

GRAND NOBLE PROJECT 1 PTY LTD



Preliminary Site Investigation

11-23 Rangers Avenue, Mosman, NSW

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Executive Summary

EI Australia (EI) was engaged by Grand Noble Project 1 Pty Ltd ('the client') to conduct a preliminary investigation of 11-23 Rangers Avenue, Mosman in New South Wales (henceforth 'the site').

The site is located within the local government area of Mosman City Council and covers an area of 3,594m². The site comprises the following allotments:

- Lot 42 in Deposited Plan (DP) 2509 = 11 Rangers Avenue;
- Lot 41 in DP 2509 = 13 Rangers Avenue;
- Lot 2 in DP748842 = 15 Rangers Avenue;
- Lot 1 in DP748842 = 17 Rangers Avenue;
- Lot 39 in DP 2509 = 19 Rangers Avenue;
- Lot 38 in DP 2509 = 21 Rangers Avenue;
- Lot 37 in DP 2509 = 23 Rangers Avenue;

This preliminary site investigation (PSI) has been prepared by EI to accompany a State Significant Development Application (SSDA) in accordance with condition 13 of the Secretary's Environmental Assessment Requirements (SEARS) dated 14 October 2025, issued in regards to the State Significant Development (SSD-96272465) for the residential development of the site. The aim of this report is to appraise the environmental (potential contamination) condition of the site. It enables the client to meet obligations under the *Contaminated Land Management Act 1997* and *State Environmental Planning Policy (Resilience and Hazards) 2021*.

The key findings were as follows:

- At the time of this investigation, the site consisted of seven residential properties. No visual sign of gross contamination was detected across the site. No olfactory evidence of contamination (i.e. suspicious odour) was detected during the inspection.
- No evidence of the presence of an underground petroleum storage system was found on any part of the site. No aboveground storage tank was observed on either of the properties.
- Based on the available historical information, the site had been used for residential purposes since 1943 at least. Some buildings appeared to have undergone redevelopment between 1970 and 1996.
- Surrounding areas had been mainly used for residential purposes since 1943 at least. There was no evidence of heavy industry in the area indicating low potential of contamination from local commercial activities.
- The site and surrounding areas were free of statutory notices and licencing agreements issued under the *Contaminated Land Management Act 1997* and *Protection of the Environment Operations Act 1997*. The site and surrounding areas were not included on the *List of NSW Contaminated Sites Notified to the EPA*.
- The sub-surface consisted of a shallow layer of anthropogenic filling (<0.5m BGL), overlying natural sandstone bedrock. Bedrock was intercepted from 0.17-0.35m BGL onwards.
- The potential for ASSs to be present was very low and additional assessment and management of ASS was unwarranted.
- The CSM established there was a low to moderate potential for site contamination, derived from a variety of sources.

- Under the proposed development, bulk excavation of majority of site soils would be performed in order to construct the one level basement and lower ground floor (covering the majority of the available area). This would result in the removal of existing site infrastructure, fill soils, and potential on-site contaminant sources within the basement construction removing this concern (if any) for the development. Where site soils are to remain on-site in setback areas, these soils should be confirmed to be suitable for the site land use.

Based on the findings of this PSI, and with consideration of EI's *Statement of Limitations (Section 7)*, EI concluded that the site can be made suitable for the proposed development and that further investigation including a Detailed Site Investigation (DSI) is not required. In accordance with *State Environment Protection Policy (Resilience and Hazards) 2021*, limited investigation is required in order to determine the suitability of the soils within the deep soil zones to remain onsite.

1. Introduction

1.1 Background and Purpose

EI Australia (EI) was engaged by Grand Noble Project 1 Pty Ltd ('the client') to conduct a preliminary investigation of 11-23 Rangers Avenue, Mosman in New South Wales (henceforth 'the site').

The site is located within the local government area (LGA) of Mosman City Council (**Figure 1, Appendix A**) and covers an area of 3,594m² (**Figure 2, Appendix A**). The site comprises the following allotments:

- Lot 42 in Deposited Plan (DP) 2509 = 11 Rangers Avenue;
- Lot 41 in DP 2509 = 13 Rangers Avenue;
- Lot 2 in DP748842 = 15 Rangers Avenue;
- Lot 1 in DP748842 = 17 Rangers Avenue;
- Lot 39 in DP 2509 = 19 Rangers Avenue;
- Lot 38 in DP 2509 = 21 Rangers Avenue;
- Lot 37 in DP 2509 = 23 Rangers Avenue;

The purpose of this report is to appraise the environmental (potential contamination) condition of the site, in support of a planning proposal to NSW Department of Planning, Housing and Infrastructure. It enables the client to meet obligations under the *Contaminated Land Management Act 1997* and *State Environmental Planning Policy (Resilience and Hazards) 2021*.

This preliminary site investigation (PSI) has been prepared by EI to accompany a State Significant Development Application (SSDA) in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEARs) dated 14 October 2025, issued in regards to the State Significant Development (SSD-96272465) for the residential development of the site. Specifically, this PSI has been prepared to response to the SEARs requirements issued below.

