant effect on a critical habitat or a threatened species, population, or ecological community.
- Not development for which another State environmental planning policy or a regional environmental plan requires development consent.
- Not being carried out or to be carried out in an area or zone to which any classifications to the following effect apply under an environmental planning instrument:
    - coastal protection,
    - conservation or heritage conservation,
    - habitat area, habitat protection area, habitat, or wildlife corridor,
    - environment protection,
    - escarpment, escarpment protection or escarpment preservation,
    - floodway,
    - littoral rainforest,
    - nature reserve,
    - scenic area or scenic protection,
    - wetland.
- Not being carried out or to be carried out on any land in a manner that does not comply with a policy made under the contaminated land planning guidelines by the council for any local government area in which the land is situated (or if the land is within the unincorporated area, the Minister).

The State Environmental Planning Policies that apply to the site (other than SEPP55 as detailed above) are listed below, none of which, when they apply to the development, impose consent required for remediation work of contaminated land (NSW Govt, Planning Portal – accessed 24/02/2022).

- SEPP (Building Sustainability Index: BASIX) 2004
- SEPP (Concurrences and Consents) 2018
- SEPP (Educational Establishments and Child Care Facilities) 2017
- SEPP (Exempt and Complying Development Codes) 2008
- SEPP (Housing) 2021
- SEPP (Infrastructure) 2007
- SEPP (Mining, Petroleum Production and Extractive Industries) 2007
- SEPP (Primary Production and Rural Development) 2019
- SEPP (Vegetation in Non-Rural Areas) 2017
- SEPP No 19—Bushland in Urban Areas
- SEPP No 33—Hazardous and Offensive Development
- SEPP No 50—Canal Estate Development
- SEPP No 64—Advertising and Signage
- SEPP No 65—Design Quality of Residential Apartment Development

Legilsation and Approvals

- Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005

6.1.2 Other Requirements.

The remediation works (involving handling potentially contaminated soil materials) to be undertaken will comply with applicable environmental regulatory and legislative requirements. The following provides a summary of the general requirements for the proposed works.

Table 6-1 Summary of General Legislative Requirements

Legislation/Regulation	Key Project Requirements
Protection of the Environment Operations Act 1997 (POEO Act).	Undertake all activities so as to minimise harm to the environment (in particular pollution of air and water and noise emissions) and not cause an offence under the Act. Transporters of particular waste types are required to be licensed under the Act.
Protection of the Environment Operations (Waste) Regulation 2014.	Some waste disposal/processing facilities (including those receiving restricted solid waste, hazardous waste) are required to be licensed under the Act. Requirements in relation to transportation, collection, storage, or disposal of waste.
Environmental Planning and Assessment Act 1979 - Planning Guidelines and SEPP 55–Remediation of Land	Under SEPP55, consent is not required for remediating contaminated land on the site. Provisions under Clause 16 SEPP55 must be followed in relations to notification timeframes.
Contaminated Land Management Act 1997	Confirm that a Statutory Site Audit is required for remediation at the discretion of the consent authority.
Work Health and Safety Act 2011	Undertake all activities so as to minimise harm to human health and not cause an offence under the Act.

6.2 Asbestos Removal Regulations and Code of Practice

The removal and disposal of asbestos containing materials and or impacted fill must be managed in accordance with:

- Work Health and Safety Act 2011 (NSW) (WHS Act).
- Work Health and Safety Regulation 2017 (NSW) (WHS Regulation).
- Code of Practice for Management and Control of Asbestos in Workplaces, National Occupational Health and Safety Commission (NOHSC 2018 (2005))
- How to Safely Remove Asbestos Code of Practice, Safe Work Australia (July 2020) (SWA 2020a).
- How to manage and control asbestos in the Workplace Code of Practice, Safe Work Australia (July 2020) (SWA 2020b).
- Australia National Occupational Health and Safety Commission (NOHSC) (2005) Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres, 2nd Edition [NOHSC: 3003 (2005)].
- NSW EPA Waste Classification Guidelines, Part 1 - Classifying Waste (NSW EPA, 2014).

Excavation and offsite removal of asbestos impacted soil is required to be conducted by a SafeWork NSW Class A or B licensed contractor. Assessment of the type of asbestos ‘bonded’ or ‘friable’ shall only be undertaken by Safework NSW approved consultant (eg: Certified Occupational Hygienist, Licenced Asbestos Assessor or similar).

Legilsation and Approvals

Before starting any affected works, the appointed contractor is required to obtain a site-specific permit approving the asbestos works from SafeWork NSW. A permit will not be granted without a current licence and the permit application must be made at least seven days before the work is due to commence.

6.3 Standards and Codes of Practice

All work should be conducted, as appropriate, in accordance with (but not limited to) the following environmental codes of practice:

- Department of Conservation and Land Management, CALM (1992): Urban Erosion Control and Sediment Control.
- NSW Department of Housing (1998): Managing Urban Stormwater – Soils and Construction.
- AS 1940–2017: Storage and handling of flammable and combustible liquids.
- AS 4976–2008: The removal and disposal of underground petroleum storage tanks.
- AS/NZS 2601-2001 Demolition of Structures.
- SafeWork NSW Code of Practice – Demolition Work 2019.

6.4 Handling, Transport and Disposal of Waste

The following provides guidance on the required documentation and approvals for the handling, transport and disposal of waste (including “General Solid”, “Restricted” and “Hazardous” Waste). The guidance is a summary of the regulatory provisions as presented in the Protection of the Environment Operations (Waste) Regulation 2014 and the Protection of the Environment Operations Act 1997.

6.4.1 Transporters of Waste

Under Schedule 1, Part 2 of the POEO Act 1997 the transport of Hazardous, Restricted Solid Waste, Liquid Waste, Clinical and Related Waste or Friable Asbestos Waste (or any combination of them), in loads exceeding 200 kilograms is declared to be a scheduled activity for which a licence is required, but where no licence is required for the premises at which it is carried out (the activity is not premises-based).

The transport of any contaminated soil waste that is generated during the remediation works from the site may require the use of licensed transporters.

6.4.2 Waste Tracking Requirements

The POEO (Waste) Regulation 2014 specifies requirements for the tracking of waste both within NSW and interstate. The wastes that must be tracked are listed in Schedule 1 of the Regulation, in particular to this work is soil contaminated by wastes referred to in Schedule 1.

An EPA on-line tracking system is available to track waste that is transported within NSW or into NSW from other states or territories.

Waste producers (the landowner) are responsible under the legislation for ensuring that wastes (defined under Schedule 1 of the Regulation) are transported only after all the necessary documents and checks have been completed. Before transporting waste from the site, the following must occur:

- Ensure the waste has been correctly characterised.
- Ensure the facility (e.g., landfill/ hazardous waste treatment facility) where the waste is being transported to be legally able to accept the waste.

7

Work Health and Safety

7.1 Site WH&S Plan

To address the WH&S requirements, a Site-specific Health and Safety Plan should be prepared by the Remediation Contractor (or Principal Contractor) prior to site works. The plan shall provide relevant health and safety standards for site personnel undertaking remediation works. All works will be undertaken under strict adherence to the Site WH&S Plan. The main features of the plan should include:

- The evaluation of on-site hazards and the risks associated with those hazards.
- Definition of personal protection standards.
- Classification of on-site personnel and work zones.
- Details on work practices and restrictions, assessment of anticipated protection levels, controls on access to work zones and decontamination practices.
- Supervision of work practices.
- Emergency information.
- Risk assessment methods.

7.2 Air Monitoring Procedures

It is prudent practice to conduct monitoring for airborne asbestos fibres during asbestos works. The results of air monitoring can be used:

- To identify failures in containment;
- To identify poor work practices; and
- To provide proof of containment for occupiers and regulatory authorities and to provide evidence of good work practices for both present and future needs.

Monitoring will be conducted in accordance with the National Occupational Health & Safety Commission (NOHSC) membrane filter method as approved by the National Association of Testing Authorities (NATA).

The appropriate TWA (NOHSC) levels are:

- Amosite - 0.1 fibre/mL;
- Chrysotile – 0.1 fibre/mL;
- Crocidolite - 0.1 fibre/mL;
- Other forms of asbestos - 0.1 fibre/mL; and
- Any mixture of these, or where the composition is unknown - 0.1 fibre/mL.

With consideration to these levels the following trigger levels have been developed:

- If airborne fibre levels reach 0.01 fibres/mL the source of fibre release is to be found and rectified. Work in the affected area does not have to stop; and
- If airborne fibre levels reach 0.02 fibres/mL work in the work area should stop and additional controls measures employed. This will involve additional water spraying during excavations.

Air monitoring should be conducted by a SafeWork NSW Licenced Asbestos Assessor which is mandatory for friable asbestos removal work.

Air monitoring results will be obtained within 24 hours of sample collection. While this precludes “real time” monitoring, inspections will be made during excavation works and, if there are any visible dusts, light water spays will be used to wet the excavation and prevent the release of any airborne asbestos fibres.

