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ARCHAEOLOGY - HERITAGE - MEDIATION - ARBITRATION

Marsden High School

Aboriginal Cultural Heritage Assessment Report

13th MAY **2021**

Report to: Department of Education, School Infrastructure NSW

LGA: City of Ryde

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DOCUMENT CONTROL

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INTEGRATED MANAGEMENT SYSTEM

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EXECUTIVE SUMMARY

SINSW propose to develop Marsden High School as a state of the art sporting facility, featuring an indoor centre with four courts, plus an additional 32 outdoor courts and parking. It is proposed that Marsden High School will be relocated to the Meadowbank Education [and Employment] Precinct. The proposed planning pathway includes undertaking early works under Exempt Development, rezoning of part of the site from SP2 to RE1 Public Recreation and Part of the site to E2 Environmental Conservation and for the remainder of the works to be undertaken as part of a local Development Application (DA).

Comber Consultants have been engaged to undertake Aboriginal consultation and to prepare this Aboriginal Cultural Heritage Assessment Report (ACHAR). The consultation and this report have been undertaken in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010.*

The consultation is documented in Section 5 and Appendix A of this report. Forty-Eight Aboriginal Organisations were invited to register an interest (see Section 5, Table 2, item 4.1.3). The following eight organisations responded and are now the Registered Aboriginal Parties (RAPs):

- Aragung Aboriginal Cultural Heritage Site
- Darug Custodian Aboriginal Corporation
- Didge Ngunawal Clan
- Ginninderra Aboriginal Corporation
- Kamilaroi Yankuntjatjara Working Group
- Ngambaa Cultural Connection
- Waawaar Awaa Aboriginal Corporation
- Wailwan Aboriginal Group

This report makes the following recommendations.

1. Aboriginal community consultation should continue.

2. As subsurface Aboriginal objects are predicted to exist within the study area, and it is an offence to harm such objects, test excavation should be undertaken in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010) and in association with the Registered Aboriginal Parties.

3. The area identified within this report as Conservation Zone including and adjacent to the Archer Creek, should not be impacted upon by the proposed works and should be maintained *in situ*. During the proposed works a physical barrier should be established around the Conservation Zone and all employees, contractors and sub-contractors engaged on the proposed development of the sporting facilities be advised that the Conservation Zone is a "no-go area".

4. If no Aboriginal objects are uncovered during the testing, the project can proceed without the need to undertake salvage. However, if Aboriginal objects are uncovered during the testing, it may be necessary to apply for a AHIP and undertake Aboriginal archaeological salvage excavations once the DA has been issued. The salvage will need to be undertaken prior to redevelopment of the site.

5. All employees, contractors/sub-contractors and anyone else working on the site should be made aware that it is an offence to harm Aboriginal objects. If any Aboriginal objects are uncovered during the course of the redevelopment of the school, all work must cease in the vicinity of that object and further advice sought from the consultant.

6. An Aboriginal heritage induction should be provided to all staff and contractors on the significance of the Aboriginal heritage of the site, including the Conservation Zone and advised of their responsibilities under the *National Parks & Wildlife Act 1974* in respect of Aboriginal heritage.

7. An interpretation strategy and plan should be developed which interprets the results of the archaeology and the Aboriginal history of the region. This should be in partnership with the RAPs. The artefacts recovered from the testing and salvage could be used in the interpretative display.

8. Should the proposed works as described in this report be altered the new proposal should be assessed and this report amended accordingly.

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1.0 INTRODUCTION

1.1. Background

SINSW propose to align with the NSW Government's commitment to developing a state of the art sporting facility, featuring an indoor centre with four courts, plus an additional 32 outdoor courts and parking. It is proposed that Marsden High School will be relocated to the Meadowbank Education [and Employment] Precinct. The proposed planning pathway includes undertaking early works under Exempt Development, rezoning of part of the site from SP2 to RE1 Public Recreation and Part of the site to E2 Environmental Conservation and for the remainder of the works to be undertaken as part of a local Development Application (DA).

To ensure that Aboriginal archaeology and cultural heritage is not adversely impacted upon by the proposal, Comber Consultants have been engaged to undertake Aboriginal consultation and to prepare this Aboriginal Cultural Heritage Assessment Report. The consultation and this report have been undertaken in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010.*

1.2. Site and description

The study area is the site of the current Marsden High School, 22A Winbourne Street, West Ryde shown in Figure 9. It is located in the City of Ryde Local Government Area (LGA) and is within the boundaries of the Metropolitan Local Aboriginal Land Council (MLALC). The study area is a mixed-use urban zone with a land area of approximately 5.5 hectares (ha).

Figure 1: Location of study area edged in red (Base image source SixMaps).

1.3. Statutory controls

The *National Parks & Wildlife Act 1974* (NPW Act) provides statutory protection to all Aboriginal sites within New South Wales. Heritage NSW is the State Government agency responsible for the implementation and management of this Act.

Part 6 of the NPW Act protects all Aboriginal objects and Aboriginal Places, and states that it is an offence to harm or desecrate an Aboriginal object or Aboriginal place, without an Aboriginal Heritage Impact Permit (AHIP). An Aboriginal object and an Aboriginal Place are defined as:

> *Aboriginal Object*
> *Any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains.*
>
> *Aboriginal Place*
> *The Minister may, by order published in the Gazette, declare any place specified or described in the order, being a place that, in the opinion of the Minister, is or was of special significance with respect to Aboriginal culture, to be an Aboriginal place for the purposes of this Act.*

The study area is not an Aboriginal Place, although it is possible that subsurface Aboriginal objects may be located on the subject area and may be impacted upon by the proposed works. Therefore, archaeological testing will need to be undertaken to determine if Aboriginal objects are located on the property, and, if so, their nature and extent. Such testing must be undertaken in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales.* Prior to undertaking such testing Aboriginal consultation must be undertaken in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW 2010). This report documents the consultation and has been written in accordance with the consultation requirements.

1.4. Objectives of the Aboriginal Cultural Heritage Assessment Report (ACHAR)

This ACHAR details the results of the Aboriginal cultural heritage consultation and provides recommendations to manage and protect Aboriginal objects within the study area before, during and after the proposed activities associated with the project.

2.0 ABORIGINAL HISTORY

The traditional custodians of the study area are the Darug whose country extended along the main east-west ridge of the Blue Mountains, the northern Blue Mountains and the Cumberland Plain in which the study area is located (Tindale 1974; Attenbrow 2010).

Research by R.H. Mathews, a pioneer linguist and anthropologist, in the early twentieth-century revealed that the Darug (or 'Dharruk' people as he referred to them) inhabited an area adjoining the 'Thurawal' (Dharawal) to the south and Gundungurra and Wiradjuri to the west. Their territory extended along the coast to the Hawkesbury River and inland to Windsor, Penrith and Campbelltown; then from the mouth of the Hawkesbury River to Mount Victoria (Mathews 1901a:140; Mathews 1901b:155). Archaeological and historical records examined in Sydney's Aboriginal Past identify three distinct groups – the coastal, hinterland and mountain Darug (Attenbrow 2010:23). The Darug of the Milperra area were from the hinterland group.

Aboriginal people have occupied the valley extending from Prospect to the coastline for at least twenty thousand years. The surrounding area was reasonably fertile and, with the resources of the river, was able to support their living needs. Anthropological studies indicate that clan sizes varied widely, consisting of between thirty to sixty people who moved through their territory using seasonal routes to access food, shelter and other resources necessary for survival as well as ceremonial sites. Generally, people camped, travelled, foraged, fished and hunted in smaller, extended family groups, coming together at times with the larger group for ceremonies and ritual combats (Attenbrow 2010: 29). These extended family units or clans consisted of up to sixty people. Each of these clans was named after the area of land where they normally resided, and to which the people had traditional links (Attenbrow 2010). The suffix "gal" was added to the place name for men of the clan and "galleon" was added for women.

The clan that lived to the north of Parramatta River and west of the upper reaches of the Lane Cove River was the Wallumede clan, with the Boromede (or Burramatta) clan territory to the west. Both clans were of the Darug language group. The main contact between clans was during ceremonial gatherings. There were linguistic and cultural differences, as well as economic ones. There was a complicated system of kinship and totems which prevented certain types of contact. It is difficult to pinpoint exact language boundaries, as information came from early colonists, explorers and ethnographers trying to interpret Aboriginal languages (Keating 1996:1-2).

The territory of the Wallumede, located between the Parramatta and Lane Cove Rivers, was traversed by a number of streams, ponds and creeks providing diverse resources from the river and land to support their cultural and living needs. Anthropological studies indicate that clan sizes varied widely, consisting of between thirty and to sixty people who moved through their territory using seasonal routes to access food, shelter and other resources necessary for survival as well as access to ceremonial sites. People camped, travelled, foraged, fished and hunted in smaller, extended family groups, coming together at times with the larger groups for ceremonies and ritual combat (Attenbrow 2010:29).

The Aboriginal economy was dependent on harvesting resources with only very little modification to the environment, with the Parramatta River playing a central part of that economy. In contrast, Europeans quickly set about clearing the land and planting crops which prevented Aboriginal people from carrying out their traditional hunting of animals and gathering of plant foods.

Current Local Aboriginal Land Council boundaries differ from these traditional boundaries. The Local Aboriginal Land Council representing the Ryde area is the Metropolitan Local Aboriginal Land Council.

3.0 ENVIRONMENTAL CONTEXT

3.1. Topography

The study area is located within the Cumberland Plain, across an undulating plain. The Cumberland Plain consists of low rolling and steep hills and is characterised by low, gently undulating slopes on the youngest of the Triassic rocks, the Wianamatta Group (Chapman & Murphy 1989:1). Local relief on the Wianamatta Group shales is between 50 – 120m (eSPADE 2020).

The Cumberland Plain is bordered on the west by the Blue Mountains and on the east by the Georges River and headwaters of the Parramatta River. To the north is the Hornsby Plateau and to the south is the Woronora Plateau (Smith 1989a:8).

The study area is located across a sloping landform, with the highest point in the north western corner sloping down towards the south eastern corner. Archer Creek runs through the eastern portion of the study area and Parramatta River is located approximately 1.5 km to the south of the study area.

3.2. Geology and soils

The Cumberland Plain overlies the Wianamatta Group of Shales. Within the study area the Wianamatta Group of Shales overlies the Ashfield Shale (Sydney 1:100,000 Geological Map). The Ashfield formation consists of black to dark-grey shale and laminate.

Several locations on the Cumberland Plain within the vicinity of the study area contain material suitable for small stone tool manufacture, such as silcrete. The nearest known source of silcrete is located approximately 2.5km to the south east of the study area in the vicinity of Homebush Bay (Comber 2008:8). Other silcrete outcrops are located at Luddenham approximately 35km to the south west, St Clair approximately 26km to the south west, and at Erskine Park approximately 25km to the south west. Other materials used to manufacture stone tools within the Cumberland Plain include chert, tuff, quartz, basalt and quartzite. These can be found in Rickaby's Creek formation approximately 30km to the north west of the study area (Clarke & Jones 1988, Smith 1989a:9-11; 1989b:6-7).

The type of soil profile present in the landscape contributes to the vegetation found at the site, and hence resources available, as well as the level of preservation of the site. The study area is located across the Glenorie soil landscape. The Glenorie soil landscape is present north of the Parramatta River on the Hornsby Plateau in Baulkham Hills, Hornsby, Ku-ring-gai, and Ryde LGAs. Small isolated areas are found at Condell Park, Hurstville and on the Cumberland Lowlands at Rosehill (eSPADE 2020).

The Glenorie soil landscape is erosional and consists of shallow to moderately deep (<100cm) red podzolic soils on crests, moderately deep (10-150cm) red and brown podzolic soils on upper slopes; deep (>200cm) yellow podzolic soils and gleyed podzolic soils along drainage lines (eSPADE 2020). This soil profile contributes to the growth of the vegetation described below.

3.3. Stream order modelling

Stream order can be used to predict Aboriginal land use patterns. A first order stream is the smallest and is a small tributary that flows into and feeds larger streams but does not normally have any water flowing into it. The joining of two first order streams creates a second order stream and when two second order streams join they form a third order stream. In addition, first and second order streams generally form on steep slopes and flow quickly until they slow down and meet the next order waterway. First order streams are intermittent (Horton 1945; Strahler 1952).

Modelling undertaken by McDonald and Mitchell (1994) on the Cumberland Plain indicates that stream order can be used to predict areas of archaeological potential. The model hypothesis is that in any particular climate and landscape, a threshold catchment area is necessary to allow permanent stream flow or the establishment of waterholes with extended longevity (i.e. months to years). The critical point where these conditions are met appears to be at the junction of two second or third order streams. Such a location is likely to contain more complex sites with a high density of artefacts, whilst second and third order streams are also likely to contain large sites within 100 metres of the watercourse.

Archer Creek, a first order stream and northern tributary of Parramatta River runs through the north-eastern portion of the study area, as shown in Figure 122 and Figure 133 below. Archer Creek flows from Brush Farm Park, approximately 1 km to the north of the study area. First order streams are intermittent streams. Aboriginal objects and sites may still be located in proximity to first order streams, however they may be less complex than those located in proximity to second and third order streams.

Figure 2: Location of Archer Creek in north west corner of study area, and proximity to Parramatta River. (Base map source OSM Standard)

Figure 3: Northern portion of Archer Creek shown in dashed purple. (Base map source OSM Standard)

3.4. Vegetation

The vegetation of the Cumberland Plain was mapped by Benson (1979 & 1981) and the NSW National Parks and Wildlife Service (2002). Historically the undulating slopes of the Cumberland Plain would have supported a tall open forest of Cumberland Plain Woodland.

Prior to the clearance of vegetation by Europeans, tall open-forest (wet sclerophyll forest) would have been found across the Epping region. The dominant tree species includes Sydney blue gum (*Eucalyptus saligna*) and blackbutt (*E. pilularis*). Other species include turpentine (*Syncarpia glomulifera*), grey ironbark (*E. paniculata*), white stringybark (*E. globidea*) and roughbarked apple (*Angophora floribunda*). Pittosporum (*Pittosporum undulatum*) and coffee bush (*Breynia oblongifolia*) are common understorey species (Benson 1980, eSPADE 2020).

Such a vegetation community would have provided a variety of edible plant species and plants suitable for artefact manufacture. In addition, Cumberland Plain vegetation provided habitat for a variety of marsupials and birds whilst the River and Creeks would have provided fish, eels and yabbies.

3.5. Current land use and disturbance

The 1943 aerial below (Figure 144) shows the site as largely undeveloped but mostly cleared. A few dwellings are located within the study area and the land appears to be utilised for agricultural purposes. The school was constructed in 1959 (Phillip Bongers, Marsden High School, pers comm 2020).

At present, the site comprises low rise school buildings within the north western portion of the site. A school assembly area and sports courts are located in the centre of the school buildings in the north west. The north eastern portion of the site contains a creek line and vegetation. The southern portion of the study area contains sporting fields.

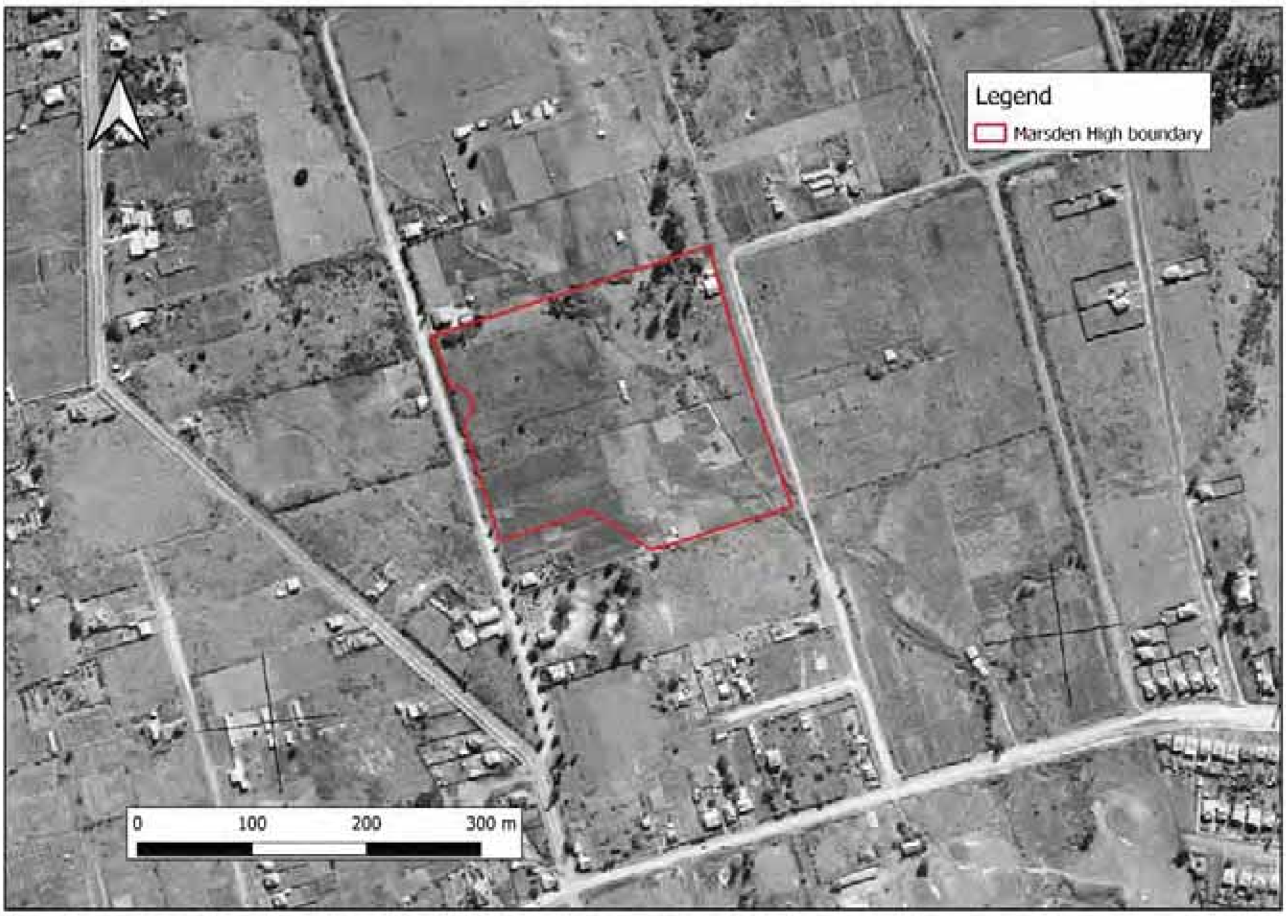

Figure 4: 1943 aerial with study area outlined in red (Sixmaps)

4.0 ARCHAEOLOGICAL CONTEXT

4.1. The Cumberland Plain

Many surveys have been undertaken in the Sydney region which indicate the richness of the archaeological resources and which provide information about Aboriginal occupation within the region. Attenbrow (2010) has excavated a range of sites within the Sydney Basin. The aim of her study was to identify local geographic variation and temporal changes in the subsistence patterns and material culture of the people of this area. She excavated sites at Balmoral Beach, Cammeray, Castle Cove, Sugarloaf Point (Lane Cove River), Darling Mills State Forest, Winston Hills, Vaucluse and Cumberland Street in the Rocks. Dates for initial occupation vary from approximately 10,000 years BP at Darling Mills to approximately 450 years BP at Cumberland Street, The Rocks.

One of the oldest dated occupation for the Sydney region is 15,000 years BP from the Shaws Creek K2 rock shelter on the Nepean River (Kohen, Stockton & Williams 1984; Nanson et al 1987). However, these dates must be considered in association with environmental data related to sea level rises. The Sydney region that we know today was vastly different to the landscape of 15,000 years ago.

The period of maximum glaciation was 15,000 – 18,000 years BP. Therefore, the date of the K2 rock shelter and Attenbrow's Darling Mills site indicate that Aboriginal people lived throughout a period of extreme environmental change. During this period, sea levels were up to 130m below current levels (Nutley 2006:1). About 10,000 years ago as temperatures began rising at the end of the last ice age, the polar ice started melting and sea levels rose. The rising sea levels forced people to abandon coastal sites and move inland, with the result that the oldest coastal sites were inundated.

By about 6,000 years ago rising water levels had flooded the coastal plain forming the Sydney landscape that we know today. The vast majority of sites in the Sydney region date to around 5,000 years BP, after sea levels had stabilised. Whilst research into submerged indigenous sites is now being undertaken (Nutley 2006), there are few sites in the Sydney area that are known to date beyond 10,000 years BP. Therefore, research undertaken to date has focused on subsistence patterns and cultural change, e.g. Attenbrow (2010).

However, many archaeological surveys have been conducted within the Sydney region, particularly on the Cumberland Plain in relation to Environmental Impact Statements. As a result of these studies, which were occasioned by the burgeoning urban expansion extending into the Cumberland Plain, the NPWS recognised the need for a coherent study of the area to fully assess the impact of urbanisation on the natural and cultural heritage of the Cumberland Plain. Smith (1989a) was commissioned by the NPWS to undertake an Aboriginal Site Planning Study to be utilised in the management of Aboriginal sites on the Cumberland Plain. Prior to her study, 307 sites had been recorded on the Cumberland Plain, mainly open artefact scatters (297) with four scarred trees, one carved tree, four axe-grinding grooves and a Mission site (the Blacktown Institute). Smith (1989a:2) added 79 open sites and 29 isolated finds from field surveys related to her study.

Smith's (1989a:3) analysis indicated that site location and site densities were influenced by the availability of water and raw materials. She concluded that other factors such as topography, natural vegetation and soil types did not influence site location. She also identified that the majority of sites recorded have been in the northern sector of the Cumberland Plain, during site surveys of areas threatened by development (Smith 1989a:21). Her field studies (1989a & 1989b:10) confirmed that site densities in the southern Cumberland Plain appear to be lower overall to site densities on the northern Plain.

Since Smith's study, there has been a dramatic increase in development in Western Sydney, resulting in a great deal more archaeological survey and excavation (Comber 1990, 1991, 2006a,b&c, 2008, 2010a&b, 2011, 2015, 2016, 2017, 2019, 2020 McDonald 1989, 2002 & 2005a; Comber & Stening 2018, 2019; Comber & Norman 2020). This further work has indicated the complexity in the archaeological record that was not previously recognised. For example, sites on permanent water are more complex than sites on ephemeral drainage lines with major confluences being prime site locations. However, McDonald (2005a) reports that archaeological sites are found in a range of landscapes and that their condition is dependent on the amount of impact from European land practices.

McDonald's (2005a) report demonstrates the dynamic nature of stone tool technologies on the Cumberland Plain. She reviewed previous work within a theoretical framework to identify intra and inter-regional variation. She not only identified change over time in the stone tool technology, but the manner in which "stone technologies were organised in relation to landscape" (McDonald 2005a:np). Her report provides a framework to tentatively date sites through technological analyses and to identify cultural changes.

Her study also indicated that the surface representation of a site on the Cumberland Plain does not necessarily reflect the actuality of that site. Of the excavations conducted by her, sub-surface deposits were present even when there was no surface indication of a site. According to McDonald (2005a:5), "despite artefacts being rare or completely absent on the surface at each of the sites investigated, all six sites were found to contain intact archaeological deposit. Almost 500 square metres were excavated during this Project and almost 35,000 artefacts retrieved." McDonald (2005) also considers that Aboriginal occupation was focussed on the major river systems and characterised by mobility between a small number of sites. As a result of her various studies and applying stream order modelling she (2005) further predicts that the density and complexity of archaeological sites will vary according to stream order, as follows:

- Fourth-Fifth order creeks (or rivers): Archaeological evidence will be more complex and possibly stratified, reflecting more permanent and repeated occupation on major creeks.
- Third order creeks: Evidence of more frequent occupation such as knapping floors or higher artefact densities will be found in the lower reaches of tributary creeks.
- Second order creeks: Sparse archaeological evidence will be found which indicates occasional use and/or occupation.
- First order creeks: Due to the intermittent nature of water flow only very sparse evidence would be found in the headwaters of upper tributaries such as background artefact scatter.

Kohen's studies at Penrith confirmed the importance of fifth order creeks and rivers. He recorded over 50 sites in the Penrith area which included open artefact scatters, axe grinding grooves and rock shelters. Kohen (1997:7) indicates that sites occurring throughout the Penrith area "are particularly likely to occur adjacent to the rivers and creeks. The distribution of raw materials associated with the manufacture of stone tools suggests that chert and basalt were carried or traded east from the river gravels and that silcrete was traded or carried from sources near South Creek and Eastern Creek, west towards the Nepean flood plain".

Comber (2006a & b) also recorded open artefact scatters and scarred trees within the Cumberland Plain. She undertook excavation at two sites at Penrith Lakes known as Camenzulis (2010c) and PL9 (2010d). At PL9 she retrieved more than 1,500 artefacts, including backed blades and an edge ground axe. Her work confirms McDonald's (2005) and Kohen's predictive model that sites are more likely to occur adjacent to the rivers and high order creeks. These excavations (Comber 2010c & d) at Penrith Lakes further indicates the possibility that sub-surface archaeological deposits will remain despite disturbance by non-Aboriginal activities and the complexity of such sites. Surveys (2006a & b) undertaken prior to the excavations recorded the areas as being disturbed by agricultural activities. They had been grazed, ploughed, planted with crops and a dam constructed. Only a small number of artefacts were recorded on the surface but over 2,500 artefacts retrieved during excavation.

A survey undertaken by Comber (2008a) and subsequent excavations undertaken by Stening (2011) at Doonside demonstrated that although no surface artefacts were recorded (Comber 2008) substantial subsurface deposits did exist on the site with over 1,000 artefacts being recovered from a highly disturbed context (Stening 2011). This site was located beside Eastern Creek an important 4th or 5th order creek. It is an important watershed with extensive evidence of Aboriginal occupation.

Excavations undertaken by Comber at the Parramatta North Urban Transformation site (PNUT), which currently contains the Cumberland Hospital and is located on the Parramatta River near Domain Creek and Toongabbie Creek has yielded extensive evidence of Aboriginal occupation. Due to historic ploughing and topdressing no artefacts were observed on the surface. However, over 3,000 artefacts have been recovered from the current program of testing.

Similar results were found at the site of Parramatta Square. The site is located within the centre of Parramatta and had contained office buildings, ancillary services and hardstand prior to demolition. The archaeological excavations revealed extensive evidence of Aboriginal occupation including hearths, despite the lack of surface evidence.

AHMS (2012) and Navin Officer (2014) undertook assessments for the concept approval for the Sydney Intermodal Terminal at Moorebank identifying a number of Potential Archaeological Deposits. Testing undertaken by Artefact (2016) for Stage 1 of the Intermodal Terminal uncovered 28 objects indicating a low level of Aboriginal occupation on a maximal upper slope ridge. The testing revealed two phases of occupation. Artefact (2016) undertook further assessment for Stage 2 without identifying any areas of Aboriginal archaeological potential. The Sydney Intermodal Terminal is located approximately 15km to the west of the current study area on the western bank of the Georges River in an environmental landscape impacted by flooding. The results of this testing indicates that evidence of Aboriginal occupation can still remain despite later disturbance and particularly despite repeated inundation from maximal flood events.

AHMS (2013) undertook an assessment of the New Brighton Golf Course at Moorebank, on the Georges River. The area contained a former swamp and was on the floodplain of the Georges River. Test excavations revealed a highly disturbed landscape and uncovered one Aboriginal object.

In 1984 Haglund undertook an archaeological survey between King Georges Road Beverly Hills and Heathcote Road, Moorebank in respect of the F5. She located on open artefact scatter and one isolated find. The open artefact scatter was located on the banks of the Georges River at Hammondville, which is approximately 15km to the south west of the present study area whilst the isolated find was located approximately 2kms to the west of the Georges River. Haglund (1984) summarised work undertaken to date in the south Sydney area noting that "The known sites are mostly by, or close to, the Georges River in sandstone cliffs or outcrops". These sites included hand stencils and engravings and middens (Haglund 1984:3).

Archaeological investigations within the Sydney Basin have established reliable Carbon 14 dating evidence of Aboriginal occupation dating from the Pleistocene but (14,700BP at Cranebrook Terrace). The majority of sites however have been dated to less than 5,000 years. The absence of earlier dates is due to the effect of sea level rises c6,000 years ago. The influx of seawater over former coastal plains would have forced people into the new confines of the Sydney Basin (Nutley 2006). This 'intensification', or increased population, was then associated with an increase in the physical evidence of post 5,000BP occupation now being recorded through archaeological investigation.

The model of occupation developed for the Cumberland Plain indicates that reliable water is a prime factor in the choosing of site locations by Aboriginal people. More complex higher density sites will be located at the confluence of several water bodies whilst evidence of frequent occupation will be located in the lower reaches of tributaries. However, evidence will still be located in areas with seasonal creek lines, but it will sparse and less complex. Ground disturbance will impact on surface evidence, but subsurface evidence may still be located in areas of high disturbance and in areas subjected to flooding.

4.2. Ryde

To date, archaeological investigation within the vicinity of the study area has been limited, with little systematic research or fully comprehensive archaeological site survey work being conducted. Many of the surveys that have been carried out have been site selective, having been conducted prior to development.

A search of AHIMS for the broader Ryde region indicate that only a small number of assessments have been undertaken nearby, resulting in only a few sites being recorded. It should be noted that the small number of sites registered with AHIMS is a result of this lack of assessment, not a lack of potential Aboriginal archaeological sites.

The AHIMS search, measuring approximately 9km north-south and 7km east-west, identified 54 registered Aboriginal sites. One site, 45-6-3022, has restrictions applied. AHIMS confirmed that this site was not within the vicinity of the current study area. The results of the extensive AHIMS search are included in Table 3 below and are shown in Figure 155 and Figure 166. One registered Aboriginal site is located within 1km of the study area, AHIMS number 45-6-2309. Further information on this site is provided below.

Site type	No. of sites
Art (Pigment or Engraved)	2
Artefact	23
Artefact, Shell	2
Grinding Groove	1
Modified Tree (Carved or Scarred)	1
Potential Archaeological Deposit (PAD)	10
Potential Archaeological Deposit (PAD), Artefact	1
Restricted	1
Shell	2
Shell, Artefact	11
TOTAL	**54**

Table 1: AHIMS search results

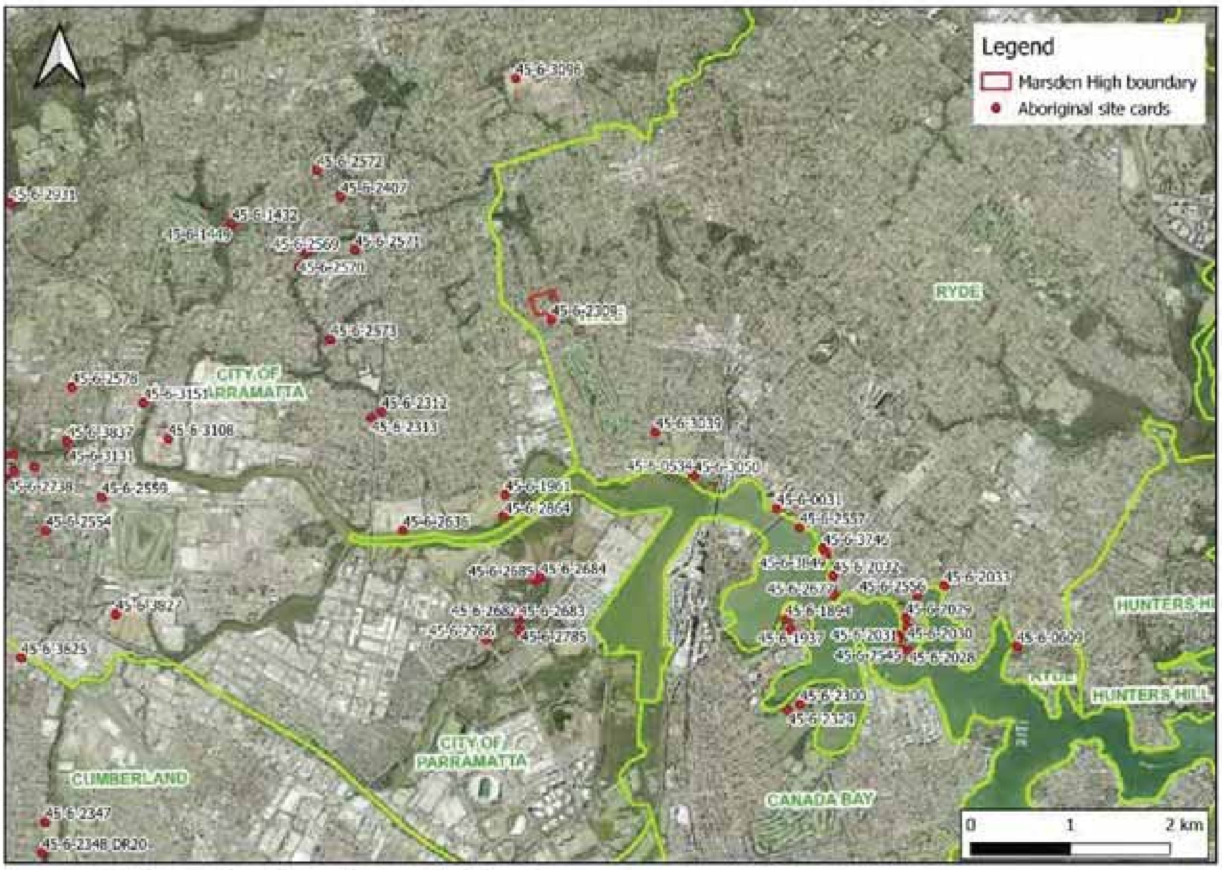

Figure 5: AHIMS search results, study area edged in red

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Figure 6: AHIMS site 45-6-2309 shown in relation to the study area

45-6-2309
This site was registered in January 1992 and is located on the property directly to the south of the current study area, at Ermington Public School. The site consists of a shell midden with several artefacts in a very disturbed condition. The artefact materials include red silcrete, quartz and chert. The site is approximately 30 m from an un-named creek that has been enclosed in a concrete pipe.

City of Ryde – Aboriginal Site Management Report (Aboriginal Heritage Office 2011)
The Aboriginal Heritage Office (AHO) prepared an Aboriginal Site Management Report for the City of Ryde LGA in 2011. The aims of the report were to:

- Identify, access and re-record all known Aboriginal sites located in the Council area, where possible,
- Provide a planning document for conserving Aboriginal cultural heritage values,
- Provide a schedule for conservation works.

The report identified 56 recorded Aboriginal sites on the AHIMS register for the LGA, discounting sites which had been recorded twice and sites without sufficient information to be relocated. While an analysis of Aboriginal social values of the City of Ryde LGA was not within the scope of the report, the AHO found that the area contained high cultural significance (AHO 2011:21).

The report divided the LGA into three Management Areas. Area 1, named 'Lane Cove River', is located across a band of land across the northern and eastern side of the LGA. Area 2, named 'Central Plateau', is the higher plateau area of the centre and west of the LGA and is the most developed section. Area 3, named 'Parramatta River', is the sloping land bordering the Parramatta River along the south of the LGA (AHO 2011:25).

The study area is located within Area 2, the Central Plateau. Much of the surface geology is shale (as identified in Section 6.2), which preserves less obvious evidence of Aboriginal presence than the sandstone dominated slopes of the other areas (AHO 2011:25). One site was identified in this area, AHIMS 45-6-2309. This site is located directly south of the current study area.

The report found that most sites did not require any additional management works beyond regular monitoring, that is, every 12 months as a minimum or 6 months for more sensitive sites. The report recommended that land managers continue to support initiatives to expand their management of Aboriginal heritage, particularly undertaking measures in regard to education and training, and site management and protection (AHO 2011:30).

4.3. Study area

There are no registered Aboriginal sites within the study area and the study area is not an Aboriginal place.

5.0 CONSULTATION

Table 1 summarises the consultation undertaken in accordance with *Aboriginal cultural heritage consultation requirements for proponents 2010*. The letters and emails are attached at Appendix A.

Table 2: Consultation undertaken in accordance with *Aboriginal cultural heritage consultation requirements for proponents 2010.*

Step	Task Requirement	Action	Date of action	Outcome
4.1.1	Identify if native title exists in relation to the project area.	We searched the National Native Title Register for land claims and registered Indigenous Land Use Agreements	14/4/2021	There are no Native Title Claimants or holders and there are no Indigenous Land Use Agreements
4.1.2	Ascertain, from reasonable sources of information, the names of Aboriginal people who may hold cultural knowledge relevant to determining the significance of Aboriginal objects and/or places. Compile a list of Aboriginal people who may have an interest for the proposed project area and hold knowledge relevant to determining the cultural significance of Aboriginal objects and/or places	We wrote to the following organisations seeking the names of any Aboriginal people or organisations who may hold cultural knowledge: • Metropolitan Local Aboriginal Land Council • City of Ryde Council • Greater Sydney Local Land Services (GSLLS) • Heritage NSW • Office of Registrar, Aboriginal Land Rights Act 1983 • NTS Corporation	4/2/2021	Office of Registrar, *Aboriginal Land Rights Act 1983* responded on 4/2/2021 and advised that there were no Registered Aboriginal owners. Ryde City Council responded on 10/02/2021 and advised that Council did not have contacts for Indigenous groups specific to Ryde LGA. Heritage NSW responded on 23 February 2021 and provided a list of 48 Aboriginal stakeholder groups who may have an interest in the project. (The list included 59 entries but 11 of these were duplicates.)
4.1.3	Written notification and advertisement: Write to the Aboriginal people whose names were obtained in step 4.1.2 and the relevant LALC(s) to notify them of the proposed project. Placed a notice in the local newspaper circulating in the general location of the proposed project, explaining the project and its exact location. Notification by letter and newspaper must include: (a) the name and contact details of the proponent (b) a brief overview of the proposed project that may be the subject of an application for an AHIP, including the	We placed an advertisement in News Local Digital Edition. We wrote to the following organisations/people identified in 4.1.2 • A1 Indigenous Services • Amanda Hickey Cultural Services • Aragung Aboriginal Cultural Heritage Site Assessments • B.H. Heritage Consultants • Badu • Barking Owl Aboriginal Corporation • Biamanga • Bilinga • Butucarbin Aboriginal Corporation • Callendulla • Clive Freeman • Darug Aboriginal Cultural Heritage Assessments • Darug Boorooberongal Elders Aboriginal Corporation • Darug Custodian Aboriginal Corporation • Darug Land Observations	Ad in paper 4/2/2021with a response by 22/02/2021 Email sent on 24/02/2021 with response date of 10/03/2021	We received responses from the following: • Lilly Carroll & Paul Boyd, Didge Ngunawal Clan • Phil Khan, Kamilaroi Yankuntjatjara Working Group • Krystle Carroll-Ellott, Ginninderra Aboriginal Corporation • James Eastwood, Aragung Aboriginal Cultural Heritage Site • Justine Saunders, Darug Custodian Aboriginal Corporation • Phill Boney, Wailwan Aboriginal Group • Kaarina Slater, Ngambaa Cultural Connection • Rodney Gunther, Waawaar Awaa Aboriginal Corporation

Step	Task Requirement	Action	Date of action	Outcome
	location of the proposed project (c) a statement that the purpose of community consultation with Aboriginal people is to assist the proposed applicant in the preparation of an application for an AHIP and to assist the Director-General of OEH in his or her consideration and determination of the application (d) an invitation for Aboriginal people who hold cultural knowledge relevant to determining the significance of Aboriginal object(s) and/or place(s) in the area of the proposed project to register an interest in a process of community consultation with the proposed applicant regarding the proposed activity (e) a closing date for the registration of interests	• Dharug • Dhinawan Culture & Heritage Pty Ltd • Didge Ngunawal Clan • DJMD Consultancy • Eric Keidge • Galamaay Cultural Consultants (GCC) • Ginninderra Aboriginal Corporation • Goobah Developments • Goodradigbee Cultural & Heritage Aboriginal Corporation, • Gulaga • Jerringong • Kamilaroi Yankuntjatjara Working Group • Metropolitan Local Aboriginal Land Council • Minnamunnung • Munyunga • Mura Indigenous Corporation • Murramarang • Murrumbul • Ngambaa Cultural Connections • Nundagurri • Pemulwuy CHTS • Thauaira • Thoorga Nura • Tocomwall • Waawaar Awaa Aboriginal Corporation • Wailwan Aboriginal Group • Walbunja • Walgalu • Wingikara • Wori Wooilywa • Wullung • Wurrumay Pty Ltd • Yerramurra		
4.1.4	A minimum of 14 days from the date the letter was sent or notice published in the newspaper to register an interest.	Closing date for registration of interest included in the notification letters and notice in the newspaper was at least 14 days from the date the letters were sent and notices appeared in the newspapers.	Ad in paper 4/2/2021with a response by 22/02/2021 Email sent 24/2/21 with a response date of 10/03/2021	See above for the organisations who responded. Letters and advertisement included closing dates
4.1.5	Must advise Aboriginal people who are registering an interest	RAP's informed by: • letter email	24/02/2021	No RAPs asked for their details to be withheld from MLALC/HNSW

Step	Task Requirement	Action	Date of action	Outcome
	that their details will be forwarded to HNSW and the LALC unless they specify that they do not want their details released.	• advertisement	4/2/2021	
4.1.6	Make a record of the names of each Aboriginal person who registered an interest. Provide a copy of that record and copy of the notification from step 4.1.3 to the relevant Heritage NSW and LALC within 28 days of closing date for registration of interest.	List of RAP's compiled and sent to Heritage NSW and MLALC	11/03/2021	Letters sent
4.1.7	LALCs holding cultural knowledge relevant to determining the significance of Aboriginal objects and places in the proposed project area who wish to register an interest to be involved in consultation must register their interest as an Aboriginal organisation rather than individuals.	Metropolitan LALC is a Registered Aboriginal Party to be involved in consultation (refer to 4.1.6)		MLALC registered
4.1.8	Where an Aboriginal organisation representing Aboriginal people, who hold cultural knowledge has registered an interest, a contact person for that organisation must be nominated. Aboriginal cultural knowledge holders who have registered an interest may indicate they have appointed a representative to act on their behalf. Where this occurs, the registered Aboriginal party must provide written confirmation and contact details of those individuals to act on their behalf.			See 4.1.3 above
4.2	Presentation of information about the proposed project.	Information about project forwarded to all RAPs with 28 days to respond.	Sent on 11/03/2021 with a response date of 13/04/2021	Information forwarded

Step	Task Requirement	Action	Date of action	Outcome
4.3.1-4.3.2	Notification of proposed assessment methodology	Methodology sent to all RAPS.	Sent on 11/03/2021 with a response date of 13/04/2021	Responses received from • Rodney Gunther, Waawaar Awaa Aboriginal Corporation 14/3/2021 • Justine Coplin, Darug Custodian Aboriginal Corporation 16/3/2021 • Phil Khan, Kamilaroi Yankuntjatjara Working Group 23/03/2021 • Jamie Eastwood, Aragung Aboriginal Cultural Heritage Site Assessments 16/03/2021 • Ngambaa Cultural Connections 15/03/2021
4.3.3	Gathering information about cultural significance			Cultural information provided by some RAPs and included in significance assessment.
4.4	Review of draft cultural heritage assessment report	ACHAR sent to all RAPs for review and comment.	ACHAR sent on 14/04/2021 with responses due on 12/05/2021	The following RAPs responded and were all in support of the ACHAR • Waawaar Awaa – Rodney Gunther 14/04/2021 • Aragung -_Jamie Eastwood 19/04/2021 • Ngaamba Cultural Connections-Kaarina Slater 22/04/2021 • Didge Ngunawal Clan - Lilly Carroll, 22/04/2021

As a result of the above consultation the following organisations are Registered Aboriginal Parties:

- Metropolitan Local Aboriginal Land Council
- Aragung Aboriginal Cultural Heritage Site Assessments
- Darug Custodian Aboriginal Corporation
- Didge Ngunawal Clan
- Ginninderra Aboriginal Corporation
- Kamilaroi Yankuntjatjara Working Group
- Ngambaa Cultural Connection
- Waawaar Awaa Aboriginal Corporation
- Wailwan Aboriginal Group

No confidential, culturally sensitive or restricted information was identified.