SEARs Requirement	Section of Report where response is provided
13. Contamination and Remediation In accordance with Chapter 4 of the <i>SEPP (Resilience and Hazards) 2021</i> , assess and quantify any soil and groundwater contamination and demonstrate that the site is suitable (or will be suitable, after remediation) for the development.	Section 3, 4 and 5

1.2 Proposed Development

Based on the development plans provided by the client (**Appendix B**), the proposed development involves the construction of a residential flat building over a Ground Floor (GF) and a Lower Ground Floor (LGF) located Below Existing Ground Level (BEGL), with a partial Basement 1 (B1) located at the southwest of the site. The LGF and B1 are proposed to have a Finished Floor Level (FFL) of RL 44.3 m AHD and RL 41.3 m AHD, respectively. A Bulk Excavation Level (BEL) varying from RL 44.0 m AHD to RL 41.0 m AHD has been assumed, allowing for the construction of the LGF and B1 slabs. To achieve the BEL, excavation depths of up to 11 m BEGL have been estimated. Locally deeper excavations may be required for footings, lift overrun pits, crane pads, and service trenches.

1.3 Project Objectives

The objectives of this preliminary site investigation (PSI) were to:

- Provide a qualitative assessment of the environmental condition of the site, by appraising the potential for contamination on the basis of field observations, historical land use and other documentary evidence; and
- Provide recommendations for further investigation of the site, should the potential for contamination be confirmed.

1.4 Scope of Work

In order to achieve the above objectives, the following scope of work was completed:

- Review of relevant topographical, geological and soil landscape maps for the project area;
- A search for groundwater bore records within close vicinity (500m radius) of the site;
- A site walkover inspection;
- Review of the findings from a previous investigation of the site;
- Review of site history, based on land title records supplied by InfoTrack Pty Ltd;
- Review of site history, based on historical aerial photographs available on the NSW Government Spatial Collaboration Portal.
- Searches of public registers maintained by the New South Wales Environment Protection Authority (EPA) for statutory notices and licensing agreements issued under the *Contaminated Land Management Act 1997* and *Protection of the Environment Operations Act 1997*;
- A search of the *List of NSW Contaminated Sites Notified to the EPA*;
- Presentation of a conceptual site model (CSM); and
- Data interpretation and reporting.

This PSI report was completed with reference to the EPA (2020) *Consultants Reporting on Contaminated Land*. It documents the investigation works, with discussion of the findings in regards to potential exposure pathways to human health and the environment. It concludes with statements concerning the potential for contamination to exist on the land and its suitability for the proposed residential use.

1.5 Regulatory Framework

The following regulatory framework and guidelines were considered during this PSI:

- *Contaminated Land Management Act 1997* (the CLM Act 1997);
- *Protection of the Environment Operations Act 1997* (the POEO Act 1997);
- *Environmental Planning and Assessment Act 1979* (the EP&A Act 1979);
- *State Environmental Planning Policy (Resilience and Hazards) 2021*;
- *Mosman Local Environmental Plan 2012*;
- NEPC (2013) *National Environment Protection (Assessment of Site Contamination) Amendment Measure*;
- EPA (2017) *Guidelines for the NSW Site Auditor Scheme*; and
- EPA (2020) *Consultants Reporting on Contaminated Land Guidelines*.

2. Site Description

2.1 Property Identification, Location and Physical Setting

The site identification details and associated information are presented in **Table 2-1**. The site locality and layout are shown in **Figures 1 and 2, Appendix A**.

Table 2-1 Site Identification

Attribute	Description
Street Address	11-23 Rangers Avenue, Mosman, NSW, 2088
Location and Description	The site is located in a residential area in Mosman (approximately 5.1km north of the Sydney central business district). It is bound by Bloxsome Lane to the north and Rangers Avenue to the south, with residential properties immediately adjacent.
Geographical Coordinates	Northern-western corner of site (GDA2020-MGA56): ▪ Easting: 336630.916 ▪ Northing: 6255012.145 (Source: https://portal.spatial.nsw.gov.au/explorer/index.html)
Area	3,594m ²
Cadastral Identification	▪ Lot 37 Section A of DP2509 ▪ Lot 38 Section A of DP2509 ▪ Lot 39 Section A of DP2509 ▪ Lot 41 Section A of DP2509 ▪ Lot 42 Section A of DP2509 ▪ Lot 1 of DP748842 ▪ Lot 2 of DP748842
State Survey Marks	The following survey marks are situated within close proximity (within 250m) to the site: ▪ PM39012: on Rangers Avenue (9m south-west); ▪ PM38993: on Holt Avenue (45m north); ▪ PM30911F: on Rangers Avenue (90m south west); ▪ PM38992: on the intersection of Holt Avenue and Cowles Road (140m north east); and ▪ PM38994: on the intersection of Holt Avenue and Bardwell Lane (100m north west) (Source: https://portal.spatial.nsw.gov.au/explorer/index.html)
LGA	Mosman City Council
Current Zoning	R3 Medium density residential (<i>Mosman Local Environmental Plan 2012</i>)

2.2 Local Land Use

The site is situated within an area of predominantly residential use. Refer to **Table 2-2** for the identified local receptors.

Table 2-2 Local Land Use

Direction	Land Use Description	Sensitive Receptor (distance from site)
North	Bloxsome Lane followed by residential properties	Residents (approximately 10m)
South	Rangers Avenue followed by residential properties	Residents (approximately 20m)
East	Residential properties, followed by Cowles Road then local commercial properties (i.e., BP petrol station, Lawrence dry cleaners)	Residents (immediately adjacent)
West	Residential properties	Residents (immediately adjacent)

2.3 Regional Setting

The topography, geology and soil landscape information is summarised in **Table 2-3**.