8

Environmental Management

Environmental management during the remediation and earthworks will be managed through a Project construction environmental management plan (CEMP). The CEMP should be prepared by the Remediation Contractor (or Principal Contractor) engaged for the project. The CEMP should include (but not limited to) the following information and plans, where required:

- *Project Objectives and Scope* – The project scope and objectives will be reassessed within the terms of any approval conditions.
- *Permits and Approvals* – All permits and approvals required prior to the remediation will be identified in the EMP.
- *Consent Conditions* – All consent conditions of approval the remediation works must be carried out in accordance with will be identified in the CEMP.
- *Complaints Procedure* – A complaint procedure will be provided in the CEMP.
- *Remedial Specification and Environmental Management Procedures* – This section will provide an accurate description of the proposed remedial activities and environmental considerations to be taken into account by the specialist remediation contractor.
- *Soil and Water Management Plan* – prepared in accordance with Managing Urban Stormwater: Soils and Construction (Landcom, 2004 – 4th edition). With consideration to minimising potential for erosion, minimising the risk of contamination from construction equipment and to avoid contamination leaving the construction site.
- *Unexpected Finds Plan* – Prepared in accordance with **Section 9** below.
- *Materials Management Plan* - This plan will outline materials management procedures as presented in Section 10 below.
- *Air Quality Management Plan* –should detail how remedial actions shall be performed in such a way as to minimise the production of fugitive emissions including odours emanating from the site.
- *Noise and Vibration Management Plan* – This will include details of noise and vibration standards to be met, noise and vibration monitoring requirements and noise and vibration control measures to be implemented.
- *Traffic Management Plan* –The purpose of this plan will be to coordinate construction traffic operations, maximise safety and minimise disruption of local traffic.
- *Monitoring and Auditing* – The monitoring methods, locations, frequency, criteria, reporting and responsibilities will be detailed in this section of the CEMP.
- *Communications and Training* – Construction employee training and awareness programs will be developed to make employees aware of environmental responsibilities and environmental issues at the site.

9 Unexpected Finds Procedure

There is a possibility some hazards within the site have not been identified to date. The nature of hazards which may be present, and which may be discovered are expected to generally be detectable through visual or olfactory means, for example:

- The presence of significant aggregates of friable or non-friable asbestos materials (visible);
- Excessive quantities of Construction/Demolition Waste (visible);
- Hydrocarbon impacted materials (visible/odorous);
- Drums or underground storage tanks (USTs) (visible); and
- Oily Ash and/or oily slag contaminated soils/fill materials (visible/odorous).

As a precautionary measure to ensure the protection of the workforce, should any of the abovementioned substances (or any other unexpected potentially hazardous substance) be uncovered during ground disturbance activities, then the following should be immediately implemented:

- Stop work within the area. Isolate the affected area via the placement of temporary barriers or other appropriate measures (i.e., plastic sheeting, geotextile fabric covers, polymer dust suppressant spray, etc.) to prevent exposure to site personnel and/or off-site airborne dust migration; and
- an Environmental Consultant should be immediately contacted to determine an appropriate course of action regarding the assessment and/or management of the “Unexpected Find”.

It is envisaged the assessment strategy will be aimed at determining the nature of the substance – that is, is it hazardous and, if so, is it at concentrations which pose an unacceptable risk to human health or the environment.

9.1 Methodology

Various strategies for developing a statistically based sampling plan are identified in EPA (1995) or any future endorsed guidance from the NSW EPA, including judgemental, random, systematic and stratified sampling patterns. Random sampling is not appropriate. Based on the history of the site a systematic sampling program is considered the most appropriate for any unexpected finds. Sampling locations will initially be placed systematically across the Area of Concern (AOC).

9.1.1 Soil Sampling

Each sample collected as part of the assessment will be examined for signs of contamination and screened with a calibrated PID to identify the presence of VOCs, which might indicate contamination.

Soil samples will be collected directly from the excavator bucket and/or walls of the excavation surface using a dedicated pair of nitrile gloves for each sample to prevent cross contamination.

Test pitting or soil boring will be undertaken by the Environmental Consultant, with the use of an excavator, backhoe or drilling rig, on an appropriately spaced grid (*in situ* materials and stockpile footprints). Locations will be extended through fill material or the stockpile footprint to a maximum depth of 0.3 m into natural, whichever is the shallower.

Soil samples will be collected at 0-0.15 m, 0.3 m, 0.5 m and every 0.5 m interval to a maximum depth of 0.3 m into natural materials (or prior refusal). Should physical evidence of gross contamination be identified during the works, sampling locations may be extended to vertically delineate contamination. During the collection of soil samples, features such as seepage, discolouration, staining, odours and other indicators of contamination will be noted.

Unexpected Finds Protocol

Samples will be placed into laboratory prepared glass sampling jars with lined screw-on caps. Sample identification details will be added to the label on each jar.

The sample jar will be preserved on ice immediately after sampling and during shipment to NATA accredited laboratories. The laboratory chain of custody documentation will be completed and accompany the samples during shipment.

During the collection of soil samples, features such as seepage, discolouration, staining, odours and other indications of contamination (e.g., ACM, staining, odours) will be noted. Photographs of site layout and features will be taken.

9.2 Remediation and Validation of Unexpected Finds

Where unexpected finds are assessed as a potential human health or ecological risk to remain on the site, remediation/management of those materials will be dictated by the remedial options set out in the RAP.

It is noted contaminated soil/fill material present will be ‘chased out’ during the excavation works based on visual, olfactory and preliminary field test results.

Additionally, all excavation works would be undertaken by a licensed contractor experienced in remediation projects and the handling of contaminated soils.

9.3 Reporting

All unexpected finds will be documented in a report/letter prepared in general accordance with the NSW EPA (2020) Consultants Reporting on Contaminated Land – Contaminated Land Guidelines.

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Conclusions

Sullivans recommend this RAP is approved by the Consent Authority for implementation to address the soil contamination, and the abandoned effluent treatment plant and UST present onsite.

The RAP was developed to provide a plan detailing the remedial work activities including delineating contamination, removal, validation, WH&S and environment management strategies associated with the remediation of localised impacted soil material and the UST at the site. The RAP has been prepared in accordance with relevant NSW EPA guidance documentation and industry standards, with sufficient detail to implement the preferred remedial strategy. The steps in remediating the site are:

- Decommission redundant UST and any remnant underground fuel dispensing infrastructure and remove from the site;
- Decommission the redundant ETP including liquids and associated infrastructure and remove from site; and,
- Delineation and excavation of impacted soil materials and transported to a licenced landfill for waste disposal.

The preferred remediation strategy presented above is considered appropriate for soil contamination onsite and is both technically feasible and practical to implement under the known site conditions.

Subject to the successful implementation of the remediation and validation measures detailed in this RAP, Sullivans considers the site can be rendered suitable for its intended future land use as for mixed use land comprising specialty residential high rise with associated basement carparking.

11

References

Australian Standard 4482.1 Guide to the investigation and sampling of sites with potentially contaminated soil, Part 1: Non-volatile and semi-volatile compounds, 2005.

Contaminated Land Management Act 1997 (NSW).

CRC CARE National Remediation Framework: Guideline on Performing Remediation Options Assessment, August 2018.

Environmental Planning and Assessment Act 1979.

National Environment Protection (Assessment of Site Contamination) Measure 2013.

NSW EPA 2020, Contaminated Land Guidelines: Consultants Reporting on Contaminated Land, 2020.

NSW EPA 2019, Guidelines for Implementing the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019.

NSW EPA 2017, Guidelines for the NSW Site Auditor Scheme (3rd Edition).

NSW EPA 1995, Sampling Design Guidelines, 1995.

NSW EPA 2014. Waste Classification Guidelines – Part 1: Classifying Waste.

Parramatta Local Environmental Plan (LEP) 2011.

Phase 1 Site Investigation, 2A Gregory Place, Harris Park, Sullivan Environmental Sciences Pty Ltd, Aug 2015.

Phase 2 Site Investigation, 2A Gregory Place, Harris Park, Sullivan Environmental Sciences Pty Ltd, Mar 2022.

Protection of the Environment Operations Act 1997.

Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019.

Protection of the Environment Operations (Waste) Regulations 2014.

State Environmental Planning Policy No.55 – Remediation of Land 1998 (SEPP55).

State Environmental Planning Policy (Resilience and Hazards) 2021.

Work Health and Safety Act 2011.

Work Health and Safety Regulation 2017.

12

Limitations

This Plan was prepared for Raad Property Acquisition No 65 Pty Ltd in accordance with normal prudent practice and by reference to applicable environmental regulatory authority and industry standards, guidelines and assessment criteria in existence at the date of this Plan, and any previous site investigation and assessment reports referred to in this Plan.

This Plan has been prepared for the sole benefit of Raad Property Acquisition No 65 Pty Ltd and neither the whole nor any part of this Plan may be used or relied upon by any party other than Raad Property Acquisition No 65 Pty Ltd.

This Plan should be read in full, and no excerpts are to be taken as representative of the findings. No responsibility is accepted by Sullivans for use of any part of this Plan in any other context.

This Plan is based solely on the investigations and findings contained in the previous reports and on the conditions encountered and information reviewed at the time of preparation. This Plan is subject to all limitations and recommendations included in the previous reports.

Where the plan indicates that information has been provided to Sullivans, Sullivans has made no independent verification of this information except as expressly stated. Sullivans assumes no liability for any inaccuracies in or omissions to that information.

Sullivans has only considered those chemicals specifically referred to in this Plan. Sullivans makes no statement or representation as to the existence (or otherwise) of any other chemicals.

This Plan has been prepared to address on-site contamination issues only (within the context of and limited to the Scope of Work).

Investigations undertaken prior to this Plan are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and contamination may have been identified prior to this Plan.