6.0 CULTURAL HERITAGE VALUES AND STATEMENT OF SIGNIFICANCE

7.1 Preamble

Significance assessment is the process whereby sites or landscapes are assessed to determine their value or importance to the community.

A range of criteria have been developed for assessing the significance which embody the values contained in the Burra Charter. The Burra Charter provides principles and guidelines for the conservation and management of cultural heritage places within Australia.

Following are the criteria which will be used to assess the significance of the study area.

7.2 Criteria

Social value (sometimes termed 'Aboriginal' value) which refers to the spiritual, traditional, historical or contemporary associations or attachments which the place or area has for the present day Aboriginal community.

Historic value refers to the associations of a place with a person, event, phase or activity of importance to the history of an Aboriginal community.

Scientific value refers to the importance of a landscape, area, place, or objects because of its potential to provide information which is of value in scientific analysis and the ability to answer scientific or technical research questions.

Aesthetic value refers to the sensory, scenic and creative aspects of the place.

Representativeness refers to whether the site demonstrates the principle characteristics of that site and is a good representative example of that site type.

Rarity refers to the degree to which such a site is known elsewhere and whether the site is uncommon, rare or endangered.

7.3 Criteria

Social Values
The artefacts predicted to be on located on the site will provide evidence of Aboriginal occupation, representing the past for the local Aboriginal community, and providing a direct link to their ancestors.

> *'The area is significant to the Darug people due to the evidence of continued occupation, within close proximity to this project site there is a complex of significant sites.' (DCAC)*

Historic Values
The study area is predicted to contain significant historic values.

Scientific Values
The study area has the potential to yield further Information through detailed scientific and archaeological research into the nature of Aboriginal occupation and techniques utilised in subsistence activities. It has the potential to contain sub-surface archaeological deposits.

Aesthetic Values
The site does not contain Aboriginal aesthetic values, however, after excavation the objects uncovered might meet this criterion.

Representative Values
Until the excavation has been completed it is not known if the site contains representative values.

Rarity Values
Until the excavation has been completed it is not known if the site contains rarity values.

6.1. Statement of significance

The area is significant to the Darug people due to the evidence of continued occupation, within close proximity to this project site there is a complex of significant sites. The artefacts predicted to be located on the site will provide evidence of Aboriginal occupation, representing the past for the local Aboriginal community, and providing a direct link to their ancestors. The current site contains a portion of Archer Creek, a tributary of the Parramatta River, and is therefore considered to be an area of archaeological potential. The study area has the potential to yield further information through detailed scientific and archaeological research into the nature of Aboriginal occupation and techniques utilised in subsistence activities. It has the potential to contain sub-surface archaeological deposits. The current site does not contain Aboriginal aesthetic values, however, after excavation any objects uncovered may meet this criterion. Until the excavation has been completed it is not known if the site contains representative or rarity values.

7.0 PROPOSED ACTIVITY

The Department of Education through School Infrastructure NSW (SINSW) propose to relocate Marsden High School to the Meadowbank Education [and Employment] Precinct. A robust Business Case is being developed in order to repurpose the Marsden High School site to a community sports facility. At present, two draft masterplan options have been developed for the study area, shown below in Figure 107.

The proposed works have not yet been finalised; however, the works will involve extensive ground disturbance including, but not limited to:

- Demolition of the existing school buildings and facilities in the north western portion of the study area.
- Cut and fill to modify site levels. There is a substantial fall of between 3-7m across the study area, comprising both natural topography and existing civil benches for school buildings and landscaping. Modification of levels will be limited by using existing site levels as much as possible.
- Landscaping.
- Construction of sports courts across the majority of the study area.
- Indoor sporting facility and car parking in the north western portion of the study area.
- Construction/upgrade of service infrastructure.
- Within the north eastern portion of the study area, natural site levels will largely remain undisturbed as these are in an ecologically protected area.

Figure 7: Masterplan option 2 (Cox Architects 2021)

8.0 AVOIDING AND MINIMISING HARM

8.1. Impacts

The proposed development will involve impact to the study area. The proposed works listed in Section 7 above are proposed to be developed on top of the existing site to minimise ground surface disturbance, although the proposed development will require the re-levelling of existing site bench levels.

As the area has been assessed as having the potential to contain subsurface Aboriginal archaeological deposits, further measures will be required in order to mitigate potential impacts to Aboriginal heritage values.

8.2. Mitigation

Archaeological test excavation

As subsurface Aboriginal objects are predicted to exist within the study area, and it is an offence to harm such objects, testing, and, if necessary, salvage excavation is proposed as a mitigation measure, as avoidance of the potential deposits is not possible. The information gained from archaeological excavation contributes to our knowledge and understanding of Aboriginal occupation. This knowledge can then be passed down to future generations through education programs and interpretation. Such strategies will contribute to building and maintaining social cohesion within the Aboriginal and broader community and protecting cultural values for future generations. Archaeological sites are valued by the Aboriginal community for more than their archaeological/scientific values. Such sites reflect both the physical and spiritual presence of ancestors on country. It is therefore important that as much information as possible is obtained to ensure recognition of Aboriginal heritage and to pass this information on to future generations.

Conservation Zone

The north eastern portion of the study area, including and adjacent to Archer Creek, contains a landform with archaeological potential. This area, shown in Figure 18 below has been maintained and managed by Council and the school and has been designated as a Conservation Zone for both natural and cultural heritage values.

Figure 8: Conservation Zone shown in red hatch

9.0 RECOMMENDATIONS

The following recommendations are based on:

- Legal requirements under the terms of the *National Parks & Wildlife Act 1974* (as amended), which states that it is an offence to harm or desecrate an Aboriginal place or object without first gaining a permit under Part 6 of the *National Parks & Wildlife Act 1974*.
- Consultation with the Registered Aboriginal Parties as detailed in this report.
- Research into the archaeological record for the Cumberland Plain and the study area.
- Results of the assessment as outlined in this report.

IT IS THEREFORE RECOMMENDED THAT:

1) Aboriginal community consultation should continue.

2) As subsurface Aboriginal objects are predicted to exist within the study area, and it is an offence to harm such objects, test excavation should be undertaken in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010) and in association with the Registered Aboriginal Parties. This testing can be undertaken without an AHIP.

3) The area identified within this report as Conservation Zone including and adjacent to the Archer Creek, should not be impacted upon by the proposed works and should be maintained *in situ*. During the proposed works a physical barrier should be established around the Conservation Zone and all employees, contractors and sub-contractors engaged on the proposed development of the sporting facilities should be advised that the Conservation Zone is a "no-go area".

4) If no Aboriginal objects are uncovered during the testing, the project can proceed without the need to undertake salvage. However, if Aboriginal objects are uncovered during the testing, it may be necessary to apply for a AHIP and undertake Aboriginal archaeological salvage excavations once the DA has been issued. The salvage will need to be undertaken prior to redevelopment of the site.

5) All employees, contractors/sub-contractors and anyone else working on the site should be made aware that it is an offence to harm Aboriginal objects. If any Aboriginal objects are uncovered during the course of the redevelopment of the school, all work must cease in the vicinity of that object and further advice sought from the consultant.

6) An Aboriginal heritage induction should be provided to all staff and contractors on the significance of the Aboriginal heritage of the site, including the Conservation Zone and advised of their responsibilities under the *National Parks & Wildlife Act 1974* in respect of Aboriginal heritage.

7) An interpretation strategy and plan should be developed which interprets the results of the archaeology and the Aboriginal history of the region. This should be in partnership with the RAPs. The artefacts recovered from the testing and salvage could be used in the interpretative display.

8) Should the proposed works as described in this report be altered the new proposal should be assessed and this report amended accordingly.

9) In the unlikely event that Aboriginal burials or skeletal material are unexpectedly uncovered, work should cease in the vicinity of the skeletal remains and the consultant immediately contacted. The area should be cordoned and protected from unauthorised access. The consultant will determine if the skeletal remains are human or animal. If human, the consultant will contact the RAPs, the Police and Heritage NSW.

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APPENDIX A: CONSULTATION

4.1.1 Identify if Native Title exists

We searched the National Native Title Register on 14th April 2021 and again on 5th May 2021for a list of registered native title claimants, native title holders and registered Indigenous Land Use Agreements

The results indicate that there are no Native Title Claimants or holders and there are no Indigenous Land Use Agreements.

Search National Native Title Register

The National Native Title Register (NNTR) is a register established under s. 192 of the *Native Title Act 1993* (Cth).

The NNTR contains determinations of native title made by:

- the High Court of Australia
- the Federal Court of Australia
- or a recognised body such as South Australia's Supreme Court and Environment Resources and Development Court.

Further information about the NNTR is available.

Tribunal file no.	
Federal Court file no.	
Short name	
Case name	
State or Territory	ALL
Registered Native Title Body Corporate*	
Representative A/TSI body area	
Local government area	Ryde City Council
Determination type	ALL
Legal process	ALL
Determination outcome	ALL
Determination date between	and
Sort by	Determination date

Search >

*Please note: current contact details for the Registered Native Title Body Corporate are available from the Office of the Registrar of Indigenous Corporations www.oric.gov.au

No results for current search criteria

D21/78776

4.1.2 Ascertaining the names of people who may hold cultural knowledge

We wrote to the following organisations. Copy of the email follows.

- Heritage NSW
- Metropolitan Local Aboriginal Land Council
- The Registrar, *Aboriginal Land Rights Act 1983* for a list of Aboriginal owners
- Native Title Services Corporation Limited (NTSCORP Limited)
- The City of Parramatta Council
- Local Land Services

From:	David Nutley
To:	HERITAGEMailbox@environment.nsw.gov.au; Information@ntscorp.com.au; metrolalc@metrolalc.org.au; gs.service@lls.nsw.gov.au; cityofryde@ryde.nsw.gov.au
Bcc:	Jillian Comber
Subject:	Aboriginal Cultural Heritage Consultation - Marsden High School, West Ryde
Date:	Thursday, 4 February 2021 2:41:00 PM
Attachments:	image002.png

MARSDEN HIGH SCHOOL, 22A WINBOURNE STREET, WEST RYDE
Title Details: 1/220808

The Department of Education through School Infrastructure NSW (SINSW) is planning to repurpose the current site of Marsden High School at 22A Winbourne Street, West Ryde within the City of Ryde Local Government Area. The proposed redevelopment will be assessed as a State Significant Development (SSD).

Comber Consultants have been engaged by SINSW to undertake Aboriginal community consultation in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010.* As required, I am writing to you to ascertain if you are aware of Aboriginal people or organisations who may hold cultural knowledge relevant to determining the significance of Aboriginal objects and or/places within the study area. If so, I would be pleased if you could forward their contact details to me.

Please provide your response by Monday 22 February 2021 to:

David Nutley Comber
Consultants
76 Edwin Street North CROYDON,
NSW 2132
David.nutley@comber.net.au M:
0408 76 553

DAVID NUTLEY

DIRECTOR

COMBER
CONSULTANTS

Responses to 4.1.2

OFFICE OF THE REGISTRAR
ABORIGINAL LAND RIGHTS ACT 1983 (NSW)

04 February 2021

By email: David.nutley@comber.net.au

David Nutley
Comber Consultants
76 Edwin Street North
CROYDON NSW 2132

Dear David,

Request - Search for Registered Aboriginal Owners – Marsden High School, 22A Winbourne Street, West Ryde.

We refer to your email dated 04 February 2021 seeking the identification of Aboriginal organisations and people who may have an interest in the proposed redevelopment of Marsden High School at 22A Winbourne Street, West Ryde New South Wales.

Under Section 170 of the Aboriginal Land Rights Act 1983 the Office of the Registrar is required to maintain the Register of Aboriginal Owners (RAO). A search of the RAO has shown that there are currently no Registered Aboriginal Owners in the project area.

We suggest you contact the Metropolitan Local Aboriginal Land Council on (02) 8394 9666 or via email nmoran@metrolalc.org.au as they may wish to participate.

Yours sincerely

Rachel Rewiri
Project Officer
Office of the Registrar, Aboriginal Land Rights Act 1983

Level 3, 2 – 10 Wentworth Street, PARRAMATTA NSW 2150
P.O Box 5068, PARRAMATTA NSW 2124
02 8633 1266

From: Michael Edwards <MichaelM@ryde.nsw.gov.au>
Sent: Wednesday, 10 February 2021 4:38 PM
To: David Nutley
Subject: RE: Aboriginal Cultural Heritage Consultation - Marsden High School, West Ryde

David,

Thank you for your email enquiry. I do not have any specific contacts for Indigenous groups specific to the Ryde LGA.

I would suggest making contact with the MLALC who may be able to identify any appropriate persons or groups.

Regards,

Michael Edwards
Heritage Advisor

Michael Edwards
Heritage Officer (Wed & Fri)
URBAN STRATEGY
P 0299528321
E MichaelM@ryde.nsw.gov.au
W www.ryde.nsw.gov.au

City of Ryde

Customer Service Centre 1 Pope Street, Ryde (Within Top Ryde City shopping centre)
North Ryde Office Riverview Business Park, Building 0, Level 1, 3 Richardson Place, North Ryde

Let's Connect Facebook | Twitter | Instagram | YouTube | eNews

NSW GOVERNMENT | Premier & Cabinet

Reference: DOC21/63853-1

Dr Jillian Comber,
Comber Consultants
79 Edwin Street
North Croydon NSW 2132
jillian.comber@comber.net.au

RE: Request for information on Aboriginal stakeholders for an Aboriginal cultural heritage assessment for the proposed "redevelopment of the Marsden High School, 22a Winbourne Street, West Ryde, NSW".

Dear Jillian,

Thank you for your letter of 4 February 2021 about Aboriginal cultural heritage consultation for proposed for the proposed "redevelopment of the Marsden High School, 22a Winbourne Street, West Ryde, NSW, within the Ryde local government area. I appreciate the opportunity to provide input.

Please find enclosed a list of known Aboriginal parties for the Ryde local government area (Attachment 1) that we consider likely to have an interest in the proposal. Note this is not an exhaustive list of all interested Aboriginal parties. Receipt of this list does not remove the requirement for a proponent/consultant to advertise the proposal in the local print media and contact other bodies and community groups seeking interested Aboriginal parties, in accordance with the *'Aboriginal cultural heritage consultation requirements for proponents 2010'* (the CRs).

We would also like to take this opportunity to remind the proponent and consultant to:

- Ensure that consultation is fair, equitable and transparent. If the Aboriginal parties express concern or are opposed to parts of or the entire project, we expect that evidence will be provided to demonstrate the efforts made to find common ground between the opponents and the proponent.

If you have any questions about this advice, please do not hesitate to contact me via paul.houston@environment.nsw.gov.au or 02 68835361.

Yours sincerely

Paul Houston
Aboriginal Heritage Planning Officer
Aboriginal Cultural Heritage Regulation - Northern
Heritage NSW
Department of Premier and Cabinet
23 February 2021

ATTACHMENT A

Table 1: List of Aboriginal stakeholder groups within the Ryde LGA. - that may have an interest in the project; provided as per the "OEH Aboriginal cultural heritage requirement for proponents 2010".

Organisation/ Individual	Contact Name	Email Address/ Fax / Phone	Postal Address	Additional information
Organisation/ Individual	**Contact Name**	**Email Address/ Fax / Phone**	**Postal Address**	**Additional information**
Metropolitan Local Aboriginal Land Council	Nathan Moran	(02) 83949666 officeadmin@metrolalc.org.au	PO Box 1103 Strawberry Hills NSW 2016	
Darug Aboriginal Cultural Heritage Assessments	Gordon Morton	02 9410 3665 or 0422 865 831	Unit 9, 6 Chapman Avenue, Chatswood, NSW 2067	
Darug Land Observations	Jamie Workman and Anna Workman	0418 494 951 0413 687 279 [illegible]	PO Box 173, Ulladulla, NSW 2539	
A1 Indigenous Services	Carolyn Hickey	0411 650 057 cazadirect@live.com	10 Marie Pitt Place Glenmore Park 2745 NSW	
Eric Keidge	Eric Keidge	04311 66423	11 Olsson Close Hornsby Heights NSW 2077	
Kamilaroi Yankuntjatjara Working Group	Phil Khan	0434 545 982 [illegible]	78 Forbes Street, Emu Plains, NSW 2750	
Tocomwall	Scott Franks	0404 171 544	PO Box 76, Caringbah NSW 1495	
Amanda Hickey Cultural Services	Amanda Hickey	0434 480 588 amandahickey@live.com.au	57 Gough st emu plains 2750	
Dhinawan Culture & Heritage Pty Ltd	Stephen Fields	0411232285 [illegible]		
Gunyuu	Kylie Ann Bell	gunyuuchts@gmail.com		
Walbunja	Hika Te Kowhai	0402 730 612 walbunja@gmail.com		
Badu	Karia Lea Bond	0476 381 207	11 Jeffery Place, Moruya, NSW 2537	
Goobah Developments	Basil Smith	0405 995 725 [illegible]	66 Grantham Road, Batehaven NSW, 2536	
Wullung	Lee-Roy James Boota	0403 703 942	54 Blackwood Street, Gerringong, NSW, 2534	
Yerramurra	Robert Parson	yerramurra@gmail.com		
Nundagurri	Newton Carriage	nundagurri@gmail.com		
Murrumbul	Mark Henry	murrumbul@gmail.com		
Jerringong	Joanne Anne Stewart	0422 800 184 jerringong@gmail.com		
Pemulwuy CHTS	Pemulwuy Johnson	0425 066 100 pemulwuyd@gmail.com	14 Top Place, Mt Annan	
Bilinga	Simalene Carriage	bilingachts@gmail.com		
Munyunga	Kaya Dawn Bell	munyungachts@gmail.com		
Wingikara	Hayley Bell	wingikarachts@gmail.com		
Minnamunnung	Aaron Broad	0402 526 888	1 Waratah Avenue, Albion Park Rail NSW 2527	
Walgalu	Ronald Stewart	walgaluchts@gmail.com		
Thauaira	Shane Carriage	thauairachts@gmail.com		

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Gunyuu	Kylie Ann Bell	gunyuuchts@gmail.com		
Walbunja	Hika Te Kowhai	0402 730 612 walbunja@gmail.com		
Badu	Karia Lea Bond	0476 381 207	11 Jeffery Place, Moruya, NSW 2537	
Goobah Developments	Basil Smith	0405 995 725 [illegible]	66 Grantham Road, Batehaven NSW, 2536	
Wullung	Lee-Roy James Boota	0403 703 942	54 Blackwood Street, Gerringong, NSW, 2534	
Yerramurra	Robert Parson	yerramurra@gmail.com		
Nundagurri	Newton Carriage	nundagurri@gmail.com		
Murrumbul	Mark Henry	murrumbul@gmail.com		
Jerringong	Joanne Anne Stewart	0422 800 184 jerringong@gmail.com		
Pemulwuy CHTS	Pemulwuy Johnson	0425 066 100 pemulwuyd@gmail.com	14 Top Place, Mt Annan	
Bilinga	Simalene Carriage	bilingachts@gmail.com		
Munyunga	Kaya Dawn Bell	munyungachts@gmail.com		
Wingikara	Hayley Bell	wingikarachts@gmail.com		
Minnamunnung	Aaron Broad	0402 526 888	1 Waratah Avenue, Albion Park Rail NSW 2527	
Walgalu	Ronald Stewart	walgaluchts@gmail.com		
Thauaira	Shane Carriage	thauairachts@gmail.com		
Dharug	Andrew Bond	dharugchts@gmail.com		
Gulaga	Wendy Smith	gulagachts@gmail.com		
Callendulla	Corey Smith	cullendullachts@gmail.com		
Murramarang	Roxanne Smith	murramarangchts@gmail.com		
DJMD Consultancy	Darren Duncan	darrenjohnduncan@gmail.com		
Butucarbin Aboriginal Corporation	Jennifer Beale	(02)9832 7167 butuheritage@gmail.com	PO Box E18, Emerton, NSW 2770	
Didge Ngunawal Clan	Lillie Carroll Paul Boyd	0426 823 944 didgengunawalclan@yahoo.com.au	33 Carlyle Crescent Cambridge Gardens NSW 2747	
Ginninderra Aboriginal Corporation	Steven Johnson and Krystle Carroll	0406991221 Ginninderra.corp@gmail.com	PO BOX 3143 Grose Vale NSW 2754	
Waiwan Aboriginal Group	Philip Boney	0436 483 210 waarlan12@outlook.com		
Barking Owl Aboriginal Corporation	Mrs Jody Kulakowski (Director)	0426 242 015 barkingowlcorp@gmail.com	2-65/69 Wehlow St. Mt Druitt	
Thoorga Nura	John Carriage (Chief Executive Officer)	0401 641 299 thoorganura@gmail.com	50B Hilltop Crescent, Surf Beach, 2536, NSW	
Darug Boorooberongal Elders Aboriginal Corporation	Paul Hand (chairperson)	0456786738 paulhand1967@gmail.com	PO Box 14 Doonside NSW 2767	
B.H. Heritage Consultants	Ralph Hampton Nola Hampton	0435 785 138 0401 662 531 hamptonralph46@gmail.com	184 Captain Cook Drive Willmot 2770 NSW 95 Mount Ettalong Road Umina Beach 2257 NSW	

		kinghampton@77gmail.com		
Ngambaa Cultural Connections	Kaarina Slater	0417861882 ngambaaculturalconnections@hotmail.com	6 Natchez Cresent, Greenfield Park NSW 2167	
Goodradigbee Cultural & Heritage Aboriginal Corporation,	Caine Carroll	0410974236 goodradigbee1@outlook.com	1 Morilla Road, East Kurrajong NSW 2758	
Mura Indigenous Corporation,	Phillip Carroll	0448824188 mura.indigenous@bigpond.com	11 Nargal Street Flinders NSW 2529	
Aragung Aboriginal Cultural Heritage Site Assessments	Jamie Eastwood	0427793334 0298323732 James.eastwood@y7mail.com	33 Bulolo Drive Whalan NSW 2770	
Waawaar Awaa Aboriginal Corporation	Rodney Gunther	0410580962 Waawaar.awaa@gmail.com	15 Bungonia Street Prestons NSW 2170	
Wori Wooilywa	Daniel Chalker	woriwooilywa@gmail.com 0409006216	261 Mockingbird Rd Pheasants Nest NSW 2574	
Darug Custodian Aboriginal Corporation	Justine Coplin	0414 962 766 justinecoplin@optusnet.com.au	PO Box 81, Windsor NSW 2756	
Wailwan Aboriginal Group	Philip Boney	0436 483 210 waarlan12@outlook.com		
Barking Owl Aboriginal Corporation	Mrs Jody Kulakowski (Director)	0426 242 015 barkingowlcorp@gmail.com	2-65/69 Wehlow St. Mt Druitt	
Darug Boorooberongal Elders Aboriginal Corporation	Paul Hand (chairperson)	0456786738 paulhand1967@gmail.com	PO.Box 14 Doonside NSW 2767	
B.H. Heritage Consultants	Ralph Hampton	0435 785 138 0401 662 531	184 Captain Cook Drive Willmot 2770	

☐	Nola Hampton	hamptonralph46@gmail.com kinghampton@77gmail.com	NSW 95 Mount Ettalong Road Umina Beach 2257 NSW	
Ngambaa Cultural Connections	Kaarina Slater	0417861882 ngambaaculturalconnections@hotmail.com	6 Natchez Cresent, Greenfield Park NSW 2167	
Goodradigbee Cultural & Heritage Aboriginal Corporation,	Caine Carroll	0410974236 goodradigbee1@outlook.com	1 Morilla Road, East Kurrajong NSW 2758	
Mura Indigenous Corporation	Phillip Carroll	0448824188 mura.indigenous@bigpond.com	11 Nargal Street Flinders NSW 2529	
Aragung Aboriginal Cultural Heritage Site Assessments	Jamie Eastwood	0427793334 0298323732 James.eastwood@y7mail.com	33 Bulolo Drive Whalan NSW 2770	
Waawaar Awaa Aboriginal Corporation	Rodney Gunther	Waawaar.awaa@gmail.com	15 Bungonia Street Prestons NSW 2170	
Clive Freeman	Clive Freeman	Mob:0437721401 Home Number: 02-44421117 clive.freeman@y7mail.com	6 Dhugan Close Wreck Bay Aboriginal Community JBT 2540	
Galamaay Cultural Consultants (GCC)	Robert Slater	Mob:0401 871 526 galamaay@hotmail.com	121 Robert Street, Tamworth NSW 2340	
Wurrumay Pty Ltd	Kerrie Slater and Vicky Slater	0421077521 wurrumay@hotmail.com	89 Pyramid street, Emu Plains NSW 2750 PO Box 414 Emu Plains NSW 2750	
Tocomwall	Scott Franks	0404 171 544	PO Box 76, Caringbah NSW 1495	
Biamanga	Seli Storer	biamangachts@gmail.com		

Thoorga Nura	John Carriage (Chief Executive Officer)	0401 641 299 thoorganura@gmail.com	50B Hilltop Crescent, Surf Beach, 2536, NSW	

4.1.3 to 4.1.8 Newspaper Advertisement

The following advertisement was placed in News Local digital edition of public notices for 30 days from 4/2/2021 with a closing date of 3 April 2021.

ABORIGINAL CULTURAL HERITAGE

Date listed: 4/2/2021

NOTIFICATION AND REGISTRATION OF ABORIGINAL INTERESTS
MARSDEN HIGH SCHOOL, 22A WINBOURNE STREET, WEST RYDE
Title Details: 1/220808

The Department of Education through School Infrastructure NSW (SINSW), propose the preparation of an Aboriginal Cultural Heritage Assessment Report and will possibly undertake excavation prior to redevelopment of the current site of Marsden High School at 22A Winbourne Street, West Ryde within the City of Ryde Local Government Area.

The proposal is to be assessed as a State Significant Development (SSD) under Part 4 Division 4.7 of the Environmental Planning and Assessment Act 1979. This requires Aboriginal community consultation to be undertaken in accordance with the Aboriginal cultural heritage consultation requirements for proponents 2010.

Registrations of interest are sought from Aboriginal people who hold cultural knowledge relevant to determining the significance of any potential Aboriginal objects at this location. This will assist in the assessment of the proposal by the NSW Department of Planning, Industry and Environment.

Please note that the details of Aboriginal people or organisations who register an interest will be forwarded to Heritage NSW and the Metropolitan Local Aboriginal Land Council (MLALC). If you do not want your details forwarded to the MLALC, please specify in your letter when registering an interest that you do not want your details forwarded to the MLALC.

Comber Consultants Pty Ltd has been appointed to undertake the archaeological assessment and consultation.

You can register, indicating the nature of your interest by phone or in writing to:

David Nutley
Comber Consultants
76 Edwin Street North
CROYDON, NSW 2132
David.nutley@comber.net.au
M: 0408 76 553

REGISTRATIONS MUST BE RECEIVED BY COB MONDAY 22 February 2021

D21/78776

4.1.3 to 4.1.8 Notification of project

We wrote to people/organisations whose names were obtained in step 4.1.2 and the relevant Local Aboriginal Land Council to notify them of the proposed project. Copies of the emails and letters appear below.

We wrote to:
cazadirect@live.com; amandahickey@live.com.au; James.eastwood@y7mail.com; hamptonralph46@gmail.com; baduchts@gmail.com; barkingowlcorp@gmail.com; biamangachts@gmail.com; bilingachts@gmail.com; butuheritage@gmail.com; cullendullachts@gmail.com; clive.freeman@y7mail.com; paulhand1967@gmail.com; justinecoplin@optusnet.com.au; daruglandobservations@gmail.com; dharugchts@gmail.com; dhinawan.ch@gmail.com; didgengunawalclan@yahoo.com.au; darrenjohnduncan@gmail.com; galamaay@hotmail.com; Ginninderra.corp@gmail.com; goobahchts@gmail.com; goodradigbee1@outlook.com; murrumbul@gmail.com; gunyuuchts@gmail.com; gulagachts@gmail.com; Phil Khan (philipkhan.acn@live.com.au); officeadmin@metrolalc.org.au; bilingachts@gmail.com; mura.indigenous@bigpond.com; murramarangchts@gmail.com; murrumbul@gmail.com; ngambaaculturalconnections@hotmail.com; nundagurri@gmail.com; pemulwuyd@gmail.com; thoorganura@gmail.com; scott@tocomwall.com.au; Waawaar.awaa@gmail.com; waarlan12@outlook.com; walbunja@gmail.com; walgaluchts@gmail.com; wingikarachts@gmail.com; woriwoolywa@gmail.com; wurrumay@hotmail.com; yerramurra@gmail.com

Subject:

ABORIGINAL CULTURAL HERITAGE CONSULTATION REQUIREMENTS FOR PROPONENTS 2010
Marsden High School, 22a Winbourne Street, West Ryde, NSW

The Department of Education through School Infrastructure NSW (SINSW) is planning to repurpose the current site of Marsden High School at 22A Winbourne Street, West Ryde within the City of Ryde Local Government Area. The proposed redevelopment will be assessed as a State Significant Development (SSD). The development includes (provide brief description of proposal). A map showing the location of the study area is attached.

Heritage NSW has advised that you are a stakeholder who may have an interest in the project. Therefore, you are invited to register an interest, particularly if you hold cultural knowledge relevant to determining the significance of Aboriginal objects and or/places within the study area. You are also invited to provide the names and contact details of any other Aboriginal person or organisations who may hold cultural knowledge relevant to the study area.

Please note that this invitation is for Aboriginal community consultation, which should not be confused with employment. As stated in section 3.4 of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010. "Consultation does not include the employment of Aboriginal people to assist in field assessment and/or site monitoring."* Therefore, responding to this invitation will not be a guarantee of work.

Please note that a log of responses will be prepared and forwarded to Heritage NSW and the Metropolitan Local Aboriginal Land Council (MLALC). If you do not want you name forwarded to MLALC, please let me know.

Please forward your response to:

David Nutley
Comber Consultants
76 Edwin Street North
Croydon NSW 2132
david.nutley@comber.net.au
PH: 0408 976 553
Fax: (02) 9799 6011

Please send your response by Wednesday 10th March.

4.1.6 Responses received to notification

We received responses to the notification from the organisations listed below. Copies of those responses follow.

- Lilly Carroll & Paul Boyd, Didge Ngunawal Clan
- Phil Khan, Kamilaroi Yankuntjatjara Working Group
- Krystle Carroll-Ellott, Ginninderra Aboriginal Corporation
- James Eastwood, Aragung Aboriginal Cultural Heritage Site
- Justine Saunders, Darug Custodian Aboriginal Corporation
- Phill Boney, Wailwan Aboriginal Group
- Kaarina Slater, Ngambaa Cultural Connection
- Rodney Gunther, Waawaar Awaa Aboriginal Corporation

D21/78776

Re: Marsden High School, 22a N

lilly carroll <didgengunawalclan@yahoo.com.au>
To David Nutley
Cc Jillian Comber
You replied to this message on 25/02/2021 10:00 AM.

Hi Dave

DNC Like to register an interest into Marsden High School 22 Winborne St West Ryde.

Kind regards Paul

From: philip khan <philipkhan.acn@live.com.au>
Sent: Thursday, 25 February 2021 7:52 AM
To: David Nutley <david.nutley@comber.net.au>
Subject: RE: Marsden High School, 22a Winbourne Street, West Ryde, NSW

Hi David,

Thank you for informing us that **Comber Consultants** will be involved in an Aboriginal Cultural Heritage Assessment at **Marsden High School, 22a Winbourne St, West Ryde, NSW** &, that you are inviting Aboriginal organisations to register, if they wish too be involved in the community consultation process.

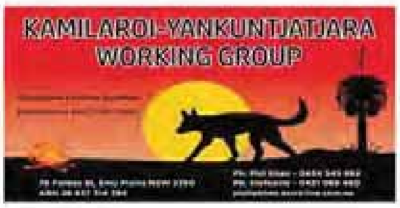
As a senior Aboriginal person for the past 40yrs, I actively participate in the protection of the Aboriginal Cultural Heritage throughout the Sydney Basin, & particularly throughout Western Sydney, on behalf of Kamilaroi Yankuntjatjara Working Group I wish to provide to you my organisation's registration of interest.

I wish to be involved & participate in all levels of consultation/project involvement. I wish to attend all meetings, participate in available field work & receive a copy of the report.

I have attached a copy of Kamilaroi Yankuntjatjara Working group's Public Liability Insurance & Workers Compensation certificate.

Should you wish me to provide further information, please do not hesitate to contact me on 0434545982 or Stefeanie on 0451068480.

Kind Regards
Phil Khan



Re: Marsden High School, 22a Winbourne Street, West Ryde, NSW

GA Ginninderra Aboriginal Corporation <ginninderra.corp@gmail.com>
To David Nutley
You replied to this message on 25/02/2021 9:26 AM.

Reply | Reply All | Forward | ...
Wed 24/02/2021 9:26 PM

Hi David,

Thank you for your email.

Please register Ginninderra Aboriginal Corporation for the above mentioned project.

All of our site officers have their white cards/insurances, and have extensive experience in surveys, excavations, sieving and recording of archaeological information.

We prefer to be contacted by email on ginninderra.corp@gmail.com. The postal address for Ginninderra AC is Po box 3143 Grose Vale NSW 2753.

I myself will be the contact, and my mobile number is 0451016224.

Please let me know if there is anything else you require.

Krystle :)

Kind regards,

Krystle Carroll-Elliott
Ginninderra Aboriginal Corporation
M: 0451016224
E: Ginninderra.corp@gmail.com

We acknowledge the Traditional Owners of Country throughout Australia and recognise their connection to land, water, and community. We pay our respects to them, their cultures, and to Elders past and present.

Re: Marsden High School, 22a Winbourne Street, West Ryde, NSW

JE James Eastwood <james.eastwood@y7mail.com>
To David Nutley
You replied to this message on 25/02/2021 2:21 PM.

Reply | Reply All | Forward | ...
Thu 25/02/2021 1:01 PM

Dear David
Thank you for your recent invitation to register a interest towards ***Aboriginal Cultural Heritage Consultation for Proponents 2010 Marsden High School 22a Winborne Street West Ryde***. Aragung Aboriginal Cultural Heritage Site Assessments Is glad to accept your invitation and would like to register a expression of interest in the above mention project . Aragung would like to be considered for participation in all aspects of this project.

Kind regards
Aragung
Co/ Jamie Eastwood

DARUG CUSTODIAN
ABORIGINAL CORPORATION

DARUG CUSTODIAN
ABORIGINAL
CORPORATION

PO BOX 81 WINDSOR 2756
PHONE: 0245775181 FAX: 0245775098
MOBILE: 0414962766 Justine Coplin
EMAIL: justinecoplin@optusnet.com.au

Attention Comber Consultants **Date:** 250221

Subject: Marsden High School, 22a Winbourne Street, West Ryde, NSW

Dear Jillian

Our group is a non- profit organisation that has been active for over forty years in Western Sydney, we are a Darug community group with over three hundred members. The main aim in our constitution is the care of Darug sites, places, wildlife and to promote our culture and provide education on the Darug history.

The West Ryde area is an area that our group has a vast knowledge of, we have worked and lived in for many years, this area is significant to the Darug people due to the connection of sites and the continued occupation. Our group has been involved in all previous assessments and works in this area as a traditional owner Darug group for the past 40 plus years.

Therefore we would like to register our interest for full consultation and involvement in the above project area.

Please contact us with all further enquiries on the above contacts.

Regards

Re: Marsden High School, 22a Winbourne Street, West Ryde, NSW

PB Phillip Boney <Waarlan12@outlook.com>
To David Nutley
Reply | Reply All | Forward | ...
Thu 25/02/2021 3:35 PM
You replied to this message on 25/02/2021 4:09 PM.

Hey Uncle Dave,

It's Phil here. So happy to hear from you, I would like to register my interest in all aspects of this project and hopefully be successful to be working with you mob again.

High regards, Phil
Wailwan Aboriginal Group

Re: Marsden High School, 22a Winbourne Street, West Ryde, NSW

RG Rodney Gunther <waawaar.awaa@gmail.com>
To David Nutley
Reply | Reply All | Forward | ...
Tue 2/03/2021 11:18 AM
You replied to this message on 2/03/2021 2:47 PM.

Workers Insurance Certificate of Currency 2022 (1).pdf 28 KB
Certificate of Currency.pdf 10 KB

Hi David,

Please register Waawaar Awaa Aboriginal Corporation for the proposed Aboriginal Cultural Heritage Assessment (ACHA) for the proposed development at Marsden High Schoolat 22A Winbourne Street West Ryde.

Waawaar Awaa Aboriginal Corporation is a local organisation situated in South Western Sydney.

Waawaar Awaa Aboriginal Corporation site officers are young and fit and have the skills, relevant experience to undertake any archaeological fieldwork.

Waawaar Awaa Aboriginal Corporation has the necessary certificates of currency (attached).

Best form of contact for reports is by email and also can ring the mobile.

Looking forward to working with you.

regards

Rodney Gunther
0410 580 962

Re: Marsden High School, 22a Winbourne Street, West Ryde, NSW

Kaarina Slater <Ngambaaculturalconnections@hotmail.c
To David Nutley

Reply | Reply All | Forward | ...

Thu 25/02/2021 5:27 PM

You replied to this message on 26/02/2021 11:46 AM.

Ngambaa Cultural Connection would like to register an interest for the above project @ winbourne street. West rude

Experienced indigenous site officer & current insurances.

Cheers

Kaarina Slater
Manager
0422 729 117

D21/78776

4.1.6 Sending list of RAPs to HNSW and MLALC

COMBER CONSULTANTS

ARCHAEOLOGY – HERITAGE – MEDIATION – ARBITRATION
ABORIGINAL – HISTORIC – MARITIME

76 EDWIN STREET NORTH, CROYDON, NSW, 2132
T 02 9799 6000 F 02 9799 6011
enquiries@comber.net.au
www.comber.net.au

DIRECTORS
DR JILLIAN COMBER | 0418 788 802
DAVID NUTLEY | 0408 976 553

11 March 2021

Heritage NSW
Email: heritagemailbox@environment.nsw.gov.au
Marsden High School: Notification of Registered Aboriginal Parties (Step 4.1.6)

This letter is being sent as notification of Registered Aboriginal Parties (Step 4.1.6) in accordance with 4.1.6 of the with *Aboriginal Cultural Heritage Consultation Requirements 2010* for the proposed Marsden High School development.