Table 2-3 Regional Setting

Attribute	Description
Topography	The site has a south-western dipping topography, with site levels varying from RL 53.30 at the north-eastern site corner to RL 50.57 at the south-western site corner. (Source: Rygate, 2024 Reference No. 80504)
Drainage	Likely to be consistent with the general slope of the site. Stormwater is expected to be collected in pits and piped to the municipal collection system.
Geology	According to the <i>Sydney 1:100,000 Geological Series Sheet 9130</i> (DMR, 1983), the site is underlain by Hawkesbury Sandstone (<i>Rh</i>), which consists of medium to coarse-grained quartz sandstone displaying small to large scale, high-angle cross-bedding with very minor shale and laminite lenses.
Soil Landscape	In accordance with the New South Wales Department of Climate Change, Energy, the Environment and Water's <i>Soil Landscapes of Central and Eastern New South Wales</i> , the site is within a gymea (<i>gy</i>) landscape, which is characterised by undulating to rolling rises and low hills on Hawkesbury Sandstone. (Source: NPIE soil and land information: https://www.environment.nsw.gov.au/eSpade2)
Acid Sulfate Soil (ASS) Risk	With reference to the <i>Prospect / Parramatta River Acid Sulfate Soil Risk Map</i> (1:25,000 scale; Murphy, 1997), the subject land lies within the map class description of 'No Known Occurrence'. In such cases, ASS is not known or expected to occur and "land management activities are not likely to be affected by ASS materials". The site is not mapped on the <i>Mosman Local Environmental Plan 2012</i> with respect to ASS. As such, ASS is not expected to be encountered during site development and further assessment and management is unwarranted.
Nearest Surface Water Features	An unnamed drainage channel located approximately 120m south of the site, which drained into Mosman Bay (approximately 530m south-west from the site).

2.4 Groundwater Bore Records and Local Groundwater Use

An online search for groundwater bores registered with WaterNSW was conducted by EI on 29 May 2025 (<https://realtimedata.waternsw.com.au/water.stm>). There were five registered bores within an approximate 500m radius, all authorised for monitoring purposes, indicating that the

local resource was not being utilised for beneficial (consumption / irrigation) use. No standing water level data were available.

Table 2-4 Bore Details

Bore	Drilled Date	Bore Depth (m BGL)	Authorised Purpose
GW113063	11/01/2021	6	Monitoring
GW113064	11/01/2021	4.5	Monitoring
GW113067	12/01/2011	5.5	Monitoring
GW113066	11/01/2011	5.6	Monitoring
GW113065	11/01/2011	3.1	Monitoring

2.5 Site Inspection

Observations were recorded during a walkover of the site conducted on 26 June 2025 and 18 August 2025. These observations are summarised below and photographs taken during the inspection are presented in **Appendix C**.

- The site comprised seven low-density residential properties. The buildings appeared to be in good condition (**Photographs 1 – 5**);
 - 11 Rangers Avenue consisted of a one storey residential property with accessible soils in the front yard;
 - 13 Rangers Avenue consisted of a two storey residential property with accessible soils in the front yard and backyard;
 - 15 Rangers Avenue consisted of a two storey residential property, no accessible soils were observed from the front yard, the back yard could not be observed;
 - 17 Rangers Avenue consisted of a two storey residential property, no accessible soils were observed from the front yard, the back yard could not be observed;
 - 19 Rangers Avenue consisted of a two storey residential property, no accessible soils were observed from the front yard, the back yard could not be observed;
 - 21 Rangers Avenue consisted of a two storey residential property, limited access to soils was observed in the front yard, the back yard could not be observed;
 - 23 Rangers Avenue consisted of a one storey residential property with accessible soils in the front and back yard.
- Surrounding properties consisted of low-density residential properties;
- The site appears to slope towards the south west;
- The vegetation across the site was varied and displayed no signs of distress, suggesting phytotoxicity was not an issue for site soils (**Photographs 6 – 7**);
- Areas where concrete was present in driveways, garden and garage areas appeared to be in good condition with no cracking observed (**Photograph 8**);
- There was no evidence that an underground petroleum storage system (UPSS) was present on-site. No above-ground storage tank (AST) was observed;
- No evidence of previous groundwater monitoring wells;
- No evidence of waste deposits, discarded materials or dumping was observed on site; and

- No olfactory indicators of contamination (i.e. suspicious odour) were detected during the inspection.

2.6 Previous Investigation

EI have previously prepared a preliminary geotechnical investigation for another client at 19-25 Rangers Avenue, Mosman NSW. Permission has been granted to use the borehole information to supplement works at the site. This PSI was also completed in conjunction with a geotechnical investigation at the site:

- EI (2025) *Geotechnical investigation; 13-23 Rangers Avenue, Mosman, NSW*, EI Australia Report E26795.G03_Rev3, dated 1 July 2025.

Based on the combined borehole logs, subsurface of the site was described as a layer of shallow topsoil / fill (< 0.5 mBGL), directly overlying sandstone bedrock.

Detailed description is listed below in **Table 2-5**.