Subsurface conditions can vary across a particular site and cannot be exhaustively defined by the investigations carried out prior to this Plan. It is unlikely therefore that the results and estimations expressed or used to compile this Plan will represent conditions at any location removed from the specific points of sampling.

A site which appears to be unaffected by contamination at the time the previous reports were prepared may later, due to natural phenomena or human intervention, become contaminated.

Except as specifically stated above, Sullivans makes no warranty, statement or representation of any kind concerning the suitability of the site for any purpose or the permissibility of any use, development or re-development of the site.

Use, development or re-development of the site for any purpose may require planning and other approvals and, in some cases, environmental regulatory authority and accredited site auditor approvals. Sullivans offers no opinion as to whether the current use has any or all approvals required, is operating in accordance with any approvals, the likelihood of obtaining any approvals for development or redevelopment of the site, or the conditions and obligations which such approvals may impose, which may include the requirement for additional environmental works.

Except as required by law, no third party may use or rely on, this Plan unless otherwise agreed by Sullivans in writing.

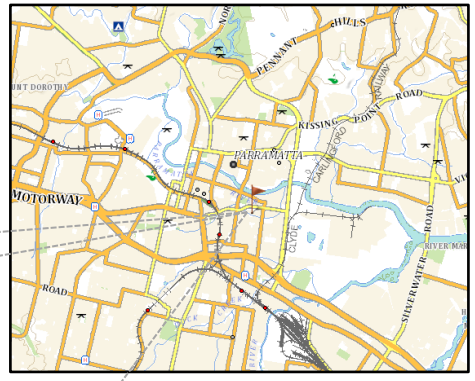
Unexpected Finds Protocol

To the extent permitted by law, Sullivans expressly disclaims and excludes liability for any loss, damage, cost or expenses suffered by any third party relating to or resulting from the use of, or reliance on, any information contained in this Plan.

It is the responsibility of third parties to independently make inquiries or seek advice in relation to their particular requirements and proposed use of the site.

A

Appendix A Figures

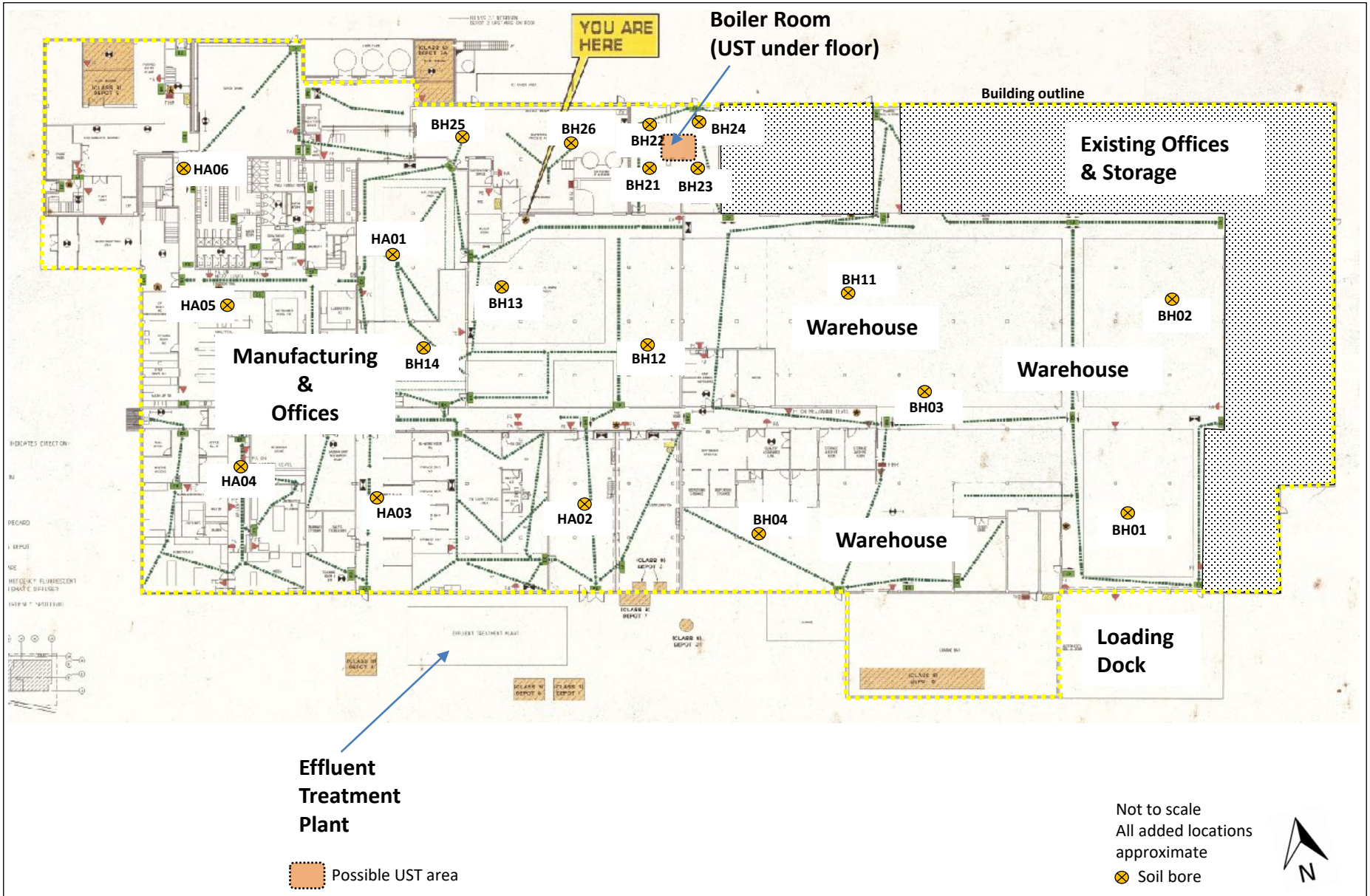


N

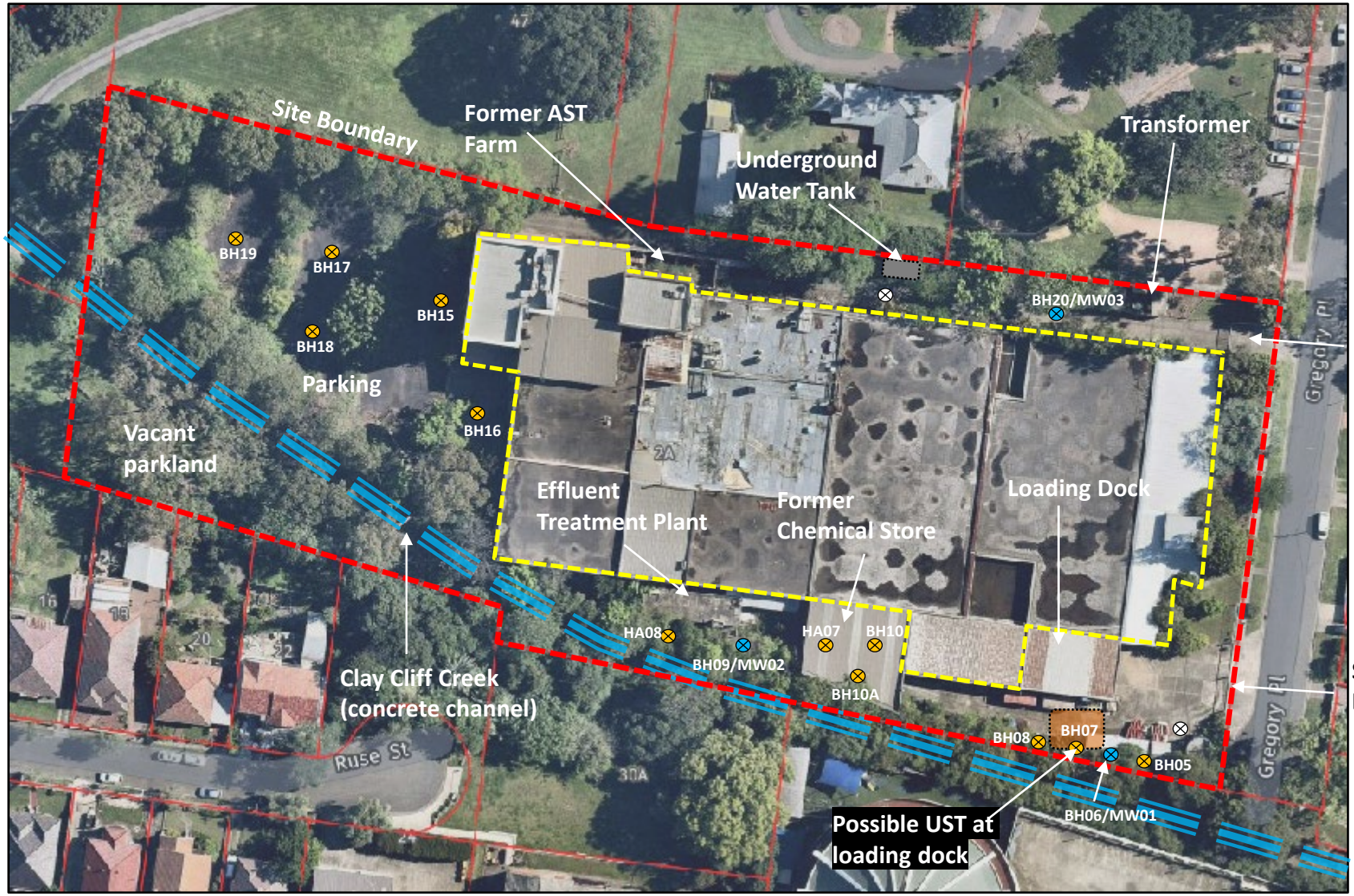
Not to scale

Source: https://maps.six.nsw.gov.au/

SULLIVAN environmental sciences	Project #: **SES_617 Harris Park**	Title: **Remedial Action Plan**
	Figure 1: **Site Location**	Address: **2A Gregory Place, Harris Park NSW 2150**