Attached please find copies of the advertisement placed in the local newspaper and the email notification sent to stakeholders.

Registration of interest was received from the following eight organisations:

Date	Name and Organisation	Contact Details	Method of Registration
24/02/2021	Ginninderra Aboriginal Corporation Krystle Carroll Elliott	Ginninderra.corp@gmail.com	Email
25/02/2021	Aragung Aboriginal Cultural Heritage Site James Eastwood	james.eastwood@y7mail.com	Email
25/02/2021	Darug Custodian Aboriginal Corporation Justine Saunders	justinecoplin@optusnet.com.au	Email
25/02/2021	Didge Ngunawal Clan Lilly Carroll	didgengunawalclan@yahoo.com.au	Email
25/02/2021	Kamilaroi Yankuntjatjara Working Group Phil Khan	philipkhan.acn@live.com.au	Email
25/02/2021	Ngambaa Cultural Connection Kaarina Slater	ngambaaculturalconnections@hotmail.com	Email
25/02/2021	Wailwan Aboriginal Group Phil Boney	Waarlan12@outlook.com	Email
02/03/2021	Waawaar Awaa Aboriginal Corporation Rodney Gunther	Waawaar.awaa@gmail.com	Email

Yours sincerely

David Nutley
Director/Archaeologist

D21/78776

COMBER
CONSULTANTS
ARCHAEOLOGY – HERITAGE – MEDIATION – ARBITRATION
ABORIGINAL – HISTORIC – MARITIME

76 EDWIN STREET NORTH, CROYDON, NSW, 2132
T 02 9799 6000 F 02 9799 6011
enquiries@comber.net.au
www.comber.net.au

DIRECTORS
DR JILLIAN COMBER | 0418 788 802
DAVID NUTLEY | 0408 976 553

11 March 2021

Mr Nathan Moran
Chief Executive Officer
Metropolitan Local Aboriginal Land Council
36-38 George St
Redfern NSW 2016

Dear Nathan

Marsden High School: Notification of Registered Aboriginal Parties (Step 4.1.6)

This letter is being sent as notification of Registered Aboriginal Parties (Step 4.1.6) in accordance with 4.1.6 of the with *Aboriginal Cultural Heritage Consultation Requirements 2010* for the proposed Marsden High School development.

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25/02/2021	Darug Custodian Aboriginal Corporation Justine Saunders	justinecoplin@optusnet.com.au	Email
25/02/2021	Didge Ngunawal Clan Lilly Carroll	didgengunawalclan@yahoo.com.au	Email
25/02/2021	Kamilaroi Yankuntjatjara Working Group Phil Khan	philipkhan.acn@live.com.au	Email
25/02/2021	Ngambaa Cultural Connection Kaarina Slater	ngambaaculturalconnections@hotmail.com	Email
25/02/2021	Wailwan Aboriginal Group Phil Boney	Waarlan12@outlook.com	Email
02/03/2021	Waawaar Awaa Aboriginal Corporation Rodney Gunther	Waawaar.awaa@gmail.com	Email

Yours sincerely

David Nutley
Director/Archaeologist

4.3 Presentation of Methodology and gathering cultural information.

The following letter was sent to all RAPs on Thursday 11th March 2021 describing the proposed project and the proposed methodology

COMBER
CONSULTANTS

ARCHAEOLOGY – HERITAGE – MEDIATION – ARBITRATION
ABORIGINAL – HISTORIC – MARITIME

76 EDWIN STREET NORTH, CROYDON, NSW, 2132
T 02 9799 6000 F 02 9799 6011
enquiries@comber.net.au
www.comber.net.au

DIRECTORS
DR JILLIAN COMBER | 0418 788 802
DAVID NUTLEY | 0408 976 553

COMBER CONSULTANTS

ARCHAEOLOGY - HERITAGE - MEDIATION - ARBITRATION
ABORIGINAL - HISTORIC - MARITIME

76 EDWIN STREET NORTH, CROYDON, NSW, 2132
T 02 9799 6000 F 02 9799 6011
enquiries@comber.net.au
www.comber.net.au

DIRECTORS
DR JILLIAN COMBER | 0418 788 802
DAVID NUTLEY | 0408 976 553

A2021

11th March 2021

TO ALL REGISTERED ABORIGINAL PARTIES

Marsden High School, West Ryde
Presentation of project information and methodology

School Infrastructure NSW (SINSW) is developing a robust Business Case in order to repurpose the Marsden High School site to a community sports facility. The Department of Education through School Infrastructure NSW (SINSW) proposes to relocate Marsden High School to the Meadowbank Education [and Employment] Precinct. At present, two draft masterplan options have been developed for the study area, shown below in Figure 3 and Figure 4.

The study area is the site of the current Marsden High School, 22A Winbourne Street, West Ryde, shown in Figure 1 and edged in red. It is located in the City of Ryde Local Government Area (LGA) and is within the boundaries of the Metropolitan Local Aboriginal Land Council (MLALC). The study area is a mixed-use urban zone with a land area of approximately 5.5 hectares (ha).

Figure 1: Location of study area edged in red

Comber Consultants have been engaged to undertake consultation in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (Consultation Requirements). The purpose of consultation is to inform all Registered Aboriginal Parties (RAPs) about the project and the proposed archaeological methodology. It is also to inform and assist the Department of Planning, Industry and Environment (DPIE) to consider and determine an Aboriginal Heritage Impact Permit (AHIP) application and to ascertain of there is any significant Aboriginal cultural heritage within the study area.

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ABN 96 109 670 573

The proposed works have not yet been finalised; however, the works will involve extensive ground disturbance including, but not limited to:

- Demolition of the existing school buildings and facilities in the north western portion of the study area.
- Cut and fill to modify site levels. There is a substantial fall of between 3-7m across the study area, comprising both natural topography and existing civil benches for school buildings and landscaping. Modification of levels will be limited by using existing site levels as much as possible.
- Landscaping.
- Construction of sports courts across the majority of the study area.
- Indoor sporting facility and car parking in the north western portion of the study area.
- Construction/upgrade of service infrastructure.
- Within the north western portion of the study area, natural site levels will largely remain undisturbed as these are in an ecologically protected area.

Archer Creek, a northern tributary of the Parramatta River runs through the north eastern portion of the study area. The Aboriginal Archaeological Due Diligence Assessment prepared by Comber Consultants in 2021 recommended that no works be undertaken in this area. As the proposal does not include ground surface impacts in this area, archaeological excavation is not required for this part of the study area.

The study area contains archaeological potential and it is proposed to undertake a program of archaeological testing and, if required, salvage excavation. The proposed methodology for the testing excavation follows. Could you please review and provide any comments? Please let me know if you would prefer any changes or a different methodology.

In accordance with the Consultation Requirements could you also please advise me of the following:

- Are you aware of any archaeological sites on or near the property?
- Can you advise me of the significance of the area?
- Do you have any cultural concerns or issues that should be addressed?
- Is there any confidential or culturally sensitive information that you would prefer is not detailed in the Aboriginal Cultural Heritage Assessment Report?

Could you please provide any comments by **Tuesday 13th April** in writing or by phone to:

David Nutley
76 Edwin St North
Croydon NSW 2132
M: 0408 976553
Email: david.nutley@comber.net.au

Thank you for your involvement in this project. Please do not hesitate to contact me if you would like any further information.

Kind regards,

D Nutley

Senior Archaeologist/Heritage Consultant

2

MARSDEN HIGH SCHOOL, WEST RYDE
EXCAVATION METHODOLOGY

The testing is to be undertaken prior to the demolition of any buildings. Two areas of Potential Archaeological Deposit (PAD), PAD 1 and PAD 2, have been identified, as shown in Figure 2 below. Test excavation will be undertaken within PAD 1 and PAD 2, following removal of hard stand.

Testing is to be undertaken in accordance with requirements 15-17 (pp24-28) of the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*, as follows:

Notification
At least 14 days' notice will be provided to Heritage NSW, before commencement of the testing as detailed in requirement 15c to: heritagemailbox@environment.nsw.gov.au

Method
As detailed in requirement 15b, a test sampling strategy has been developed that provides a framework for PAD 1 and PAD 2. The strategy must be in accordance with requirement 16a.

1. Test excavation units will be placed on a systematic grid appropriate to the scale of the PAD being investigated e.g. 10m intervals, 20m intervals, or other justifiable and regular spacing.
2. Any test excavation point will be separated by at least 5m.
3. Test excavation units will be excavated using hand tools only.
4. Test excavations will be excavated in 50cm x 50 cm units.
5. Test excavation units will be combined and excavated as necessary to understand the site characteristics. They will generally be combined to form a 1m x 1m trench, however:
    i. The maximum continuous surface area of a combination of test excavation units at any single excavation point conducted in accordance with point 1 (above) will be no greater than 3 m²
    ii. The maximum surface area of all test excavation units will be no greater than 0.5% of the PAD being investigated.
6. Where the 50 cm x 50 cm excavation unit is greater than 0.5% of the area then point 5 (ii) (above) does not apply.
7. The first excavation unit will be excavated and documented in 5 cm spits. Based on the evidence of the first excavation unit, 10 cm spits or sediment profile/stratigraphic excavation (whichever is smaller) may then be implemented.
8. All material excavated from the test excavation units will be wet sieved using a 3mm aperture wire-mesh sieve.
9. Test excavation units will be excavated to at least the base of the identified Aboriginal object-bearing units, and must continue to confirm the soils below are culturally sterile.
10. Photographic and scale drawings will be undertaken.
11. Test excavation units will be backfilled immediately following completion of the test excavations.
12. If Aboriginal objects are uncovered a Site Recording Form will be completed and sent to the Aboriginal Heritage Information Management System (AHIMS).
13. Following test excavation, an Aboriginal Site Impact Recording form will be completed and submitted to the AHIMS Registrar as soon as practicable, for each AHIMS site that has been the subject of test excavation.

Figure 2: PAD 1 shown edged in orange, PAD 2 shown edged in green, no go zone shown in red

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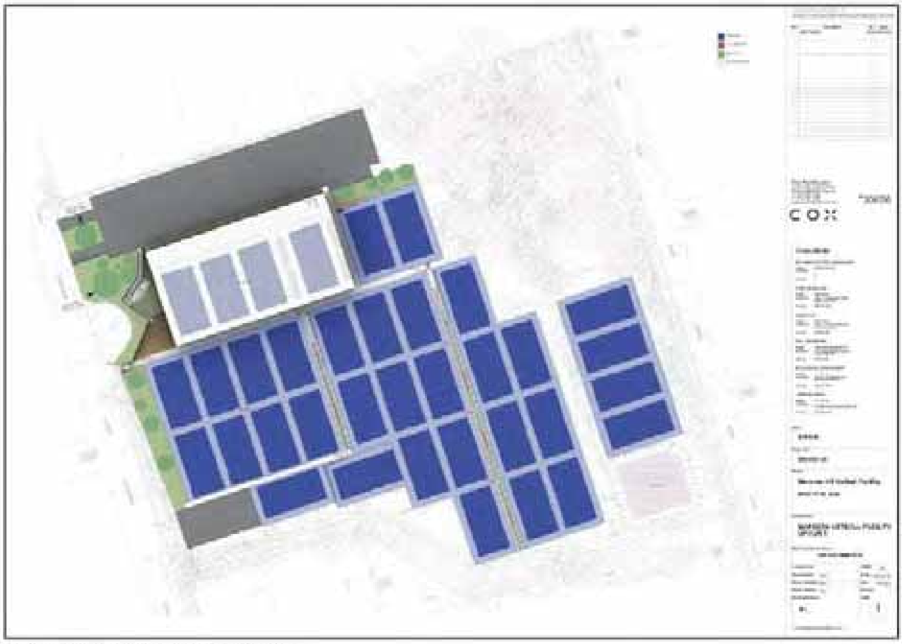

Figure 3: Masterplan option 1 (Cox Architects 2021)

1

Figure 4: Masterplan option 2 (Cox Architects 2021)

2

D21/78776

The following responses were received to the information and methodology sent to all RAPs on Thursday 11 March 2021

DARUG CUSTODIAN
ABORIGINAL CORPORATION

DARUG CUSTODIAN
ABORIGINAL
CORPORATION

PO BOX 81 WINDSOR 2756
PHONE: 0245775181 FAX: 0245775098
MOBILE: 0415770163 Leanne Watson
0414962766 Justine Coplin
EMAIL: mulgokiwi@bigpond.com / justinecoplin@optusnet.com.au

Attention: Comber Consultants **Date:**150321

Subject: Marsden High School, West Ryde

Dear David

Our group is a non- profit organisation that has been active for over forty years in Western Sydney, we are a Darug community group with over three hundred members. The main aim in our constitution is the care of Darug sites, places, wildlife and to promote our culture and provide education on the Darug history.

Our group promotes Darug Culture and works on numerous projects that are culturally based as a proud and diverse group. It has been discussed by our group and with many consultants and researches that our history is generic and is usually from an early colonists perspective or solely based on archaeology and sites. These histories are adequate but they lack the people's stories and parts of important events and connections of the Darug people and also other Aboriginal people that now call this area home and have done so for numerous generations.

This area is significant to the Darug people due to the evidence of continued occupation, within close proximity to this project site there is a complex of significant sites.

Landscapes and landforms are significant to us for the information that they hold and the connection to Darug people. Aboriginal people (Darug) had a complex lifestyle that was based on respect and belonging to the land, all aspects of life and survival did not impact on the land but helped to care for and conserve land and the sustenance that the land provided. As Darug people moved through the land there were no impacts left, although there was evidence of movement and lifestyle, the people moved through areas with knowledge of their areas

and followed signs that were left in the landscape. Darug people knew which areas were not to be entered and respected the areas that were sacred.

Knowledge of culture, lifestyle and lore have been part of Darug people's lives for thousands of years, this was passed down to the next generations and this started with birth and continued for a lifetime. Darug people spent a lifetime learning and as people grew older they passed through stages of knowledge, elders became elders with the learning of stages of knowledge not by their age, being an elder is part of the kinship system this was a very complicated system based on respect.

Darug sites are all connected, our country has a complex of sites that hold our heritage and past history, evidence of the Darug lifestyle and occupation are all across our country, due to the rapid development of Sydney many of our sites have been destroyed, our sites are thousands of years old and within the short period of time that Australia has been developed pre contact our sites have disappeared.

The *Aboriginal cultural heritage consultation requirements for proponents* Section 4.1.8 refers to "Aboriginal organisations representing Aboriginal people who hold cultural knowledge". Recent consultation meetings have revealed that many of these Aboriginal organisations and individuals do not hold cultural knowledge of the Western Sydney area. The increasing involvement of such parties in cultural heritage management means that genuine local Aboriginal organisations are unable to properly care for our cultural heritage.

Many Aboriginal organisations listed in the OEH response letter do not contribute to the Aboriginal community of Western Sydney. Individuals listed in the OEH response letter do not represent the community and while they may be consulted with, should not be employed for their own personal financial benefit.

Our organisation is committed to providing benefits back to our local Aboriginal community through such measures as funding the local Aboriginal juniors' touch football team, painting classes for the local children and donating money to various charities. Employment in cultural heritage activities is source of income that organisations such as ours can use to contribute to beneficial activities and support within the community.

Darug custodian Aboriginal Corporation's site officers have knowledge of Darug land, Darug Culture,Oral histories, landforms, sites, Darug history, wildlife, flora and legislative requirements. We have worked with consultants and developers for many years in Western

Sydney (Darug Land) for conservation, site works, developments and interpretation/education strategie.

Darug Custodian Aboriginal Corporation have received and reviewed the report for Marsden High School, West Ryde

We support the recommendations set out in this report.

Please contact us with all further enquiries on the above contacts.

Regards

Justine Coplin

From: Kaarina Slater <Ngambaaculturalconnections@hotmail.com>
Sent: Monday, 15 March 2021 1:12 PM
To: David Nutley <david.nutley@comber.net.au>; Phil Khan (philipkhan.acn@live.com.au) <philipkhan.acn@live.com.au>; Phillip Boney <Waarlan12@outlook.com>; Rodney Gunther <waawaar.awaa@gmail.com>; Ginninderra Aboriginal Corporation <ginninderra.corp@gmail.com>; lilly carroll <didgengunawalclan@yahoo.com.au>; justinecoplin@optusnet.com.au; James Eastwood <james.eastwood@y7mail.com>
Cc: Jillian Comber <jillian.comber@comber.net.au>
Subject: Re: Marsden High School consultation

Hi David

Hope all is well
I've have read and agree with the above Methodology for the project.

I have ancestral & Knowledge of Country to the project area.

Experienced Indigenous Site Officer

Current Insurances

Kaarina slater
0422 729 117
NCC

D21/78776

From:	Rodney Gunther <waawaar.awaa@gmail.com>
Sent:	Sunday, 14 March 2021 10:13 PM
To:	David Nutley; Jillian Comber
Subject:	Re: Marsden High School consultation
Attachments:	Workers Insurance Certificate of Currency 2022 (1).pdf; Certificate of Currency.pdf

Hi David,

Waawaar Awaa Aboriginal Corporation supports the draft Marsden High School Methodology for the following reasons:

- Testing of PAD 1 and possible salvage if warranted.
- Testing of PAD 2 and possible salvage if warranted.
- Use of a 3mm sieve - wet sieving proposed.
- **Avoidance of Archer Creek** (red zone area) being a northern tributary of the Parramatta River that runs through the north eastern portion of the study area recommended as **no works** will be undertaken in this area and **no ground surface impacts** will occur in this part of the study area.

1. **Could you provide indicative mapping showing location of proposed transects and test pit locations if they have been identified.**

In accordance with the Consultation Requirements could you also please advise me of the following:
• Are you aware of any archaeological sites on or near the property? - **Only from the information you have provided and the AHIMS 5 km search data.**
• Can you advise me of the significance of the area? - **The study is near Archer Creek and would have been a resource for Aboriginal people in traditional times.**
• Do you have any cultural concerns or issues that should be addressed? - **Only if testing identifies, rare, unique or sensitive Aboriginal objects including Human remains.**
• Is there any confidential or culturally sensitive information that you would prefer is not detailed in the Aboriginal Cultural Heritage Assessment Report?- **Only if testing identifies, rare, unique or sensitive Aboriginal objects including Human remains.**

Please find attached Waawaar Awaa Aboriginal Corporations Workers Compensation and Public Liability Insurances for the proposed testing excavations for PAD 1 and 2.

Waawaar Awaa Aboriginal Corporation cultural knowledge holder, Barry Gunther will assist in addressing any concerns if any going forward.

Looking forward to working with you on this project.

regards

Rodney Gunther
0410 580 962

From: James Eastwood
To: David Nutley
Subject: Response
Date: Tuesday, 16 March 2021 1:40:09 PM

Dear David

Thank you for your recent email ***RE: Marsden High School West Ryde - Presentation of Information and Methodolodgy*** .

Aragung Aboriginal Cultural Heritage Site Assessments has review the above information prepared by Comber Consultants and agrees and supports all information sated in the presentation of information and methodology.

Aragung considers Archaeological investigation such as Marsden High School West Ryde to be vitally important not only for First Nation indigenous People, as such investigation provides direct tangible ancestral evidence to our heritage , but also such investigation provides a bridging tool to reconciliation and education for the wider community and our shared local histories.

As the project subject area is closely associated to near by Archer Creek a tributary of the Parramatta River - (Burramattgal River) which is held highly for its cultural significance by the Burramattagal of the Darug People, and given that evidence from previous recorded site associate closely to the project area - Aragung feels strongly that the potential for remaining Aboriginal archaeological deposit will be high.

As a Aboriginal Community member of Parramatta in association to the city of Ryde , a First Nation Indigenous Person who has traditional ancestry heritage connection to the project area, Aragung would like to be considered for involvement in all future aspects of this project .

Kind Regards
Aragung
Co/Jamie Eastwood

Hi David,

Thank you for your methodology report, we agree & support all your recommendations regarding Marsden High School.
We look forward to working with you & the team on this project.

Kind Regards
Phil Khan

4.4 Review of draft cultural heritage assessment report

The draft Aboriginal Cultural Heritage Assessment Report was sent to all RAPs on14/04/2021 for review and comments with responses due on 12/05/2021

From: James Eastwood <james.eastwood@y7mail.com>
Sent: Monday, 19 April 2021 9:01 AM
To: David Nutley
Subject: Draft Report

Attention : Comber Consultants ***Date 19/04/21***
Subject: Marsden High School Aboriginal Cultural Heritage Assessment Report

Dear David

Aragung Aboriginal cultural Heritage Site Assessments have received and reviewed the Aboriginal Cultural Heritage Report for Marsden High School West Ryde.

Aragung supports and agrees to all recommendations , methodology and mitigation measures stated and set out in the above report prepared by Comber Consultants .

As Aragung has a Traditional cultural connection to the project area, Aragung would like to be considered for future involvement in the above project .

Please be advise that Aragung posses all up to date Necessary Insurance for field work and can provided these details upon request.

Should you have any further enquirers please do not hesitate to contact Aragung via email or phone on the above address

Kind regards
Aragung
Co/ Jamie Eastwood.

From: Rodney Gunther <waawaar.awaa@gmail.com>
Sent: Wednesday, 14 April 2021 6:00 PM
To: David Nutley <david.nutley@comber.net.au>
Subject: Re: FW: Marsden High School consultation

Hi David,

Waawaar Awaa Aboriginal Corporation supports the draft ACHAR for the Marsden High School considering the following:

- Archaeological investigation within the vicinity of the study area has been limited, with little systematic research or fully comprehensive archaeological site survey work being conducted.
- Many of the surveys that have been carried out have been site selective, having been conducted prior to development.
- A search of AHIMS for the broader Ryde region indicate that only a small number of assessments have been undertaken nearby, resulting in only a few sites being recorded.
- The small number of sites registered with AHIMS is a result of this lack of assessment, not a lack of potential Aboriginal archaeological sites.
- AHIMS site 45-6-2309 is a significant site showing Aboriginal occupation of the area.
- Testing of PAD 1 and possible salvage if warranted.
- Testing of PAD 2 and possible salvage if warranted.
- **Avoidance of Archer Creek** (red zone area) being a northern tributary of the Parramatta River that runs through the north eastern portion of the study area recommended as **no works** will be undertaken in this area and **no ground surface impacts** will occur in this part of the study area.
- Include Metropolitan LALC as a RAP in the Registration list and change the total of RAPs to nine.
- Update notification information with Heritage NSW regarding RAP list total and inclusion of Metro LALC.
- Prefer the term Aboriginal group rather than Aboriginal owners.

To better inform the cultural values of the area Waawaar Awaa Aboriginal Corporation requests to be involved in the testing excavation works and any proposed salvage works (relevant insurances attached).

regards

Rodney Gunther
Barry Gunther

D21/78776

By email dated 13/05/2021 we provided the following response to Rodney Gunther's requests:

From: David Nutley
Sent: Thursday, 13 May 2021 3:14 PM
To: Rodney Gunther
Subject: RE: FW: Marsden High School consultation

Dear Rodney

Thank you for your email of 14th April and your comments in support of the ACHAR for Marsden High School.

As you correctly advised, the Metropolitan Local Aboriginal Land Council (MLALC) is among the RAPs for this project. MLALC has now been added to the full list of RAPS for this project on page 16, bringing the total number of RAPs to 9.

Your preference for the use of 'Aboriginal groups' in place of 'Aboriginal owners' is also noted. In section 2, Aboriginal History, the use of the term 'traditional owners' in the first sentence has now been replaced by 'traditional custodians' of the study area. Where the report refers to the Aboriginal Land Rights Act 1983 (see section 5.0, item 4.1.2 of this report on page 17), the term 'owners' is retained as that is the term used in the current legislation.

Please let me know if you have any questions about the above.

Regards

David

DAVID NUTLEY

DIRECTOR
ARCHAEOLOGIST
HERITAGE CONSULTANT

76 EDWIN STREET NORTH, CROYDON, NSW, 2132
T 02 9799 6000 F 02 9799 6011 M 0408 976 553
E david.nutley@comber.net.au
www.comber.net.au

COMBER CONSULTANTS

Comber Consultants acknowledges the traditional custodians of the land on which we work and pay our respects to Elders past and present.

From:	lilly carroll <didgengunawalclan@yahoo.com.au>
Sent:	Thursday, 22 April 2021 7:42 PM
To:	David Nutley
Cc:	Gina Gou
Subject:	Re: Marsden High School consultation

Hi David

DNC Agrees to all that has been proposed
for Marsden high school consultation

Knowledge holder of proposed land
Fully experienced site officer
Fully insured
0426823944

Sent from Yahoo Mail for iPhone

On Thursday, April 22, 2021, 5:19 pm, Kaarina Slater <Ngambaaculturalconnections@hotmail.com> wrote:

> On behalf of Ngambaa Cultural connections I've have read and agree with the above Methodology for the project.
>
> I have ancestral & Knowledge of Country to the project area.
>
> Experienced Indigenous Site Officer
>
> Current Insurances
>
> Kaarina slater
> 0422 729 117
> NCC

From:	Kaarina Slater <Ngambaaculturalconnections@hotmail.com>
Sent:	Thursday, 22 April 2021 5:20 PM
To:	David Nutley; Metropolitan Council (metrolalc@metrolalc.org.au); Phil Khan (philipkhan.acn@live.com.au); Phillip Boney; Rodney Gunther; Ginninderra Aboriginal Corporation; lilly carroll; justinecoplin@optusnet.com.au; James Eastwood
Cc:	Gina Gou
Subject:	Re: Marsden High School consultation

On behalf of Ngambaa Cultural connections I've have read and agree with the above Methodology for the project.

I have ancestral & Knowledge of Country to the project area.

Experienced Indigenous Site Officer

Current Insurances

Kaarina slater
0422 729 117
NCC

D21/78776

APPENDIX B: TECHNICAL REPORT: ABORIGINAL ARCHAEOLOGICAL ASSESSMENT

D21/78776

COMBER
CONSULTANTS

ARCHAEOLOGY - HERITAGE - MEDIATION - ARBITRATION

Marsden High School

Aboriginal Archaeological Assessment

29 January **2021**

Report to: School Infrastructure NSW

LGA: City of Ryde

Version: B.2021

ABN 96 109 670 573 | 76 EDWIN STREET NORTH | CROYDON, NSW, 2132 | T 02 9799 6000 | F 02 9799 6011 www.comber.net.au

DOCUMENT CONTROL

PROJECT NO.: IS395 **STATUS:** FINAL

REV	DATE	PREPARED BY	EDITED BY	APPROVED BY
A	22/01/2021	Veronica Norman	Dr Jillian Comber	Dr Jillian Comber
B	29/01/2021	Veronica Norman	Dr Jillian Comber	Dr Jillian Comber

ACKNOWLEDGEMENTS

- I would like to thank Phillip Bongers, Marsden High School, who provided assistance with the field inspection and provided information on the history and development of the school.
- The history included in Section 5 has been compiled using information provided by Caroline Plim, B.A., DipLoc&Applied History.

INTEGRATED MANAGEMENT SYSTEM

Comber Consultants has a certified integrated management system to the requirements of ISO 9001 (quality), ISO 14001 (environmental), ISO 45001 (health and safety) and AS/NZS 4801 (health and safety). This is your assurance that Comber Consultants is committed to excellence, quality, and best practice and that we are regularly subjected to rigorous, independent assessments to ensure that we comply with stringent Management System Standards.

ECAAS ECAAS ECAAS ECAAS
ISO 9001 CERTIFIED | AS/NZS 4801 CERTIFIED | ISO 45001 CERTIFIED | ISO 14001 CERTIFIED

EXECUTIVE SUMMARY

The Department of Education through School Infrastructure NSW (SINSW) proposes to relocate Marsden High School to the Meadowbank Education [and Employment] Precinct. A robust Business Case is being developed in order to repurpose the Marsden High School site to a community sports facility. It is proposed that the Business Case will be submitted to Treasury for funding approval. The final Business Case will be required to complete an optioneering exercise which must consider alternative scenarios based on the service needs of the local community area and proposed site.

The proposed planning pathway includes undertaking early works (2-4 outdoor courts) under Exempt Development, rezoning of the site from SP2 to RE1 and for the remainder of the works to be undertaken as part of a local Development Application (DA).

To ensure that significant Aboriginal cultural heritage is not impacted upon by the project Comber Consultants have been engaged to undertake this Aboriginal Archaeological Due Diligence Assessment.

The environmental and archaeological data provided in this report indicates that the study, Marsden High, West Ryde, has the potential to contain subsurface Aboriginal objects. Under the *National Parks & Wildlife Act 1974*, it is an offence to harm such objects. Therefore, this report makes the following recommendations:

1. The area identified within this report as Conservation Zone including and adjacent to the Archer Creek, should not be impacted upon by the proposed works and should be maintained *in situ*. A physical barrier should be established around the Conservation Zone and all staff advised that the Conservation Zone is a "no-go area".

2. Aboriginal community consultation in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010* should be undertaken. Such consultation can take up to four months to be completed. An Aboriginal Cultural Heritage Assessment Report (ACHAR) will need to be prepared which details the results of the consultation and the archaeological assessment. The archaeological report will need to be appended to the ACHAR.

3. As subsurface Aboriginal objects are predicted to exist within the study area, and it is an offence to harm such objects, test excavation should be undertaken in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010) and in association with the with the Registered Aboriginal Parties.

4. If Aboriginal objects are uncovered during the testing, Aboriginal archaeological salvage excavations will need to be undertaken once the DA has been issued. The salvage will need to be undertaken prior to redevelopment of the site.

5. If no Aboriginal objects are uncovered during the testing, the project can proceed without the need to undertake salvage. However, all employees, contractors/sub-contractors and anyone else working on the site should be made aware that it is an offence to harm Aboriginal objects. If any Aboriginal objects are uncovered during the course of the redevelopment of the school, all work must cease in the vicinity of that object and further advice sought from the consultant.

6. An Aboriginal heritage induction should be provided to all staff and contractors on site on the significance of the Aboriginal heritage of the site, including the Conservation Zone and advised of their responsibilities under the *National Parks & Wildlife Act 1974* in respect of Aboriginal heritage.

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1.0 INTRODUCTION

1.1. Background

School Infrastructure NSW (SINSW) is developing a robust Business Case in order to repurpose the Marsden High School site to a community sports facility. It is proposed that the Business Case will be submitted to Treasury for funding approval. The final Business Case will be required to complete an optioneering exercise which must consider alternative scenarios based on the service needs of the local community area and proposed site.

SINSW proposes to align with the NSW Government's commitment to developing a state of the art sporting facility, featuring an indoor centre with four courts, plus an additional 32 outdoor courts and parking. It is proposed that Marsden High School will be relocated to the Meadowbank Education [and Employment] Precinct. The proposed planning pathway includes undertaking early works (2-4 outdoor courts) under Exempt Development, rezoning of the site from SP2 to RE1 and for the remainder of the works to be undertaken as part of a local Development Application (DA).

To ensure that significant Aboriginal cultural heritage is not impacted upon by the proposal Comber Consultants have been engaged to undertake this Aboriginal Archaeological Due Diligence Assessment Report. This report is written in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW 2010) and the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (OEH)*. The environmental and archaeological data provided in this report indicates that the study area, Marsden High School, West Ryde, has the potential to contain subsurface Aboriginal objects. Under the *National Parks & Wildlife Act 1974*, it is an offence to harm such objects.

1.2. Location and description

The study area is the site of the current Marsden High School, 22A Winbourne Street, West Ryde, shown in Figure 9 edged in red. It is located in the City of Ryde Local Government Area (LGA) and is within the boundaries of the Metropolitan Local Aboriginal Land Council (MLALC). The study area is a mixed-use urban zone with a land area of approximately 5.5 hectares (ha).

Figure 9: Location of study area edged in red

2.0 LEGISLATION

2.1. *National Parks & Wildlife Act 1974*

The *National Parks & Wildlife Act 1974* (NPW Act) provides statutory protection to all Aboriginal sites within New South Wales. Heritage NSW is the State Government agency responsible for the implementation and management of this Act.

Part 6 of the NPW Act protects all Aboriginal objects and Aboriginal Places, and states that it is an offence to harm or desecrate an Aboriginal object or Aboriginal place, without an Aboriginal Heritage Impact Permit (AHIP). An Aboriginal object and an Aboriginal Place are defined as:

> *Aboriginal Object*
> *Any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains.*
>
> *Aboriginal Place*
> *The Minister may, by order published in the Gazette, declare any place specified or described in the order, being a place that, in the opinion of the Minister, is or was of special significance with respect to Aboriginal culture, to be an Aboriginal place for the purposes of this Act.*

The study area is not an Aboriginal Place, although it is possible that subsurface Aboriginal objects may be located on the subject area and may be impacted upon by the proposed works. Therefore, it will be necessary to apply for an AHIP.

To obtain an AHIP, it is necessary to undertake archaeological testing in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010), prior to applying for a permit. To obtain an AHIP, consultation must be undertaken with the Aboriginal community in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW 2010). A Research Design which clearly outlines the proposed methodology for the salvage will also need to be prepared in consultation with the Aboriginal community.

Undertaking consultation and obtaining a permit is a lengthy process. Following is an outline of the minimum time required:

Activity	**Approximate time required**
Aboriginal community consultation in accordance with OEH's *Aboriginal cultural heritage consultation requirements for proponents 2010* and commencement of Aboriginal Cultural Heritage Assessment Report (ACHAR).	12 weeks minimum (3½months)
Preparation of AHIP application with relevant information for submission to Heritage NSW. Documents to be forwarded to Heritage NSW: • AHIP application • This Aboriginal archaeological report • Report coversheet • Aboriginal Cultural Heritage Assessment Report (detailing the Aboriginal community consultation. This can only be completed once the consultation has been finalised). • This Aboriginal archaeological due diligence report.	1 day
Receipt of permit from Heritage NSW who have a service guarantee to issue the permit 8 weeks from the date of receipt of all information. After submitting the AHIP application, if Heritage NSW request further information, the clock stops and the 8 weeks recommences once they receive the further information. Our experience is that it takes a lot longer than 8 weeks for the AHIP to issue	8 weeks minimum
TOTAL TIME REQUIRED	**Approximately 6 months minimum**

2.2. Heritage Act 1977

State Heritage Register

s31 of the NSW Heritage Act 1977 provides for the establishment and maintenance of the State Heritage Register by the Heritage Council. s32 allows the Minister to direct the listing of an item which is of State heritage significance and sets out the procedure for listing an item. Aboriginal sites can be listed on the State heritage register if they are of State heritage significance. Such places can include Mission sites and cemeteries.

The current study area is not listed on the State Heritage Register.

3.0 METHODOLOGY

This project was conducted in three stages, being background research, field survey and report preparation, as detailed below.

Stage 1: Background Research
Prior to the field component of this project, the Aboriginal Heritage Information Management System (AHIMS) was searched on 14 December 2020. A copy is attached as Appendix A. Site data, associated documents and archaeological survey reports held by AHIMS were reviewed. Environmental information relating to Aboriginal land use was also researched. Such research facilitated an understanding of the potential nature of sites and site patterning in the region, which enabled a predictive statement to be made. It also provided an archaeological and environmental context within which a significance assessment could be made, if any Aboriginal sites were located during a field survey.

Stage 2: Site Inspection
The archaeological site inspection was undertaken on Tuesday 15 December 2020 by Veronica Norman and Agata Calabrese, archaeologists, Comber Consultants.

Stage 3: Report preparation
Further archaeological research was conducted, where necessary, to clarify the results of the survey. This report was then compiled and provided to SINSW.

4.0 PROPOSAL

The Department of Education through School Infrastructure NSW (SINSW) propose to relocate Marsden High School to the Meadowbank Education [and Employment] Precinct. A robust Business Case is being developed in order to repurpose the Marsden High School site to a community sports facility. At present, two draft masterplan options have been developed for the study area, shown below in Figure 10 and Figure 11.

The proposed works have not yet been finalised; however, the works will involve extensive ground disturbance including, but not limited to:

- Demolition of the existing school buildings and facilities in the north western portion of the study area.
- Cut and fill to modify site levels. There is a substantial fall of between 3-7m across the study area, comprising both natural topography and existing civil benches for school buildings and landscaping. Modification of levels will be limited by using existing site levels as much as possible.
- Landscaping.
- Construction of sports courts across the majority of the study area.
- Indoor sporting facility and car parking in the north western portion of the study area.
- Construction/upgrade of service infrastructure.
- Within the north western portion of the study area, natural site levels will largely remain undisturbed as these are in an ecologically protected area.

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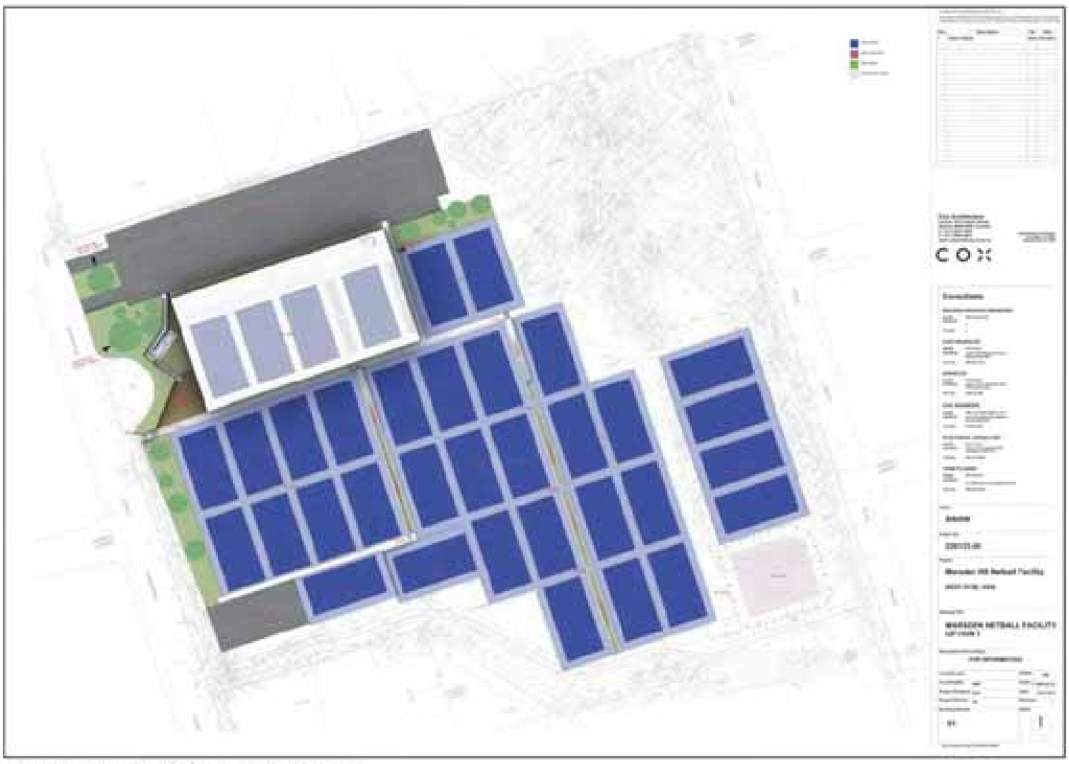

Figure 10: Masterplan option 1 (Cox Architects 2021)

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Figure 11: Masterplan option 2 (Cox Architects 2021)

5.0 ABORIGINAL HISTORY

The traditional owners of the study area are the Darug whose country extended along the main east-west ridge of the Blue Mountains, the northern Blue Mountains and the Cumberland Plain in which the study area is located (Tindale 1974; Attenbrow 2010).

Research by R.H. Mathews, a pioneer linguist and anthropologist, in the early twentieth-century revealed that the Darug (or 'Dharruk' people as he referred to them) inhabited an area adjoining the 'Thurawal' (Dharawal) to the south and Gundungurra and Wiradjuri to the west. Their territory extended along the coast to the Hawkesbury River and inland to Windsor, Penrith and Campbelltown; then from the mouth of the Hawkesbury River to Mount Victoria (Mathews 1901a:140; Mathews 1901b:155). Archaeological and historical records examined in Sydney's Aboriginal Past identify three distinct groups – the coastal, hinterland and mountain Darug (Attenbrow 2010:23). The Darug of the Milperra area were from the hinterland group.

Aboriginal people have occupied the valley extending from Prospect to the coastline for at least twenty thousand years. The surrounding area was reasonably fertile and, with the resources of the river, was able to support their living needs. Anthropological studies indicate that clan sizes varied widely, consisting of between thirty to sixty people who moved through their territory using seasonal routes to access food, shelter and other resources necessary for survival as well as ceremonial sites. Generally, people camped, travelled, foraged, fished and hunted in smaller, extended family groups, coming together at times with the larger group for ceremonies and ritual combats (Attenbrow 2010: 29). These extended family units or clans consisted of up to sixty people. Each of these clans was named after the area of land where they normally resided, and to which the people had traditional links (Attenbrow 2010). The suffix "gal" was added to the place name for men of the clan and "galleon" was added for women.