Table 2-5 Sub-Surface Profile

Layer	Description	Minimum and Maximum Depth
Hardstand	Concrete	0.0 – 0.09
Fill	Silty SAND: fine to medium grained, dark grey, with rootlets, sub-angular gravels.	0.17 – 0.35
Natural / bedrock	SANDSTONE: fine to medium grained, yellow to brown with iron staining, medium strength, slightly weathered	0.17 – 19.7
	SILSTRONE: dark-grey, thinly bedded	19.7 – 20.66+

+ Termination depth of deepest borehole.

3. Historical Search Information

3.1 Land Titles Information

A historical land titles search was conducted through InfoTrack. Copies of relevant documents resulting from this search are presented in **Appendix D**. A list of the previous and current registered proprietors is presented in **Table 3-1**.

Table 3-1 Summary of Historical Property Ownership

Period of Ownership	Registered Proprietor(s)
Lot 37 Section A in DP 2509	
1906 – 1914	Emma Jane Hall (Widow)
1914 – 1944	Public Trustee (Transmission application – Not investigated)
1944 – 1952	William Arthur Green (Gentlemen) Ada Victoria Green (Spinster)
1952 – 1963	Ada Victoria Green (Spinster)
1963 – 2015	George Whitehouse (Engineer) Mary Annette Whitehouse (Married Woman)
2015 – 2019	Mary Annette Whitehouse (Married Woman)

Period of Ownership	Registered Proprietor(s)
2019 – 2020	David Maxwell Whitehouse Linda Jane Hoy
2020 – present	Sean Christopher Daggett Summer Butler
Lot 38 Section A in DP 2509	
1920 – 1926	Francis Daniel Harrison (Civil Servant)
1926 – 1953	Arthur William Moriarty (Land Valuer)
1953 – 1963	Llodes Annette Moriarty (Spinster) (Transmission Application – Not Investigated)
1963 – 1964	Robert Gilder Dixon (Forestry Manager) Kathryn Ann Dixon (Married Woman)
1964 – 1971	David Donald Turner (Architect) Sally Jeanette Turner (Married Woman)
1971 – 1973	Anthony Lawrie (Insurance Officer) Maureen Margaret Lawrie (Married Woman)
1973 – 1987	James Francis Malone (Pharmacist)
1987 – 2020	Richard James Eyre Pamala Joy Eyre
2020 – present	Bruce Andrew Cornell Elaine Dorothy Cornell
Lot 39 Section A in DP 2509	
1921 – 1937	Henry Frederick Holt (Glass Merchant)
1937 – 1953	Perpetual Trustee Company (Limited) (Transmission Application – Not Investigated)
1953 – 1954	Henry Frederick Holt (Company Director) Sheila Mary Holt (Spinster)
1954 – 1976	William Grham MacDiarmid (Company Director)
1976 – 1976	Kathleen Hazel MacDiarmid (Widow) Section 93 Application – Not Investigated)
1976 – 1981	Ian James MacDiarmid (Real Estate Agent) (Transmission Application – Not Investigated)
1981 – 1998	Louis Kordal (Retired Company Director)
1998 – 2022	Richard William Savage Judith Anne Savage
2022 – present	Judith Anne Savage
Lot 41 Section A in DP 2509	
1921 – 1936	Leslie Alfred Dobson (Warehouse Manager)
1936 – 1942	John James Quigley (Architect) Paul Francis O'Brien (Solicitor)
1942 – 1964	Elsie May Jones (Married Woman)
1964 – 1964	Clarence John Fearnside Jones (Telephone Technician) Dudley Fearnside (Barrister and Solicitor)

Period of Ownership	Registered Proprietor(s)
1964 – 1994	Silvano Guidi (Electrical Mechanic) Nina Guidi (Married Woman)
1994 – 1994	Nina Guidi
1994 – 2014	Grahame Richarsson Vivian Richardson
2014 – present	Scott James Richards
Lot 42 Section A in DP 2509	
1912 – 1939	Perpetual Trustee Company Limited (Transmission Application – Not Investigated)
1939 – 1955	Sydney Fox Ashwin (Stained Glass Artist)
1955 – 1962	Jane Margaret Walton (Married Woman)
1962 – 1973	Francis Frederick Marshall (Marine Engineer)
1973 – 1983	Francis Frederick Marshall (Marine Engineer) Margaret Caswyn Marshall (Married Woman)
1983 – 1986	Roger Ian Morse (Engineer)
1986 – 1987	Richard William Swanson Angela Elizabeth McRann
1987 – 1989	Kenneth William Damm Katherine Susan Damm
1989 – 2005	Peter Nielsen Dian Nielsen
2005 – 2009	Grahame Henry Alexander Mellis Elizabeth Diane Mellis
1912 – 1939	Perpetual Trustee Company Limited (Transmission Application – Not Investigated)
Lots 1 & 2 in DP748842	
1908 – 1944	Arthur Ernest Blunder (Landowner)
1944 – 1944	James Joseph McCarthy (Clerk) (Transmission Application – Not Investigated)
1944 – 1985	Arthur Ernest Blunden (Architect)
<u>Continued as Lot 1 in DP748842</u>	
1985 – 1988	Gregory Arthur Blunden Ruth Margaret Hall Mary Louise Blunden Felicity Therese Burfitt
1988 – 1989	Gregory Arthur Blunden Mary Louise Blunden
1989 – 1991	Ruth Margaret Crocker
1991 – 1993	Peter James Frawley
1993 – 1996	Penelope Lee Bradley Wallace Robert McCann
1996 – 2009	Robert Harold Victor Douglass