SULLIVAN environmental sciences	Project #: **SES_617 Harris Park**	Title: **Remedial Action Plan**
	Figure 2: **UST/ETP Locations**	Address: **2A Gregory Place, Harris Park NSW 2150**



Possible UST area

Soil bore

Groundwater well

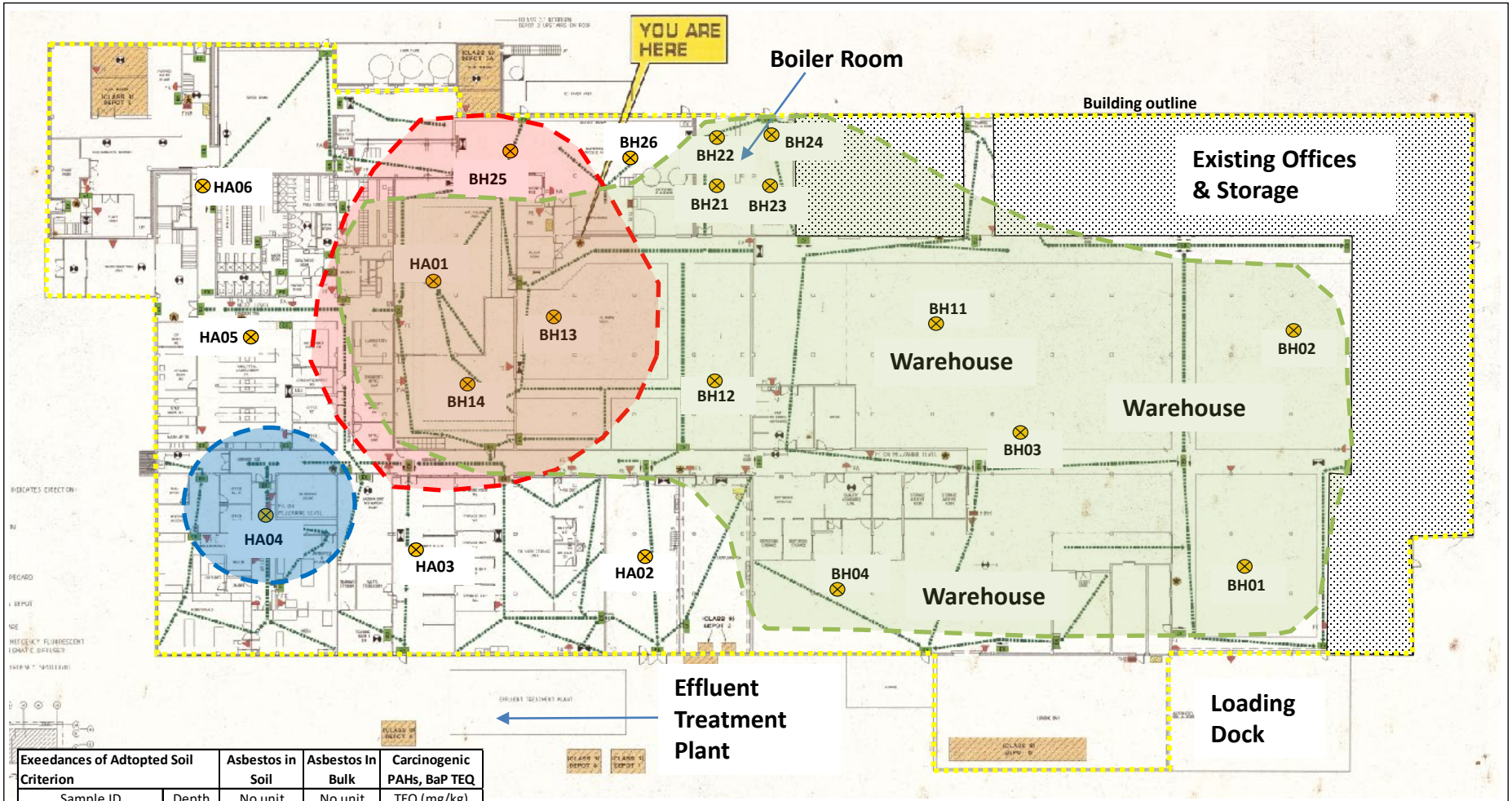
Groundwater well (destroyed)

Not to scale

All added locations approximate

Source: Nearmaps Oct 2021

SULLIVAN environmental sciences	Project #: **SES_617 Harris Park**	Title: **Remedial Action Plan**
	Figure 3: **UST/ETP Locations**	Address: **2A Gregory Place, Harris Park NSW 2150**



Exeedances of Adtopted Soil Criterion		Asbestos in Soil	Asbestos In Bulk	Carcinogenic PAHs, BaP TEQ
Sample ID	Depth	No unit	No unit	TEQ (mg/kg)
BH06_2.0-2.2	2.0-2.2	-	-	8.6
BH13_ACM_0.4	0.4	Yes	-	-
BH14_ACM_0.6	0.6	-	Yes	-
BH25_0.4	0.54	Yes	-	-
HA01_0.3-0.4	0.3-0.4	Yes	-	<0.2
HA04_0.4-0.5	0.4-0.5	-	-	7.5
HA01_0.3-0.4_FCP	0.3-0.4	-	Yes	-
HIL B - Residential (Minimal Soil Access)		Detect	Detect	4