The clan that lived to the north of Parramatta River and west of the upper reaches of the Lane Cove River was the Wallumede clan, with the Boromede (or Burramatta) clan territory to the west. Both clans were of the Darug language group. The main contact between clans was during ceremonial gatherings. There were linguistic and cultural differences, as well as economic ones. There was a complicated system of kinship and totems which prevented certain types of contact. It is difficult to pinpoint exact language boundaries, as information came from early colonists, explorers and ethnographers trying to interpret Aboriginal languages (Keating 1996:1-2).

The territory of the Wallumede, located between the Parramatta and Lane Cove Rivers, was traversed by a number of streams, ponds and creeks providing diverse resources from the river and land to support their cultural and living needs. Anthropological studies indicate that clan sizes varied widely, consisting of between thirty and to sixty people who moved through their territory using seasonal routes to access food, shelter and other resources necessary for survival as well as access to ceremonial sites. People camped, travelled, foraged, fished and hunted in smaller, extended family groups, coming together at times with the larger groups for ceremonies and ritual combat (Attenbrow 2010:29).

The Aboriginal economy was dependent on harvesting resources with only very little modification to the environment, with the Parramatta River playing a central part of that economy. In contrast, Europeans quickly set about clearing the land and planting crops which prevented Aboriginal people from carrying out their traditional hunting of animals and gathering of plant foods.

Current Local Aboriginal Land Council boundaries differ from these traditional boundaries. The Local Aboriginal Land Council representing the Ryde area is the Metropolitan Local Aboriginal Land Council.

6.0 ENVIRONMENTAL CONTEXT

6.1. Topography

The study area is located within the Cumberland Plain, across an undulating plain. The Cumberland Plain consists of low rolling and steep hills and is characterised by low, gently undulating slopes on the youngest of the Triassic rocks, the Wianamatta Group (Chapman & Murphy 1989:1). Local relief on the Wianamatta Group shales is between 50 – 120m (eSPADE 2020).

The Cumberland Plain is bordered on the west by the Blue Mountains and on the east by the Georges River and headwaters of the Parramatta River. To the north is the Hornsby Plateau and to the south is the Woronora Plateau (Smith 1989a:8).

The study area is located across a sloping landform, with the highest point in the north western corner sloping down towards the south eastern corner. Archer Creek runs through the eastern portion of the study area and Parramatta River is located approximately 1.5 km to the south of the study area.

6.2. Geology and soils

The Cumberland Plain overlies the Wianamatta Group of Shales. Within the study area the Wianamatta Group of Shales overlies the Ashfield Shale (Sydney 1:100,000 Geological Map). The Ashfield formation consists of black to dark-grey shale and laminate.

Several locations on the Cumberland Plain within the vicinity of the study area contain material suitable for small stone tool manufacture, such as silcrete. The nearest known source of silcrete is located approximately 2.5km to the south east of the study area in the vicinity of Homebush Bay (Comber 2008:8). Other silcrete outcrops are located at Luddenham approximately 35km to the south west, St Clair approximately 26km to the south west, and at Erskine Park approximately 25km to the south west. Other materials used to manufacture stone tools within the Cumberland Plain include chert, tuff, quartz, basalt and quartzite. These can be found in Rickaby's Creek formation approximately 30km to the north west of the study area (Clarke & Jones 1988, Smith 1989a:9-11; 1989b:6-7).

The type of soil profile present in the landscape contributes to the vegetation found at the site, and hence resources available, as well as the level of preservation of the site. The study area is located across the Glenorie soil landscape. The Glenorie soil landscape is present north of the Parramatta River on the Hornsby Plateau in Baulkham Hills, Hornsby, Ku-ring-gai, and Ryde LGAs. Small isolated areas are found at Condell Park, Hurstville and on the Cumberland Lowlands at Rosehill (eSPADE 2020).

The Glenorie soil landscape is erosional and consists of shallow to moderately deep (<100cm) red podzolic soils on crests, moderately deep (10-150cm) red and brown podzolic soils on upper slopes; deep (>200cm) yellow podzolic soils and gleyed podzolic soils along drainage lines (eSPADE 2020). This soil profile contributes to the growth of the vegetation described below.

6.3. Stream order modelling

Stream order can be used to predict Aboriginal land use patterns. A first order stream is the smallest and is a small tributary that flows into and feeds larger streams but does not normally have any water flowing into it. The joining of two first order streams creates a second order stream and when two second order streams join they form a third order stream. In addition, first and second order streams generally form on steep slopes and flow quickly until they slow down and meet the next order waterway. First order streams are intermittent (Horton 1945; Strahler 1952).

Modelling undertaken by McDonald and Mitchell (1994) on the Cumberland Plain indicates that stream order can be used to predict areas of archaeological potential. The model hypothesis is that in any particular climate and landscape, a threshold catchment area is necessary to allow permanent stream flow or the establishment of waterholes with extended longevity (i.e. months to years). The critical point where these conditions are met appears to be at the junction of two second or third order streams. Such a location is likely to contain more complex sites with a high density of artefacts, whilst second and third order streams are also likely to contain large sites within 100 metres of the watercourse.

Archer Creek, a first order stream and northern tributary of Parramatta River runs through the north-eastern portion of the study area, as shown in Figure 12 and Figure 13 below. Archer Creek flows from Brush Farm Park, approximately 1 km to the north of the study area. First order streams are intermittent streams. Aboriginal objects and sites may still be located in proximity to first order streams, however they may be less complex than those located in proximity to second and third order streams.

Figure 12: Location of Archer Creek in north west corner of study area, and proximity to Parramatta River.

Figure 13: Northern portion of Archer Creek shown in dashed purple.

6.4. Vegetation

The vegetation of the Cumberland Plain was mapped by Benson (1979 & 1981) and the NSW National Parks and Wildlife Service (2002). Historically the undulating slopes of the Cumberland Plain would have supported a tall open forest of Cumberland Plain Woodland.

Prior to the clearance of vegetation by Europeans, tall open-forest (wet sclerophyll forest) would have been found across the Epping region. The dominant tree species includes Sydney blue gum (*Eucalyptus saligna*) and blackbutt (*E. pilularis*). Other species include turpentine (*Syncarpia glomulifera*), grey ironbark (*E. paniculata*), white stringybark (*E. globidea*) and roughbarked apple (*Angophora floribunda*). Pittosporum (*Pittosporum undulatum*) and coffee bush (*Breynia oblongifolia*) are common understorey species (Benson 1980, eSPADE 2020).

Such a vegetation community would have provided a variety of edible plant species and plants suitable for artefact manufacture. In addition, Cumberland Plain vegetation provided habitat for a variety of marsupials and birds whilst the River and Creeks would have provided fish, eels and yabbies.

6.5. Current land use and disturbance

The 1943 aerial below (Figure 14) shows the site as largely undeveloped but mostly cleared. A few dwellings are located within the study area and the land appears to be utilised for agricultural purposes. The school was constructed in 1959 (Phillip Bongers pers comm 2020).

At present, the site comprises low rise school buildings within the north western portion of the site. A school assembly area and sports courts are located in the centre of the school buildings in the north west. The north eastern portion of the site contains a creek line and vegetation. The southern portion of the study area contains sporting fields.

Figure 14: 1943 aerial with study area outlined in red (Sixmaps)

7.0 ARCHAEOLOGICAL BACKGROUND

7.1. The Cumberland Plain

Many surveys have been undertaken in the Sydney region which indicate the richness of the archaeological resources and which provide information about Aboriginal occupation within the region. Attenbrow (2010) has excavated a range of sites within the Sydney Basin. The aim of her study was to identify local geographic variation and temporal changes in the subsistence patterns and material culture of the people of this area. She excavated sites at Balmoral Beach, Cammeray, Castle Cove, Sugarloaf Point (Lane Cove River), Darling Mills State Forest, Winston Hills, Vaucluse and Cumberland Street in the Rocks. Dates for initial occupation vary from approximately 10,000 years BP at Darling Mills to approximately 450 years BP at Cumberland Street, The Rocks.

One of the oldest dated occupation for the Sydney region is 15,000 years BP from the Shaws Creek K2 rock shelter on the Nepean River (Kohen, Stockton & Williams 1984; Nanson et al 1987). However, these dates must be considered in association with environmental data related to sea level rises. The Sydney region that we know today was vastly different to the landscape of 15,000 years ago.

The period of maximum glaciation was 15,000 – 18,000 years BP. Therefore, the date of the K2 rock shelter and Attenbrow's Darling Mills site indicate that Aboriginal people lived throughout a period of extreme environmental change. During this period, sea levels were up to 130m below current levels (Nutley 2006:1). About 10,000 years ago as temperatures began rising at the end of the last ice age, the polar ice started melting and sea levels rose. The rising sea levels forced people to abandon coastal sites and move inland, with the result that the oldest coastal sites were inundated.

By about 6,000 years ago rising water levels had flooded the coastal plain forming the Sydney landscape that we know today. The vast majority of sites in the Sydney region date to around 5,000 years BP, after sea levels had stabilised. Whilst research into submerged indigenous sites is now being undertaken (Nutley 2006), there are few sites in the Sydney area that are known to date beyond 10,000 years BP. Therefore, research undertaken to date has focused on subsistence patterns and cultural change, e.g. Attenbrow (2010).

However, many archaeological surveys have been conducted within the Sydney region, particularly on the Cumberland Plain in relation to Environmental Impact Statements. As a result of these studies, which were occasioned by the burgeoning urban expansion extending into the Cumberland Plain, the NPWS recognised the need for a coherent study of the area to fully assess the impact of urbanisation on the natural and cultural heritage of the Cumberland Plain. Smith (1989a) was commissioned by the NPWS to undertake an Aboriginal Site Planning Study to be utilised in the management of Aboriginal sites on the Cumberland Plain. Prior to her study, 307 sites had been recorded on the Cumberland Plain, mainly open artefact scatters (297) with four scarred trees, one carved tree, four axe-grinding grooves and a Mission site (the Blacktown Institute). Smith (1989a:2) added 79 open sites and 29 isolated finds from field surveys related to her study.

Smith's (1989a:3) analysis indicated that site location and site densities were influenced by the availability of water and raw materials. She concluded that other factors such as topography, natural vegetation and soil types did not influence site location. She also identified that the majority of sites recorded have been in the northern sector of the Cumberland Plain, during site surveys of areas threatened by development (Smith 1989a:21). Her field studies (1989a & 1989b:10) confirmed that site densities in the southern Cumberland Plain appear to be lower overall to site densities on the northern Plain.

Since Smith's study, there has been a dramatic increase in development in Western Sydney, resulting in a great deal more archaeological survey and excavation (Comber 1990, 1991, 2006a,b&c, 2008, 2010a&b, 2011, 2015, 2016, 2017, 2019, 2020 McDonald 1989, 2002 & 2005a; Comber & Stening 2018, 2019; Comber & Norman 2020). This further work has indicated the complexity in the archaeological record that was not previously recognised. For example, sites on permanent water are more complex than sites on ephemeral drainage lines with major confluences being prime site locations. However, McDonald (2005a) reports that archaeological sites are found in a range of landscapes and that their condition is dependent on the amount of impact from European land practices.

McDonald's (2005a) report demonstrates the dynamic nature of stone tool technologies on the Cumberland Plain. She reviewed previous work within a theoretical framework to identify intra and inter-regional variation. She not only identified change over time in the stone tool technology, but the manner in which "stone technologies were organised in relation to landscape" (McDonald 2005a:np). Her report provides a framework to tentatively date sites through technological analyses and to identify cultural changes.

Her study also indicated that the surface representation of a site on the Cumberland Plain does not necessarily reflect the actuality of that site. Of the excavations conducted by her, sub-surface deposits were present even when there was no surface indication of a site. According to McDonald (2005a:5), "despite artefacts being rare or completely absent on the surface at each of the sites investigated, all six sites were found to contain intact archaeological deposit. Almost 500 square metres were excavated during this Project and almost 35,000 artefacts retrieved." McDonald (2005) also considers that Aboriginal occupation was focussed on the major river systems and characterised by mobility between a small number of sites. As a result of her various studies and applying stream order modelling she (2005) further predicts that the density and complexity of archaeological sites will vary according to stream order, as follows:

- Fourth-Fifth order creeks (or rivers): Archaeological evidence will be more complex and possibly stratified, reflecting more permanent and repeated occupation on major creeks.
- Third order creeks: Evidence of more frequent occupation such as knapping floors or higher artefact densities will be found in the lower reaches of tributary creeks.
- Second order creeks: Sparse archaeological evidence will be found which indicates occasional use and/or occupation.
- First order creeks: Due to the intermittent nature of water flow only very sparse evidence would be found in the headwaters of upper tributaries such as background artefact scatter.

Kohen's studies at Penrith confirmed the importance of fifth order creeks and rivers. He recorded over 50 sites in the Penrith area which included open artefact scatters, axe grinding grooves and rock shelters. Kohen (1997:7) indicates that sites occurring throughout the Penrith area "are particularly likely to occur adjacent to the rivers and creeks. The distribution of raw materials associated with the manufacture of stone tools suggests that chert and basalt were carried or traded east from the river gravels and that silcrete was traded or carried from sources near South Creek and Eastern Creek, west towards the Nepean flood plain".

Comber (2006a & b) also recorded open artefact scatters and scarred trees within the Cumberland Plain. She undertook excavation at two sites at Penrith Lakes known as Camenzulis (2010c) and PL9 (2010d). At PL9 she retrieved more than 1,500 artefacts, including backed blades and an edge ground axe. Her work confirms McDonald's (2005) and Kohen's predictive model that sites are more likely to occur adjacent to the rivers and high order creeks. These excavations (Comber 2010c & d) at Penrith Lakes further indicates the possibility that sub-surface archaeological deposits will remain despite disturbance by non-Aboriginal activities and the complexity of such sites. Surveys (2006a & b) undertaken prior to the excavations recorded the areas as being disturbed by agricultural activities. They had been grazed, ploughed, planted with crops and a dam constructed. Only a small number of artefacts were recorded on the surface but over 2,500 artefacts retrieved during excavation.

A survey undertaken by Comber (2008a) and subsequent excavations undertaken by Stening (2011) at Doonside demonstrated that although no surface artefacts were recorded (Comber 2008) substantial subsurface deposits did exist on the site with over 1,000 artefacts being recovered from a highly disturbed context (Stening 2011). This site was located beside Eastern Creek an important 4th or 5th order creek. It is an important watershed with extensive evidence of Aboriginal occupation.

Excavations undertaken by Comber at the Parramatta North Urban Transformation site (PNUT), which currently contains the Cumberland Hospital and is located on the Parramatta River near Domain Creek and Toongabbie Creek has yielded extensive evidence of Aboriginal occupation. Due to historic ploughing and topdressing no artefacts were observed on the surface. However, over 3,000 artefacts have been recovered from the current program of testing.

Similar results were found at the site of Parramatta Square. The site is located within the centre of Parramatta and had contained office buildings, ancillary services and hardstand prior to demolition. The archaeological excavations revealed extensive evidence of Aboriginal occupation including hearths, despite the lack of surface evidence.

AHMS (2012) and Navin Officer (2014) undertook assessments for the concept approval for the Sydney Intermodal Terminal at Moorebank identifying a number of Potential Archaeological Deposits. Testing undertaken by Artefact (2016) for Stage 1 of the Intermodal Terminal uncovered 28 objects indicating a low level of Aboriginal occupation on a maximal upper slope ridge. The testing revealed two phases of occupation. Artefact (2016) undertook further assessment for Stage 2 without identifying any areas of Aboriginal archaeological potential. The Sydney Intermodal Terminal is located approximately 15km to the west of the current study area on the western bank of the Georges River in an environmental landscape impacted by flooding. The results of this testing indicates that evidence of Aboriginal occupation can still remain despite later disturbance and particularly despite repeated inundation from maximal flood events.

AHMS (2013) undertook an assessment of the New Brighton Golf Course at Moorebank, on the Georges River. The area contained a former swamp and was on the floodplain of the Georges River. Test excavations revealed a highly disturbed landscape and uncovered one Aboriginal object.

In 1984 Haglund undertook an archaeological survey between King Georges Road Beverly Hills and Heathcote Road, Moorebank in respect of the F5. She located on open artefact scatter and one isolated find. The open artefact scatter was located on the banks of the Georges River at Hammondville, which is approximately 15km to the south west of the present study area whilst the isolated find was located approximately 2kms to the west of the Georges River. Haglund (1984) summarised work undertaken to date in the south Sydney area noting that "The known sites are mostly by, or close to, the Georges River in sandstone cliffs or outcrops". These sites included hand stencils and engravings and middens (Haglund 1984:3).

Archaeological investigations within the Sydney Basin have established reliable Carbon 14 dating evidence of Aboriginal occupation dating from the Pleistocene but (14,700BP at Cranebrook Terrace). The majority of sites however have been dated to less than 5,000 years. The absence of earlier dates is due to the effect of sea level rises c6,000 years ago. The influx of seawater over former coastal plains would have forced people into the new confines of the Sydney Basin (Nutley 2006). This 'intensification', or increased population, was then associated with an increase in the physical evidence of post 5,000BP occupation now being recorded through archaeological investigation.

The model of occupation developed for the Cumberland Plain indicates that reliable water is a prime factor in the choosing of site locations by Aboriginal people. More complex higher density sites will be located at the confluence of several water bodies whilst evidence of frequent occupation will be located in the lower reaches of tributaries. However, evidence will still be located in areas with seasonal creek lines, but it will sparse and less complex. Ground disturbance will impact on surface evidence, but subsurface evidence may still be located in areas of high disturbance and in areas subjected to flooding.

7.2. Ryde

To date, archaeological investigation within the vicinity of the study area has been limited, with little systematic research or fully comprehensive archaeological site survey work being conducted. Many of the surveys that have been carried out have been site selective, having been conducted prior to development.

A search of AHIMS for the broader Ryde region indicate that only a small number of assessments have been undertaken nearby, resulting in only a few sites being recorded. It should be noted that the small number of sites registered with AHIMS is a result of this lack of assessment, not a lack of potential Aboriginal archaeological sites.

The AHIMS search, measuring approximately 9km north-south and 7km east-west, identified 54 registered Aboriginal sites. One site, 45-6-3022, has restrictions applied. AHIMS confirmed that this site was not within the vicinity of the current study area. The results of the extensive AHIMS search are included in Table 3 below and are shown in Figure 15 and Figure 16. One registered Aboriginal site is located within 1km of the study area, AHIMS number 45-6-2309. Further information on this site is provided below.

Site type	No. of sites
Art (Pigment or Engraved)	2
Artefact	23
Artefact, Shell	2
Grinding Groove	1
Modified Tree (Carved or Scarred)	1
Potential Archaeological Deposit (PAD)	10
Potential Archaeological Deposit (PAD), Artefact	1
Restricted	1
Shell	2
Shell, Artefact	11
TOTAL	**54**

Table 3: AHIMS search results

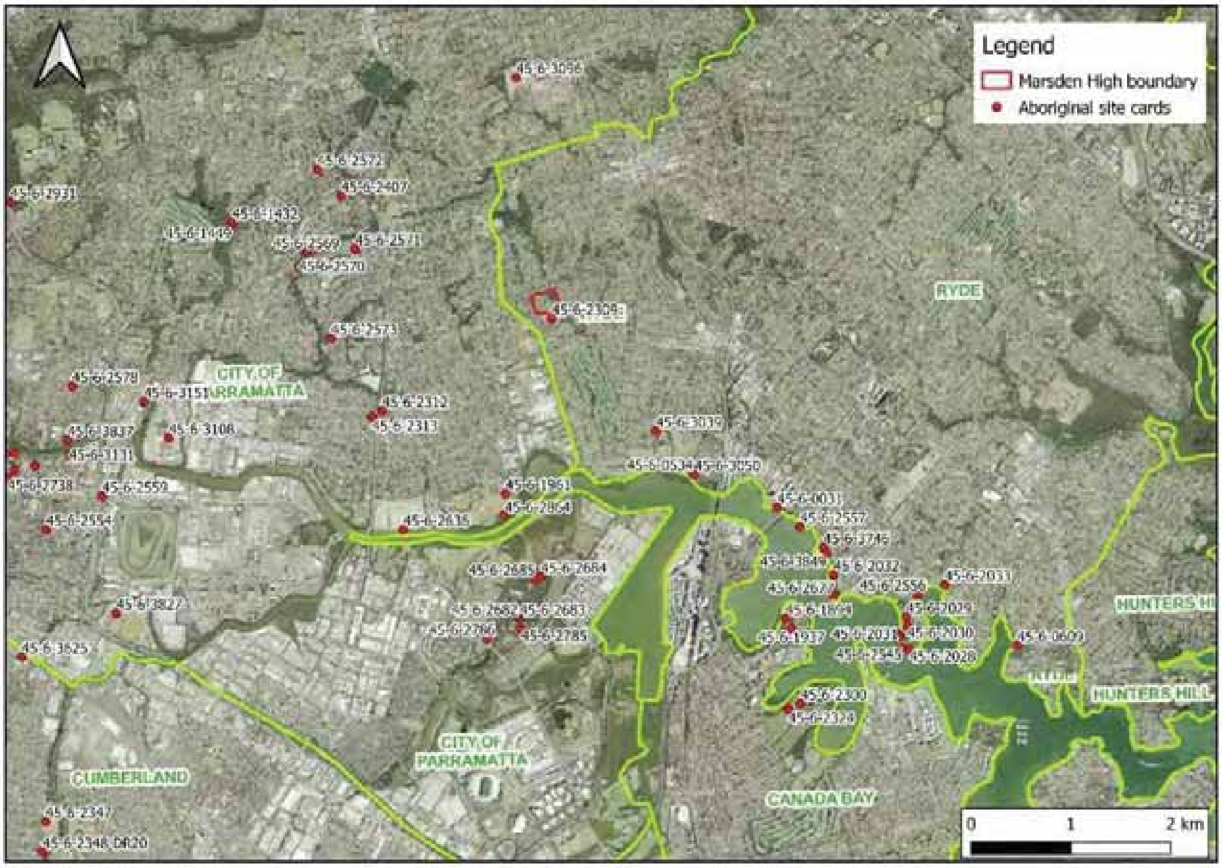

Figure 15: AHIMS search results, study area edged in red

Figure 16: AHIMS site 45-6-2309 shown in relation to the study area

45-6-2309
This site was registered in January 1992 and is located on the property directly to the south of the current study area, at Ermington Public School. The site consists of a shell midden with several artefacts in a very disturbed condition. The artefact materials include red silcrete, quartz and chert. The site is approximately 30 m from an un-named creek that had been enclosed in a concrete pipe.

City of Ryde – Aboriginal Site Management Report (Aboriginal Heritage Office 2011)
The Aboriginal Heritage Office (AHO) prepared an Aboriginal Site Management Report for the City of Ryde LGA in 2011. The aims of the report were to:

- Identify, access and re-record all known Aboriginal sites located in the Council area, where possible,
- Provide a planning document for conserving Aboriginal cultural heritage values,
- Provide a schedule for conservation works.

The report identified 56 recorded Aboriginal sites on the AHIMS register for the LGA, discounting sites which had been recorded twice and sites without sufficient information to be relocated. While an analysis of Aboriginal social values of the City of Ryde LGA was not within the scope of the report, the AHO found that the area contained high cultural significance (AHO 2011:21).

The report divided the LGA into three Management Areas. Area 1, named 'Lane Cove River', is located across a band of land across the northern and eastern side of the LGA. Area 2, named 'Central Plateau', is the higher plateau area of the centre and west of the LGA and is the most developed section. Area 3, named 'Parramatta River', is the sloping land bordering the Parramatta River along the south of the LGA (AHO 2011:25).

The study area is located within Area 2, the Central Plateau. Much of the surface geology is shale (as identified in Section 6.2), which preserves less obvious evidence of Aboriginal presence than the sandstone dominated slopes of the other areas (AHO 2011:25). One site was identified in this area, AHIMS 45-6-2309. This site is located directly south of the current study area.

The report found that most sites did not require any additional management works beyond regular monitoring, that is, every 12 months as a minimum or 6 months for more sensitive sites. The report recommended that land managers continue to support initiatives to expand their management of Aboriginal heritage, particularly undertaking measures in regard to education and training, and site management and protection (AHO 2011:30).

7.3. Study area

There are no registered Aboriginal sites within the study area and the study area is not an Aboriginal place.

7.4. Site prediction

On the basis of the environmental and archaeological information detailed above, it is expected that the following statements could be made, and the following site types could be located within the study area.

- Historic occupation and landscaping, together with evidence of construction activities relating to the school indicate that soil profiles within the study area would have been partially modified, particularly in the north eastern portion of the study area, however undisturbed topsoils may still be present. Evidence of Aboriginal occupation may be present in the A horizons and below.
- It is possible that fill will exist on the site. Such fill may have been used to level the site prior to construction and may cap subsurface archaeological deposits. Archaeological excavations throughout various urban areas in NSW clearly show that extensive subsurface evidence of Aboriginal occupation can remain despite later disturbance. Therefore, it can be predicted the study area may contain archaeological potential.
- The study area was originally located within an accessible landscape with ample resources would have been suitable for human occupation and daily activities. The close proximity to water sources, including Archer Creek, and rich flora and fauna would have provided Aboriginal people with ample opportunities for hunting, gathering and conducting daily activities. The study area would have been suitable for human occupation and activities prior to European settlement.
- The presence of registered Aboriginal sites within the Ryde region containing high levels of disturbance indicate that surface artefacts, isolated finds, *in situ* artefact deposits and shell middens may be present within the current study. The study area is within relative proximity to a silcrete source, indicating that artefacts may be fashioned from this material.
- Mature trees are present on site; however it is unlikely that culturally modified trees would be present as the 1943 aerial image indicates that the majority of the study area had been cleared.

8.0 RESULTS, IMPACT AND MITIGATION

8.1. Results

The study area was inspected on 15 December 2020 by Veronica Norman and Agata Calabrese, archaeologists Comber Consultants. Phillip Bongers, General Assistant, Marsden High School, escorted Comber Consultants around the site. The study area was inspected on foot and photographs were taken.

The study area is located across an undulating terrain. Site surface levels slope downwards from the north western corner to the south eastern corner. The surface levels across the site fall from approximately RL 42m relative to the Australian Height Datum (AHD) near the north western corner to about RL 30m, AHD on the south eastern corner (Douglas Partners 2020:3).

Survey Unit 1 (shown in blue in Figure 17), located in the north western portion of the study area, consists of the low-rise school buildings (Photograph 1), playground areas, asphalted surfaces, some vegetation and sealed and unsealed car parking areas (Photograph 2, Photograph 3, Photograph 4). The study area is located across an upper slope landform. Visibility was low-moderate across Survey Unit 1, with areas of exposures identified in areas of disturbance from vehicle movements and at the base of trees.

No Aboriginal objects were identified within Survey Unit 1. Due to the proximity to Archer Creek, and the possibility that the asphalt may be capping intact subsurface deposits, the survey unit is considered a Potential Archaeological Deposit (PAD).

Photograph 1: View north west into school buildings

Photograph 2: View east to car park in the north western corner of study area

Photograph 3: View south west towards school buildings and sports courts

Photograph 4: View north west into school buildings

Survey Unit 2, located in the north eastern portion of the study area, consists of Archer Creek and landscaped vegetation, as well as an unsealed car park (Photograph 5 - Photograph 7). This survey unit is located across a terraced landform and a watercourse. Visibility was nil to low, with areas of exposure along the creek line covered with leaf litter and unsealed car parks covered with gravel. Archer Creek runs approximately north – south through this survey unit, and then runs through a culvert beneath the road. While the area had previously been mostly cleared, as shown in the 1943 aerial, disturbance appears to be relatively minimal in this area. Phillip Bongers advised that grading of the top portion of the creek line had previously been undertaken and the culvert constructed, however he was not aware of any further works which may have disturbed the creek line (pers comm 2020). Raised terraces, likely natural, are located on either side of the creek line (Photograph 8).

No Aboriginal objects were identified within Survey Unit 2. Due to the minimal levels of disturbance and presence of Archer Creek this area is considered a PAD.

Photograph 5: View south along Archer Creek

Photograph 6: View north to culvert at top of creek line

Photograph 7: View north towards unsealed car park

Photograph 8: View north west into school buildings

Survey Unit 3, located across the southern portion of the study area, consists of sport ovals/courts with some vegetation (Photograph 9). Phillip Bonger understands that fill has been spread across the oval, but is not aware of other major impacts to the area. The survey unit is located across a lower slope, flood plain and watercourse. To the south of the road Archer Creek runs beneath the oval. Visibility was nil to low, due to the grass cover of the oval. Areas of exposure were identified at the base of trees and in areas subject to vehicle movement. Phillip Bonger identified the portion of the study area to the east of the line of trees as being prone to heavy flooding (pers comm 2020) (Photograph 10).

No Aboriginal objects were identified within Survey Unit 3. Due to the proximity to the creek line and relatively low levels of disturbance, Survey Unit 3, with the exception of the flood plain, is considered to be an area of Potential Archaeological Deposit (PAD).

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Photograph 9: View south west to oval


Photograph 10: View south towards flood plain

Figure 17: Survey units

8.2. Effective Survey Coverage

Ground surface visibility (GSV) refers to the amount of bare ground visible during the field survey. The visibility of some site types, such as open artefact scatters, is dependent upon GSV and exposure. Heritage NSW guidelines suggest that this information be presented in a table which quantifies and the local detectability (DECCW 2010:19).

Survey coverage is shown below in Table 4 and landform summary in Table 5.

Survey Unit	Landform	Survey unit area (m2)	Visibility (%)	Exposure (%)	Effective Survey Coverage (m2)	Effective Coverage (%)
1	Upper slope	22,623.000	5%	10%	113.12	0.5
2	Terrace, watercourse	10,005.000	5%	10%	50.03	0.5
3	Lower slope, floodplain, watercourse	22,047.000	5%	10%	110.24	0.5

Table 4: Survey coverage

Landform	Landform area (m2)	Area effectively surveyed	% of landform surveyed	Number of sites	Number of artefacts/features
Upper slope	22,623.000	113.12	0.5	0	0
Lower slope	9,042	100.24	1.1	0	0
Terrace	77,138	45.30	0.1	1	0
Watercourse	1,375	7.72	0.6	0	0
Floodplain	23,067	7.00	0.0	0	0

Table 5: Landform summary

8.3. Impacts

The proposed development will involve impact to the study area. The proposed works have not yet been finalised, however while the facility is proposed to be developed on top of the existing site to minimise ground surface disturbance, the proposed development is likely to require the re-levelling of existing site bench levels.

It is assumed that works will involve, but may not be limited to:

- Demolition of the existing school buildings and facilities in the north western portion of the study area
- Cut and fill to modify site levels. There is a substantial fall of between 3-7m across the study area, comprising both natural topography and existing civil benches for school buildings and landscaping. Modification of levels will be limited by using existing site levels as much as possible
- Landscaping
- Construction of sports courts across the majority of the study area
- Indoor sporting facility and car parking in the north western portion of the study area
- Construction/upgrade of service infrastructure
- Within the north western portion of the study area, natural site levels will largely remain undisturbed as these are in an ecologically protected area.

As the area has been assessed as having the potential to contain subsurface Aboriginal archaeological deposits, further measures will be required in order to mitigate potential impacts to Aboriginal heritage values.

8.4. Mitigation

Archaeological excavation

As subsurface Aboriginal objects are predicted to exist within the study area, and it is an offence to harm such objects, testing, and, if necessary, salvage excavation is proposed as a mitigation measure, as avoidance of the potential deposits is not possible. The information gained from archaeological excavation contributes to our knowledge and understanding of Aboriginal occupation. This knowledge can then be passed down to future generations through education programs and interpretation. Such strategies will contribute to building and maintaining social cohesion within the Aboriginal and broader community and protecting cultural values for future generations. Archaeological sites are valued by the

Aboriginal community for more than their archaeological/scientific values. Such sites reflect both the physical and spiritual presence of ancestors on country. It is therefore important that as much information as possible is obtained to ensure recognition of Aboriginal heritage and to pass this information on to future generations.

Heritage Conservation Zone

The north eastern portion of the study area, including and adjacent to Archer Creek, contains a landform with archaeological potential. This area, identified by this report as a Conservation Zone, is shown in Figure 18 below. This area has been maintained as a vegetated area by the council and school. The proposed works do not include redevelopment of this area for environmental and cultural purposes. Archaeological excavation is not required in this area as no ground surface impacts are proposed.

Figure 18: Conservation Zone shown in red hatch

9.0 SIGNIFICANCE ASSESSMENT

9.1. Preamble

Significance assessment is the process whereby sites or landscapes are assessed to determine their value or importance to the community.

A range of criteria have been developed for assessing the significance which embody the values contained in the Burra Charter. The Burra Charter provides principles and guidelines for the conservation and management of cultural heritage places within Australia.

Following are the criteria which will be used to assess the study area.

9.2. Criteria

Social Value (sometimes termed "Aboriginal" value) which refers to the spiritual, traditional, historical or contemporary associations and attachments which the place or area has for the present-day Aboriginal community.

Historic Value refers to the associations of a place with a person, event, phase or activity of importance to the history of an Aboriginal community.

Scientific Value refers to the importance of a landscape, area, place or object because of its archaeological and/or other technical aspects.

Aesthetic Value refers to the sensory, scenic, architectural and creative aspects of the place.

Representativeness refers to whether the site demonstrates the principal characteristics of that site and is a good representative example of that site type.

Rarity refers to the degree to which such a site is known elsewhere and whether the site is uncommon, rare or endangered.

9.3. Assessment

Social Values
The artefacts predicted to be on located on the site will provide evidence of Aboriginal occupation, representing the past for the local Aboriginal community, and providing a direct link to their ancestors.

Historic Values
The study area is predicted to contain significant historic values.

Scientific Values
The study area has the potential to yield further Information through detailed scientific and archaeological research into the nature of Aboriginal occupation and techniques utilised in subsistence activities. It has the potential to contain sub-surface archaeological deposits.

Aesthetic Values
The site does not contain Aboriginal aesthetic values, however, after excavation the objects uncovered might meet this criterion.

Representative Values
Until the excavation has been completed it is not known if the site contains representative values.

Rarity Values
Until the excavation has been completed it is not known if the site contains rarity values.

9.4. Statement of significance

The artefacts predicted to be located on the site will provide evidence of Aboriginal occupation, representing the past for the local Aboriginal community, and providing a direct link to their ancestors. The current contains a portion of Archer Creek, a tributary of the Parramatta River, and is therefore considered to be an area of archaeological potential. The study area has the potential to yield further information through detailed scientific and archaeological research into the nature of Aboriginal occupation and techniques utilised in subsistence activities. It has the potential to contain sub-surface archaeological deposits. The current site does not contain Aboriginal aesthetic values, however, after excavation any objects uncovered may meet this criterion. Until the excavation has been completed it is not known if the site contains representative or rarity values.

10.0 RECOMMENDATIONS

The following recommendations are made on the basis of:

- Legal requirements under the terms of the *National Parks & Wildlife Act 1974* (as amended), which states that it is an offence to harm or desecrate an Aboriginal objects.
- Research into the environmental and archaeological background of the study area and its surroundings, as detailed in this report;
- Results of the site inspection and archaeological assessment as outlined in this report.

IT IS THEREFORE RECOMMENDED THAT:

9. The area identified within this report as Conservation Zone including and adjacent to the Archer Creek, should not be impacted upon by the proposed works and should be maintained *in situ*. A physical barrier should be established around the Conservation Zone and all staff advised that the Conservation Zone is a "no-go area".

10. Aboriginal community consultation in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010* should be undertaken. Such consultation can take up to four months to be completed. An Aboriginal Cultural Heritage Assessment Report (ACHAR) will need to be prepared which details the results of the consultation and the archaeological assessment. The archaeological report will need to be appended to the ACHAR.

11. As subsurface Aboriginal objects are predicted to exist within the study area, and it is an offence to harm such objects, test excavation should be undertaken in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010) and in association with the with the Registered Aboriginal Parties.

12. If Aboriginal objects are uncovered during the testing, Aboriginal archaeological salvage excavations will need to be undertaken once the DA has been issued. The salvage will need to be undertaken prior to redevelopment of the site.

13. If no Aboriginal objects are uncovered during the testing, the project can proceed without the need to undertake salvage. However, all employees, contractors/sub-contractors and anyone else working on the site should be made aware that it is an offence to harm Aboriginal objects. If any Aboriginal objects are uncovered during the course of the redevelopment of the school, all work must cease in the vicinity of that object and further advice sought from the consultant.

14. An Aboriginal heritage induction should be provided to all staff and contractors on site on the significance of the Aboriginal heritage of the site, including the Conservation Zone and advised of their responsibilities under the *National Parks & Wildlife Act 1974* in respect of Aboriginal heritage.

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APPENDIX A: AHIMS EXTENSIVE SEARCH

MARSHALL DAY Acoustics

MARSDEN HIGH SCHOOL PLANNING PROPOSAL
ACOUSTIC REPORT

Rp 001 r01 20201092 | 25 March 2021

D21/78776

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Report No.:	**Rp 001 r01 20201092**

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APPENDIX A ENVIRONMENTAL NOISE LOGGER SURVEY

1.0 INTRODUCTION

Marshall Day Acoustics Pty Ltd (MDA) has been commissioned by School Infrastructure NSW (SINSW) on behalf of the Department of Education (DOE) to prepare an acoustic report to supplement a Planning Proposal to amend a 'land use zone' Development Standard in the Ryde Local Environmental Plan 2014 from SP2 Educational Establishment to RE1 Public Recreation.

The subject site is currently known as Marsden High School and is located at 22 Winbourne Street, West Ryde.

Neither Ryde City Council nor any known State Government bodies provide specific policy or guidance for the acoustic assessment of proposed 'land use zone' changes. This report provides a qualitative assessment of acoustic factors relating to the proposed 'land use zone' change, comparing and contrasting the acoustic characteristics associated with the current and proposed uses and providing comments on conceptual acoustic considerations for future development, should the sought change be approved.

2.0 DEVELOPMENT DESCRIPTION

The subject site is located at 22 Winbourne Street, West Ryde, approximately 1.5 km north west of Meadowbank and 5 km south east of Macquarie Park and is currently occupied by Marsden High School buildings and associated facilities.

The site is currently zoned SP2 Educational Establishment in the Ryde Local Environmental Plan 2014 (Ryde LEP 2014). Surrounding residential lots are predominantly zoned R2 Low Density Residential

A street map indicating the site, boundary and surrounds is provided in Figure 1. An aerial image of the site and surrounds is provided in Figure 2.

Figure 1: Locality map as provided by SINSW

Figure 2: Aerial image of the site as provided by SINSW

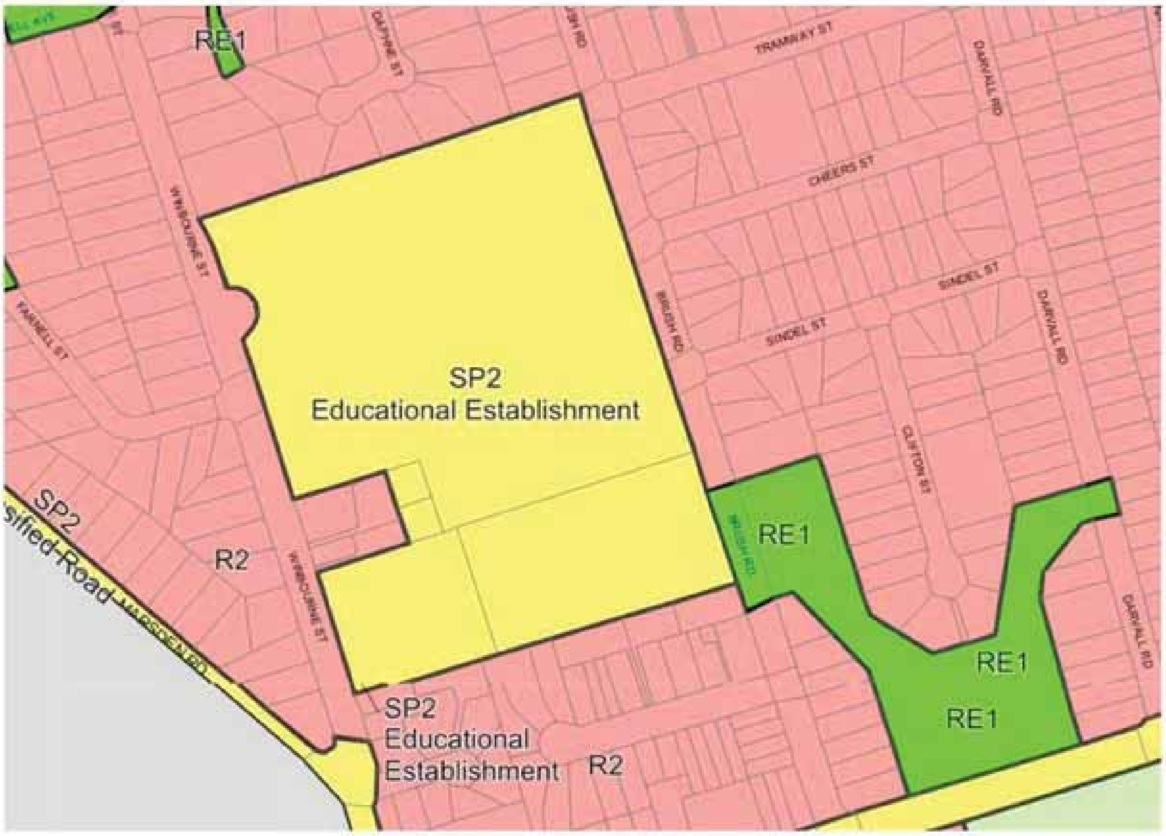
Vehicular and pedestrian access is currently via Winbourne Street and Brush Road. A pedestrian refuge island is located on Winbourne Street adjacent to the school site.