Period of Ownership	Registered Proprietor(s)
2009 - 2025	Jeremy John Hilton Light Margaret Ceciley Light
2025 – present	Jeremy John Hilton Light
<u>Continued as Lot 2 in DP748842</u>	
1985 – 1988	Gregory Arthur Blunden Ruth Margaret Hall Mary Louise Blunden Felicity Therese Burfitt
1988 – 1991	Felicity Therese Burfitt
1991 – 2015	Kate Jacqueline Iddon
2015 – present	Frederick John Kelly

3.2 Historical Aerial Photograph Review

The historical aerial photographs reviewed as part of this PSI included:

- 1943 to 1996 available through NSW Historical Imagery (<https://portal.spatial.nsw.gov.au>)
- 2002 to 2025 available through Google Earth.

A summary of the information obtained from the aerial photography is presented in **Table 3-2**.

Table 3-2 Historical Aerial Photograph Review

Photograph	Site Description	Site Use	Surroundings
1943	The site appeared to be occupied by a number of residential properties.	Residential	Surroundings comprised of residential properties.
1955	Site remained largely unchanged with previous imagery with the exception of redevelopment of housing on-site. It is inferred that properties on 15-23 Rangers Avenue have possibly been demolished and redeveloped.	Residential	Surroundings relatively similar to previous image.
1970	Site unchanged compared with previous image with further redevelopment on site. It is inferred that properties on 15-21 Rangers Avenue have possibly been demolished and redeveloped.	Residential	Surroundings relatively similar to previous image.
1996	Site unchanged compared with previous image with further redevelopment on site. It is inferred that properties on 15-21 Rangers Avenue have possibly been demolished and redeveloped.	Residential	Surroundings relatively similar to previous image.
2002	The site appeared to be largely unchanged.	Residential	Surroundings relatively similar to previous image.
2009	The site appeared to be largely unchanged.	Residential	Surroundings relatively similar to previous image.
2017	The site appeared to be largely unchanged.	Residential	Surroundings relatively similar to previous image.
2025	The site appeared to be largely unchanged.	Residential	Surroundings relatively similar to previous image.

3.3 Council Information

A request to search property files archived by Mosman Council was initiated on 5 June 2025 and 19 August 2025 to include 11 Rangers Avenue. The files pertaining to 11-23 Rangers Avenue, Mosman did not contain any records pertaining to contamination, storage of dangerous goods or environmental issues. A copy of the provided records is attached in **Appendix E**.

3.4 EPA Online Public Registers

Searches of public registers maintained by the EPA for statutory notices and licensing agreements issued under the *Contaminated Land Management Act 1997* and *Protection of the Environment Operations Act 1997* were conducted by EI for this PSI.

Record of Notices under Section 58 of CLM Act 1997

An on-line search of the contaminated land public record was conducted on 13 June 2025. The contaminated land public record is a searchable database of:

- Orders made under Part 3 of the CLM Act 1997;
- Notices available to the public under Section 58 of the CLM Act 1997;
- Approved voluntary management proposals under the CLM Act 1997 that have not been fully carried out and where the approval of the EPA has not been revoked;
- Site audit statements provided to the EPA under Section 53B of the CLM Act 1997 that relate to significantly contaminated land;
- Where practicable, copies of anything formerly required to be part of the public record; and
- Actions taken by the EPA under Section 35 or 36 of the *Environmentally Hazardous Chemicals Act 1985* (the EHC Act 1985).

The search confirmed that neither the site, nor the surrounding lands within close proximity ($\leq 250\text{m}$ radius), were subject to any regulatory notices relevant to the above legislations.

List of NSW Contaminated Sites Notified to EPA

A search through the *List of NSW Contaminated Sites Notified to the EPA* under Section 60 of the *CLM Act 1997* was conducted on 17 July 2024. This list is maintained by the EPA and includes properties on which contamination has been identified, but not necessarily deemed to be impacted significantly enough to warrant regulation.

Neither the site, nor any surrounding land within close proximity ($\leq 250\text{m}$ radius), had been notified to the EPA as contaminated (i.e. these were not on the list).

- Although not listed on the list of NSW Contaminated Sites, it is noted that a service station (BP, Avenue Road, Cowles Rd, Mosman NSW 2088) and a dry cleaning business (Lawrence Dry Cleaners Mosman, 85 Avenue Rd, Mosman NSW 2088) are located approximately 200-300m east from the site. These two properties are located at hydraulically cross-gradient locations of the site, and any potential migration of contaminants to the site is considered unlikely.

POEO Public Register

A search of the *Protection of the Environment Operations Act 1997* public register was conducted on 13 June 2025. This public register contains records related to environmental protection licences, applications, notices, audits, pollution studies and reduction programs. The search confirmed that no part of the site was subject to any licensing agreements / notices / programs relevant to the above legislation.

Neither the site, nor any surrounding land within close proximity is listed on the POEO public register.

4. Conceptual Site Model

In accordance with the NEPC (2013) *Schedule B2 - Guideline on Site Characterisation*, a CSM was developed as part of the contamination appraisal, which assessed plausible linkages between potential contamination sources, migration pathways and receptors. It is hereby presented, taking into account the findings from EI's walkover inspection, previous investigation and the historical search information.