Estimated area impacted by asbestos

Estimated area impacted by Carcinogenic PAHs

Estimated area ash containing fill materials

Not to scale
All added locations approximate
⊗ Soil bore

N

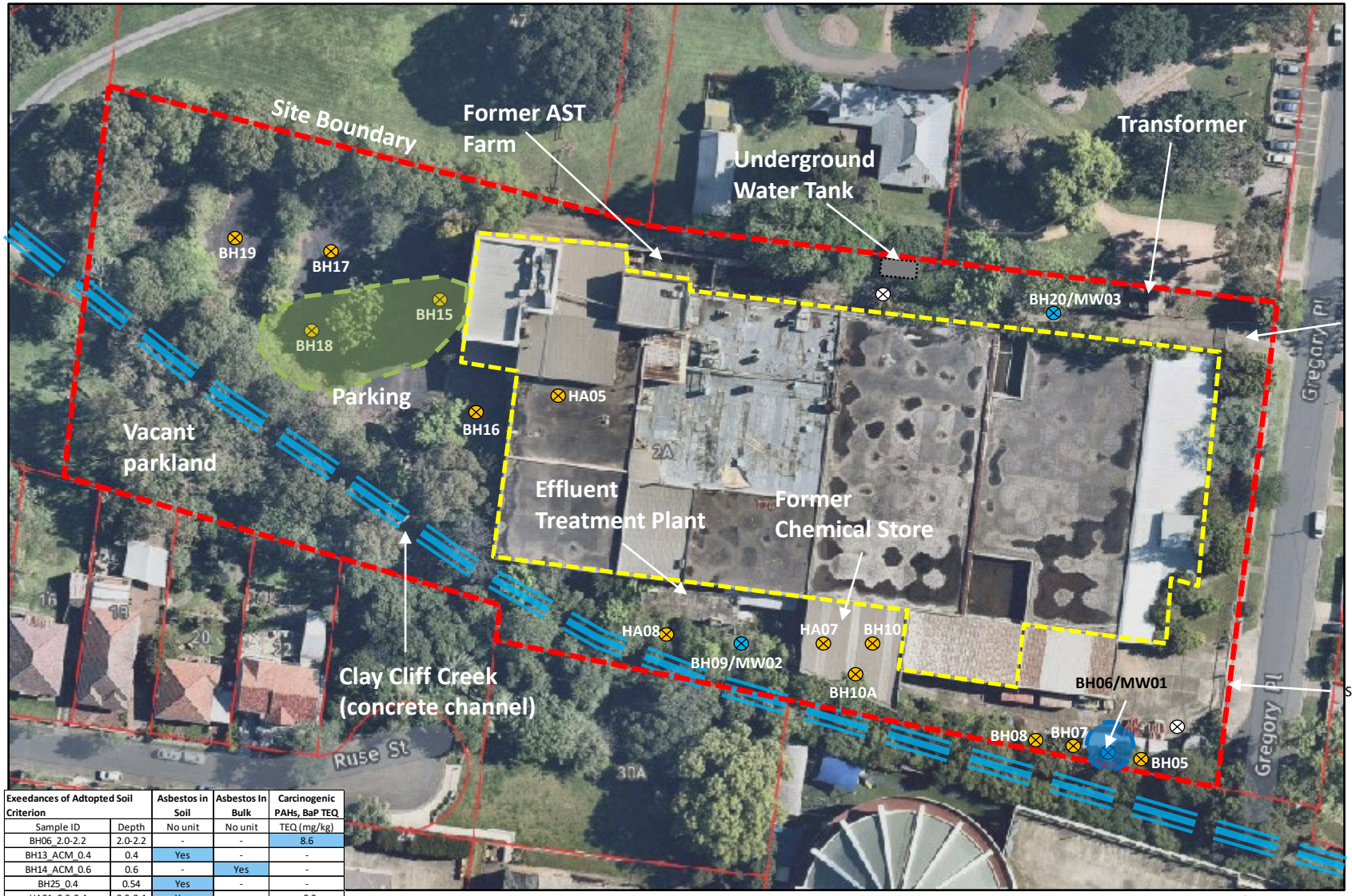
SULLIVAN environmental sciences

Project #: **SES_617 Harris Park**

Title: **Remedial Action Plan**

Figure 4: **Asbestos, PAH and ash impacts under building**

Address: **2A Gregory Place, Harris Park NSW 2150**



Exeedances of Adtopted Soil Criterion		Asbestos in Soil	Asbestos In Bulk	Carcinogenic PAHs, BaP TEQ
Sample ID	Depth	No unit	No unit	TEQ (mg/kg)
BH06_2.0-2.2	2.0-2.2	-	-	8.6
BH13_ACM_0.4	0.4	Yes	-	-
BH14_ACM_0.6	0.6	-	Yes	-
BH25_0.4	0.54	Yes	-	-
HA01_0.3-0.4	0.3-0.4	Yes	-	<0.2
HA04_0.4-0.5	0.4-0.5	-	-	7.5
HA01_0.3-0.4_FCP	0.3-0.4	-	Yes	-
HIL B - Residential (Minimal Soil Access)		Detect	Detect	4

Estimated area impacted by Carcinogenic PAHs

Estimated area ash containing fill materials

⊗ Groundwater well (destroyed)

⊗ Groundwater well ⊗ Soil bore

Not to scale

All added locations approximate

Source: Nearmaps Oct 2021

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Project #: **SES_617 Harris Park**

Title: **Remedial Action Plan**

Figure 5: **PAH and ash impacts under external areas**

Address: **2A Gregory Place, Harris Park NSW 2150**

B

Appendix B Summary Results Tables

Table 1
SES_617 - Soil Analytical Results
Harris Park - Remedial Action Plan

| | | | | Asbestos | | | Total Recoverable Elements | | | | | | | | BTEXN | | | | | | | Volatile Hydrocarbons | | | | Total Recoverable Hydrocarbons | | | | | | | |

Table 1
SES_617 - Soil Analytical Results
Harris Park - Remedial Action Plan

| | | | OC Pesticides in Soil | | |

Table 1
SES_617 - Soil Analytical Results
Harris Park - Remedial Action Plan

| | | | Volatile Organic Compounds | | |

Table 1
SES_617 - Soil Analytical Results
Harris Park - Remedial Action Plan

Full 8270 SVOC in Soil

| Sample ID | Date | Depth | Gamma-chlordane | Endrin ketone | Azinphos-methyl (Guthion) | Azinphos-methyl ethyl | Bromophos ethyl | Carbophenothion | Chlorfenvinphos-cis | Chlorfenvinphos-trans | Chlorpyrifos (Chlorpyrifos Ethyl) | Chlorpyrifos-methyl | Co-Ral (Coumaphos) | Diazinon (Dimpylate) | Dichlorvos | Demeton-S-methyl | Dimethoate | Disulfoton (Di-syston) | EPN | Ethion | Ethoprophos (ethoprop or prophos) | Famphur (Famophos) | Fenamiphos (Phenamiphos) | Fenchlorophos (Ronnel) | Fenitrothion | Fenthion | Malathion (Maldison) | Methidathion | Mevinphos-cis/trans | o,o,o-triethyl phosphorothioate | Parathion ethyl (Parathion) | Parathion methyl | Phorate | Pirimiphos-ethyl | Pirimiphos-methyl | Profenofos | Prothiophos (Tokuthion) | Sulfotepp | Tetrachlorvinphos (Stirophos) | PCB Congener C28 | PCB Congener C52 | PCB Congener C101 | PCB Congener C118 | PCB Congener C138 | PCB Congener C153 | PCB Congener C180 | Hexachlorobenzene (HCB) | 1,2-dichlorobenzene | 1,3-dichlorobenzene | 1,4-dichlorobenzene | Hexachlorobutadiene | Hexachlorocyclopentadiene | Hexachloroethane | Hexachloropropene | Pentachlorobenzene | Pentachloroethane | 1,2,3,5 and 1,2,4,5 - tetrachlorobenzene | 1,2,3,4-tetrachlorobenzene | 1/2-Chloronaphthalene | 1,2,4-trichlorobenzene | Bis(2-ethylhexyl)phthalate | Bis(2-ethylhexyl)adipate | Butyl benzyl phthalate | Di-n-butyl phthalate | Diethyl phthalate | Dimethyl phthalate | Dioctyl phthalate | Carbofuran | Carbaryl | Trifluralin | N-nitroso-di-n-butylamine (NDBA) | N-nitroso-diethylamine (NDEA) | N-nitroso-di-n-propylamine (NDPA) | N-nitroso-morpholine (NMOR) | N-nitroso-piperidine (NPIP) | N-nitroso-pyrrolidine (NPYR) | 4-amino biphenyl | Acetophenone | 1,3-dinitrobenzene | 2,4-dinitrotoluene | 2,6-dinitrotoluene | Isophorone | Nitrobenzene | p-(dimethylamino) azobenzene |
|---|---|---

Table 1
SES_617 - Soil Analytical Results
Harris Park - Remedial Action Plan

			Phenacetin	Pentachloronitrobenzene (quintozene)
		Units	mg/kg	mg/kg
		EQL	1	0.5
		HIL B - Residential with Minimal Access to Soils	-	-
		HSL-D Commercial for VI (Sand, 0 to <1m)	-	-
		HSL-D Commercial for VI (Sand, 1-2m)	-	-
		HSL-D Commercial for VI (Sand, 2-4m)	-	-
		CRC Care Direct Contact HSL-B Residential	-	-
		Management Limits - Residential	-	-
		USEPA Regional Screening Levels - Residential	-	-
Sample ID	**Date**	**Depth**		
	Maximum		**0.0**	**0.0**
BH01_0.2-0.3	8/11/2021	0.2-0.3	-	-
QC01	8/11/2021	-	-	-
BH01_1.5-2.0	8/11/2021	1.5-2.0	-	-
BH02_0.4-0.5	8/11/2021	0.4-0.5	-	-
BH02_1.5-1.7	8/11/2021	1.5-1.7	-	-
BH03_0.3-0.5	8/11/2021	0.3-0.5	-	-
BH04_0.3-0.5	8/11/2021	0.3-0.5	<1	<0.5
BH04_1.2-1.4	8/11/2021	1.2-1.4	-	-
BH05_0.4-0.5	8/11/2021	0.4-0.5	-	-
BH05_1.5-1.7	8/11/2021	1.5-1.7	-	-
BH06_0.5-0.7	8/11/2021	0.5-0.7	-	-
BH06_2.0-2.2	8/11/2021	2.0-2.2	<1	<0.5
BH07_0.3-0.5	8/11/2021	0.3-0.5	-	-
BH08_0.4-0.5	8/11/2021	0.4-0.5	-	-
BH08_0.8-1.0	8/11/2021	0.8-1.0	-	-
QC03	8/11/2021	-	-	-
BH09_0.5-0.6	8/11/2021	0.5-0.6	-	-
QC02	8/11/2021	-	-	-
BH09_1.9-2.0	8/11/2021	1.9-2.0	-	-
BH10A_0.7-0.8	9/11/2021	0.7-0.8	<1	<0.5
BH10A_1.1-1.3	9/11/2021	1.1-1.3	-	-
BH11_0.2-0.3	9/11/2021	0.2-0.3	-	-
QC04	9/11/2021	-	-	-
BH12_0.2-0.3	9/11/2021	0.2-0.3	-	-
BH12_ACM_0.2-0.3	9/11/2021	0.2-0.3	-	-
BH12_0.6-0.8	9/11/2021	0.6-0.8	-	-
BH13_0.3-0.4	9/11/2021	0.3-0.4	-	-
BH13_ACM_0.4	9/11/2021	0.4	-	-
BH14_0.4-0.5	9/11/2021	0.4-0.5	-	-
BH14_ACM_0.6	9/11/2021	0.6	-	-
BH15_0.7-0.8	9/11/2021	0.7-0.8	<1	<0.5
BH15_1.2-1.4	9/11/2021	1.2-1.4	-	-
BH16_0.5-0.6	9/11/2021	0.5-0.6	-	-
BH17_0.8-0.9	9/11/2021	0.8-0.9	-	-
QC05	9/11/2021	-	-	-
BH18_0.6-0.7	9/11/2021	0.6-0.7	-	-
BH18_0.9-1.0	9/11/2021	0.9-1.0	<1	<0.5
BH19_0.8-1.0	9/11/2021	0.8-1.0	-	-
BH19_1.4-1.6	9/11/2021	1.4-1.6	-	-
BH19_2.3-2.5	9/11/2021	2.3-2.5	-	-
BH20_0.3-0.4	10/11/2021	0.3-0.4	-	-
BH20_2.5-2.7	10/11/2021	2.5-2.7	-	-
BH21_0.3-0.5	10/11/2021	0.3-0.5	-	-
BH21_1.9-2.0	10/11/2021	1.9-2.0	-	-
BH22_0.2-0.3	10/11/2021	0.2-0.3	-	-
BH22_2.6-2.7	10/11/2021	2.6-2.7	-	-
BH22_2.3-2.4	10/11/2021	2.3-2.4	-	-
BH23_0.2-0.3	10/11/2021	0.2-0.3	-	-
BH23_2.2-2.3	10/11/2021	2.2-2.3	-	-
BH24_0.2-0.4	10/11/2021	0.2-0.4	-	-
BH24_2.6-2.7	10/11/2021	2.6-2.7	-	-
BH25_0.4	10/11/2021	0.54	-	-
BH26_0.4-0.5	10/11/2021	0.4-0.5	-	-
BH26_2.4-2.5	10/11/2021	2.4-2.5	-	-
HA01_0.3-0.4	8/11/2021	0.3-0.4	-	-
HA04_0.4-0.5	9/11/2021	0.4-0.5	<1	<0.5
HA05_0.5-0.7	9/11/2021	0.5-0.7	<1	<0.5
HA06_0.4-0.6	9/11/2021	0.4-0.6	-	-
HA07_0.4-0.5	9/11/2021	0.4-0.5	-	-
HA07_0.6-0.7	9/11/2021	0.6-0.7	<1	<0.5
HA08_1.4-1.5	9/11/2021	1.4-1.5	<1	<0.5
Trip Spike A	4/11/2021	Spike A	-	-
Trip Blank 1	4/11/2021	Blank 1	-	-
HA01_0.3-0.4_FCP	4/11/2021	0.3-0.4	-	-