There is high value biodiversity (vegetation) to the north east and scattered trees/cleared land to the remainder of the site. An open waterway exists to the north east of the site, within the vegetated area, whereafter it is piped to the south eastern corner of the site under Brush Road. Topography of the site falls from north/north west to south east

2.1 Site surrounds

Ermington Public School, zoned SP2 Educational Establishment, is located immediately south of the site. Properties zoned R2 Low Density Residential surround the site to the north, east and west. Maze Park, zoned RE1 Public Recreation, is located south east of the site. There are two locally heritage listed items within vicinity of the site, being the former School residence/1988 Ermington School Building and Maze Park. A current zoning map, taken from the Ryde LEP 2014, for the subject site and surrounds is shown in Figure 3.

Figure 3: Current zoning map for site and surrounds



3.0 EXISTING NOISE ENVIRONMENT

Two unattended noise loggers were deployed at the site from Thursday 18 February 2021 until Wednesday 3 March 2021. Information regarding equipment specifications is provided in Table 1. The location of the noise loggers is denoted in Figure 4.

Table 1: Unattended logger information

Position	Make	Model	Serial Number	Location
1	01dB	Duo Smart Noise Monitor	10196	7 Daphne Street
2	01dB	Duo Smart Noise Monitor	10419	20 Winbourne Street

Figure 4: Unattended noise logger locations

Both loggers continuously measured background levels with post-processing resampling noise levels into 15 minute intervals following methodologies provided in the NSW EPA's Noise Policy for Industry (NPfI).

Logger background noise data was then analysed and edited, removing data sets affected by poor weather conditions and data exclusion guidelines also set out in the NPfI. Data for 24 and 25 February 2021 was not available for the logger at Position 1 due to an equipment storage failure. In order to provide comparable survey periods, data for Position 2 was excluded for the same period.

The calibration of both units was checked prior to and following the measurement period using a Rion NC-74 Sound Level Calibrator and exhibited no significant deviation.

The background and ambient noise levels measured by the loggers and processed in accordance with the NPfI are shown in Figure 5 and Figure 6.

Figure 5: Background and ambient noise levels for logger location 1 – 7 Daphne Street

Period	Time of day	Rating Background Level, dB $L_{A90, 15min}$	Equivalent Continuous Noise Level, dB $L_{Aeq, 15min}$
Day	0700-1800 hrs	39	60
Evening	1800 – 2200 hrs	38	53
Night	2200 - 0700 hrs	31	41

Figure 6: Background and ambient noise levels for logger location 2 – 20 Winbourne Street

Period	Time of day	Rating Background Level, dB $L_{A90, 15min}$	Equivalent Continuous Noise Level, dB $L_{Aeq, 15min}$
Day	0700-1800 hrs	43	52
Evening	1800 – 2200 hrs	42	61
Night	2200 - 0700 hrs	40	49

In review of the measured noise levels, and incorporating experiences on-site during deployment and retrieval of equipment, the site exhibits a noise environment typical for a Suburban area as defined in the NPfI:

> *'Suburban–an area that has local traffic with characteristically intermittent traffic flows or with some limited commerce or industry. This area often has the following characteristic: evening ambient noise levels defined by the natural environment and human activity.'*

Further, the surrounding land use zones align with those summarised in Table 2.3 of the NPfI as being associated with the receiver category 'Suburban residential'.

On this basis the acoustic environment of the subject site and surrounds is defined as Suburban in nature.

4.0 RYDE LOCAL ENVIRONMENTAL PLAN 2014

The Ryde LEP 2014 provides a Land Use Table, aiming to define the types of developments and uses that may be permitted under a particular land use zone. The aim of the overall planning instrument is to ensure consistency and alignment between adjoining land uses whilst fostering a flexible attitude with respect to development opportunities..

Whilst the Ryde LEP 2014 (or other available statutory or advisory document) does not provide prescriptive methodologies, assessment criteria or other guidance for the acoustic assessment of rezoning proposals, it is assumed that the intent of the Ryde LEP 2014 would need to be considered by any submission seeking a land zone use change.

For the purposes of this acoustic assessment it is expected that any proposed land use change would need to ensure that the introduction of a new land use zone provides consistency and alignment with neighbouring land use zones, in an acoustic context.

In considering this, the potential developments permitted under the sought land use zone (RE 1 Public Recreation) will be qualitatively and conceptually reviewed with respect to the existing zone (SP2 Infrastructure Educational Establishment), with consideration given to the acoustic amenity of adjoining residential receivers and the likelihood or otherwise of adverse impact.

Table 2 provides extracts from the Ryde LEP 2014 denoting the current and proposed land use zones for the subject site as well as the land use zones for the surrounding residential receivers. Also included are the types of developments permitted for the land use zones as defined in the Ryde LEP 2014.

Table 2: Development types permitted under the current and proposed land use zones for the subject site and surrounds, Ryde LEP 2014

Current subject site and adjoining land use zone and permitted developments	Proposed subject site and adjoining land use zone and permitted developments	Surrounding residential land use zone and permitted developments
SP2 Infrastructure	**RE1 Public Recreation**	**R2 Low Density Residential**
The Ryde LEP 2014 does not provide extensive detail regarding the development types permitted under the Zone SP2 Infrastructure land use zone, with 'Aquaculture' and 'Roads' only described as permitted with consent. Given the site is currently zoned specifically as *SP2 Infrastructure – Educational Establishment* Ryde City has clearly accepted an Educational Establishment to be permitted under the SP2 Infrastructure land use zone.	The Ryde LEP 2014 indicates that 'Environmental protection works' are permitted without consent. Developments that are permitted but require a consent submission are listed as: - Aquaculture - Business identification signs - Community facilities - Environmental facilities - Kiosks - Recreation areas - Recreation facilities (indoor) - Recreation facilities (outdoor) - Restaurants or cafes - Roads	The Ryde LEP 2014 indicates that 'home occupation' is permitted without consent. Developments that are permitted but require a consent submission are extensive and listed as: - Bed and breakfast accommodation - Boarding houses - Business identification signs - Centre-based child care facilities - Community facilities - Dual occupancies (attached) - Dwelling houses - Environmental protection works - Group homes - Health consulting rooms - Home-based child care - Home businesses - Home industries - Hospitals - Oyster aquaculture - Places of public worship - Pond-based aquaculture - Recreation areas - Residential care facilities - Respite day care centres - Roads - Secondary dwellings - Tank-based aquaculture

5.0 ACOUSTIC ASSESSMENT OF PROPOSED LAND USE ZONE CHANGE

Marsden High School has been located at the subject site, in one form or another, since 1959.

The existence and operation of Marsden High School over the past 50 years means the noise amenity and characteristics associated with the school are an integral part of the noise environment at the surrounding residential receivers.

On this basis, it is assumed that the noise characteristics and amenity associated with the SP2 Infrastructure Education Establishment, subject to appropriate noise control and management, are acceptable for integration with the adjoining R2 Low Density Residential receivers. This is supported by the widespread locating of schools within low density residential areas throughout NSW.

In order to provide a conceptual, qualitative assessment of the proposed land use zone change, a comparison of the acoustic amenity of the current and proposed land use zones is provided comparing and contrasting associated acoustic characteristics.

This approach is taken to determine whether the proposed RE1 Public Recreation use is acoustically similar to the current SP2 Infrastructure Educational Establishment use, and thus may be suitable for integration with the surrounding R2 Low Density Residential zoning.

5.1 SP2 Infrastructure – Educational Establishment - Existing Acoustic Amenity

Acoustic sources related to operation of the school and the times in which they may typically occur are detailed in Table 3. These factors are important in understanding how the operation of the school influences the local acoustic amenity.

Table 3: SP2 Infrastructure Education Establishment - associated noise characteristics

Noise source	Time of occurrence	Acoustic considerations
Traffic and pedestrian noise from student and staff arrival and departure	Typically occurring 0730-0900 hrs and 1500-1800 hrs Weekdays	Noise management likely to be implemented by the school through student education and use of traffic marshals
Noise emissions from internal spaces	0900-1500 hrs Weekdays	Noise generated within internal spaces of a school are typically low in magnitude and often well controlled by the building façade. Amplified music or speech for performance or assemblies may be used occasionally giving rise to higher noise emissions. The school has abilities to control emissions through the closing of openable façade elements.
School bell/PA	0900-1500 hrs Weekdays	---
Outdoor play/sporting activities	Sporadic occurrence throughout 0900-1500 hrs Weekdays	Play/sporting activities may give rise to shouting or yelling from participants as well as instruction from teaching staff and whistles throughout gameplay. Primary noise control measures would be implemented through activity management with physical noise controls playing a secondary role.

Noise source	Time of occurrence	Acoustic considerations
Community use	Occasional weekday evenings and weekends	It would be expected that weekday evening use may occur in both internal spaces and external sporting facilities. Weekend use may include community use of sporting fields during the day giving rise to noise characteristics similar to weekday play/sporting activities. Before and after school care may also occur internally and externally typically after 7am and up to 6pm Monday to Friday. Specific existing community use of the school is not known.
Mechanical services	Likely to occur continuously. Some equipment may turn on and off with use with use occurring primarily during the weekday periods.	---

5.2 RE1 Public Recreation - Associated Acoustic Amenity

An exhaustive review of the variety of development permutations that may be captured under the RE1 Public Recreation development types listed in Table 3 is not within the scope of this assessment. Whilst the proposed development types are somewhat varied, for acoustic purposes they can generally be grouped into two types of development:

Passive – in which use is characterised by contemplative activities that generate little noise e.g. open parkland or recreational activities that may not require prepared facilities or require facilities that do not generate significant noise

Active – in which use is characterised by commerce or recreation (e.g. sporting) activities which generate their own noise e.g. restaurants /kiosks/cafes or structured individual or team activity that requires the use of special facilities, courses, fields, or equipment

As can be seen above, the crucial consideration in determining whether a use may be Passive or Active for acoustic purposes is the extent of noise generation arising from the facilities and use.

Based on the features of the subject site, it appears to be unlikely that aquaculture or environmental facilities (waste treatment type uses) are likely to be a future development consideration. As such these development types are excluded from consideration in this report.

The remaining development types are primarily related to restaurant/café/kiosk uses or recreation and sporting activities. These have been grouped based on the above Passive and Active definitions, and are shown in Table 4. Some development types are applicable to both groups and have been included with context.

Table 4: Passive and active grouping of RE1 Public Recreation developments

Passive recreation uses	Active recreation uses
Business identification signs Zero noise generation **Recreation facilities (outdoor), Recreation areas** Where no prepared facilities are required or facilities that in themselves are unlikely to give rise to significant noise generation e.g. outdoor artificial climbing wall, wildlife viewing, jogging paths	**Community facilities, Recreation facilities (indoor), Recreation facilities (outdoor), Recreation areas** Sporting facilities e.g netball, hockey, football, tennis, skateboarding. Indoor or outdoor community performance spaces likely to exhibit amplified speech or music **Kiosks, restaurants or cafes** Premises may range in size from minor ice cream kiosk type location to larger premises with indoor and outdoor dining spaces. Provision of mechanical services may be included. May feature a liquor license. **Roads** Publicly accessible and/or navigable by motorised vehicles. May include provisions for car parking

5.2.1 Acoustic Characteristics

Acoustic characteristics associated with the RE1 Public Recreation land use zone have been evaluated. A summary is provided in Table 5.

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MARSHALL DAY Acoustics

Table 5: RE1 Public Recreation - associated noise characteristics

Development type	Noise source	Time of occurrence	Acoustic considerations
Passive recreation uses			
Business identification signs	N/A	N/A	Zero noise generation
Recreation facilities (outdoor), Recreation areas	General chatter and/or quiet instruction related to contemplative activities Footfall noise associated with running/jogging	Typically expected during day and evening daily	The magnitude of noise emissions associated with passive activities would not be expected to require noise control considerations or be of a level to give rise to adverse noise impacts. Generally speaking noise emissions are expected to be minimal.
Active recreation uses			
Community facilities, Recreation facilities (indoor), Recreation facilities (outdoor), Recreation areas	External and internal sporting activities may give rise to noise from participants as well as instruction from teaching staff and whistles throughout gameplay Amplified speech or music related to indoor or outdoor community performances	Outdoor activity may occur on any day and could occur in the evening if lighting is provided. Indoor spaces could be in use any day or evening.	The extent of noise emissions would be related to the number of activities occurring concurrently, the management of the activity and the performance of the building enclosure where indoor activities apply. Primary noise control measures may be implemented through activity management or via physical noise controls For indoor facilities, the performance of the building façade may need to be considered as well as the emissions from external mechanical services.

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Development type	Noise source	Time of occurrence	Acoustic considerations
Kiosks/Restaurants and cafes	Patron noise emissions during services Business shutdown and waste disposal Outdoor patrons Mechanical services	Operations might occur on any day of the week and could include evening or night-time use.	For smaller takeaway kiosk type premises patron noise would be expected to be sporadic, brief and low in volume. Where a large number of patrons may be in attendance appropriate management procedures can assist in minimising noise emissions. The building enclosure may need to be developed to provide suitable noise control performance to control noise emissions from internal spaces. Similar management procedures to ensure waste disposal and business shutdown is conducted quietly and without impact may also be required. Noise emissions from operation of mechanical services may need to be evaluated. Management procedures in conjunction with physical noise controls may need to be employed to reduce noise impacts.
Roads	Public vehicle use Car parking	Roads in use 24 hours a day. Car parks more typically in use day and evening daily	Construction of a new road would trigger assessment under the NSW EPA Road Noise Policy, however this would not be out of character with the existing road network. Use of internal roads or car parks is likely to give rise to noise emissions that will need to be appropriately controlled. The extent of noise emissions will be dependent on size and intensity of use. Physical noise controls, as well as the careful planning of routes and positioning may be required to minimise impacts.

5.3 Discussion – Comparison of SP2 Education use and RE1 Public Recreation use

Review of the acoustic amenity and characteristics associated with an RE1 Public Recreation land use zone indicates that noise emissions from the permitted development types are likely to range in magnitude from quieter passive uses to more active uses such as sporting facilities.

Generally, noise emissions from potential passive recreation use may be lower than that for the existing Marden High School as the noisier, active sport and play associated with the school would not be present as part of a passive recreation use. Similarly, amplified music or speech related to school or community performances within the school buildings would also not be present for passive recreation use.

Whilst the timing of activities likely to occur under the passive recreation use may differ to that expected during school use i.e. some activities may occur at the weekend, the noise associated with passive use is likely to be compatible with the adjacent land uses.

New developments permitted under the RE1 Public Recreation that may be characterised by active uses such as sporting facilities and commerce (kiosks/restaurants/cafes) are not expected to introduce any new significant noise source types such as industrial noise, with the types of associated acoustic sources being generally similar to that of the existing school.

Both uses feature sporting activities likely to comprise calls, shouts, whistles and elevated instruction. Buildings associated with both uses may feature internal amplified music and external mechanical services. Patrons/students are a feature of both uses. Noise from traffic and car park activities is also common.

Acoustic differences may arise however when the timing of activities is considered, as public recreation activities may be expected to occur more prevalently during the evening and weekends than occurs for education facilities. The implementation of noise control measures such as physical noise controls and management processes may assist in ameliorating impacts.

The impact from any proposed use of the site for café/kiosk/restaurant, new road or dedicated indoor or outdoor recreational facilities would need to be assessed if/when a development approval is put forward.

6.0 CONCLUSION

Ryde City does not provide specific policy or guidance for the acoustic assessment of proposed 'land use zone' changes.

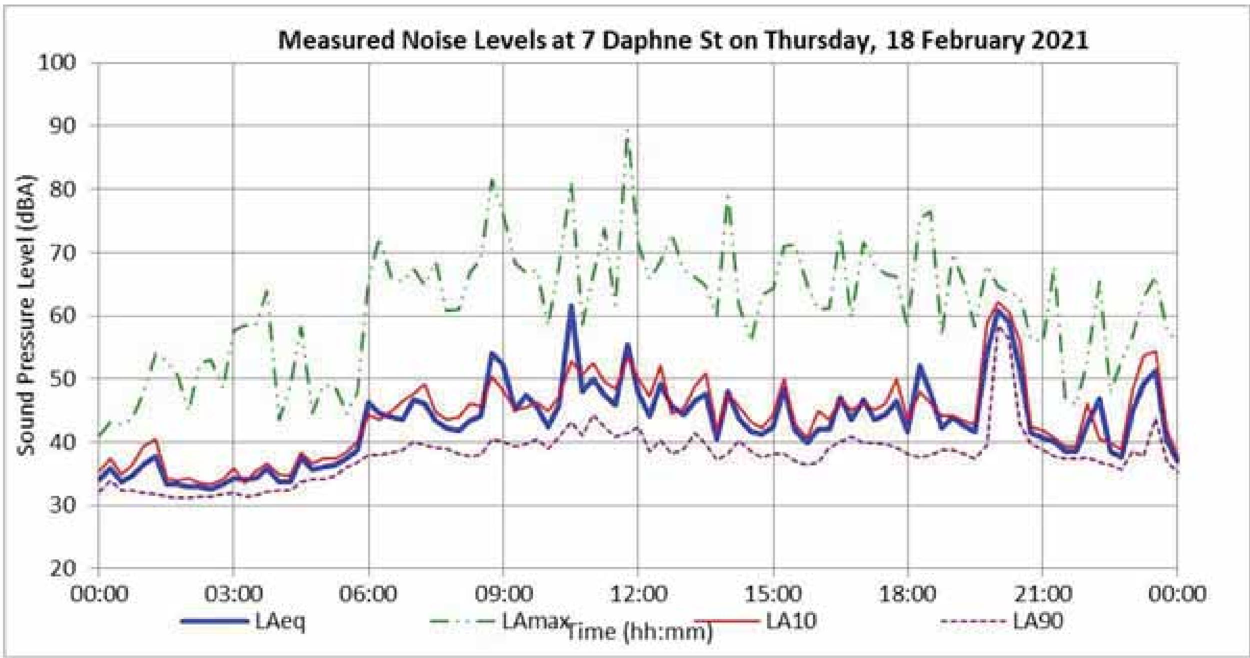
To evaluate the acoustic impacts that may be associated with the proposed change of 'land use zone' for the subject site, from SP2 Infrastructure Educational Establishment to RE1 Public Recreation, a qualitative assessment of acoustic factors has been developed.

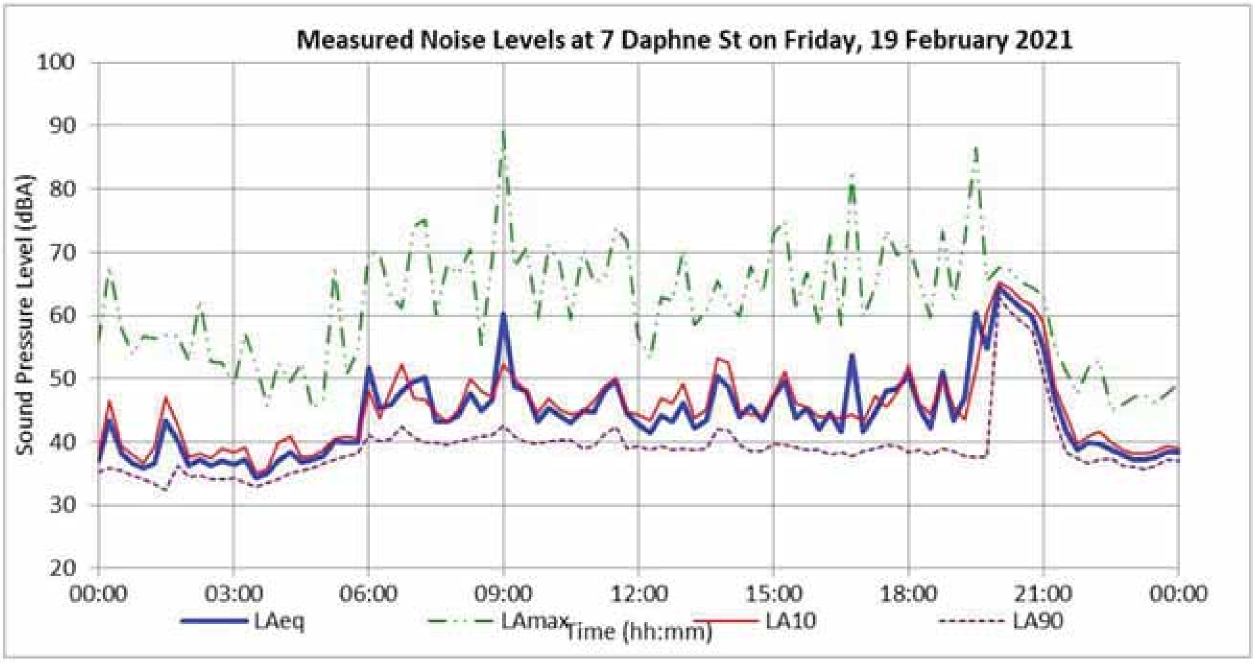
The assessment compares and contrasts the acoustic characteristics associated with the current and proposed uses, determines qualitative outcomes and provides comments on conceptual acoustic considerations for future development, should the sought change be approved.

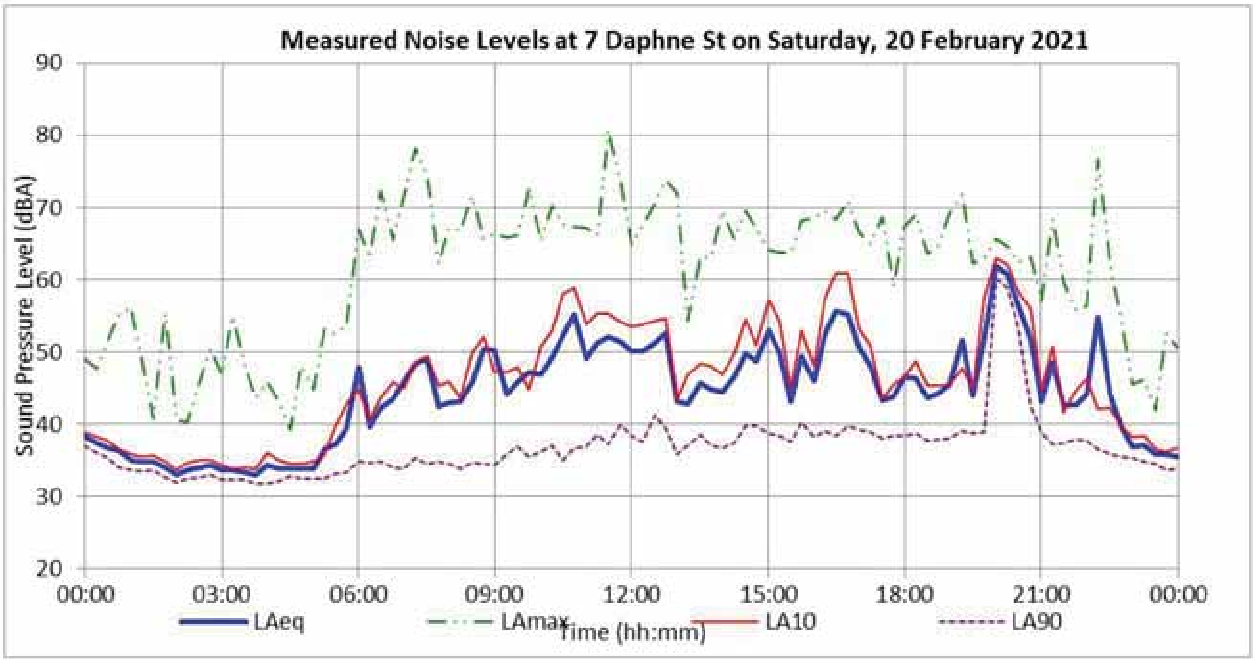
The allowable uses under an RE1 Public Recreation zoning appear to be consistent with the site location. It is notable that an RE1 Zone, being Maze Park, is located very close to the site, within a residential area. Following rezoning, any future development proposal would still need to be assessed for noise impacts and mitigation measures applied if required.

APPENDIX A ENVIRONMENTAL NOISE LOGGER SURVEY

A1 Position 1 Summary



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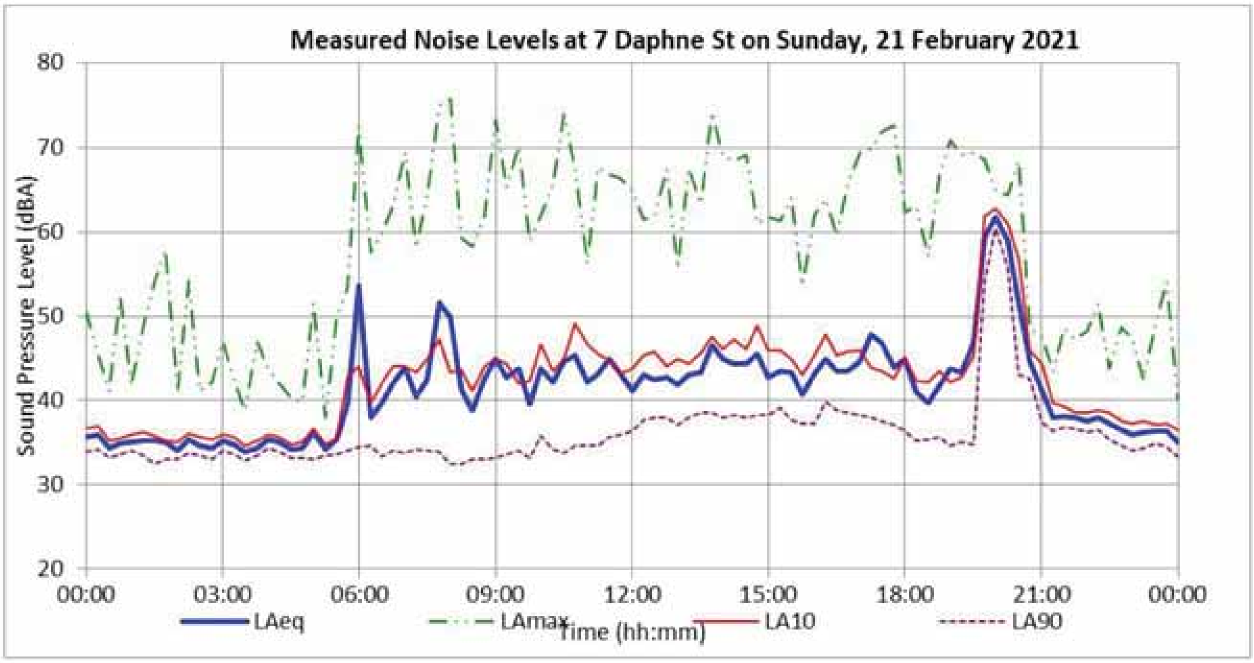
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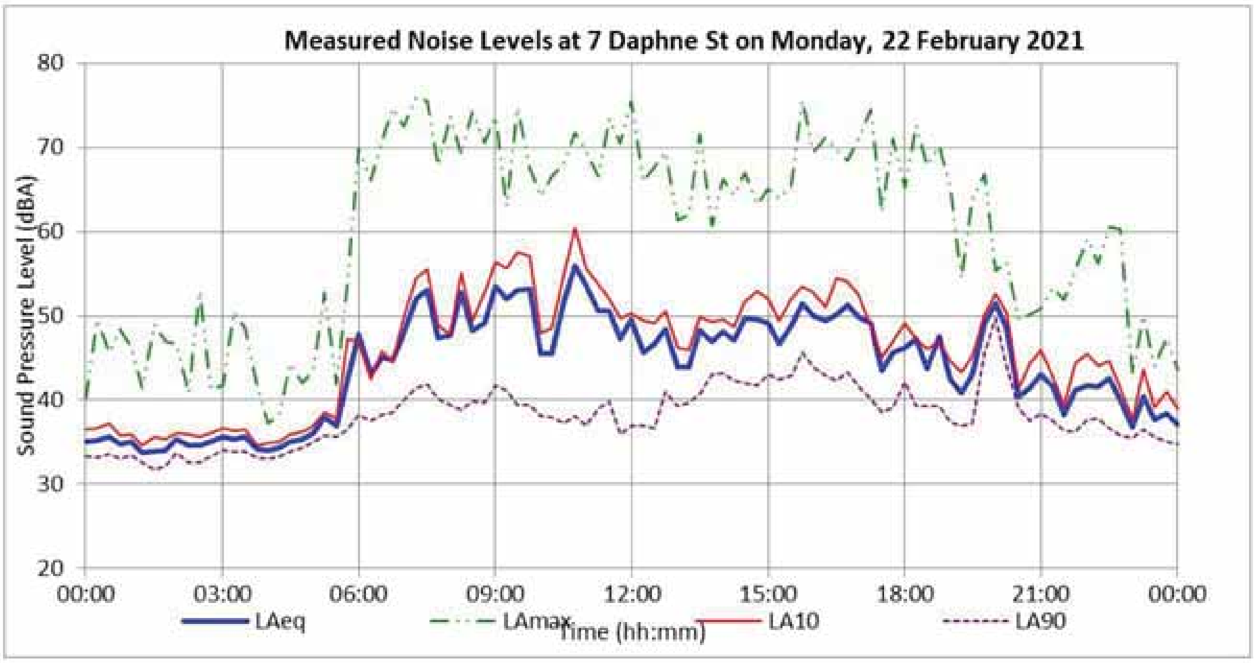
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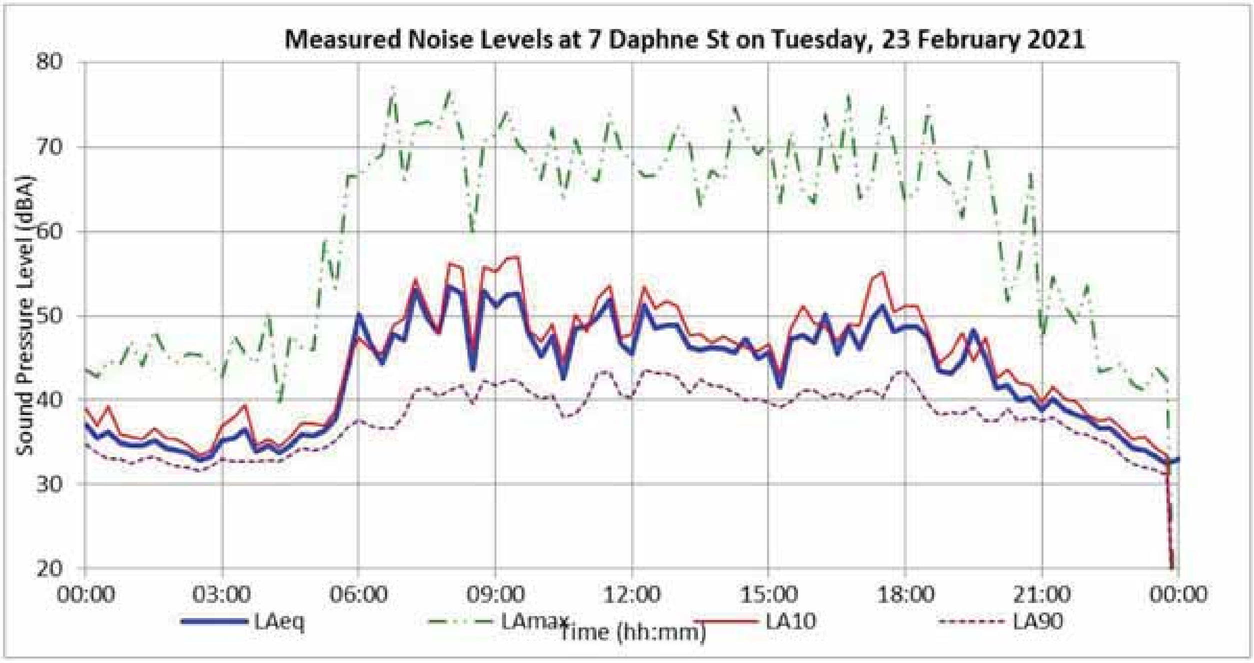
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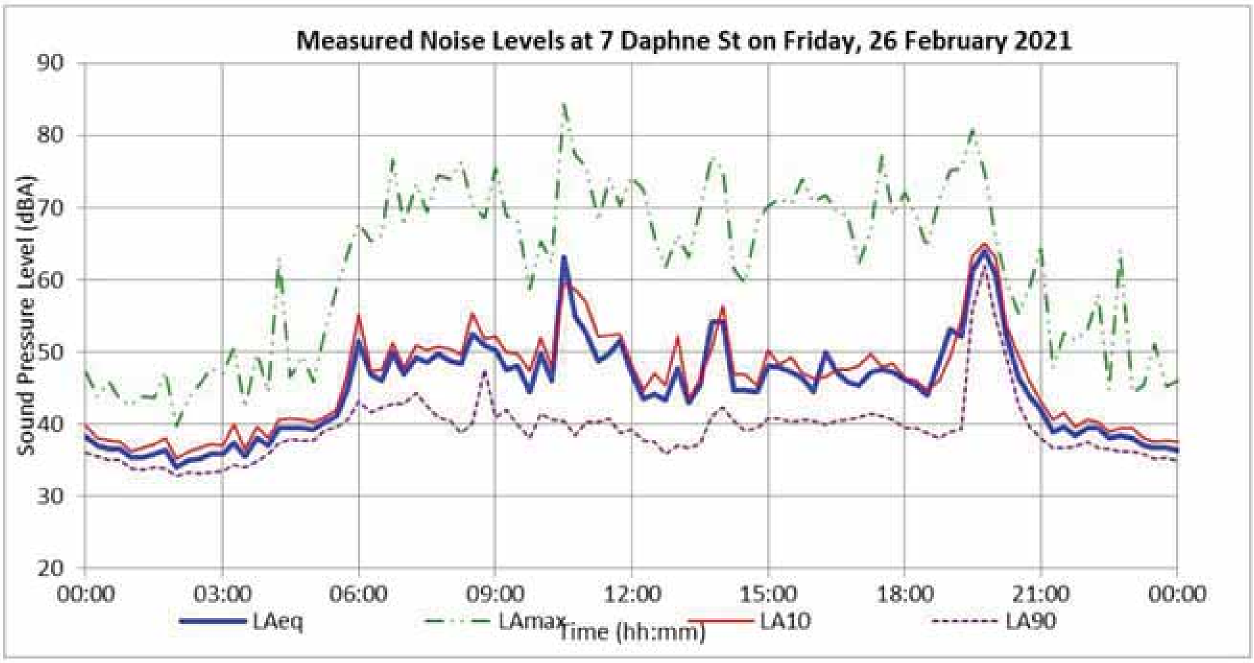

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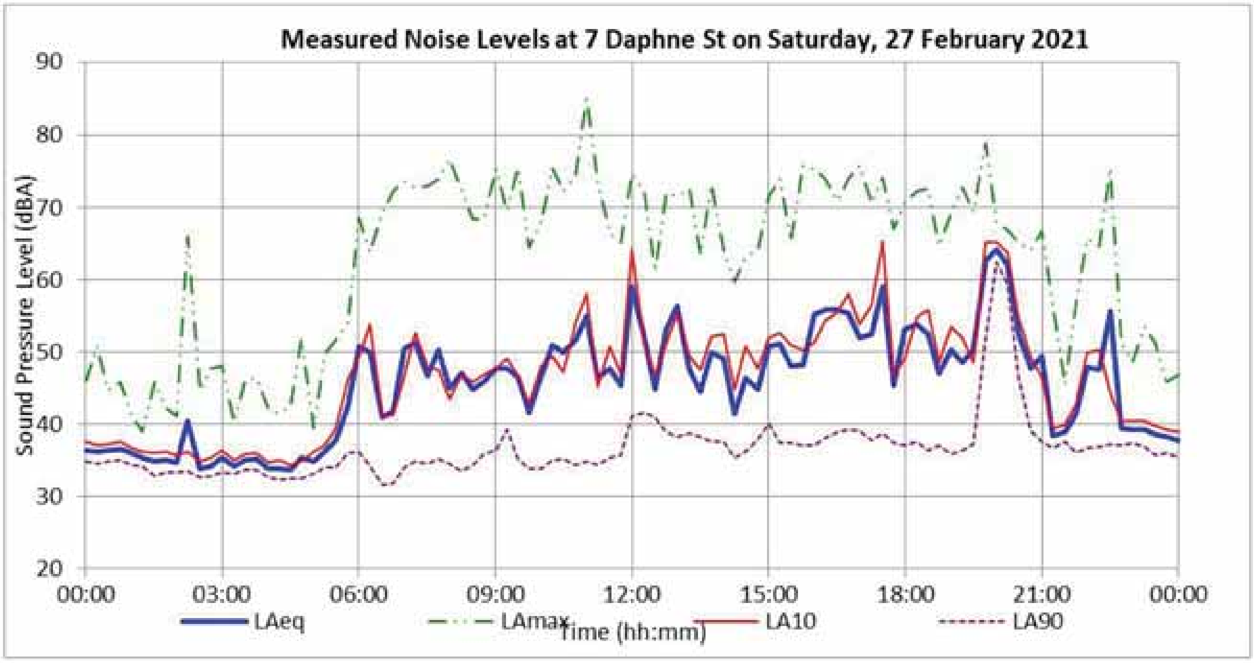