4.1 Rationale

The primary purpose of this PSI was to appraise the potential for contamination to exist on the site. If such a potential was suspected, the environmental and human-health risks associated with contamination were to be evaluated.

This appraisal did not involve intrusive sampling and laboratory analysis of soils, soil vapours or groundwater. Instead, the potential for contamination was based on a desktop study, collating information from history searches and government-maintained databases, as well as a walkover inspection. Professional judgement was then applied, based on previous experience.

4.2 Summary of Site History

Based on the available historical information, the site was used for residential purposes from at least 1943. Thereafter, and continuing up to the time of this PSI, the land was used for residential (housing) purposes.

Surrounding areas were predominantly used for residential purposes from at least 1943 to date.

4.3 Subsurface Conditions

Based on the previous investigation and the geotechnical investigation (**Section 2.6**), subsurface conditions of the site were expected to be a layer of shallow filling (to a maximum of 0.35 mBGL), directly overlying sandstone bedrock. Bedrock is intercepted from as shallow as 0.17m BGL onwards.

4.4 Potential Contamination Sources

The potential contamination sources were as follows:

- Imported fill soils of unknown origin and quality (used to grade the site);
- Weathering of exposed building fabrics containing potential hazardous substances (ACM, lead-based paints and metallic surfaces);
- Application of pesticides around building (footing) perimeters;
- Leakage from parked vehicles; and
- Off-site migration from neighbouring properties.

4.5 Contaminants of Potential Concern (COPCs)

The COPCs at the site were considered to be:

- Priority Metals (PM) - arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc;
- Total Recoverable Hydrocarbons (TRH);
- Monocyclic Aromatic Hydrocarbons Benzene, Toluene, Ethylbenzene, Xylenes (BTEX);
- Polycyclic Aromatic Hydrocarbons (PAH);
- Organochlorine and Organophosphorus Pesticides (OCP / OPP);

- Polychlorinated Biphenyls (PCB); and
- Asbestos.

Notes:

All emerging chemicals managed by the EPA in accordance with the EHC Act 1985 through a chemical control order were **not** considered to be contaminants for this site.

ASS parameters were **not** considered to be of relevance for any future (detailed) site investigation, nor the proposed redevelopment.

PFAS Assessment

NSW EPA (2017) requires that PFAS are considered when investigating land contamination. An assessment of the probability for PFAS occurrence is provided in **Table 4-1**. This was based on considerations outlined in the *PFAS National Environmental Management Plan* (HEPA, 2020) and the EnRisk (2016) decision tree. In this instance, the potential for PFAS to be present on-site was deemed low and thus PFAS sampling / analysis of soil and water was considered unwarranted.

Table 4-1 Potential for PFAS Contamination

Preliminary Screening	Probability of Occurrence ¹
Is the past or present site activity listed in HEPA (2020) ² as being an activity associated with PFAS contamination? If so, list activity.	L
Is the past or present off-site activity up-gradient or adjacent to the site listed in HEPA (2020) ² as being an activity associated with PFAS contamination? If so, list activity.	L
Did fire training involving the use of suppressants occur on-site between 1970 and 2010?	L
Did fire training occur up-gradient of or adjacent to the site between 1970 and 2010? ³	L
Have “fuel” fires ever occurred on-site between 1970 and 2010? e.g. ignition of fuel (solvent, petrol, diesel, kero) tanks	L
Have PFAS been used in manufacturing or stored on-site? ⁴	L
Could PFAS have been imported to the site in fill material from a site with activity listed in HEPA (2020)?	L
Could PFAS-contaminated groundwater or run-off have migrated on to the site?	L
Is the site or adjacent sites listed in the NSW EPA PFAS Investigation Program? ⁵	L
If the probability is medium or high in any of the rows, does the site analytical suite need to be optimised to include sampling and testing for PFAS in soil (including ASLP testing) and waters?	No

Notes:

- Note 1 Probability: L – low (documentation has been reviewed and there is no recorded instance or compelling rationale), M – moderate (documentation has been reviewed and there is potential for an instance with compelling rationale); H – high (all documentation has been reviewed and there is strong evidence of a recorded instance).
- Note 2 Activities listed in Appendix B of the HEPA (2020). Further information, refer to https://www.oecd.org/env/ehs/risk-management/PFC_FINAL-Web.pdf.
- Note 3 Runoff from up-gradient PFAS use may impact surface water, soil, sediment and groundwater.
- Note 4 PFAS is used wide range of industrial processes and consumer products, including in the manufacture of non-stick cookware, specialised garments and textiles, Scotchguard™ and similar products (used to protect fabric, furniture, leather and carpets from oils and stains), metal plating and in some types of fire-fighting foam (<https://www.nicnas.gov.au/chemical-information/factsheets/chemical-name/perfluorinated-chemicals-pfas>).
- Note 5 <https://www.epa.nsw.gov.au/your-environment/contaminated-land/pfas-investigation-program>

Emerging Chemicals

The NSW EPA uses Chemical Control Orders (CCOs) as a primary legislative tool under the *Environmentally Hazardous Chemicals Act 1985* to manage chemicals of concern and limit their potential impact on the environment. Considerations for chemicals controlled by CCOs, and other potential emerging chemicals, are outlined in **Table 4-2**.

In this instance, the potential for an emerging chemical of concern to be present on-site was deemed low, with the exceptions of PCB and pesticides (in near-surface, imported fill).