Table 1
SES_617 - Soil Analytical Results
Harris Park - Remedial Action Plan

Sample ID	Date	Depth	Aniline	4-chloroaniline	2-nitroaniline	3-nitroaniline	4-nitroaniline	Diphenylamine	o-toluidine	5-nitro-o-toluidine	1-naphthylamine	2-naphthylamine	Bis(2-chloroethoxy) methane	Bis(2-chloroethyl) ether	Bis(2-chloroisopropyl) ether	4-chlorophenyl phenyl ether	4-bromophenyl phenyl ether	Methyl methanesulfonate	Ethyl methanesulfonate	Dibenzofuran	Benzyl alcohol	Safrole	Isosafrole Isomer 1	Isosafrole Isomer 2	1,4-naphthoquinone	Thionazin	3/4-methyl phenol (m/p-cresol)	2-methyl phenol (o-cresol)	2,6-dichlorophenol	2,4,5-trichlorophenol	4-chloro-3-methylphenol	2-chlorophenol	2,4-dichlorophenol	2,4-dimethylphenol	2-nitrophenol	Phenol	2,4,6-trichlorophenol	Pentachlorophenol	4-nitrophenol
Units			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL			3	1	1	1	1	0.5	1	1	1	1	0.5	0.5	0.5	0.5	0.5	1	1	0.5	1	0.5	1	1	0.5	1	1	0.5	0.5	0.5	2	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1
HIL B - Residential with Minimal Access to Soils			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HSL-D Commercial for VI (Sand, 0 to <1m)			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HSL-D Commercial for VI (Sand, 1-2m)			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HSL-D Commercial for VI (Sand, 2-4m)			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRC Care Direct Contact HSL-B Residential			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Management Limits - Residential			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
USEPA Regional Screening Levels - Residential			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Maximum		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
BH01_0.2-0.3	8/11/2021	0.2-0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC01	8/11/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH01_1.5-2.0	8/11/2021	1.5-2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH02_0.4-0.5	8/11/2021	0.4-0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH02_1.5-1.7	8/11/2021	1.5-1.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH03_0.3-0.5	8/11/2021	0.3-0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH04_0.3-0.5	8/11/2021	0.3-0.5	<3	<1	<1	<1	<1	<0.5	<1	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<0.5	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
BH04_1.2-1.4	8/11/2021	1.2-1.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH05_0.4-0.5	8/11/2021	0.4-0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH05_1.5-1.7	8/11/2021	1.5-1.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH06_0.5-0.7	8/11/2021	0.5-0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH06_2.0-2.2	8/11/2021	2.0-2.2	<3	<1	<1	<1	<1	<0.5	<1	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<0.5	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
BH07_0.3-0.5	8/11/2021	0.3-0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH08_0.4-0.5	8/11/2021	0.4-0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH08_0.8-1.0	8/11/2021	0.8-1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC03	8/11/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH09_0.5-0.6	8/11/2021	0.5-0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC02	8/11/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH09_1.9-2.0	8/11/2021	1.9-2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH10A_0.7-0.8	9/11/2021	0.7-0.8	<3	<1	<1	<1	<1	<0.5	<1	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<0.5	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
BH10A_1.1-1.3	9/11/2021	1.1-1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH11_0.2-0.3	9/11/2021	0.2-0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC04	9/11/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH12_0.2-0.3	9/11/2021	0.2-0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH12_ACM_0.2-0.3	9/11/2021	0.2-0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH12_0.6-0.8	9/11/2021	0.6-0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH13_0.3-0.4	9/11/2021	0.3-0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH13_ACM_0.4	9/11/2021	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH14_0.4-0.5	9/11/2021	0.4-0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH14_ACM_0.6	9/11/2021	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH15_0.7-0.8	9/11/2021	0.7-0.8	<3	<1	<1	<1	<1	<0.5	<1	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<0.5	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
BH15_1.2-1.4	9/11/2021	1.2-1.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH16_0.5-0.6	9/11/2021	0.5-0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH17_0.8-0.9	9/11/2021	0.8-0.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QC05	9/11/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH18_0.6-0.7	9/11/2021	0.6-0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH18_0.9-1.0	9/11/2021	0.9-1.0	<3	<1	<1	<1	<1	<0.5	<1	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<0.5	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
BH19_0.8-1.0	9/11/2021	0.8-1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH19_1.4-1.6	9/11/2021	1.4-1.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH19_2.3-2.5	9/11/2021	2.3-2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH20_0.3-0.4	10/11/2021	0.3-0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH20_2.5-2.7	10/11/2021	2.5-2.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH21_0.3-0.5	10/11/2021	0.3-0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH21_1.9-2.0	10/11/2021	1.9-2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH22_0.2-0.3	10/11/2021	0.2-0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH22_2.6-2.7	10/11/2021	2.6-2.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH22_2.3-2.4	10/11/2021	2.3-2.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH23_0.2-0.3	10/11/2021	0.2-0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH23_2.2-2.3	10/11/2021	2.2-2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH24_0.2-0.4	10/11/2021	0.2-0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH24_2.6-2.7	10/11/2021	2.6-2.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH25_0.4	10/11/2021	0.54	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH26_0.4-0.5	10/11/2021	0.4-0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH26_2.4-2.5	10/11/2021	2.4-2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA01_0.3-0.4	8/11/2021	0.3-0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA04_0.4-0.5	9/11/2021	0.4-0.5	<3	<1	<1	<1	<1	<0.5	<1	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<0.5	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
HA05_0.5-0.7	9/11/2021	0.5-0.7	<3	<1	<1	<1	<1	<0.5	<1	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<0.5	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
HA06_0.4-0.6	9/11/2021	0.4-0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA07_0.4-0.5	9/11/2021	0.4-0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA07_0.6-0.7	9/11/2021	0.6-0.7	<3	<1	<1	<1	<1	<0.5	<1	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<0.5	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
HA08_1.4-1.5	9/11/2021	1.4-1.5	<3	<1	<1	<1	<1	<0.5	<1	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<0.5	<1	<0.5	<1	<1	<0.5	<1	<1	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1
Trip Spike A	4/11/2021	Spike A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trip Blank 1	4/11/2021	Blank 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA01_0.3-0.4_FCP	4/11/2021	0.3-0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 2 SES_617 - PASS Soil Analytical Results Harris Park - Remedial Action Plan				TAA (Titratable Actual Acidity)					Chromium Reducible Sulphur (CRS)		HCl Extractable S, Ca and Mg in Soil/Solids ICP OES	Acid Neutralising Capacity (ANC)				Chromium Suite Net Acidity Calculations						
			Moisture	pH KCl	Titratable Actual Acidity	Titratable Actual Acidity (TAA) moles H+/tonne	Titratable Actual Acidity (TAA) S%w/w	Sulphur (SKCl)	Chromium Reducible Sulphur (Scr)	Chromium Reducible Sulphur (Scr)	Acid Soluble Sulfur (SHCl)	Acid Neutralisation Capacity (ANCBT) as % $CaCO_3$	Acid Neutralisation Capacity (ANCBT) as kg H_2SO_4/t	ANC as % $CaCO_3$	Lime Equivalence	s-Net Acidity	a-Net Acidity	Liming Rate	Verification s-Net Acidity	a-Net Acidity without ANCBT	Liming Rate without ANCBT	s-Net Acidity without ANC
		Units	%w/w	pH Units	kg H2SO4/T	moles H+/T	%w/w S	%w/w	%	moles H+/T	%w/w	% CaCO3	kg H2SO4/T	% CaCO3	% CaCO3	%w/w S	moles H+/T	kg CaCO3/T	%w/w S	moles H+/T	kg CaCO3/T	%w/w S
		EQL	1	0	0.25	5	0.01	0.005	0.005	5	0.005	0.1	0.1	0.1	0.1	0.005	5	0.1	-20	5	0.1	0.005
		ASSMAC 1998 - >1000T disturbance*	-	-	-	18	0.03		0.03	18	-	-	-	-	-	0.03	18	-	-	18	-	0.03
Sample ID	Date	Depth																				
BH01_1.5-2.0	8/11/2021	1.5-2.0	-	**7.4**	<0.25	<5	<0.01	-	<0.005	<5	-	**0.1**	**1.2**	**0.1**	**0.1**	<0.005	<5	<0.1	**-0.03**	<5	<0.1	<0.005
BH05_1.5-1.7	8/11/2021	1.5-1.7	-	**5.8**	**0.49**	**10**	**0.02**	-	**0.009**	**6**	-	-	-	-	-	**0.025**	**16**	NA	**0.01**	**16**	NA	**0.025**
BH19_1.4-1.6	9/11/2021	1.4-1.6	-	**6.2**	**0.31**	**6**	**0.01**	-	**0.007**	<5	-	-	-	-	-	**0.017**	**11**	NA	**0.01**	**11**	NA	**0.017**
BH19_2.3-2.5	9/11/2021	2.3-2.5	-	**6.4**	<0.25	<5	<0.01	-	<0.005	<5	-	-	-	-	-	<0.005	<5	<0.1	0.00	<5	<0.1	<0.005
BH20_2.5-2.7	10/11/2021	2.5-2.7	-	**6.4**	<0.25	<5	<0.01	-	<0.005	<5	-	-	-	-	-	<0.005	<5	<0.1	0.00	<5	<0.1	<0.005
BH22_2.3-2.4	10/11/2021	2.3-2.4	-	**6.4**	<0.25	<5	<0.01	-	<0.005	<5	-	-	-	-	-	<0.005	<5	<0.1	0.00	<5	<0.1	<0.005