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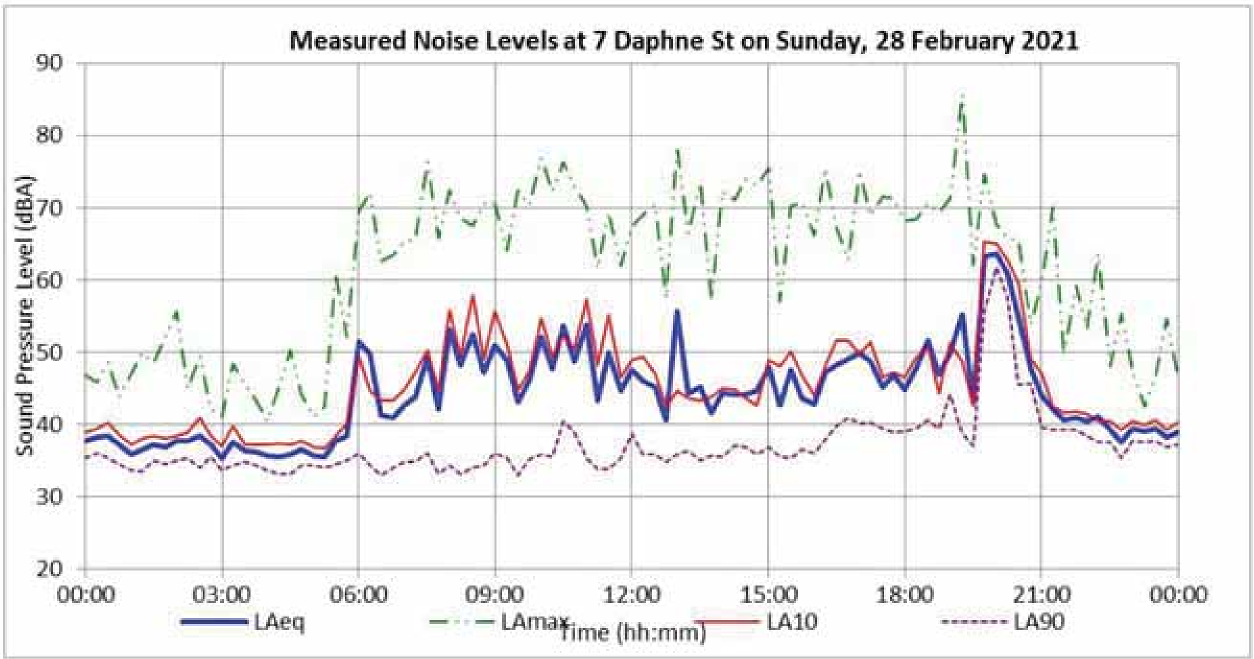
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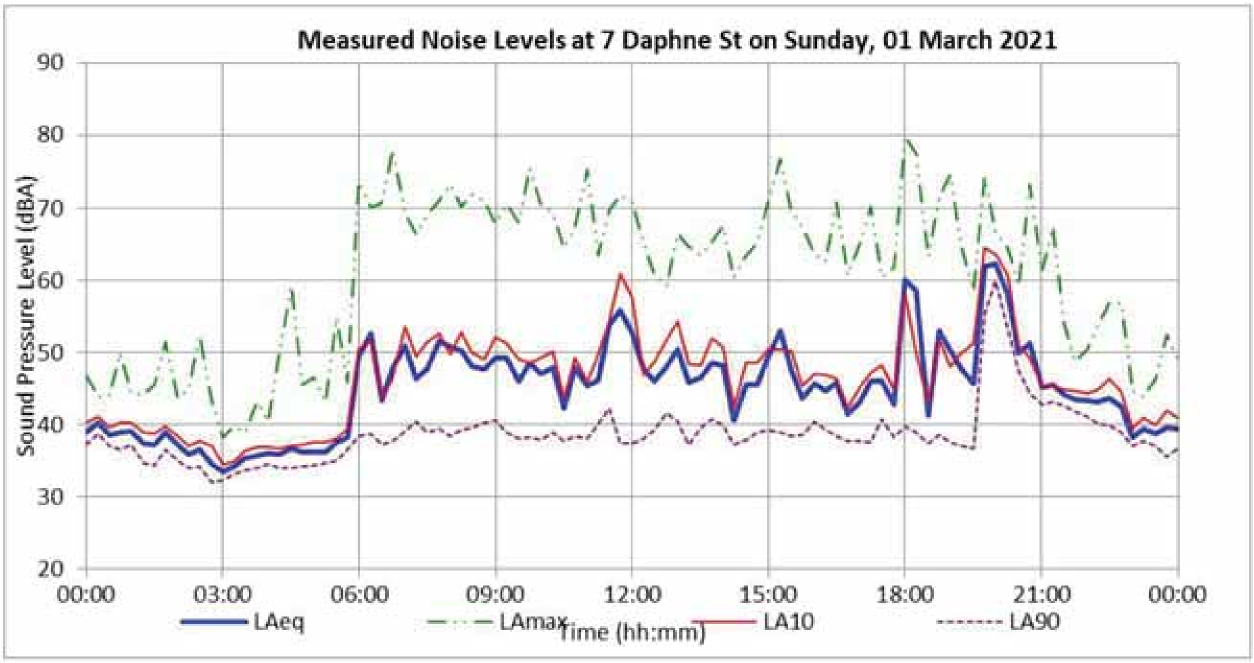
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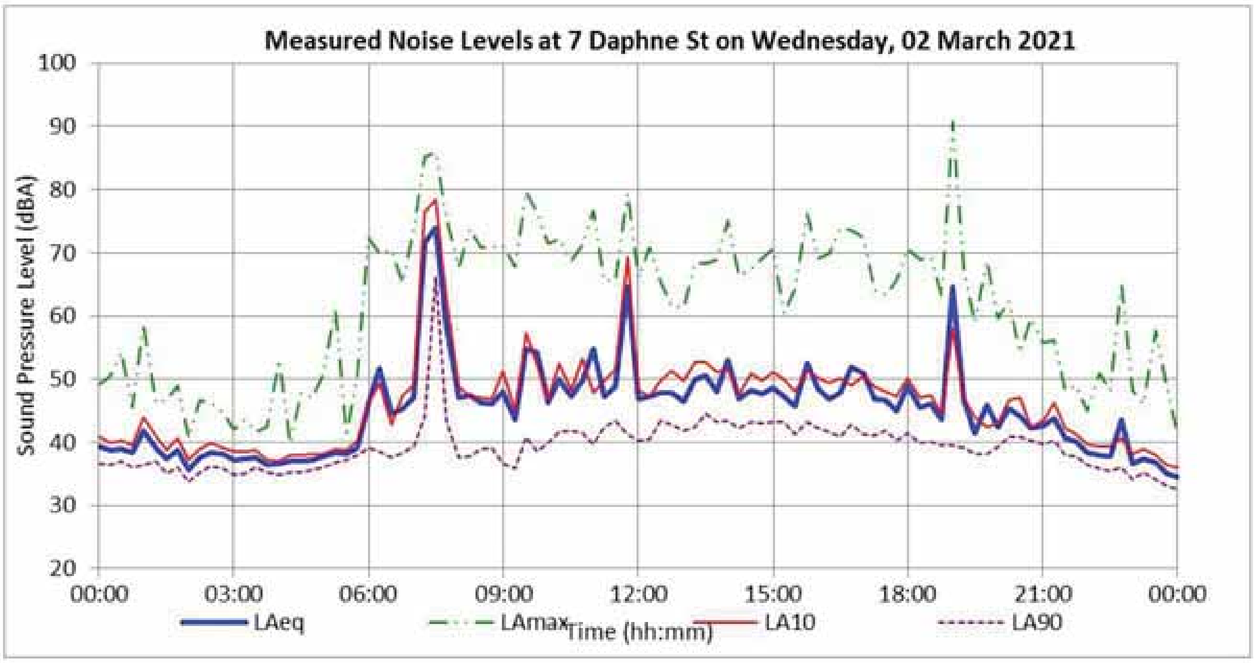
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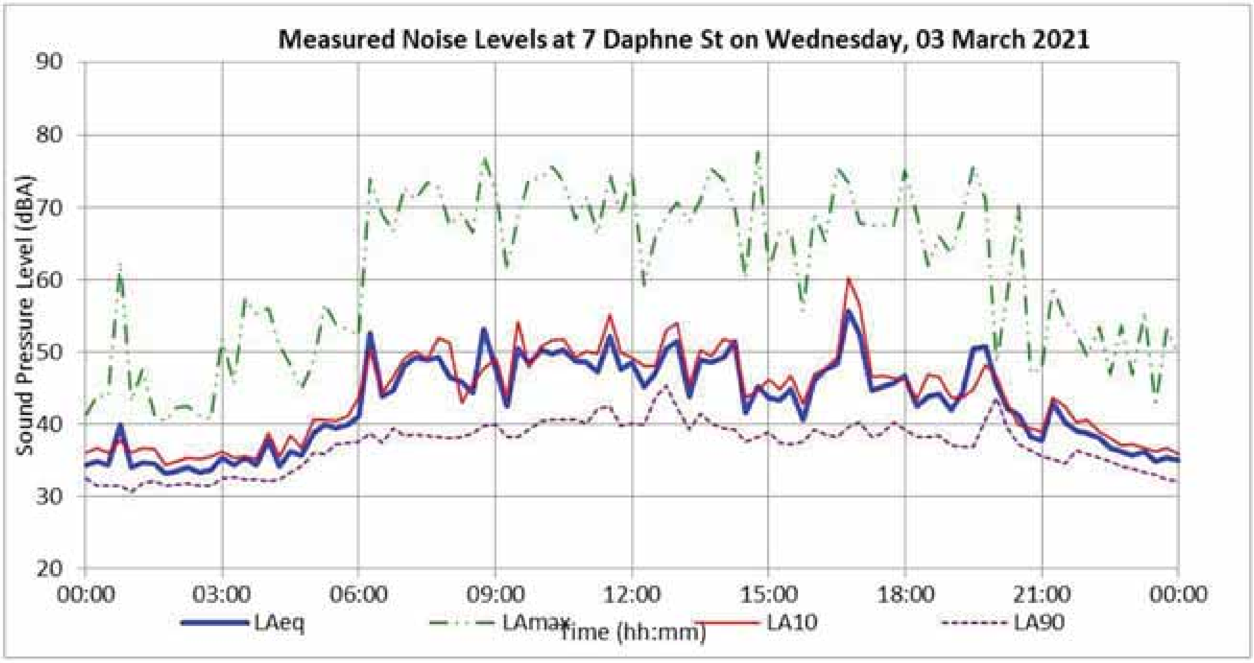
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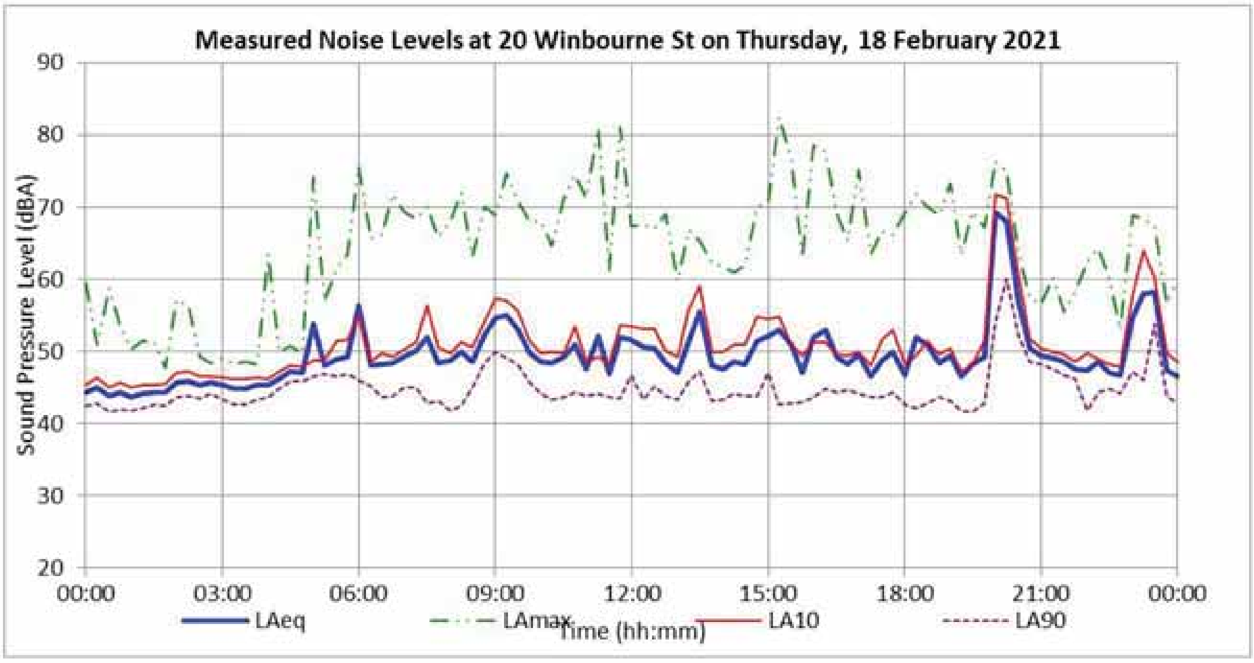

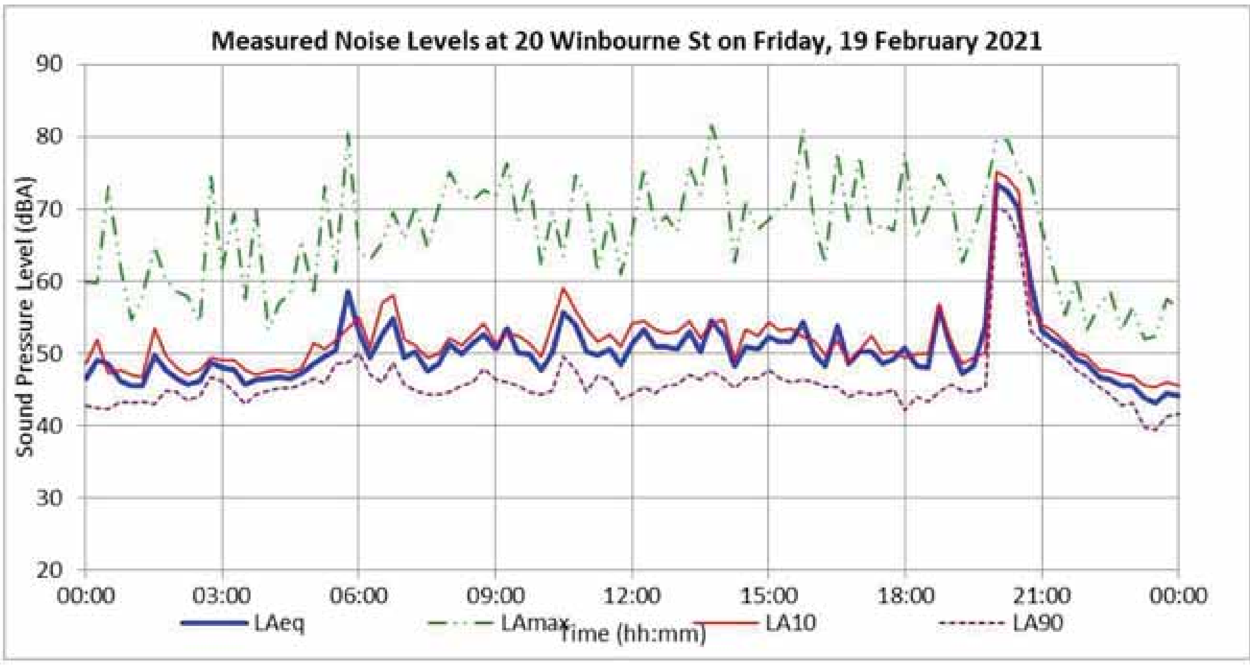

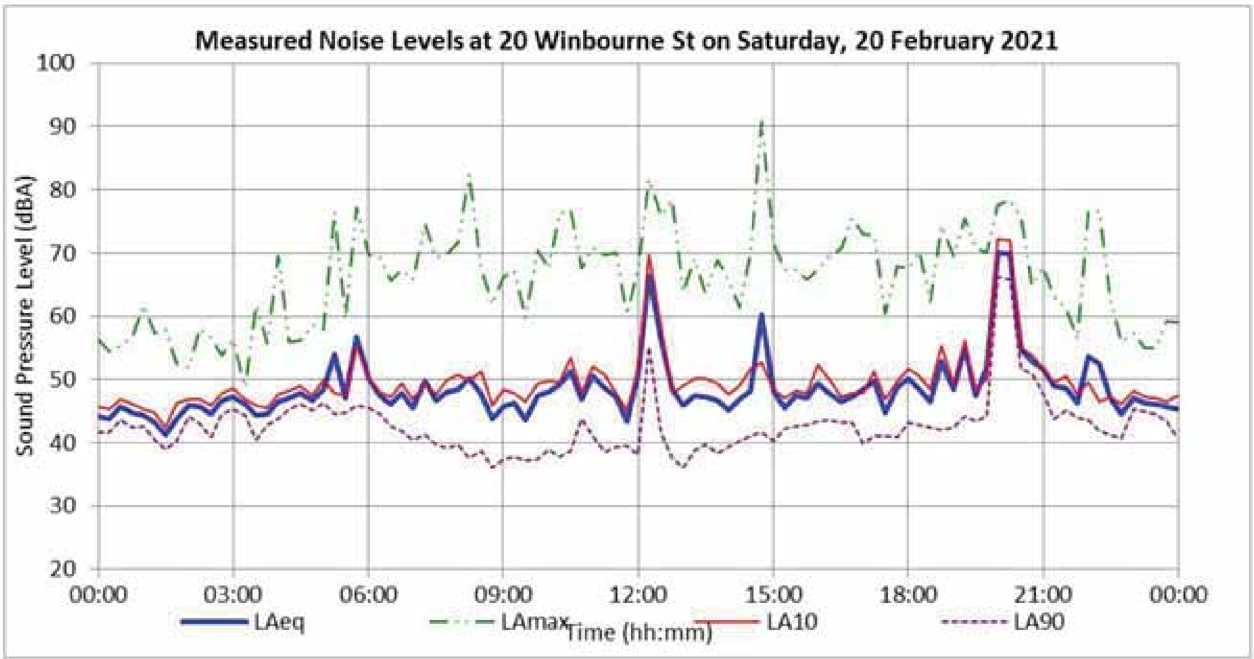
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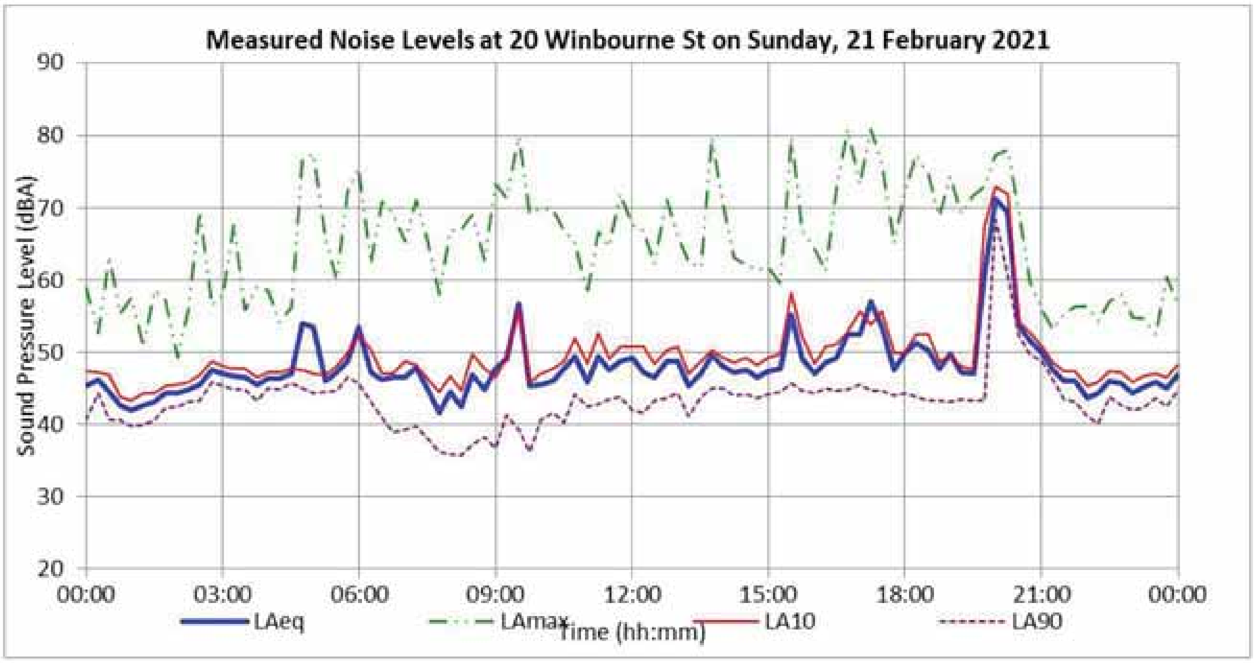
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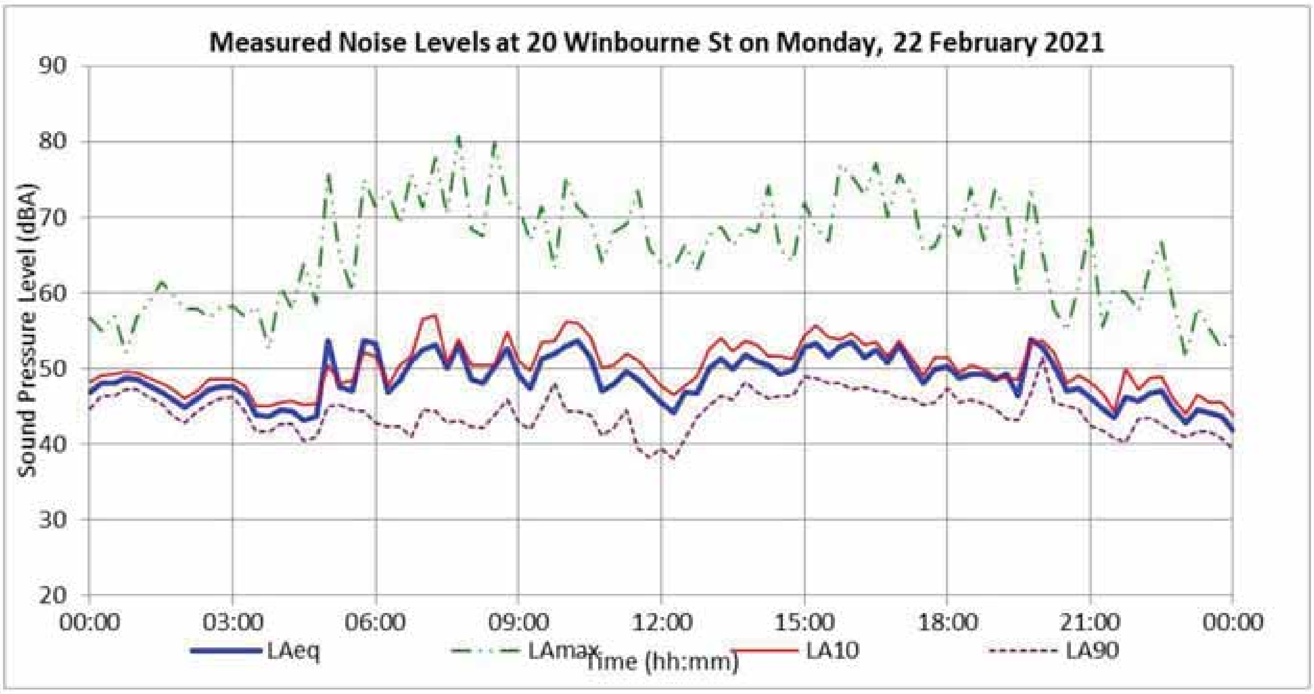
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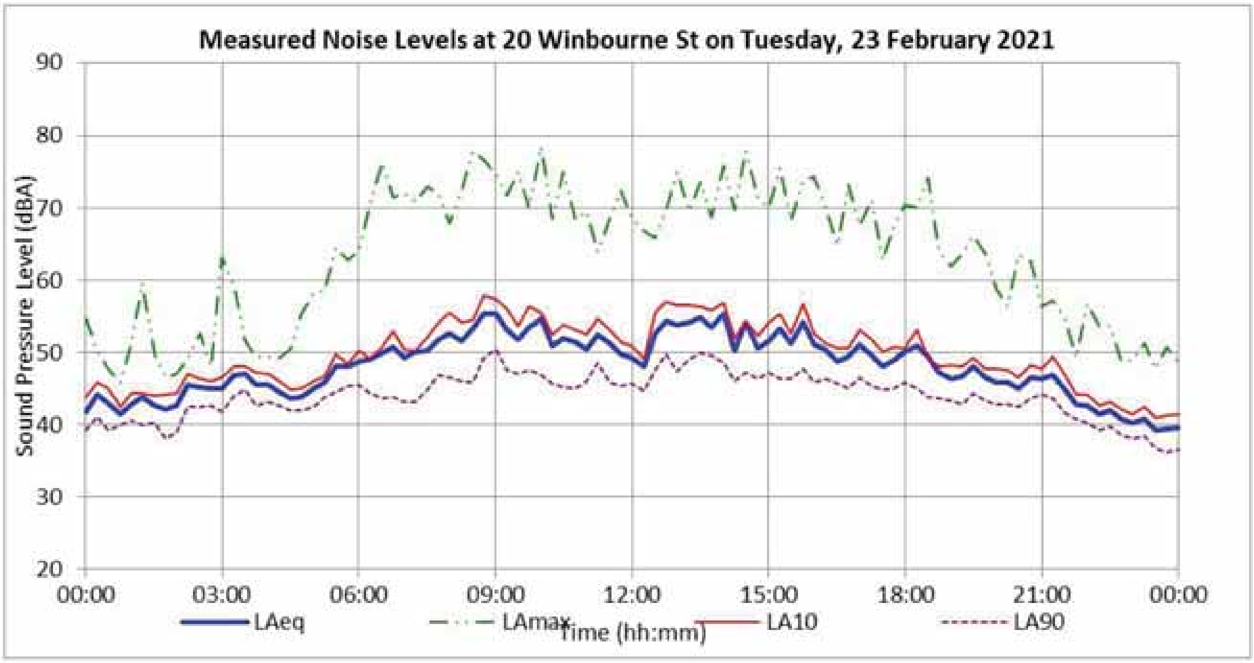
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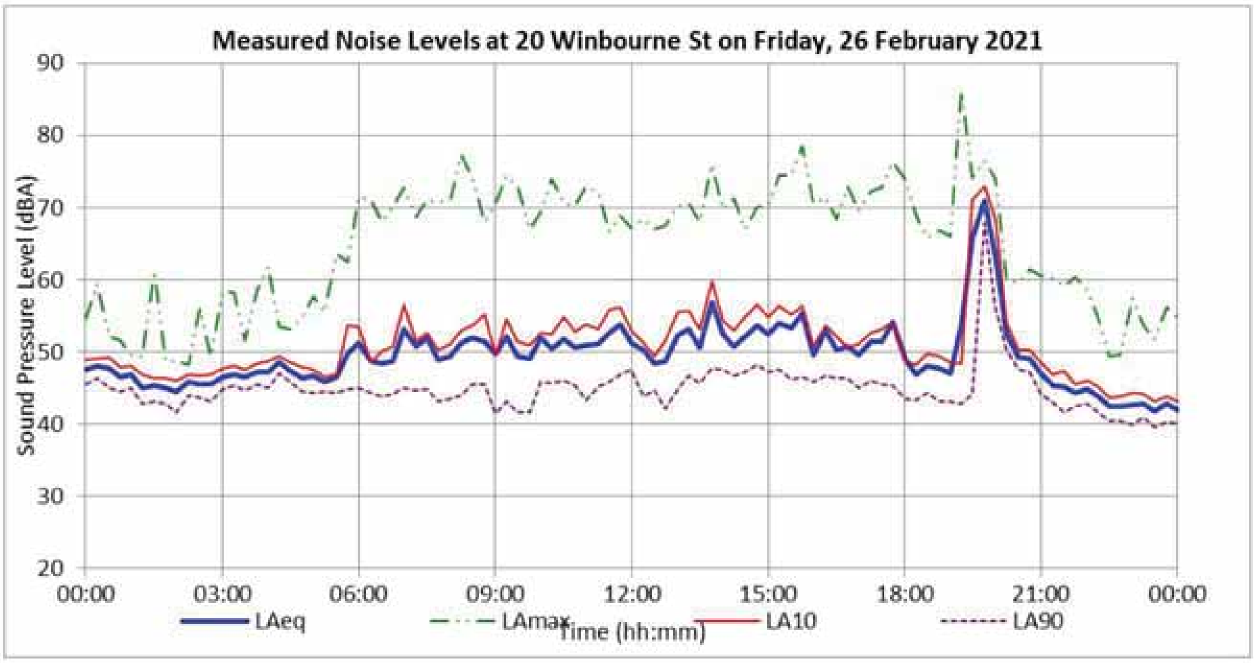
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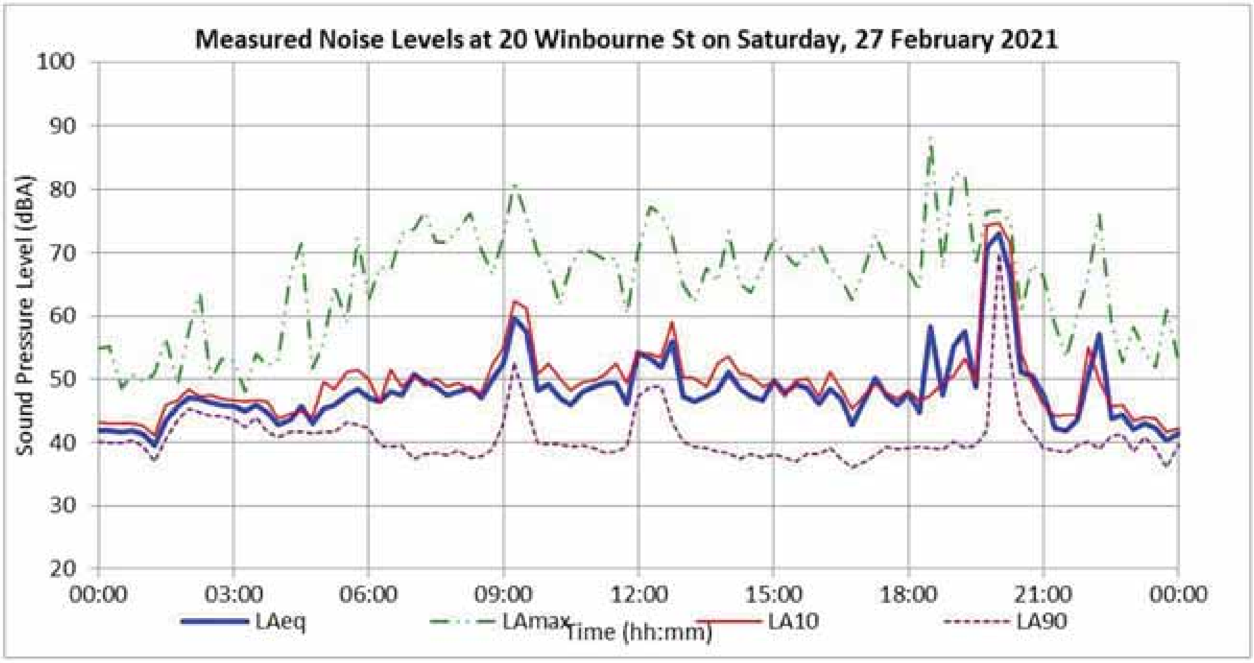
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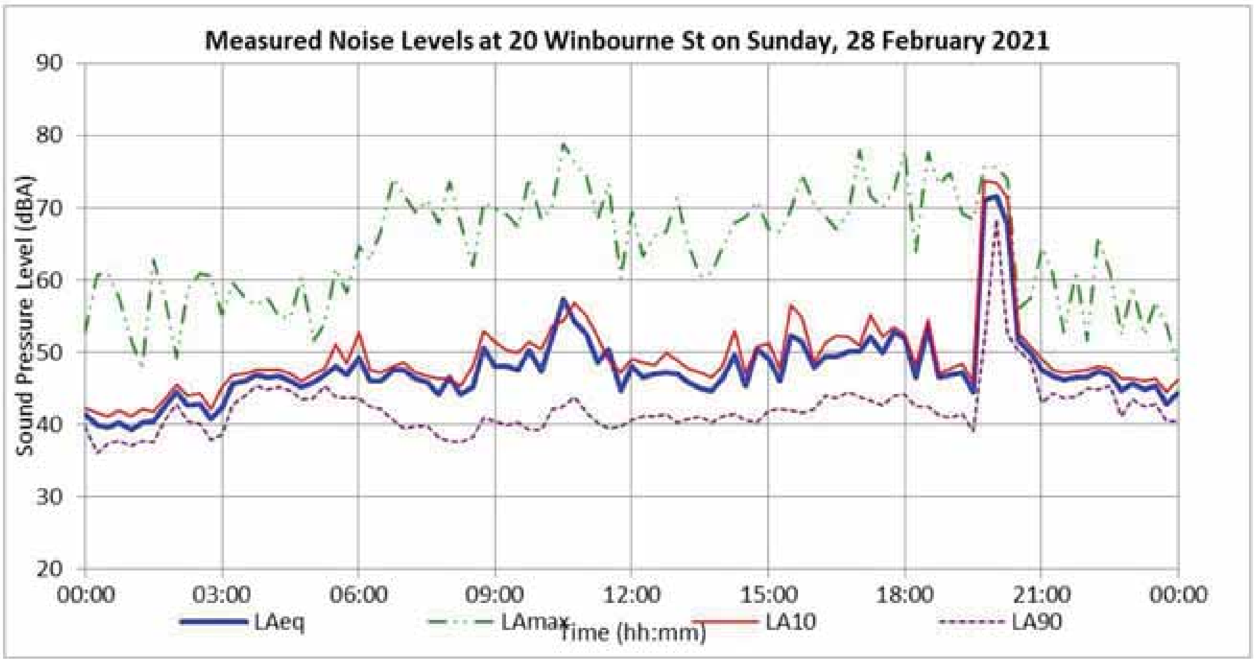
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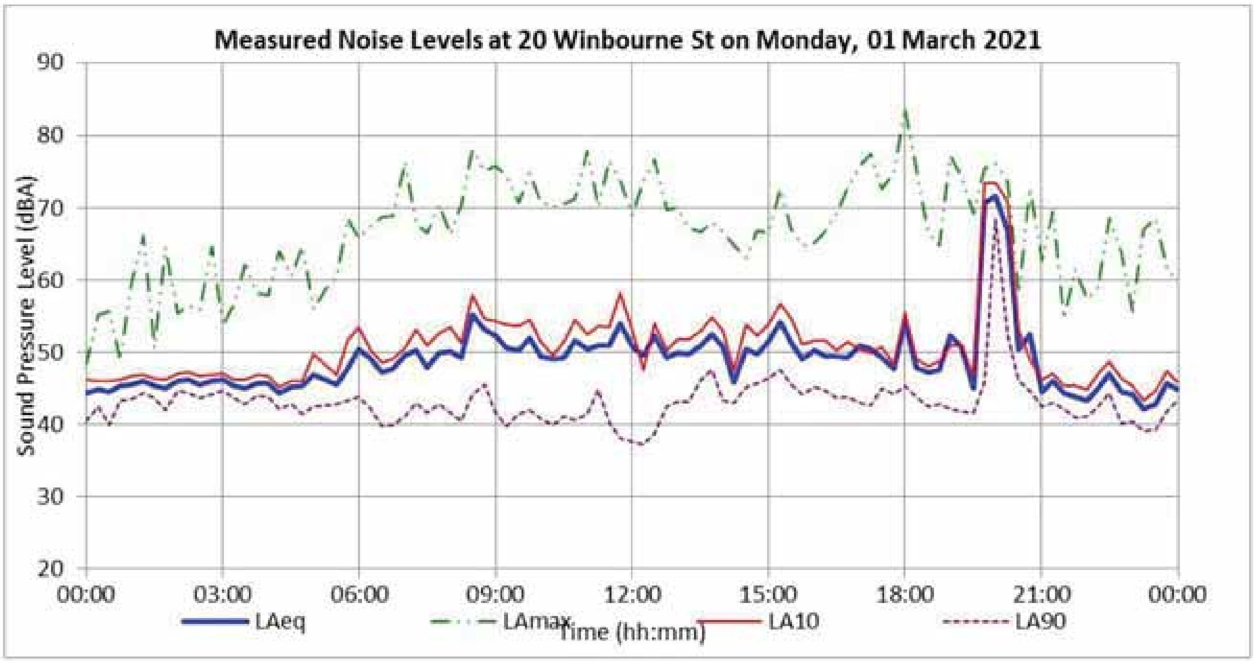
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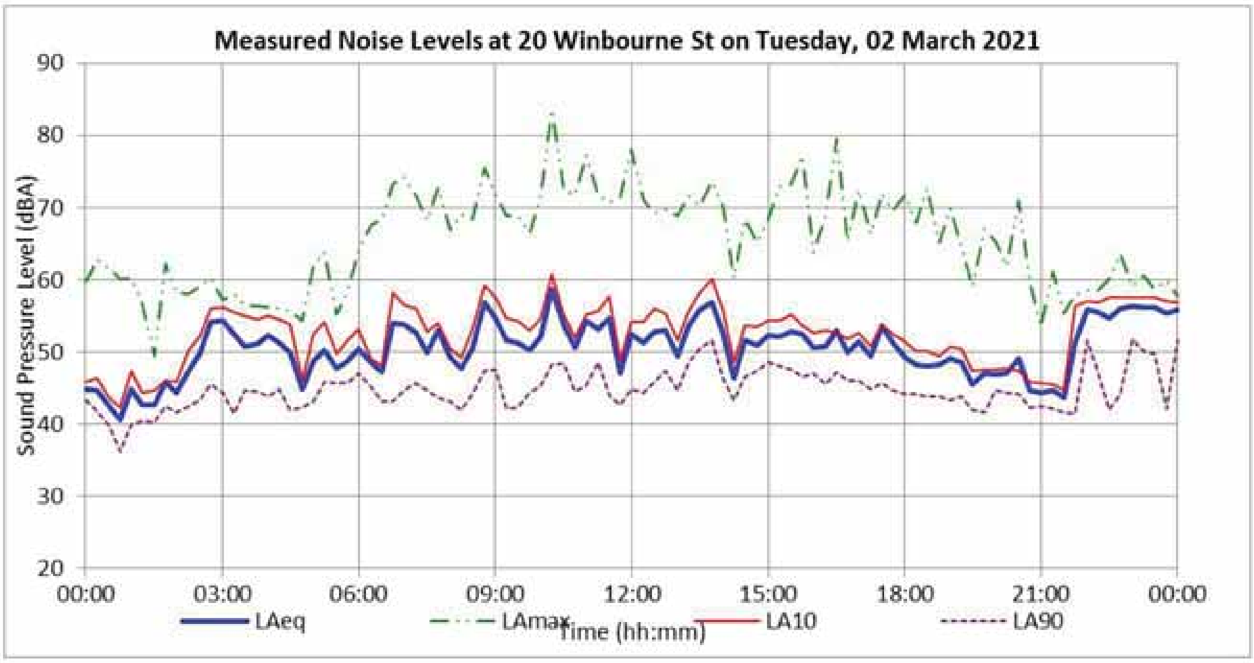
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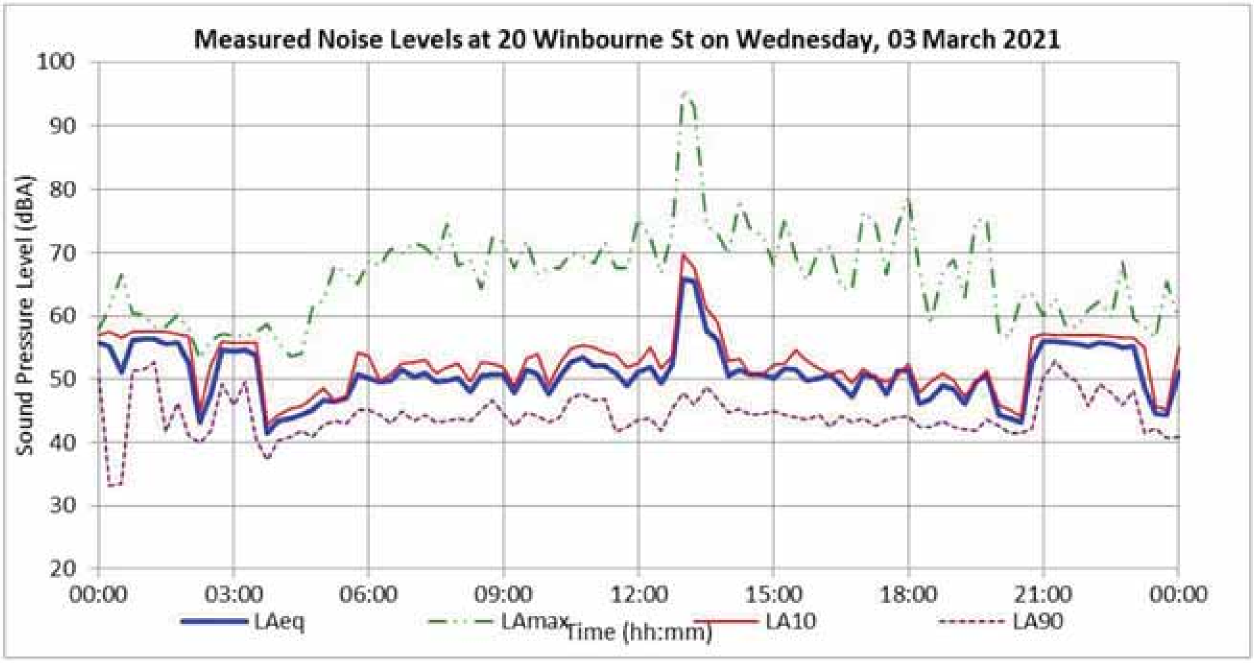
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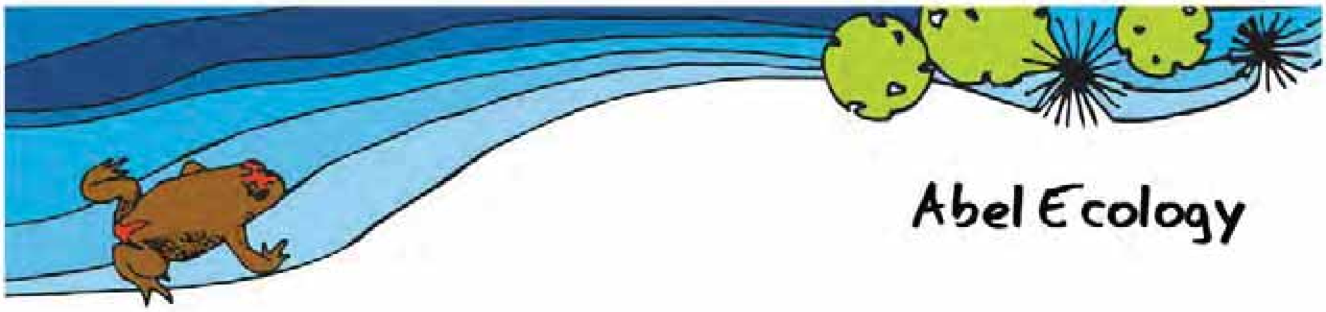

Bushfire Opportunities and Constraints Assessment Report

for

Marsden High School
22 Winbourne Street
West Ryde NSW 2114

Proposed repurpose of site to a community sports facility

Prepared for:	Schools Infrastructure NSW
Report No:	AE21-2227-BAL-OPPCon-REP-ISS-3
Prepared by:	Abel Ecology
Date:	13 May 2021

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2 Samuel 20:18 ACN 626 221 467 – ABN 37 626 221 467

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Document History

Report	Version	Prepared by	Proofread by	Technical Review by	Submission	
					Method	Date
Report	Issue 1	Mark Mackinnon	Danny Wotherspoon	DW	Dropbox	3 February 2021
Report	Issue 2	Mark Mackinnon	Denise McNamara	DW	Dropbox	1 March 2021
Report	Issue 3	Mark Mackinnon Mark Mackinnon BPAD Bushfire Planning & Design Accredited Practitioner Level 3	Jane Bonwick		Dropbox	12 May 2021

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List of Abbreviations

AHIMS	Aboriginal Heritage Information Management System
APZ	Asset Protection Zone
BAL	Bushfire Attack Level
NCC	*National Construction Code*
BC Act 2016	*Biodiversity Conservation Act 2016*
BFMC	Bushfire Management Committee
DCP	Development Control Plan
DP	Deposited Plan
DPIE	Department of Planning, Industry and Environment
DTS	Deemed-To-Satisfy
EP&A Act 1979	*Environmental Planning and Assessment Act 1979*
EP&A Regulation 2000	*Environmental Planning and Assessment Regulation 2000*
EPBC Act 1999	*Environmental Protection and Biodiversity Conservation Act 1999*
IPA	Inner Protection Area
kW/m^2	kilowatts per square metre (being a measure of radiant heat)
LEP	Local Environment Plan
LGA	Local Government Area
LLS Act 2013	*Local Land Services Act 2013*
NP&W Act 1974	*National Parks and Wildlife Act 1974*
OEH	Office of Environment and Heritage (old State department name)
OPA	Outer Protection Area
PDA	Principal Development Area
PBP 2019	*Planning for Bushfire Protection 2019*
RFS	Rural Fire Service
RF Act 1997	*Rural Fires Act 1997*
RF Regulation 2013	*Rural Fires Regulation 2013*
RHF	Radiant Heat Flux
SEPP	State Environmental Planning Policy
SFPP	Special Fire Protection Purpose

Note regarding maps in this report

The diagrams/site maps used in this report have been supplied by and are used with the permission of Gina Gou (Project Officer), Schools Infrastructure NSW.