Table 4-2 Potential for Contamination by an Emerging or Controlled Chemical

Chemicals of Concern (CCO or emerging)	Decision
Were aluminium smelter wastes used or stored on site (CCO, 1986)?	No
Do dioxin contaminated wastes (CCO, 1986) have the potential to impact the site? ¹	No
Were organotin products (CCO, 1989) used or stored on site? ²	No
Were polychlorinated biphenyls (PCBs) used or PCB wastes (CCO, 1997) stored on-site? ³	No
Were scheduled chemical or wastes (CCO, 2004) used or stored? ⁴	Possibility for pesticides to have been applied to building footings and/or present in imported fill
Are other emerging chemicals suspected? ⁵	No
If Yes to any questions, has site sampling suite been optimised to include sampling for these chemicals of concern?	Yes

Note 1 From burning of certain chemicals, smelting or chemical manufacturing or fire on or near the site.

Note 2 From anti-fouling paints used or removed at boat and ship yards and marinas.

Note 3 From older transformer oils and electrical capacitors

Note 4 Twenty-four mostly organochlorine pesticides and industrial by-products

Note 5 Other chemicals considered as emerging (e.g. 1,4 dioxane; associated with some CVOC).

4.6 Potential Receptors

The following potential receptors of site contamination were identified:

- Current and future site users / occupants;
- On-site demolition, excavation and construction workers (during future redevelopment);
- Users of the adjacent land during the demolition, excavation and construction works;
- Future site users and maintenance (underground service) workers;
- Human and ecological receptors in areas of exposed soil / landscaping; and
- Local groundwater.

4.7 Risk Assessment

A qualitative assessment of the potential risks for the site relating to the identified sources of contamination is summarised in **Table 4-3**.

Table 4-3 Assessment of Potential Contamination Risk

Potential Source	Impacted Medium	Potential Contaminants	Risk of Contamination
Importation of fill materials of unknown origin and quality	Shallow soil	PM, TRH, BTEX, PAH, OCP, OPP, PCB, asbestos	Low Shallow filling present on the site. Contaminant loads, if present, are low.
Deposition of hazardous building materials	Near surface soil	PM (particularly lead, zinc), PCB, asbestos	Low to Moderate Given the building ages, conditions and replacements, hazardous materials (ACM, lead-based paints, SMF and electrical capacitors) likely to be present within the site structures or potentially present in near surface soil during previous uncontrolled demolition practice.

Potential Source	Impacted Medium	Potential Contaminants	Risk of Contamination
			Current buildings in good condition and primarily of brick construction in the older buildings.
Applications of pesticides	Near surface soil (building footings)	PM (arsenic and copper), OCP, OPP	Low If present, pesticides are expected to be limited to shallow/ surface soils. OCP phased out historically; OPP have short life-time (readily degraded) once applied.
Leaks from vehicles	Near surface soil (parking areas)	PM, TRH, BTEX	Low Contamination, if present, likely to be localised and restricted to surface (shallow) soil horizons. Pavements on the site were in good condition, restricting vertical movement.
Migration from neighbouring properties	Soil Groundwater	PM, TRH, VOC (CVOC, BTEX), PAH, phenols	Low Local area is mainly comprised of residential properties. A service station and a dry cleaning business are located approximately 200-300m east (hydraulically cross-gradient) from the site. Potential migration of contaminants to the site from these properties is considered to be low.

4.8 Summary of the CSM

A summary of the CSM, including the potential contamination sources, exposure pathways and human and environmental receptors is presented in **Table 4-2**. Based on this model, there was considered a low to moderate risk potential for contamination to exist on the site.

Under the proposed development (**Appendix B**), bulk excavation of majority of site soils would be performed in order to construct the one level basement and lower ground floor (covering the majority of the available area). This would result in the removal of existing site infrastructure, fill soils, and potential on-site contaminant sources within the basement construction removing this concern for the development. Where site soils are to remain on-site in setback areas, these soils should be confirmed to be suitable for the site land use.

Table 4-4 Summary of the CSM

Potential Source	Impacted Media	COPCs	Transport Mechanism	Exposure Pathway	Potential Receptor
Importation of fill materials of unknown origin and quality	Soil	PM, TRH, BTEX, PAH, OCP, OPP, PCB, asbestos	Disturbance of surface and subsurface soils during site redevelopment, future site maintenance and future use of the site post redevelopment	Ingestion Dermal contact Inhalation of particulates Inhalation of vapours	S-P-R linkage potentially complete for: Current site occupiers Demolition / excavation / construction workers Adjacent property users Future site users Human and ecological receptors in landscaped areas
Deposition of hazardous building materials			Atmospheric dispersion from soil to outdoor and indoor air spaces		
Application of pesticides			Volatilisation of contamination from soil and diffusion to indoor air spaces.		
Leaks from vehicles					
Off-site migration	Surface and groundwater	PM, TRH, VOC (CVOC, BTEX), PAH, phenols	Surface transfer in (stormwater) runoff Down-gradient migration	Ingestion Dermal contact	Excavation / construction workers Human and ecological receptors in areas of exposed soil / landscaping Local (down-gradient) groundwater Current and future site occupiers Adjacent site users Future intrusive workers
			Volatilisation of contamination from groundwater to indoor or outdoor air spaces (onsite and offsite)	Inhalation of vapours	
			Migration of dissolved phase impacts in groundwater via diffusion and advection	Biota uptake	