Notes

ASSMAC 1998: - Acid Sulfate Soils Assessment Guidelines, NSW Acid Sulfate Soils Management Advisory Committee August 1998

*Action Criteria if more than 1000 tonnes disturbed

Table 3
SES617 - Groundwater and Effluent Treatment Plant
Analytical Results
Harris Park - Remedial Action Plan

| | | Heavy Metals | | | | | | | | Total Petroleum Hydrocarbons | | | | | | Total Recoverable Hydrocarbons - ASC NEPM 2013 | | | | | | | BTEXN | | | | | | | | Polycyclic Aromatic Hydrocarbons | | | | | | | |

Table 3
SES617 - Groundwater and Effluent Treatment Plant
Analytical Results
Harris Park - Remedial Action Plan

| | | Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous Samples - Low Level | | | | | | | | | | | | | | | | | | | | | | | VOCs in Water | | | | | | | | | | | | | | | | | | |

Table 3
SES617 - Groundwater and Effluent Treatment Plant
Analytical Results
Harris Park - Remedial Action Plan

| | | 2-hexanone (MBK) | 1,2-dibromoethane (EDB) | Tetrachloroethene (Perchloroethylene,PCE) | 1,1,1,2-tetrachloroethane | Chlorobenzene | Bromoform (THM) | cis-1,4-dichloro-2-butene | Styrene (Vinyl benzene) | 1,1,2,2-tetrachloroethane | 1,2,3-trichloropropane | trans-1,4-dichloro-2-butene | Isopropylbenzene (Cumene) | Bromobenzene | n-propylbenzene | 2-chlorotoluene | 4-chlorotoluene | 1,3,5-trimethylbenzene | tert-butylbenzene | 1,2,4-trimethylbenzene | sec-butylbenzene | 1,3-dichlorobenzene | 1,4-dichlorobenzene | p-isopropyltoluene | 1,2-dichlorobenzene | n-butylbenzene | 1,2-dibromo-3-chloropropane | 1,2,4-trichlorobenzene | Hexachlorobutadiene | 1,2,3-trichlorobenzene | Acenaphthene | Acenaphthylene | Anthracene | Benzo(a)anthracene | Benzo(b&j)fluoranthene | Benzo(k)fluoranthene | Benzo(ghi)perylene | Benzo(a)pyrene | Chrysene | Dibenzo(ah)anthracene | Fluoranthene | Fluorene | Indeno(1,2,3-cd)pyrene | 1-methylnaphthalene | 2-methylnaphthalene | Naphthalene | Phenanthrene | Pyrene | 2-acetylaminofluorene | 7,12-dimethyl-benz(a)anthracene | 3-methylcholanthrene | Aldrin | Alpha-BHC | Beta-BHC | Delta-BHC | Gamma-BHC (Lindane) | p,p-DDD | p,p-DDE | p,p-DDT | Dieldrin | Alpha-endosulfan | Beta-endosulfan | Endosulfan sulphate | Endrin | Heptachlor | Heptachlor epoxide | Isodrin | Methoxychlor | Mirex | Alpha-chlordane | Gamma-chlordane | Endrin ketone | Azinphos-methyl (Guthion) |
|---|---|---

Table 3
SES617 - Groundwater and Effluent Treatment Plant
Analytical Results
Harris Park - Remedial Action Plan

Full 8270 SVOC in Water

| | | Bromophos ethyl | Carbophenothion | Chlorfenvinphos-cis | Chlorfenvinphos-trans | Chlorpyrifos (Chlorpyrifos Ethyl) | Chlorpyrifos-methyl | Co-Ral (Coumaphos) | Diazinon (Dimpylate) | Dichlorvos | Demeton-S-methyl | Dimethoate | Disulfoton (Di-syston) | EPN | Ethion | Ethoprophos (Ethoprop or Prophos) | Famphur (Famophos) | Fenamiphos (Phenamiphos) | Fenchlorophos (Ronnel) | Fenitrothion | Fenthion | Malathion (Maldison) | Methidathion | Mevinphos-cis/trans | O,O,o-triethyl phosphorothioate | Parathion ethyl (Parathion) | Parathion methyl | Phorate | Pirimiphos-ethyl | Pirimiphos-methyl | Profenofos | Prothiophos (Tokuthion) | Sulfotepp | Tetrachlorvinphos (Stirophos) | PCB Congener C28 | PCB Congener C52 | PCB Congener C101 | PCB Congener C118 | PCB Congener C138 | PCB Congener C153 | PCB Congener C180 | Hexachlorobenzene (HCB) | 1,2-dichlorobenzene | 1,3-dichlorobenzene | 1,4-dichlorobenzene | Hexachlorobutadiene | Hexachlorocyclopentadiene | Hexachloroethane | Hexachloropropene | Pentachlorobenzene | Pentachloroethane | 1,2,3,4-tetrachlorobenzene | 1/2-Chloronaphthalene | 1,2,4-trichlorobenzene | Bis(2-ethylhexyl)phthalate | Bis(2-ethylhexyl)adipate | Butyl benzyl phthalate | Di-n-butyl phthalate | Diethyl phthalate | Dimethyl phthalate | Dioctyl phthalate | Carbofuran | Carbaryl | Trifluralin | N-nitroso-di-n-butylamine (NDBA) | N-nitroso-diethylamine (NDEA) | N-nitroso-di-n-propylamine (NDPA) | N-nitroso-morpholine (NMOR) | N-nitroso-piperidine (NPIP) | N-nitroso-pyrrolidine (NPYR) | 4-amino biphenyl | Acetophenone | 1,3-dinitrobenzene |
|---|---|---

Table 3
SES617 - Groundwater and Effluent Treatment Plant
Analytical Results
Harris Park - Remedial Action Plan

		2,4-dinitrotoluene	2,6-dinitrotoluene	Isophorone	Nitrobenzene	p-(dimethylamino) azobenzene	Phenacetin	Pentachloronitrobenzene (quintozene)	Aniline	4-chloroaniline	2-nitroaniline	3-nitroaniline	4-nitroaniline	Diphenylamine	o-Toluidine	5-nitro-o-toluidine	1-naphthylamine	2-naphthylamine	Bis(2-chloroethoxy) methane	Bis(2-chloroethyl) ether	Bis(2-chloroisopropyl) ether	4-chlorophenyl phenyl ether	4-bromophenyl phenyl ether	Methyl methanesulfonate	Ethyl methanesulfonate	Dibenzofuran	Benzyl alcohol	Safrole	Isosafrole Isomer 1	Isosafrole Isomer 2	1,4-naphthoquinone	Thionazin	3/4-methyl phenol (m/p-cresol)	2-methyl phenol (o-cresol)	2,6-dichlorophenol	2,3,4,6-tetrachlorophenol	2,4,5-trichlorophenol	4-chloro-3-methylphenol	2-chlorophenol	2,4-dichlorophenol	2,4-dimethylphenol	2-nitrophenol	Phenol	2,4,6-trichlorophenol	Pentachlorophenol	4-nitrophenol	Total Endosulfan (alpha+beta+sulfate)
Units		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LOR		1.0	1.0	1.0	1.0	1.0	1.0	1.0	5.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.5	0.5	0.5	0.5	2.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.0	0.2
HSL-A&B Residential for VI (Sand)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANZG 2018 Eco (Marine) 95% Protection		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NEMP V2 Human Health - Recreational Use (HEPA, Jan		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NEMP V2 Ecological - Marine water 95% species		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NEMP V2 Ecological - Marine water 99% species		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sample ID	**Date**																																																
MW01	12/11/2021	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<1	<1	<1	<1	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.2
MW02	12/11/2021	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<1	<1	<1	<1	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.2
MW03	12/11/2021	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<1	<1	<1	<1	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.2
QZ01	12/11/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ETP01	12/11/2021	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<1	<1	<1	<1	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.2
ETP02	12/11/2021	<1	<1	<1	<1	<1	<1	<1	<5	<1	<1	<1	<1	<1	<1	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.2
Trip Spike C	26/10/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trip Blank 3	26/10/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