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Executive summary

This Bushfire Opportunities and Constraints Assessment Report has been prepared by an Accredited BPAD Practitioner using the Simplified Procedure (Method 1) as detailed in Appendix 1 of *Planning for Bushfire Protection 2019*.

This proposal has been prepared in accordance with *Planning for Bushfire Protection 2019* in its entirety and the development complies with most relevant Acceptable Solutions in *PBP 2019*. In accordance with s.4.14(1A) of the *EP&A Act 1979* ... *"the consent authority may, ... grant consent to the carrying out of the development but only if it has consulted with the Commissioner of the NSW Rural Fire Service concerning measures to be taken with respect to the development to protect persons, property and the environment from danger that may arise from a bush fire."* As a result, this planning proposal must be referred to the Rural Fire Service in accordance with Section 4.14(1A) of the *EP&A Act 1979*.

Abel Ecology makes no warranties as to the accuracy of the information provided in the report. All enquiries related to the information and conclusions presented in this report must be made to the Practitioner.

A bushfire assessment of the proposed redevelopment site at 22 Winbourne Street, West Ryde NSW (the 'site') was undertaken on 20 January 2021. The 5.56 ha (approx.) allotment has existing infrastructure currently being used by Marsden High School. The proposal is for Marsden High School to relocate to the Meadowbank Education (and Employment) Precinct. At which point the site will be free for repurpose as a community sports (netball) facility. Current infrastructure (buildings and services) is proposed to be demolished and in their place, will be an indoor four-court sports centre, 32 outdoor netball courts, associated car parks and landscaping. The redevelopment has two design layouts for consideration that will occupy an area of up to 2.93 ha (Option 1: 29,345 m^2 approx.) and 3.09 ha (Option 2: 30,939 m^2 approx.) respectively.

The aim of the assessment was to ascertain the potential fire hazard and establish the site capability for an Asset Protection Zone (APZ) while complying with relevant legislation. The report will be used to ensure the planning proposal satisfies the performance requirements of the *National Construction Code* (NCC), *Planning for Bushfire Protection 2019*.

The access road to the proposed development footprint is from Winbourne Street and/or from Brush Road. Winbourne Street is a council bitumen road, 590 metres long, of suitable grades, 7 - 12 metres wide and is regularly maintained. Winbourne Street serves as the main entry to the site. Brush Road on the east side of the site, is a council bitumen road, 835 metres long, of suitable grades, 7 - 9 metres wide and is regularly maintained.

City of Ryde Council has not listed any significant environmental features relevant to the proposed development site. The site has significant vegetation as mapped on the Biodiversity Values Map. In composition the vegetation in the northeast corner of the site is closest to Sydney Blue Gum - Blackbutt - Smooth-barked Apple (PCT id: 1237) moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion.

In part, Blue Gum High Forest in the Sydney Basin Bioregion is scheduled as a Critically Endangered Ecological Community under the NSW *Biodiversity Conservation Act 2016* and potentially could be classified under the same category for the Commonwealth under the *Environment Protection and Biodiversity Conservation Act 1999*. The Principal Development Area has no threatened, protected or endangered floral or faunal species, populations, or habitat as prescribed by Department of Planning, Industry and Environment (DPIE). No part of the Principal Development Area has been identified as critical habitat for threatened species.

With regard to any clearing of native vegetation on the property, it is the responsibility of the landowner to check whether all required permissions from local and statutory authorities are in place. This may include Part 5 of the *EP&A Act 1979* and the *Biodiversity Conservation Act 2016*.

The vegetation hazard which will most significantly influence fire behaviour is the 'Remnant' (Low Hazard) Forest in the Northeast corner of the site. There is no hazardous vegetation identified offsite.

The following conclusions and recommendations apply:

The site is not mapped as bush fire prone land. In our opinion, the site is not sterilised by the bushfire threat. This report concludes that the planning proposal can comply with PBP 2019. The State will therefore be able to construct the proposed development with the following measures included:

a) This proposal has been prepared in accordance with *PBP 2019* in its entirety and the development complies with most relevant Acceptable Solutions in *PBP 2019*. In accordance with s.4.14(1A) of the *EP&A Act 1979 ... "the consent authority may, ..., grant consent to the carrying out of the development but only if it has consulted with the Commissioner of the NSW Rural Fire Service concerning measures to be taken with respect to the development to protect persons, property and the environment from danger that may arise from a bush fire."* As a result, this planning proposal must be referred to the Rural Fire Service in accordance with Section 4.14(1A) of the *EP&A Act 1979*.

b) The site is not mapped as bush fire prone land.

c) Building construction for all aspects of the proposed Indoor Sports Centre are to be built in accordance with the NCC, and must comply with section 3 and 5 (BAL – 12.5) of *Australian Standard 3959* (2018) *Construction of buildings in bushfire-prone areas* and *Table 6.8a* of *PBP 2019* and as modified by Section 7.5, 7.5.1, 7.5.2, 7.5.3, and 7.5.4 (where applicable) of *PBP 2019*. Refer to AS 3959 (2018) for a detailed description.

   - Proposed Class 10 buildings are to comply with Section 7 of this report and:
     - Class 10a: Sheds – s.8.3.2 of *PBP 2019*.
     - Class 10b: fences and gates – Section 7.6 of *PBP 2019*.

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   - https://infostore.saiglobal.com/en-au/standards/as-3959-2018-122340_saig_as_as_2685241/

d) We recommend a site Vegetation Management Plan (VMP) be produced for the on-going management and maintenance of the site asset protection zone. The APZ will be maintained to Inner Protection Area condition as per Sec. 6.1 and 6.7 of this report, Appendix 4 of *PBP 2019* and the RFS *Standards for Asset Protection Zones* (Appendix 3 and see www.rfs.nsw.gov.au). The VMP will observe mapped / shaded vegetation on the Biodiversity Values Land Map, and retention of hollow-bearing trees (Abel Ecology Due Diligence Report AE21-2216-REP-ISS 1, Dated 22 Jan 2021). Total clearance of all vegetation is not acceptable. Vegetation management undertaken to establish the required Asset Protection Zone shall be minimised while still complying with PBP guidelines.

e) In accordance with a site Vegetation Management Plan, an asset protection zone is to be maintained permanently on the north / northwest aspect:
   - To IPA condition (15% tree canopy cover) for a horizontal distance of 21 - 82 metres from the external wall of the Indoor Sports Centre to the north site boundary.
   - Trees will need to be removed to achieve this requirement.

f) In accordance with a site Vegetation Management Plan, an asset protection zone is to be maintained permanently on the east / northeast aspect:
   - To IPA condition (15% tree canopy cover) for a horizontal distance of 38 metres from the external wall of the Indoor Sports Centre to the boundary of shaded vegetation on the Biodiversity Values Land Map.
   - Trees will need to be removed to achieve this requirement. The Abel Ecology Due Diligence Assessment (AE21 2216 REP ISS 1 22Jan21) has identified trees 41 – 46 (numbering - Bradshaw Consulting Arborists 2020) to be nominated for removal. Vehicles, plant, storage items, dumpings/stockpiles and walkways are not permitted anywhere within the shaded areas on the Biodiversity Values Land Map. Trees are not to be felled into the shaded areas on the Biodiversity Values Land Map.

g) In accordance with a site Vegetation Management Plan, an asset protection zone is to be maintained permanently on the west / southwest aspect:
   - To IPA condition (15% tree canopy cover) for a horizontal distance of 28 metres from the external wall of the Indoor Sports Centre to the west boundary.
   - Trees will need to be removed to achieve this requirement.

h) In accordance with a site Vegetation Management Plan, an asset protection zone is to be maintained permanently on the south / southeast aspect:
   - To IPA condition (15% tree canopy cover) for a horizontal distance of 100 metres from the external wall of the Indoor Sports Centre to the south boundary.
   - Trees will need to be removed to achieve this requirement.

i) Winbourne Street offers adequate access and egress to firefighters, emergency workers, and those involved in evacuation and complies with the performance criteria in Table 6.8b of *PBP 2019*. Brush Road does not comply with the performance criteria in Table 6.8b of *PBP 2019* in the following ways:
   - It is a two-way road with a carriageway less than an 8 metre width kerb to kerb;
   - Parking is provided inside the carriageway width, further reducing the carriageway width.

j) All weather access to the site will be provided in recognition of the risk to fire fighters and / or evacuating occupants. There will be access to the rear of the Indoor Sports Centre for operational activities via the proposed 93 - 99 metre long site driveway / car park. Fire vehicles must be able to drive to the rear of the Indoor Sports Centre. The access driveway / car park must comply with section 6.4 of this report and acceptable solutions from Table 6.8b of *PBP 2019* for non-perimeter roads, property access and RFS vehicle access and turning requirements.

k) Utility services along Winbourne Street are adequate to meet the needs of firefighters and others assisting in bush fire fighting. Gas and electricity services are to be located so as to not contribute to the risk of fire to the buildings. Gas and electricity services are to be installed as per Sec. 6.3 of this report.

l) Fire hazard management for the subject site needs to take into account hollow-bearing trees, and native vegetation that is:

- Scheduled as Critically Endangered under the NSW *Biodiversity Conservation Act 2016* and for the Commonwealth under the *Environment Protection and Biodiversity Conservation Act 1999* and or,
- Is shaded in the Biodiversity Values Land Map. Refer to the Abel Ecology Due Diligence Report (AE21-2216-REP-ISS 1, Dated 22 Jan 2021).

m) Water supply is to be provided in accordance with Sec. *6.2 of this report and Table 6.8c of PBP 2019.*

n) A site Bushfire Emergency Management and Evacuation Plan is to be prepared consistent with Sec. 6.6 of this report.

Introduction

Abel Ecology was engaged by the Schools Infrastructure NSW, to prepare a bushfire opportunities and constraints assessment for the proposed redevelopment of the Marsden High School site. The report will be used to supplement a business case for submission to Treasury NSW. The report will be used to ensure the planning proposal satisfies the performance requirements of the *National Construction Code* (NCC), and *Planning for Bushfire Protection 2019*.

We have considered the details sent to us and completed a detailed inspection of the site on 20 January 2021. This report serves to:

a) Identify the site and proposed development,
b) Determine the bushfire threat, and
c) Identify work to be completed in order to improve the chances of building survival in the event of a bushfire. These works will satisfy the Performance Requirements of the *National Construction Code* (NCC) and achieve compliance with *Planning for Bushfire Protection 2019 (PBP 2019)*.

The *Bushfire Opportunities and Constraints Assessment* Report concludes, the site is not sterilised by the bushfire threat and the State will be able to construct the proposed development provided appropriate precautions are taken. This report concludes that the planning proposal can comply with *PBP 2019*.

1.1 Planning relationships

1.1.1 Legislation

a) Section 4.14 *Environmental Planning and Assessment Act 1979 (Previously s.79BA EP & A Act 1979)*
b) Clause 272 *EP & A Regulation 2000*
c) Section 10.3 *EP & A Act 1979 (Previously s.146 EP & A Act 1979)*
d) Section 4.15(1) *EP & A Act 1979 (Previously s.79C(1)(c) EP & A Act 1979)*
e) Section 4.46 *EP & A Act 1979 (Previously s.91 EP & A Act 1979)*
f) *Rural Fires Act 1997* (amended) s.63(1), 63(2)

1.1.2 Planning policies

a) *Planning for Bushfire Protection 2019*
b) City of Ryde Council DCP 2014
c) City of Ryde Council LEP 2014
d) Adjacent land is controlled by the Hunters Hill, Lane Cove, Ryde, Willoughby Bushfire Risk Management Plan 2010.

This report is prepared using PBP 2019. Section 4.14(1A) of the *EP&A Act 1979* provides that the consent authority may issue consent for the development, after it has consulted with the Commissioner of the NSW Rural Fire Service (NSW RFS) (8.3.11 of *PBP 2019*).

2 The site and proposed development

2.1 Existing site description

On Site

The site is identified as 22 Winbourne Street, West Ryde NSW (Figure 1 and Figure 2).

The site is approximately 5.56 ha in area and is zoned:

- Educational Establishment (SP2).

The site is not mapped as Bush Fire Prone Land (Figure 3).

The site is roughly regularly shaped with a frontage of 190 metres to Winbourne Street and depths of 256 metres and 253 metres on the north and south boundaries respectively (Figure 1). The east boundary is 240 metres long and has frontage to Brush Road along its entire length.

It is likely the site has been historically cleared of intact native vegetation for more than a century (see 1943 aerial image – Figure 4). In 1943 the landuse appears to have been agricultural (e.g. pig farm, grazing and cropping). A small number of remnant trees are present in the northeast corner and along the north boundary (Figure 4). In 1959 Marsden High School was established on the site and this landuse has continued until this day. The highest elevation point is in the northwest corner of the site and the land slopes evenly towards a drainage line running parallel the east site boundary.

The site is accessed from Winbourne Street and/or from Brush Road. Winbourne Street is a council bitumen road, 590 metres long, of suitable grades, 7 - 12 metres wide and is regularly maintained. Winbourne Street serves as the main entry to the site. Brush Road on the east side of the site, is a council bitumen road, 835 metres long, of suitable grades, 7 - 9 metres wide and is regularly maintained.

Figure 1. Aerial photo of the site.

Site locality 22 Winbourne Street, West Ryde NSW

Scale: Picture width = 470 metres

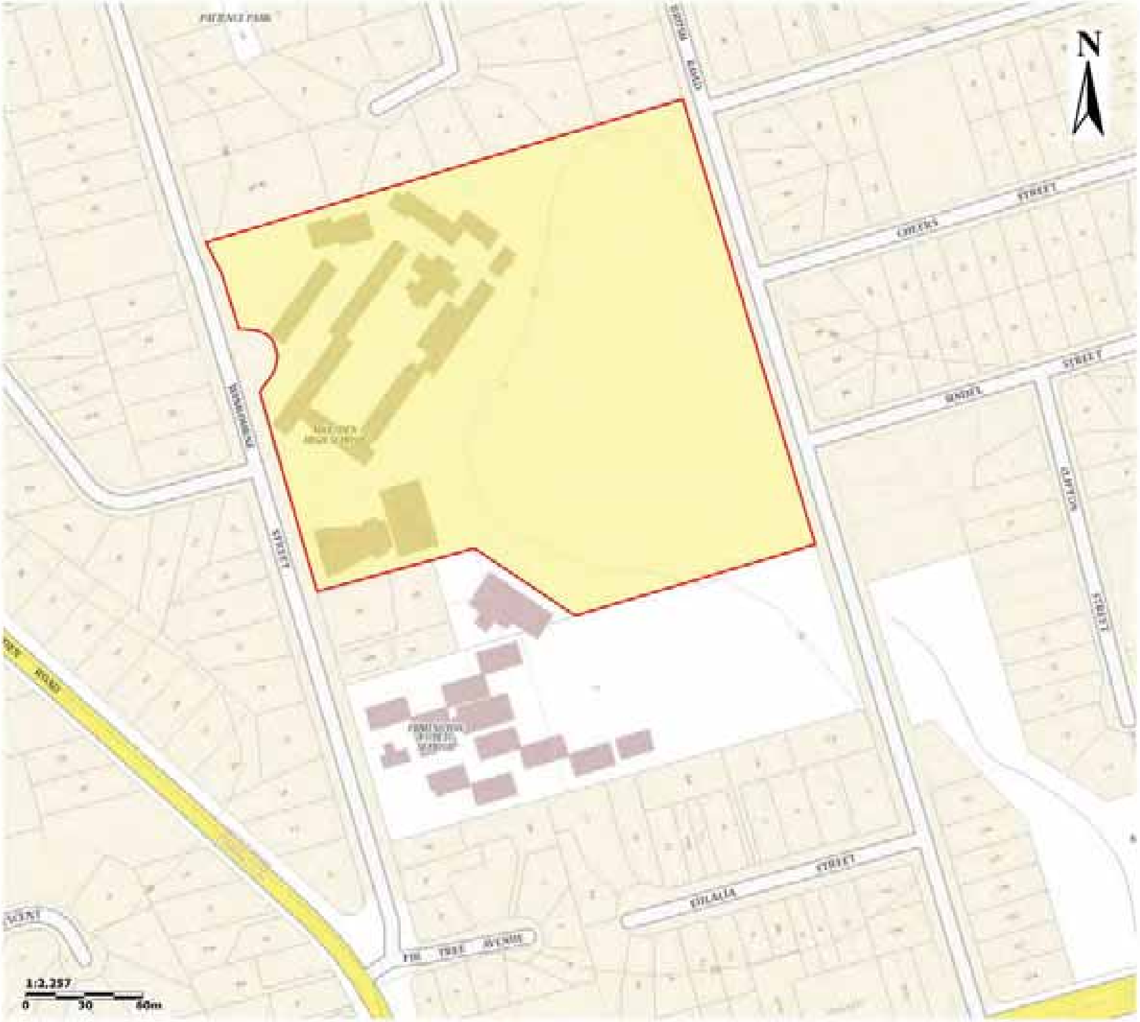

Figure 2. Topographic map of the site.

Site locality – 22 Winbourne Street, West Ryde NSW

Scale: Picture width = 575 metres

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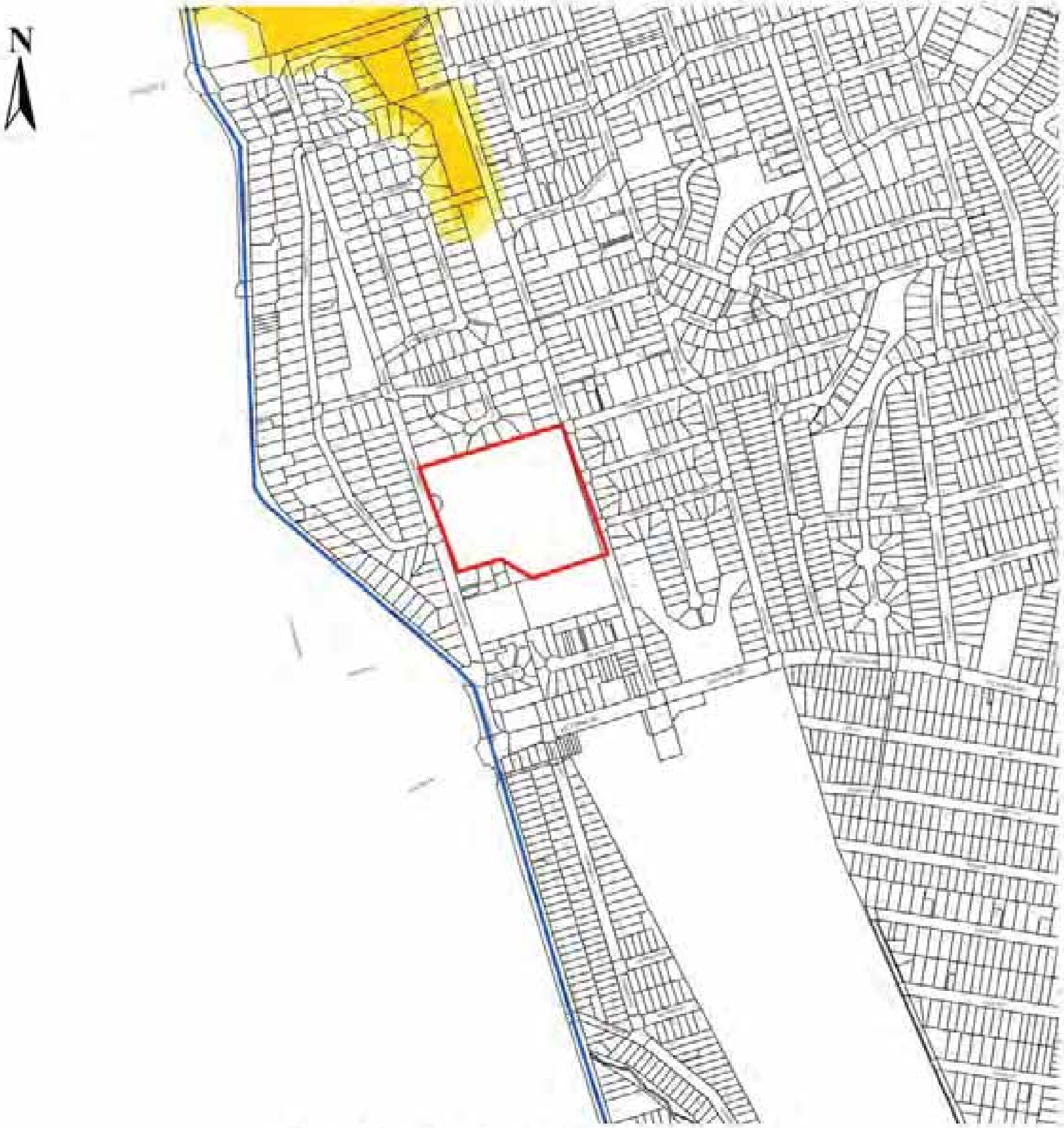

Figure 3. Bush Fire Prone Land map.

Scale: Picture length = 1.9 km

- Subject land
- Bush Fire Prone Land – Vegetation Category 1
- Bush Fire Prone Land – Vegetation Buffer 30 m and 100 m

Extract from the Bush Fire Prone Land Map for the City of Ryde Local Government Area, dated January 2021.

Figure 4. An aerial photograph and boundary of the subject site in 1943.

Figure 5. Site photos of Dry Sclerophyll Forest in the northeast corner of the site.

2.2 Existing vegetation description

On Site

The vegetation description is according to Figures A1.2 in *PBP 2019* based on Keith (2004). The vegetation and fuel load within the site boundary on the northeast corner of the Principal Development Area is consistent with Dry Sclerophyll Forest (22/36.1 t/Ha) (Figure 5). However, the provisions of A1.11.1 of *PBP 2019* could be applied due the small patch size of the unmanaged vegetation (0.5 ha). Remnant vegetation with a patch size of less than 1 ha are considered low hazard and APZ setbacks and building construction standards for this patch size may be the same as for Rainforests (10/13.2 t/Ha). To be clear, the current extent of unmanaged vegetation in the northeast corner of the site is 0.5 ha. The Biodiversity Values shaded area (Figure 9), which is proposed to be fully retained and regenerated to forest is 0.75 ha is size. The current extent of canopy cover in the northeast corner of the site is 0.99 ha (Figure 10 and Figure 11). All three areas uniformly overlap each other; we are describing the same area with three possible boundaries based on existing and proposed management actions (Figure 10 and Figure 11). A significant amount of mown lawn exists under tree canopy cover in the northeast corner of the site (Figure 6), which changes where the edge of managed vegetation is measured towards the proposal.

Adjacent Properties

The vegetation and fuel load on adjacent properties on all aspects of the Principal Development Area is consistent with suburban residential properties with managed gardens (<4 t/Ha) (Figure 1 and Figure 10).

Figure 6. A significant amount of mown lawn exists under tree canopy cover in the northeast corner of the site.

2.3 The proposal

The proposal is for Marsden High School to relocate to the Meadowbank Education (and Employment) Precinct. At which point the site will then be free for repurpose as a community sports (netball) facility. Current infrastructure (buildings and services) is proposed to be demolished and in their place will be, an indoor four-court sports centre, 32 outdoor netball courts, associated car parks and landscaping.

The redevelopment has two design layouts (Figure 7 and Figure 8) for consideration that will occupy an area of up to 2.93 ha (Option 1: 29,345 m² approx.) and 3.09 ha (Option 2: 30,939 m² approx.) respectively. The option of removing all site remnant vegetation is no longer being explored to expand the development proposal.

The indoor sports centre in accordance with the provisions of 8.3.11 of *Planning for Bushfire Protection 2019* (*PBP 2019*), is to be treated as a Special Fire Protection Purpose, public assembly building due to its proposed footprint being in excess of 500 m². The proposed footprint of the indoor sports centre in both design layouts is between 3,424 m² and 4,172 m². The proposal will thus include the construction of a public assembly building (Class 9b) with the appropriate level of bushfire protection measures in order to meet the required performance criteria of *PBP 2019*. This includes the clearance / maintenance of an Asset Protection Zone (APZ) within the Principal Development Area (PDA) of the site. The PDA is all site area but the northeast corner of the site (i.e. Biodiversity Values shaded area) (Figure 7, Figure 8 Figure 9, Figure 10 and Figure 11).

To meet the bushfire protection measures stated in *PBP 2019* for the indoor sports centre the proposed APZ distances are:

Proposed Option 1

- The full length from the external wall of the Indoor Sports Centre to the north site boundary (21 - 82 metres),
- 38 metres on the east aspect,
- 100 metres on the south and
- 28 metres on the west aspect.

Proposed Option 2

- 34 metres on the northwest aspect,
- 38 metres on the northeast aspect,
- 28 metres on the southwest aspect and
- 100 metres on the southeast aspect.

Within the APZ, tree canopy will be reduced / maintained to 15 per cent cover and will continue to be mown consistent with inner protection area (IPA) condition. Trees will need to be removed to achieve this requirement.

2.4 Significant environmental features

City of Ryde Council has not listed any significant environmental features relevant to the proposed development site. The site has significant vegetation as mapped on the Biodiversity Values Map (Figure 9). Almost all of the regenerating native vegetation in the northeast corner of the site is shaded on the Biodiversity Values Land Map (Figure 9). If any of the shaded vegetation on the Biodiversity Values Land Map is removed or altered as part of this proposal, a Biodiversity Development Assessment Report will be required for entry into the Biodiversity Offsets Scheme identified in s. 7.4 of the *Biodiversity Conservation Act 2016*.

Abel Ecology assumes the proposal is not State Significant Development, requiring approval under Part 5 of the *EP & A Act 1979*.

The following State Environmental Planning Policies apply to the site:

- SEPP (Vegetation in Non-Rural Areas) 2017
- SEPP No 19—Bushland in Urban Areas 1986

Figure 7. Site proposal diagram (Option 1– Client preferred option).

D21/78776

Figure 8. Site proposal diagram (Option 2).

2.5 Threatened flora and fauna

The Principal Development Area has no threatened, protected or endangered floral or faunal species, populations, or habitat as prescribed by Department of Planning, Industry and Environment (DPIE). No part of the Principal Development Area has been identified as critical habitat for threatened species. No 'Areas of Outstanding Biodiversity Value' were discovered upon site inspection.

The site has significant vegetation. Almost all of the regenerating native vegetation in the northeast corner of the site is shaded on the Biodiversity Values Land Map (Figure 9). In composition it is closest to Sydney Blue Gum - Blackbutt - Smooth-barked Apple (PCT id: 1237) moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion. In part, Blue Gum High Forest in the Sydney Basin Bioregion is scheduled as a Critically Endangered Ecological Community under the NSW *Biodiversity Conservation Act 2016* and potentially could be classified under the same for the Commonwealth under the *Environment Protection and Biodiversity Conservation Act 1999*.

2.6 Archaeological and Heritage Significant sites

Abel Ecology is not aware of Heritage Significant sites on the land. The site does not form part of the Heritage map overlay of the City of Ryde Council LEP 2014.

Abel Ecology is not aware of Aboriginal relics on the land. Databases have not been searched.

Figure 9. NSW Biodiversity Values Mapping of the site. Clearing or disturbing any of the purple shaded vegetation will result in entry into the Biodiversity Offsets Scheme identified in s. 7.4 of the *Biodiversity Conservation Act 2016*.

3 Survey methods

Survey methods were applied in accordance with assessment method set in Appendix 1 of *Planning for Bushfire Protection* 2019, Table A1.12.1 (*PBP 2019*), for Special Fire Protection Purpose. The report has also been prepared in accordance with Appendix 2, 3, and 4 of *PBP 2019*.

The provisions of A1.11.1 of *PBP 2019* have been applied due the small patch size (0.75 ha) of the onsite vegetation constituting a bushfire hazard (i.e. mapped Biodiversity Values area Figure 9, Figure 10, and Figure 11). Remnant vegetation with a patch size of less than 1 ha are considered low hazard and APZ setbacks and building construction standards for this patch size may be the same as for Rainforests (10/13.2 t/Ha).

A trained consultant used a slope meter on-site to gain the effective slope angle used in the site analysis.

See Appendix 1 for definitions of fire management terminology.

4 Assessment of bushfire hazard

Figure 10. Bushfire assessment of proposed Option 1.

Figure 11. Bushfire assessment of proposed Option 2.

Hazard rating is assessed as follows:

Table 1: Summary Table - DTS Method 1: Appendix 1 of *Planning for Bushfire Protection 2019* and Table A1.12.1 of PBP 2019. FFDI 100

Proposed Indoor Sports Centre Option 1	**Effective Slope**	**Vegetation**	**Separation distance from un-managed vegetation**	**Bushfire Attack Level**
Northeast Aspect	Up-slope / Level	Remnant (Rainforest)	31 metres (Note: 38 metres needed to reach compliance)	BAL-12.5
Southwest Aspect	Up-slope	Managed Land	>140 metres	BAL-Low
Southeast Aspect	Level	Managed Land	>140 metres	BAL-Low
Northwest Aspect	Up-slope	Managed Land	>140 metres	BAL-Low
Proposed Indoor Sports Centre Option 2				
North Aspect	Up-slope	Managed Land	>140 metres	BAL-Low
West Aspect	Up-slope	Managed Land	>140 metres	BAL-Low
East Aspect	Up-slope / Level	Remnant (Rainforest)	35 metres (Note: 38 metres needed to reach compliance)	BAL-12.5
South Aspect	Up-slope	Managed Land	>140 metres	BAL-Low

5 Issues arising from the assessment

5.1 Assessment outcome

Dominant hazard

The dominant bushfire hazard to the proposal / PDA is from unmanaged Dry Sclerophyll Forest (Remnant) on the Northeast aspect of both Proposal Options (1 & 2) of the Indoor Sports Centre.

Building construction constraints

Our assessment indicates the required building construction for the proposed Indoor Sports Centre (Proposal Options 1 & 2) is BAL-12.5 on all aspects. Building construction for all aspects of the proposed Indoor Sports Centre are to be built in accordance with the NCC, and must comply with section 3 and 5 (BAL–12.5) of *Australian Standard 3959* (2018) *Construction of buildings in bushfire-prone areas* and Table 6.8a of *PBP 2019* and as modified by Section 7.5, 7.5.1, 7.5.2, 7.5.3, and 7.5.4 (where applicable) of *PBP 2019*. Refer to AS 3959 (2018) for a detailed description.

The development is not in bush fire attack level-40 (BAL-40) or the flame zone (BAL-FZ).

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https://infostore.saiglobal.com/en-au/standards/as-3959-2018-122340_saig_as_as_2685241/

Proposed Class 10 buildings are to comply with:

- There is no bushfire protection requirement for Class 10a and 10b structures located more than 6 metres from Special Fire Protection Purpose buildings in bushfire prone areas.
- A Class 10a and 10b structure are not permitted to be located within 6 metres of a Special Fire Protection Purpose refuge building. Class 10a buildings are non-habitable buildings being a private garage, carport, shed or the like.
- For Class 10b buildings, fences and gates. All fences and gates in bushfire prone areas should be made of either hardwood or non-combustible material. In circumstances where the fence or gate is located within 6 metres of a Special Fire Protection Purpose building they should be made of non-combustible material only (Table 6.8a and s. 7.6 of *PBP 2019*).

Asset Protection Zone

There is adequate space on the allotment to clear existing vegetation and permit a deemed-to-satisfy separation distance for exposure of less than 10 kW/m² of radiant heat and BAL-12.5 construction of the Special Fire Protection Purpose building. The APZ is not located on lands with a slope exceeding 18°, and is wholly within the boundaries of the development site. The APZ will be maintained to Inner Protection Area condition. All APZs are achievable for either proposal 1 or 2.

An APZ will need to be maintained as Inner Protection Area condition for a minimum distance of 38 metres on the Northeast aspect for Proposal Option 1, or North aspect for Proposal Option 2 and 100 metres on all other aspects of each proposal or until the site boundary is reached. The Abel Ecology Due Diligence Assessment (AE21 2216 REP ISS 1 22Jan21) has identified trees 41 – 46 (numbering - Bradshaw Consulting Arborists 2020) to be nominated for removal (refer to Figure 6 of the Due Diligence Assessment, and Figure 10 and Figure 11 of this report).

The APZ distances reflect a balance between the requirements of Table A1.12.1 (*PBP 2019*) and the requirements of the *Biodiversity Conservation Act 2016* and City of Ryde Council LEP 2014. In saying that, the APZ could be larger in order to achieve a lower BAL assessment; however in doing so, the ecological impact and requirements of the Biodiversity Offsets Scheme would need to be carefully considered.

The APZ will be maintained to Inner Protection Area condition as per Appendix 4 of *PBP 2019* and the RFS document *Standards for Asset Protection Zones*. Individual tree canopies must have at least two metre gaps between them, but close standing trees are allowed to form clumps as long as the tree canopy cover threshold is not exceeded for IPA condition. Regeneration of the site vegetation and landscaping cannot conflict with the RFS document 'Standards for Asset Protection Zones' for the area that is designated as an APZ.

5.2 Conformance with the objectives in *PBP 2019*

This is Special Fire Protection Purpose (SFPP) development as the proposal is to build a new public assembly building (indoor sports centre), which does not fall under the requirements for sub-division and Infill.

The proposed position of the indoor sports centre for both proposal options (1 & 2), does not currently afford occupants and defenders protection from life threatening levels of radiant heat (>10 kW/m^2) from a bushfire (Objective i). Compliance with the <10 kW/m^2 of radiant heat threshold relies on the removal of trees 41 – 46 (numbering - Bradshaw Consulting Arborists 2020). The siting of the building for both proposal options has breached the 10 kW/m^2 Threshold Line illustrated in Figure 10, Figure 11 and Table 1. The proposed siting of the indoor sports centre (Proposal Options 1 & 2) is only suitable if trees located 'outside' the area shaded on the Biodiversity Values Land Map, but inside the 38 metres APZ on the northeast aspect are removed. Otherwise, the proposed siting of the indoor sports centre must be shifted to establish the 38 metres APZ in order to not breach the 10 kW/m^2 Threshold Line illustrated in Figure 10 and Figure 11. No part of an external wall of a SFPP development can be exposed to >10 kW/m^2 of radiant heat. The separation distance required for the indoor sports centre is a minimum of 38 metres from un-managed vegetation.

The siting of the building for both proposal options does eliminate direct flame contact from flames originating within the unmanaged vegetation in the northeast corner of the site (Refer to Figure 10). This relates directly with the performance criteria for SFPP in relation to 'siting and design' and Objective iii. of *PBP 2019*. The indoor sports centre will be constructed to BAL-12.5 and the design will offer adequate defence against the estimated radiant heat level and from ember attack. A BAL-12.5 outcome is consistent with Objective iii. of *PBP 2019*.

Adequate space exists within the surrounding allotments to provide fire hazard protection. The current proposed footprints (Proposal Option 1 & 2) of the indoor sports centre will be exposed to radiant heat levels exceeding 10 kW/m^2, therefore utilisation of the surrounding managed grounds is recommended. The existing managed grounds of the site and residential development on all aspects of the PDA (except the northeast site corner) fit the definition of Low Threat Vegetation - Exclusions (A1.10 *PBP 2019* pp.88) and therefore meet *PBP 2019* performance criteria for a defendable space (Objective ii). The existing managed ground will continue to be treated to IPA condition and meet on-site APZ requirements (Objective iii.).

The landscape design will incorporate a defendable space immediately surrounding the indoor sports centre (both proposal options). The APZ, which is wholly within the boundaries of the development site and located on land with a slope less than 18 degrees, will be managed and maintained to prevent the spread of a fire towards the indoor sports centre. The proposed indoor sports centre is currently not separated from the small patch of remnant forest to the north / north east, for a minimum distance of 38 metres. The area between, is mown grass and landscaped garden. The area between, will be landscaped appropriately to meet IPA condition and maintained through the enforcement of a Vegetation Management Plan (Objective v.).

Winbourne Street offers adequate access and egress to firefighters, emergency workers, and those involved in evacuation (Objective iv.). Brush Road is only seven (7) metres wide and is not compliant with the minimum eight (8) metre wide acceptable solution required by Table 6.8b of *PBP 2019* for SFPP development. Therefore, full compliance with the access and egress provisions of Table 6.8b of *PBP 2019* will be challenging if Brush Road is to be used as the primary access point to the site. Brush Road is not currently relied upon for public road access by the current proposal options. Utility services along Winbourne Street and Brush Road are adequate to meet the needs of firefighters and others assisting in bush fire fighting (Objective vi.).

While the proposed development currently does not meet the minimum APZ for Special Fire Protection Purpose development, it can comply with the PBP Specific Objectives for Special Fire Protection Purpose development as listed at Section 6.2 of PBP and is repeated below:

The specific objectives of Special Fire Protection Purpose are:

a) *Minimize levels of radiant heat, smoke and ember attack through increased APZ, building design and siting;*

   The size of the current APZ illustrates only a minor non-compliance (3 – 7.5 metres) based on the current tree line. This objective can be satisfied if trees 41 – 46 (numbering - Bradshaw Consulting Arborists 2020) to be nominated for removal. Trees 41 – 46 are located outside the area shaded on the Biodiversity Values Land Map. BAL – 12.5 construction is designed to deal with a 10 k/W m² level of radiation, and siting of the indoor sports centre will be satisfied if trees 41 – 46 to be nominated for removal.

b) *Provide an appropriate operational environment for emergency service personnel during fire fighting and emergency management;*

   The size of the current APZ illustrates only a minor non-compliance (3 – 7.5 metres) based on the current tree line. This objective can be satisfied if trees 41 – 46 (numbering - Bradshaw Consulting Arborists 2020) to be nominated for removal. Proposed vehicle access provides an appropriate operational environment for emergency service personnel to access the proposed building and hazardous vegetation. A defendable space is established through the proposed APZ. This objective can be satisfied.

c) *Ensure the capacity of existing infrastructure (such as roads and utilities) can handle the increase in demand during emergencies as a result of the development;*

   The site is currently used as a Public High School. Existing roads can handle the increase in demand during emergencies as a result of the development. This objective is satisfied.

d) *Ensure emergency evacuation procedures and management, which provides for the special characteristics and needs of occupants;*

   The provision of a Bushfire Emergency Management and Evacuation Plan, access, and services that comply with PBP will be recommended conditions of approval. This objective is satisfied.

5.3 Deviation from the objectives of *PBP 2019*

The proposed position of the indoor sports centre for both proposal options (1 & 2), does not currently afford occupants and defenders protection from life threatening levels of radiant heat (>10 kW/m²) from a bushfire (Objective i). The siting of the building for both proposal options has breached the 10 kW/m² Threshold Line illustrated in Figure 10, Figure 11 and Table 1. Compliance with the <10 kW/m² of radiant heat threshold relies on the removal of trees 41 – 46 (numbering - Bradshaw Consulting Arborists 2020). The proposed siting of the indoor sports centre (Proposal Options 1 & 2) is only suitable if trees located 'outside' the area shaded on the Biodiversity Values Land Map, but inside the 38 metres APZ on the northeast aspect are removed.