Footnotes:

S-P-R = Source-Pathway-Receptor

The overall potential for contamination to exist on the site was deemed to be moderate

Source-Pathway-Receptor linkages considered to be potentially complete; although

Site workers during excavation and construction, as well as future building / service maintenance, are assumed to use personal protective equipment (PPE), as per SafeWork NSW regulations; hence, eliminating Source-Pathway-Receptor linkage

ASS parameters not considered to be of relevance for any future (detailed) site investigation

5. Conclusion

The site identified as 11-23 Rangers Avenue, Mosman, NSW was the subject of this PSI, the main objective being to appraise the potential for contamination. The key findings were as follows:

- At the time of this investigation, the site consisted of seven residential properties. No visual sign of gross contamination was detected across the site. No olfactory evidence of contamination (i.e. suspicious odour) was detected during the inspection.
- No evidence of the presence of an underground petroleum storage system was found on any part of the site. No aboveground storage tank was observed on either of the properties.
- Based on the available historical information, the site had been used for residential purposes since 1943 at least. Some buildings appeared to have undergone redevelopment between 1970 and 1996.
- Surrounding areas had been mainly used for residential purposes since 1943 at least. There was no evidence of heavy industry in the area indicating low potential of contamination from local commercial activities.
- The site and surrounding areas were free of statutory notices and licencing agreements issued under the *Contaminated Land Management Act 1997* and *Protection of the Environment Operations Act 1997*. The site and surrounding areas were not included on the *List of NSW Contaminated Sites Notified to the EPA*.
- The sub-surface consisted of a shallow layer of anthropogenic filling (<0.5m BGL), overlying natural sandstone bedrock. Bedrock was intercepted from 0.17-0.35m BGL onwards.
- The potential for ASSs to be present was very low and additional assessment and management of ASS was unwarranted.
- The CSM established there was a low to moderate potential for site contamination, derived from a variety of sources.
- Under the proposed development, bulk excavation of majority of site soils would be performed in order to construct the one level basement and lower ground floor (covering the majority of the available area). This would result in the removal of existing site infrastructure, fill soils, and potential on-site contaminant sources within the basement construction removing this concern (if any) for the development. Where site soils are to remain on-site in setback areas, these soils should be confirmed to be suitable for the site land use.

Based on the findings of this PSI, and with consideration of EI's *Statement of Limitations (Section 7)*, EI concluded that the site can be made suitable for the proposed development and that further investigation including a Detailed Site Investigation (DSI) is not required. In accordance with *State Environment Protection Policy (Resilience and Hazards) 2021*, limited investigation is required in order to determine the suitability of the soils within the deep soil zones to remain onsite.

EI considers that the investigation can be managed through the development application process, in accordance with *State Environmental Planning Policy (Resilience and Hazards) 2021*.

6. Recommendations

EI provides the following recommendations in relation to the proposed site redevelopment:

- Before commencement of any demolition works, a hazardous materials survey (HMS) should be completed by a suitably qualified consultant, to assess for the presence and location of any hazardous materials within the existing building structures. This will aid demolition management of on-site structures.
 - All identified hazardous materials must be appropriately managed during future demolition works, to maintain worker health and safety and prevent the spread of hazardous substances onto the ground surface.
 - An asbestos clearance inspection and certificate should be completed by a suitably qualified professional (SafeWork NSW Licensed Asbestos Assessor) following the removal of all ACM (if identified).
 - Where clearance inspection indicates hazardous materials remain on the site, further delineation, removal and re-clearance inspection, must be undertaken.
- Limited soil investigation in the area where soils are to be retained on the site.
- All soil materials designated for off-site disposal as part of the proposed development, including any *virgin excavated natural material* (VENM), must be pre-classified in accordance the EPA (2014) *Waste Classification Guidelines*. Any material imported to the site should be validated as suitable for the intended land use, in accordance with EPA guidelines.

7. Statement of Limitations

This report has been prepared for the exclusive use of Grand Noble Project 1 Pty Ltd, whom is the only intended beneficiary of EI's work. The scope of the investigation carried out for the purpose of this report was limited to that agreed with Grand Noble Project 1 Pty Ltd.

No other party should rely on this document without the prior written consent of EI, and EI undertakes no duty, or accepts any responsibility or liability, to any third party who purports to rely upon this document without EI's approval.

EI has used a degree of care and skill ordinarily exercised in similar investigations by reputable members of the environmental industry in Australia, as at the date of this document. No other warranty, expressed or implied, is made or intended. Each section of this report must be read in conjunction with the whole of this report, including its appendices.

The conclusions presented in this report are based on a limited assessment of historical and current uses of the site. Due to the preliminary nature of this investigation, findings are not based on actual samples collected or testing conducted. EI has relied upon information provided by the client and other third parties to prepare this document, some of which could not be verified by EI due to the anecdotal or historical nature of the information.

EI's professional opinions are reasonable and based on its professional judgment, experience and training.

EI's professional opinions contained in this document are subject to modification if additional information is obtained through the data searches that have been initiated with government authorities.

Technical opinions may also be amended in the light of further investigation, observations, or validation testing and analysis during remedial activities. In some cases, further testing and analysis may be required, which may result in a further report with different conclusions.

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