C

Appendix C Proposed Development Drawings

DRAFT

UNIT TYPES

1 BED		
98	129*	(27.6%)
1 BED + S		
31		
2 BED		
277	298	(63.7%)
2 BED + S		
21		
3 BED		(8.7%)
41		

Grand total: 468

UNIT TYPES - BLD A

1 BED		
32	52	(25.4%)
1 BED + S		
20		
2 BED		
117	135	(65.9%)
2 BED + S		
18		
3 BED		(8.7%)
18		

Grand total: 205

UNIT TYPES - BLD B

1 BED		
46	49	(32.7%)
1 BED + S		
3		
2 BED		
88	91	(60.7%)
2 BED + S		
3 BED		(6.6%)
10		

Grand total: 150

UNIT TYPES - BLD C

1 BED		
20	28	(24.8%)
1 BED + S		
8		
2 BED		(63.7%)
72		
3 BED		(11.5%)
13		

Grand total: 113

NATURAL CROSS VENTILATION

YES
A: 111

YES
B: 94

YES
C: 71

276 (59.0%)

ADG GUIDELINE = 280.8 (60%)

SOLAR ACCESS (9AM-3PM)

YES
A: 152

YES
B: 88

YES
C: 88

328 (70.1%)

ADG GUIDELINE = 327.6 (70%)

GFA SCHEDULE

LEVEL	GFA (m²)
BUILDING A:	
L1 (G)	2640.45
L2	2939.04
L3	2939.04
L4	2939.04
L5	2726.16
L6	2074.24
L7	1428.88
L8	1428.88
	19115.71
BUILDING B:	
L1 (G)	2164.74
L2	2159.03
L3	2158.46
L4	2158.46
L5	1817.94
L6	1320.42
L7	971.96
L8	971.96
	13722.99
BUILDING C:	
L1 (G)	1136.94
L2	1253.30
L3	1253.30
L4	1253.30
L5	1253.30
L6	1253.30
L7	1253.30
L8	1253.30
	9910.05
PROPOSED GFA	42748.75
PROPOSED FSR	2.20:1
PROPOSED FSR (DEVELOPABLE)	2.51:1
TOTAL SITE AREA	19,480.00 m²
PROPOSED SITE AREA (DEVELOPABLE)	17,021.51 m²
TARGET GFA	48,700 m²
TARGET FSR	2.50:1

issue	amendment	date	legend
1	PCG MEETING #1	21.07.21	
2	ISSUE TO TRAFFIC ENGINEER FOR COMMENT	23.07.21	

23-Jul-21 3:10:51 PM

do not scale from drawings.

the layout shown and the areas noted on this drawing are indicative only. layouts are to be read in conjunction with floor plans, elevations + sections.

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NSW ARB Frank Stanisic 4480

client
HALLMARK

PRELIMINARY NOT FOR SUBMISSION

project
2A GREGORY PLACE
HARRIS PARK

checked: Checker
drawing: DEVELOPMENT DATA
scale:
drawn: Author
issue: 2
scale bar:
project no: 14 004
drawing no: CD 0002

DRAFT

issue	amendment	date	legend
1	ISSUE TO TRAFFIC ENGINEER FOR COMMENT	23.07.21	

23-Jul-21 3:10:57 PM

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HALLMARK

PRELIMINARY NOT FOR SUBMISSION

north: tn

scale: 1:400@A1, 1:800@A3

scale bar: 0 4 8 12 16 20 m

project: 2A GREGORY PLACE, HARRIS PARK

checked: FS

drawing: BASEMENT 2 PLAN

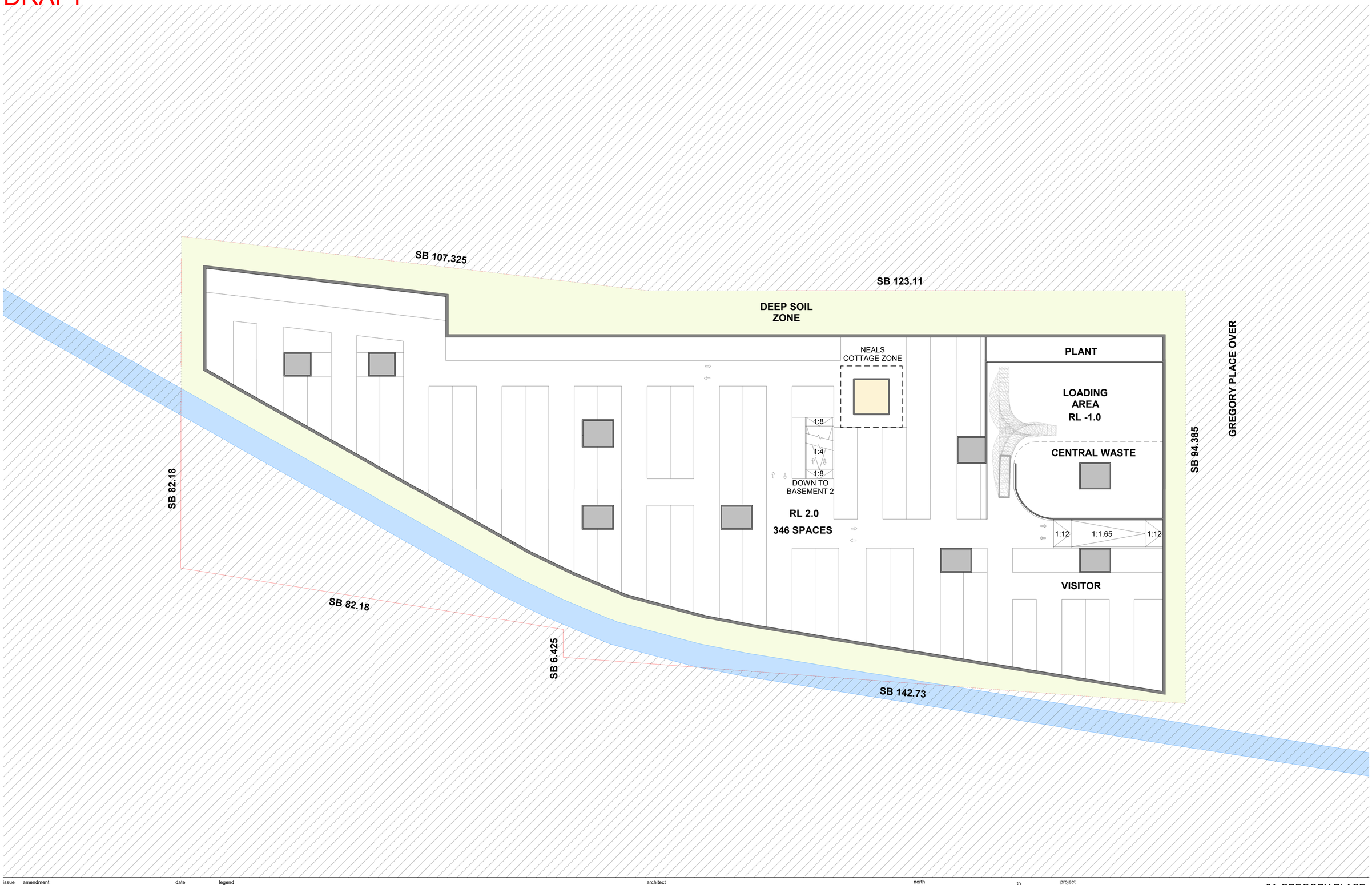
drawn: JN/AN

issue: 1

project no: 14 004

drawing no: CD 2001

DRAFT



issue	amendment	date	legend
1	ISSUE TO TRAFFIC ENGINEER FOR COMMENT	23.07.21	

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HALLMARK

north: tn

scale: 1:400@A1, 1:800@A3

scale bar: 0 4 8 12 16 20 m

project: 2A GREGORY PLACE, HARRIS PARK

checked: FS

drawing: BASEMENT 1 PLAN

drawn: JN/AN

issue: 1

project no: 14 004

drawing no: CD 2002

23-Jul-21 3:11:03 PM

do not scale from drawings.

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PRELIMINARY NOT FOR SUBMISSION

DRAFT

issue	amendment	date
1	PCG MEETING #1	21.07.21
2	ISSUE TO TRAFFIC ENGINEER FOR COMMENT	23.07.21

legend
- 1 BED
- 2 BED
- 3 BED

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client
HALLMARK

north: tn

scale: 1:400@A1, 1:800@A3

scale bar: 0 4 8 12 16 20 m

project
2A GREGORY PLACE
HARRIS PARK

checked: FS
drawing: LEVEL 1 (G) PLAN
drawn: JN/AN
issue: 2
project no: 14 004
drawing no: CD 2003

do not scale from drawings.

the layout shown and the areas noted on this drawing are indicative only. layouts are to be read in conjunction with floor plans, elevations + sections.

PRELIMINARY NOT FOR SUBMISSION

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