Brush Road does not comply with Objective iv. of *PBP* 2019 and the specific objectives of Special Fire Protection Purposes in the following ways:

- Brush Road is only seven (7) metres wide and is not compliant with the minimum eight (8) metre wide acceptable solution required by Table 6.8b of *PBP 2019* for SFPP development as a primary public access road.

In our opinion we do not believe the aims and objectives of *PBP 2019* regarding safe operation access, egress and protection from life threatening levels of radiant heat (>10 kW/m²) from a bushfire for emergency personnel and visitors has been compromised. The planning proposal will therefore not need to be referred to the local Rural Fire Service for comment on non-compliance with *PBP 2019* in accordance with Section 4.14 of the *Environmental Planning and Assessment Act 1979*.

5.4 Flame length

Flame length is not expected to impact the building from north / northeast aspects.

5.5 Expected radiant heat flux (RHF)

The BAL–12.5 construction is designed to deal with a 10 k/W m² level of radiation.

6 Infrastructure and other requirements

6.1 Asset Protection Zone management

All APZs are achievable for this proposal. The APZ objective can be satisfied if trees 41 – 46 (numbering - Bradshaw Consulting Arborists 2020) are nominated for removal. If the nominated trees are not removed, both proposal footprints for the indoor sports centre must be modified to accommodate the required APZ distances.

To meet the bushfire protection measures stated in PBP 2019 for the indoor sports centre the proposed APZ distances are:

Proposed Option 1

- The full length from the external wall of the Indoor Sports Centre to the north site boundary (21 - 82 metres),
- 38 metres on the east aspect,
- 100 metres on the south and
- 28 metres on the west aspect.

Proposed Option 2

- 34 metres on the northwest aspect,
- 38 metres on the northeast aspect,
- 28 metres on the southwest aspect and
- 100 metres on the southeast aspect.

Legislative responsibility to manage hazardous fuels s.63(2) *RF Act 1997*.
S.63(2) of the *Rural Fires Act 1997* No 65 states, "It is the duty of the owner or occupier of land to take the notified steps (if any) and any other practicable steps to prevent the occurrence of bush fires on, and to minimise the danger of the spread of bush fires on or from, that land."

The residents will be required to maintain fuel levels consistent with the provisions of the Asset Protection Zone being, *Table 6.8a of PBP 2019 (SFPP)* and Appendix 4 of PBP 2019 as well as the RFS *Standards for Asset Protection Zones* (see www.rfs.nsw.gov.au). The Asset Protection Zone is to be maintained on a permanent basis through the enforcement of a Vegetation Management Plan. The site is zoned as Land Management Zone with 'Low risk' (likelihood: unlikely, consequence: moderate) human settlement' which will be impacted upon by bushfire in the Hunters Hill, Lane Cove, Ryde, Willoughby Bushfire Risk Management Plan 2010. Ultimate responsibility will fall on the landowner to manage bushfire fuel on the property.

Total clearance of all vegetation is generally not acceptable especially in areas mapped by the Biodiversity Values Map (i.e. Critically Endangered Ecological Communities). Vegetation management undertaken to establish the required Asset Protection zone should be minimised while still complying with PBP guidelines.

6.2 Water supply

There is town mains water supply available. The nearest hydrant is located approximately 24 metres west of the proposed northwest car park entrance of the site on the nature strip outside any designated parking bays. The next nearest hydrant is located on the corner of Farnell Street and Winbourne Street directly adjacent the site and complies with the performance criteria for a reticulated water supply in Table 6.8c of *PBP 2019*. Hydrants are located every 100 metres along Winbourne Street and Brush Road.

Where applicable, fire hydrants / reticulated water supply to the site is to be installed compliant with the following:

- Fire hydrant spacing, design and sizing comply with the relevant clauses of Australian Standard AS 2419.1:2005 - *Fire hydrant installations System design, installation and commissioning*;
- Hydrants are not to be located within any road carriageway or parking bay;
- Fire hydrant flows and pressures are to comply with AS 2419.1:2005; and
- All above-ground water service pipes external to the building are metal, including and up to any taps.
- Unobstructed access is to be provided at all times;
- A suitable accessible connection located within the IPA or non-hazard side and away from the building is to be provided for RFS purposes in the form of a 65 mm ball valve and Storz fitting;
- The ball valve, and pipes must be adequate for full 50mm inner diameter water flow through the Storz fitting and are metal.
- Ball valve and pipes are adequate for water flow and are metal.
- Access to the water supply (i.e. pump and hose reel) is to be shielded from radiant heat.
- Fire hose reels are constructed in accordance with *AS/NZS 1221:1997 Fire hose reels*, and installed in accordance with *AS 2441:2005 Installation of Fire hose reels*.

6.3 Gas and electricity services

Gas and electricity services are to be located so as to not contribute to the risk of fire to the building in the following ways:

- Reticulated or bottled gas is installed and maintained in accordance with *AS/NZS 1596:2014 2014 – The storage and handling of LP Gas* and the requirements of relevant authorities. Metal piping is to be used;
- All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side of the installation;
- If gas cylinders need to be kept close to the building, the release valves are directed away from the building and at least 2 metres away from any combustible material, so that they do not act as a catalyst to combustion. Connections to and from gas cylinders are metal;
- Polymer sheathed flexible gas supply lines are not used;
- Gas service pipes are metal, including and up to any outlets;
- The location of electricity services limits the possibility of ignition of surrounding bushland or the fabric of buildings;
- Where practicable, electrical transmission lines are underground;
- Where overhead, electrical transmission lines are proposed, the lines must comply with the

following:
- Lines are installed with short pole spacing (30 metres), unless crossing gullies, gorges or riparian areas;
- No part of a tree is closer to a power line than the distance set out in accordance with the specifications in *ISSC3 Guideline for Managing Vegetation Near Power Lines*.

6.4 Access and egress

The following roads provide access for fire fighting vehicles and evacuation opportunity for residents.

Public roads

Winbourne Street provides all weather access to the site and complies with the performance criteria in Table 6.8b of *PBP 2019* in the following ways. Winbourne Street is a two-wheel drive, all weather road, council bitumen road, which is:

- Access is provided to all structures;
- Clearly sign-posted (buildings/properties are clearly numbered);
- 590 metres long, with three through road connections along its length, the closest being between 55 -110 metres from any of the proposed site entrances onto Winbourne Street;
- Is linked to the internal road system at an interval of no greater than 500 metres in urban areas;
- Traffic management devices are constructed to not prohibit access by emergency services vehicles;
- Of suitable grades (does not exceed 15 degrees for sealed roads or an average of 10 degrees across its length, or other gradient specified by road design standards, whichever is the lesser gradient;
- Has a cross fall not exceeding 3 degrees;
- Twelve metres wide kerb to kerb, including curves;
- Designed to carry fully loaded fire fighting vehicles (up to 23 tonnes);
- Suitable turning areas for fire fighting vehicles in accordance with Appendix 3 of PBP 2019 are provided;
- A height clearance of four metres is maintained;
- Provides clear access to reticulated water supply (hydrants are located outside of parking bays and road carriageways);
- Hydrants are provided in accordance with the relevant clauses of Australian Standard AS 2419.1:2005 - *Fire hydrant installations System design, installation and commissioning*;
- Parking does not obstruct the minimum paved width; and
- Is regularly maintained.

Winbourne Street has no compliance issues with Table 6.8b of *PBP 2019*.

Brush Road does not comply with the performance criteria in Table 6.8b of *PBP 2019* in the following ways:

1. It is a two-way road with a carriageway less than 8 metre width kerb to kerb;
2. Parking is provided inside the carriageway width, further reducing the carriageway width.

Perimeter Roads

The site perimeter road (Winbourne Street) does comply with Table 6.8b of *PBP 2019* in the following ways:

- It is a two-way sealed road with a 8 - 12 metre carriageway width kerb to kerb;
- Parking is provided outside of the carriageway width;
- Hydrants are located clear of parking areas and carriageway, and should be located on the side of the road away from the bushfire threat where possible;
- There are through roads, and these are linked to the internal road system at an interval of no greater than 500 metres;
- Curves of roads have a minimum inner radius of 6 metres;
- The maximum road grade is 15° and an average grade not exceeding 10°;
- The road crossfall does not exceed 3°;
- A minimum vertical clearance of 4 metres to any overhanging obstructions, including tree branches, is provided;
- Designed to carry fully loaded fire fighting vehicles (up to 23 tonnes).

Brush Road does not comply with the performance criteria in Table 6.8b of *PBP 2019* in the following ways:

1. It is a two-way road with a carriageway less than 8 metre width kerb to kerb;
2. Parking is provided inside the carriageway width, further reducing the carriageway width.

Non-perimeter Roads

The site non-perimeter roads shall comply with Table 6.8b of *PBP 2019* in the following ways:

- There is a minimum 5.5 metre width kerb to kerb;
- Parking is provided outside of the carriageway width;
- Hydrants are located clear of parking areas and carriageway, and should be located on the side of the road away from the bushfire threat where possible;
- There are through roads, and these are linked to the internal road system at an interval of no greater than 500 metres;
- Curves of roads have a minimum inner radius of 6 metres;
- The maximum road grade is 15° and an average grade not exceeding 10°;
- The road crossfall does not exceed 3°;
- All kerbs constructed around access lanes should be no higher than 250mm and free of vertical obstructions at least 300mm back from the kerb face to allow clearance for front and rear body overhang of RFS vehicles;
- A minimum vertical clearance of 4 metres to any overhanging obstructions, including tree branches, is provided, and

The design of the car parks for each proposal (Proposal Options 1 & 2) appear to comply with the performance criteria in Table 6.8b of *PBP 2019* for a non-perimeter road.

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Property access

All weather access to the site will be provided in recognition of the risk to fire fighters and / or evacuating occupants. There is access to the rear of the site for operational activities. Fire vehicles must be able to drive to the rear of the indoor sports centre.

The site driveway servicing the PDA (i.e. the proposed north car park) must comply with the performance criteria in Table 6.8b of *PBP 2019* in the following ways. These are:

- Access is provided to the indoor sports centre;
- The site driveway carriageway / swept path (excluding drainage and edging) is a minimum 5.5 metres wide;
- Clearly sign-posted, two-wheel drive, sealed bitumen all- weather road;
- Some short constrictions in the access may be accepted where they are not less than 3.5 metres wide, extend for no more than 30 metres and where the obstruction cannot be reasonably avoided or removed;
- The dead end of the proposed north car park must incorporate a minimum 12 metre outer radius turning circle compliant with Figure A3.3 Type A, B, C, or D of PBP 2019 (refer to Figure 12 – 15 below);
- Curves have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress;
- The minimum distance between inner and outer curves is six metres;
- Is less than 200 metres in length, contains no bridges (bridges must be sign-posted with weight rating). The proposed driveway / car park on-site is 93 - 99 metres long;
- Crossfall of the pavement is not more than 10 degrees;
- Maximum grades for sealed roads / the site driveway do not exceed 15 degrees and average grades are not more than 10 degrees;
- A minimum vertical clearance of four metres to any overhanging obstructions, including tree branches;
- Traffic management devices are constructed to facilitate access by emergency services vehicles;
- The site driveway does not traverse through a wetland or other land potentially subject to periodic inundation (other than flood or storm surge);
- The internal road surfaces have a capacity to carry fully-loaded fire fighting vehicles (23 tonnes), bridges and causeways are to clearly indicate load rating;
- Suitable access for a Category 1 fire appliance to within 4 metres of the static water supply must be provided where no reticulated supply is available; and
- Is regularly maintained.

RFS vehicle access and turning requirements

Turn-around areas for RFS vehicles, which comply with Appendix 3 of PBP 2019 are located along Winbourne Street and Brush Road. A turning circle is located directly outside the west end of the proposed indoor sports centre, adjoining the swept path of Winbourne Street. Along Brush Road, the only suitable turning points for medium- rigid vehicles are three-point-turns at the closest road intersections: Cheers Street, Tramway Street and Hermoyne Street 41 metres, 129 metres, and 265 metres to the north respectively, and Sindel Street 52 metres to the south of the existing vehicle access gate. Winbourne Street and Brush Road are council bitumen through roads. Due to street parking along Brush Road, there is limited areas where the formed road provides space for medium-rigid vehicles to pass in opposite directions safely.

The RFS requires that any dead ends (e.g. proposed site car park/s) should be provided with a turn-around area, which preferably avoids multipoint turns. The minimum turning radius should be no less than the respective outer radius given in Figure 12. Where multipoint turning is proposed the RFS will consider the following types shown in Figure 13, Figure 14 and Figure 15:

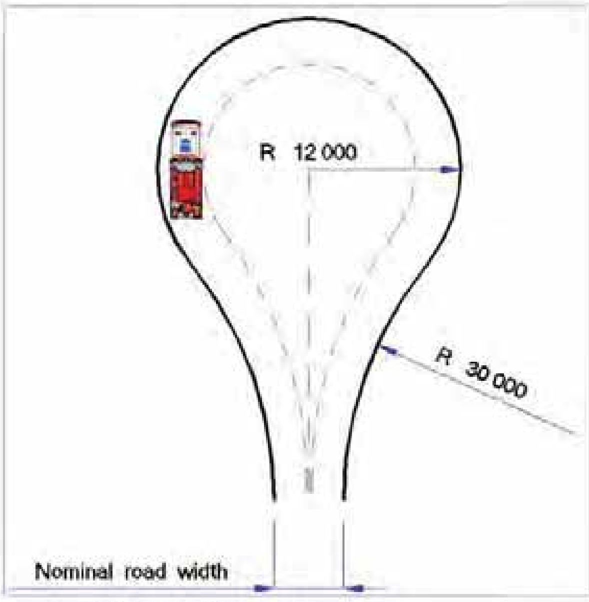

Figure 12 Type A

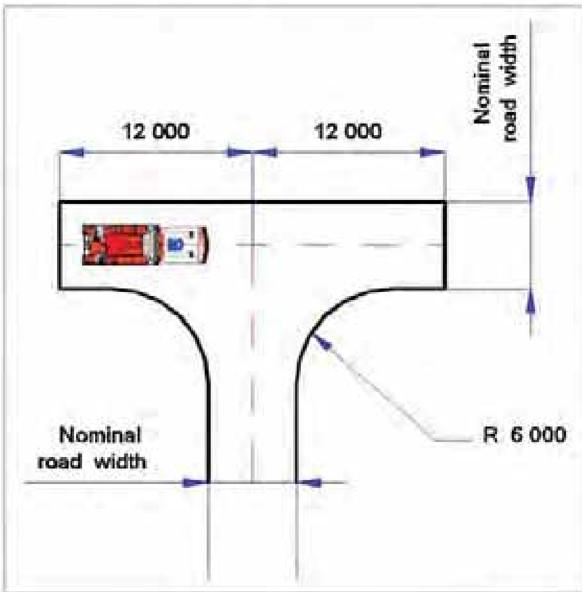

Figure 13 Type B

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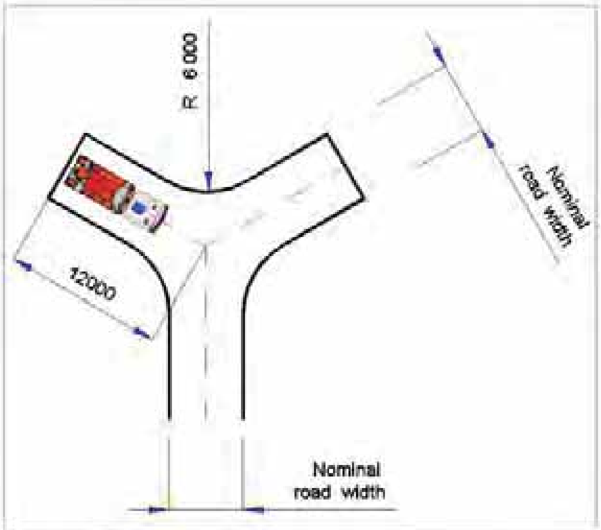

Figure 14 Type C

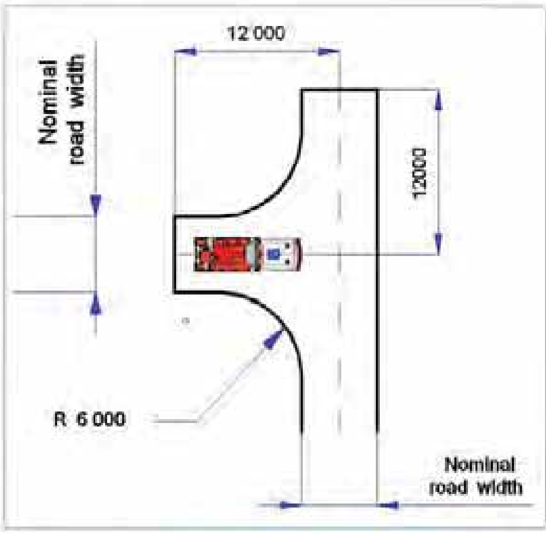

Figure 15 Type D

Fire trails

Fire trails are not required for compliance with *PBP 2019*.

6.5 Availability of fire fighting services

The nearest NSW Fire and Rescue Station is located at 269 Rowe Street, Eastwood NSW, 2.4 km from the site.

6.6 Bushfire Emergency Evacuation Plan development

Bushfire Emergency Management and Evacuation Plan is a prescriptive measure of Special Fire Protection Purpose (SFPP) developments.

A site Bushfire Emergency Management and Evacuation Plan is to be prepared consistent with the:

- The NSW RFS document: *A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan*,
- NSW RFS Schools Program guide (where applicable),
- Australian Standard AS 3745:2010 *Planning for emergencies in facilities*, and
- The emergency and evacuation management plan should include a mechanism for the early relocation of occupants.

Stable management arrangements must be established for consultation and implementation of the bushfire emergency and evacuation management plan. An Emergency Planning Committee must be established to consult with the community membership and staff in developing and implementing an Emergency Procedures Manual. Detailed plans of all emergency assembly areas including 'on-site' and 'off-site' arrangements as stated in AS 3745 are clearly displayed within the building, and an annual (as a minimum) trial emergency evacuation must be conducted.

6.7 Landscaping

The Vegetation Management Plan within the asset protection zone is to comply with the principles of Appendix 4 of *PBP 2019* (see Appendix 2). For example, this means:

- Landscaping is not to abut the indoor sports centre as this may cause a direct fire path to combustible building elements. Suitable impervious areas are provided immediately surrounding the building such as courtyards, paths and driveways. A pathway or non-combustible ground finish is to adjoin the indoor sports centre for a distance of at least 1.0 metre.
- Total clearance of all vegetation within the APZ is not acceptable. Vegetation management undertaken to establish the required Asset Protection zone shall be minimised while still complying with PBP guidelines.
- Grassed areas, mowed lawns or ground cover plantings are provided in close proximity to the building. Garden beds of flammable shrubs are not to be located under trees and must be no closer than 10 metres from an exposed window or door.
- Planting of trees and shrubs are restricted in the immediate vicinity of the building, which over time, if not properly maintained, can come in contact with or overhang the building.
- Retained or planted trees and shrubs do not form a continuous stand from the hazard to the asset and will not over time compromise the asset protection zone.
- Local plant species that are of low flammability (low volatile oil levels, high moisture content in leaves and low levels of retained dead material) are selected or retained for use within the asset protection zone.
- The Vegetation Management Plan is to accommodate emergency vehicle access to the rear of the dwelling and turning circle requirements.
  - Fire hazard management for the subject site needs to take into account hollow-bearing trees, and any of the shaded vegetation on the Biodiversity Values Land Map. Refer to the Abel Ecology Due Diligence Report (AE21-2216-REP-ISS 1, Dated 22 Jan 2021).

A full list of landscaping requirements can be found Appendix 4 of *PBP 2019* and the RFS document *Standards for Asset Protection Zones* must also be consulted.

7 Building construction requirements

Our assessment indicates the required building construction for the proposed Indoor Sports Centre (Proposal Options 1 & 2) is BAL-12.5 on all aspects. Building construction for all aspects of the proposed Indoor Sports Centre are to be built in accordance with the NCC, and must comply with section 3 and 5 (BAL – 12.5) of *Australian Standard 3959* (2018) *Construction of buildings in bushfire-prone areas* and *Table 6.8a* of *PBP 2019* and as modified by Section 7.5, 7.5.1, 7.5.2, 7.5.3, and 7.5.4 (where applicable) of *PBP 2019*. Refer to AS 3959 (2018) for a detailed description.

The development is not in bush fire attack level-40 (BAL-40) or the flame zone (BAL-FZ).

AS-3959 (2018) is now available as PDF for free from - https://infostore.saiglobal.com/en-au/standards/as-3959-2018-122340_saig_as_as_2685241/

Proposed Class 10 buildings are to comply with:

- There is no bushfire protection requirement for Class 10a and 10b structures located more than 6 metres from Special Fire Protection Purpose buildings in bushfire prone areas.
- A Class 10a and 10b structure are not permitted to be located within 6 metres of a Special Fire Protection Purpose refuge building. Class 10a buildings are non-habitable buildings being a private garage, carport, shed or the like.
- For Class 10b buildings, fences and gates. All fences and gates in bushfire prone areas should be made of either hardwood or non-combustible material. In circumstances where the fence or gate is located within 6 metres of a Special Fire Protection Purpose building they should be made of non-combustible material only (Table 6.8a and s. 7.6 of *PBP 2019*).

8 Conclusion and recommendations

The site is not mapped as bush fire prone land. In our opinion, the site is not sterilised by the bushfire threat. This report concludes that the planning proposal can comply with *PBP 2019*. The State will therefore be able to construct the proposed development with the following measures included:

a) This proposal has been prepared in accordance with *PBP 2019* in its entirety and the development complies with most relevant Acceptable Solutions in *PBP 2019*. In accordance with s.4.14(1A) of the *EP&A Act 1979 ... "the consent authority may, ..., grant consent to the carrying out of the development but only if it has consulted with the Commissioner of the NSW Rural Fire Service concerning measures to be taken with respect to the development to protect persons, property and the environment from danger that may arise from a bush fire."* As a result, this planning proposal must be referred to the Rural Fire Service in accordance with Section 4.14(1A) of the *EP&A Act 1979*.

b) The site is not mapped as bush fire prone land.

c) Building construction for all aspects of the proposed Indoor Sports Centre are to be built in accordance with the NCC, and must comply with section 3 and 5 (BAL – 12.5) of *Australian Standard 3959* (2018) *Construction of buildings in bushfire-prone areas* and Table 6.8a of *PBP 2019* and as modified by Section *7.5, 7.5.1, 7.5.2, 7.5.3*, and 7.5.4 (where applicable) of *PBP 2019*. Refer to AS 3959 (2018) for a detailed description.

- Proposed Class 10 buildings are to comply with Section *7* of this report and:
  - Class 10a: Sheds – s.8.3.2 of PBP 2019
  - Class 10b: fences and gates – Section *7.6* of *PBP 2019*.

AS-3959-2018 is now available as PDF for free from -

- https://infostore.saiglobal.com/en-au/standards/as-3959-2018-122340_saig_as_as_2685241/

d) We recommend a site Vegetation Management Plan (VMP) be produced for the on-going management and maintenance of the site asset protection zone. The APZ will be maintained to Inner Protection Area condition as per Sec. 6.1 and 6.7 of this report, Appendix 4 of PBP 2019 and the RFS *Standards for Asset Protection Zones* (Appendix 3 and see www.rfs.nsw.gov.au). The VMP will observe mapped / shaded vegetation on the Biodiversity Values Land Map, and retention of hollow-bearing trees (Abel Ecology Due Diligence Report AE21-2216-REP-ISS 1, Dated 22 Jan 2021). Total clearance of all vegetation is not acceptable. Vegetation management undertaken to establish the required Asset Protection zone shall be minimised while still complying with PBP guidelines.

e) In accordance with a site Vegetation Management Plan, an asset protection zone is to be maintained permanently on the north / northwest aspect:

- To IPA condition (15% tree canopy cover) for a horizontal distance of 21 - 82 metres from the external wall of the Indoor Sports Centre to the north site boundary.
- Trees will need to be removed to achieve this requirement.

f) In accordance with a site Vegetation Management Plan, an asset protection zone is to be maintained permanently on the east / northeast aspect:

- To IPA condition (15% tree canopy cover) for a horizontal distance of 38 metres from the external wall of the Indoor Sports Centre to the boundary of shaded vegetation on the Biodiversity Values Land Map.

- Trees will need to be removed to achieve this requirement. The Abel Ecology Due Diligence Assessment (AE21 2216 REP ISS 1 22Jan21) has identified trees 41 – 46 (numbering - Bradshaw Consulting Arborists 2020) to be nominated for removal. Vehicles, plant, storage items, dumpings/stockpiles and walkways are not permitted anywhere within the shaded areas on the Biodiversity Values Land Map. Trees are not to be felled into the shaded areas on the Biodiversity Values Land Map.

g) In accordance with a site Vegetation Management Plan, an asset protection zone is to be maintained permanently on the west / southwest aspect:
- To IPA condition (15% tree canopy cover) for a horizontal distance of 28 metres from the external wall of the Indoor Sports Centre to the west boundary.
- Trees will need to be removed to achieve this requirement.

h) In accordance with a site Vegetation Management Plan, an asset protection zone is to be maintained permanently on the south / southeast aspect:
- To IPA condition (15% tree canopy cover) for a horizontal distance of 100 metres from the external wall of the Indoor Sports Centre to the south boundary.
- Trees will need to be removed to achieve this requirement.

i) Winbourne Street offers adequate access and egress to firefighters, emergency workers, and those involved in evacuation and complies with the performance criteria in *Table 6.8b of PBP 2019*. Brush Road does not comply with the performance criteria in *Table 6.8b of PBP 2019* in the following ways:

- It is a two-way road with a carriageway less than an 8 metre width kerb to kerb;
- Parking is provided inside the carriageway width, further reducing the carriageway width.

j) All weather access to the site will be provided in recognition of the risk to fire fighters and / or evacuating occupants. There will be access to the rear of the Indoor Sports Centre for operational activities via the proposed 93 - 99 metre long site driveway / car park. Fire vehicles must be able to drive to the rear of the Indoor Sports Centre. The access driveway / car park must comply with section 6.4 of this report and acceptable solutions from Table 6.8b of *PBP 2019* for non-perimeter roads, property access and RFS vehicle access and turning requirements.

k) Utility services along Winbourne Street are adequate to meet the needs of firefighters and others assisting in bush fire fighting. Gas and electricity services are to be located so as to not contribute to the risk of fire to the buildings. Gas and electricity services are to be installed as per Sec. 6.3 of this report.

l) Fire hazard management for the subject site needs to take into account hollow-bearing trees, and native vegetation that is:

- Scheduled as Critically Endangered under the NSW *Biodiversity Conservation Act 2016* and for the Commonwealth under the *Environment Protection and Biodiversity Conservation Act 1999* and or,
- Is shaded in the Biodiversity Values Land Map. Refer to the Abel Ecology Due Diligence Report (AE21-2216-REP-ISS 1. Dated 22 Jan 2021).

m) Water supply is to be provided in accordance with Sec. 6.2 of this report and Table 6.8c of PBP 2019.

n) A site Bushfire Emergency Management and Evacuation Plan is to be prepared consistent with Sec. 6.6 of this report.

9 Literature Review

Abel Ecology 2021. Due Diligence Report for Marsden High School, 22 Winbourne St, West Ryde NSW 2114 Lot 1 DP 220808, Lots C & D DP23326. Proposed Netball complex. (AE21-2216-REP-ISS 1, Dated 22 Jan 2021).

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Standards Australia (2018) AS 3959. *Construction of buildings in bushfire-prone areas.* Standards Australia, Sydney.

Tozer, M.G. Turner, K., Keith, D.A., Tindall, D., Pennay, C., Simpson, C., MacKenzie, B., Beukers, P. and Cox, S. (2010). Native vegetation of southeast NSW: a revised classification and map for the coast and eastern tablelands. Cunninghamia, 11(3): 359-406.

Appendix 1. Glossary of Definitions and Terms

This section defines and explains some commonly used expressions relating to bushfires.

Bushfire (or wild fire) is generally defined to mean any unplanned fire in vegetation. Fires can also be used for land management purposes such as grazing or hazard reduction. Bushfires generally have a seasonal pattern and occur in spring and summer but can occur at other times of year under suitable conditions. The behaviour of fires is primarily influenced by:

- fuel (type, load, moisture, continuity and compaction);
- ignition source;
- topography (slope and aspect); and
- weather (humidity, temperature, wind).

Bushfire danger is a relative measure of weather conditions (temperature, drought indices, humidity and wind speed) describing the likelihood of fire ignition, spread, control difficulty and damage potential. There is currently an emphasis on prevention and suppression of bushfires to minimise damage to human life and property.

Bushfire hazard is an assessment of the particular combination of available fuel (vegetation), slope and climate/weather pattern relating to a site. This includes leaf litter and ground cover, standing fuel of the shrub and canopy layers and the season of the year. The assessment is usually rated on a scale from 'low' (or insignificant) to 'extreme' and gives a final indicator of the potential severity of a fire.

Bushfire risk means the probability of a wildfire "igniting, spreading and causing damage to assets of value to the community" (Planning for Bushfire Protection 2019). Related to this is bushfire threat which is the threat of potential damage to life and property arising from a combination of hazard, risk and bushfire danger.

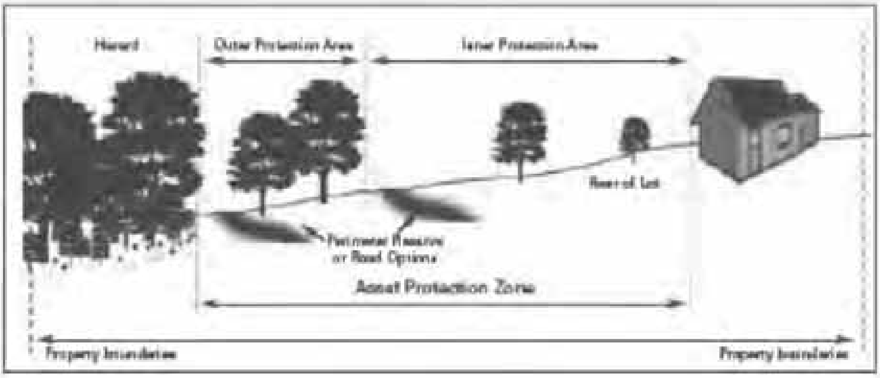
Hazard reduction means a reduction or modification of fuel by burning, chemical, mechanical or manual means.

Prescribed burn means a planned fire ignited by a land manager in accordance with a fuel management plan or for ecosystem management purposes.

Fire regime means the pattern of occurrence of fire, specifically the regularity, periodicity, seasonality, spatial extent, patchiness and intensity. This is important in terms of assessing risks and ecological impacts and is often used in prescribing a management goal to be achieved. There is debate about what constitutes a natural or pre European fire pattern. For the purpose of these definitions natural means an existence independent of human action.

Bushfire Risk Management is achieved by use of **Asset Protection Zones (APZ),** defined by the document "Planning For Bushfire Protection 2019" (NSW Rural Fire Service). An APZ acts as a buffer zone between the development and the bushfire hazard, and consists of an Outer Protection Area (OPA) and an Inner

Protection Area (IPA). The primary purpose of an Asset Protection Zone is to ensure that a progressive reduction of bushfire fuels occurs between the bushfire hazard and any habitable structures within the development.



OPA = Outer Protection Area

Location: adjacent to the hazard
Purpose: substantially reduces the intensity of an approaching fire, reducing the level of direct flame, radiant heat and ember attack on the IPA
Depth: between 10 and 15m deep, depending on the type of land use and vulnerability of the building or persons affected.
Fuel Loading: discontinuous tree canopy and shrub layer; fine fuel load usually less than 8 tonnes per hectare.

IPA = Inner Protection Area

Location: extends from the edge of the OPA to the development to be protected
Purpose: minimise the impact of direct flame contact and radiant heat on the development
Depth: dependent upon the slope of the land

Performance criteria for IPA:

- Minimal fine fuel which can be set alight by a fire
- Any vegetation in the IPA does not provide a path for the transfer of fire to the development - i.e. fuels are discontinuous.

The presence of trees and shrubs in the IPA is acceptable provided that they:

- Do not touch or overhang the building;
- Do not form a continuous canopy;
- Are not species that retain dead material or deposit excessive quantities of ground fuel in a short time;
- Are located far enough away from a building that they will not ignite the building by direct flame contact or radiant heat emission.

Appendix 2. Asset Protection Zone maintenance

To meet the bushfire protection measures stated in *PBP 2019* for the indoor sports centre the proposed APZ distances are:

Proposed Option 1

- The full length from the external wall of the Indoor Sports Centre to the north site boundary (21 - 82 metres),
- 38 metres on the east aspect,
- 100 metres on the south and
- 28 metres on the west aspect.

Proposed Option 2

- 34 metres on the northwest aspect,
- 38 metres on the northeast aspect,
- 28 metres on the southwest aspect and
- 100 metres on the southeast aspect.

The APZ will be maintained to Inner Protection Area condition as per Appendix 4 of *PBP 2019* and the RFS document *Standards for Asset Protection Zones*. At least 75% of the ground cover must be retained after maintenance to prevent soil erosion:

Inner Protection Area

Specification

a) Trees

i. Canopy - average cover of whole IPA less than 15% (at maturity); not continuous from hazard to asset with 2-5 metres separation between tree crowns; not overhanging within 2-5 metres of building; islands of canopy permitted.

ii. All lower limbs less than two metres above ground removed.

iii. Preference should be given to smooth barked and evergreen trees.

b) Trees and shrubs

i. Retained as clumps or islands, cover less than 10% of whole area.

ii. Shrubs should not be located under trees.

iii. Create large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings.

iv. Clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation.

c) Grass

i. Should be kept mown (as a guide grass should be kept to no more than 100mm in height).

ii. Leaves and vegetation debris should be removed.

Maintenance

The IPA is to be maintained as follows:

a) Minimal fine fuel at ground level which could be set alight by a bushfire.

b) Vegetation does not provide a path for the transfer of fire to the development - that is, fuels are discontinuous.

c) No trees to overhang the building.

d) Trees must be well spread out and not form a canopy.

e) Trees or shrubs that retain dead material or deposit excessive quantities of fuel in a short period of time must not be within the IPA.

f) Trees and shrubs must be located far enough from the house that the radiant heat they produce or direct flame contact will not ignite the house.

g) Wooden sheds, combustible material, large areas/quantities of garden mulch, stacked flammable building materials etc, must not be within the IPA.

Appendix 3. Fire emergency procedure

Bush Fire Survival Plan

We recommend that you prepare your own Bush Fire Survival Plan
http://www.rfs.nsw.gov.au/file_system/attachments/Attachment_BushFireSurvivalPlan.pdf

Personal safety and survival

(from s6.5 of Planning for Bushfire Protection 2001)
The survivability of a building and its occupants is dependent upon the amount of preparation prior to the actual fire event.

As the bushfire approaches

Personal Protection

Protect yourself from radiant heat by wearing:

a) cotton overalls or thicker long sleeved shirt and long pants of cotton or wool;
b) clothes which are loose fitting;
c) a strong pair of shoes or boots with woollen or cotton socks;
d) gloves, if your hands are not used to working with tools;
e) goggles, if the smoke is thick;
f) a "bandana" or large handkerchief to protect the airways from smoke and hot air;
g) a wide-brimmed hat or hard hat if one is available; but
h) leave your ears uncovered - they warn you of heat levels.

DO NOT WEAR SYNTHETICS – WEAR WOOL, COTTON OR DENIM.

Protection of Children, Elderly and Pets

During the approach of a bushfire:

a) keep children, elderly and pets inside the house;
b) give them plenty of water to drink; and
c) make sure you keep track of their movements.

Outside the home

a) Close windows and doors and any shutters and fit any screens.
b) Block the down pipes and fill them with water.
c) Put doormats inside.
d) Store all combustible furniture and awnings.
e) Wet down wood piles and areas of garden mulch.

Inside the home

a) Fill all sinks, baths and any buckets with water and put a filled bucket in the roof.
b) Block any gaps under the doors with wet towels.
c) Place a ladder to provide access to the roof area.
d) Monitor the radio – keep a spare set of batteries.
e) Turn off any gas.

The car

a) Park in a cleared area.
b) Close all doors, windows and vents.
c) Leave the keys in the ignition.
d) Store woollen blankets inside.

When the bushfire is close

a) Remain outside as long as possible patrolling the area for spot fires.
b) Suppress any spot fires which start close to the house or in the guttering.
c) Take refuge when the smoke starts to thicken.
d) Take your hoses and fittings inside when you move inside.
e) Activate any sprinkler system.

As the bushfire passes over

a) Remain calm and keep other occupants calm.
b) Move to the side of the house away from the main fire front.
c) Carry out regular inspections, particularly of windows to determine if they have shattered and embers have entered any rooms.

After the bushfire has passed

a) Before passing through a closed doorway, feel the door – if it is hot do not open it as there may be a fire on the other side – leave it closed to stop the fire spreading and exit via another route.
b) Check the house for fires – the roof, roof spaces and any under floor areas.
c) If the house is on fire move onto burnt out ground but keep clear of burning trees.

Evacuation or relocation

a) Research shows that where people are in attendance and are well prepared then buildings are more likely to survive a bushfire. Early evacuation or relocation is a serious consideration where:
b) you are not confident that your house is prepared to withstand a bushfire;
c) you are worried about your children or elderly members of the household;
d) you suspect that you or members of the household will be unable to cope with the stress of staying;
e) it is safe to leave and you have a clear idea of where a safe refuge is to be found; and
f) you know the destination to be safe.

If you do decide to relocate, or are directed to evacuate:

a) DO IT EARLY;
b) close all doors and windows and consider leaving them unlocked – a fire fighter may need access to your home;
c) know where you are going;
d) drive carefully.

NOTE: According to Section 60L of the *NSW State Emergency and Rescue Management Act 1989* No 165, you can be directed to evacuate an area or premises (https://www.legislation.nsw.gov.au/#/view/act/1989/165):

> ***60L Power of police to evacuate or to take other steps concerning persons***
>
> *(1) A directing officer may, if satisfied that there are reasonable grounds for doing so for the purpose of protecting persons from injury or death threatened by an actual or imminent emergency, direct, or authorise a police officer to direct, a person to do any or all of the following:*
>
> > *(a) to leave any particular premises and to move outside the danger area,*
> > *(b) to take any children or adults present in any particular premises who are in the person's care and to move them outside the danger area,*
> > *(c) not to enter the danger area.*
>
> *directing officer means:*
> *(a) the Minister, or*
> *(b) the State Emergency Operations Controller, or*
> *(c) a police officer of or above the rank of sergeant, or*
> *(d) a police officer of a class prescribed by the regulations for the purposes of this definition.*

Appendix 4. Company Profile

Abel Ecology has been in the ecological consulting business since 1991, starting in the Sydney Region, and progressively more state wide in New South Wales since 1998, and now also in Victoria. During this time extensive expertise has been gained with regard to Master Planning, Environmental Impact assessments including biodiversity reports, bushfire reports, Vegetation Management Plans, Management of threatened species, Review of Environmental Factors, and as Expert Witness in the Land and Environment Court. We have done consultancy work for industrial and commercial developments, golf courses, civil engineering projects, tourist developments as well as residential and rural projects. This process has also generated many connections with relevant government departments and city councils in NSW. Our team consists of four scientists and two administrative staff, plus casual assistants as required.

Licences

NPWS s132C Scientific licence number is SL100780 expires 31 July 2021
NPWS GIS data licence number is CON95034
DG NSW Dept of Primary Industries Animal Care and Ethics Committee Approval expires 8 November 2021
DG NSW Dept of Primary Industries Animal Research Authority expires 8 November 2021.

The Consultancy Team

Dr Danny Wotherspoon

Grad Dip Bushfire Protection (University of Western Sydney 2012)
PhD (researching Cumberland Plain vegetation and fauna habitat, at Centre for Integrated Catchment Management, University of Western Sydney, 2008)
Planning for Bushfire Protection Certificate course (University of Technology, 2006)
Consulting Planners Bushfire Training Course (Planning Institute of Australia, 2003)
MA (Macquarie University, 1991)
Wildlife Photography Certificate (Sydney Technical College, 1987)
Herpetological Techniques Certificate (Sydney Technical College, 1986)
Applied Herpetology Certificate (Sydney Technical College, 1980)
Dip Ed (University of New England, 1978)
BSc (Zoology, Ecology) University of New England 1974)

Dr Daniel McDonald

Cert IV – GIS (Riverina TAFE 2016)
PhD (The University of Sydney 2006)
M. Agr (The University of Sydney 1996)
B. Ag Sc. (The University of Sydney 1991)
Daniel is an accredited Biobanking Assessor
Quantified Tree Risk Assessment (QTRA) and Visual Tree Assessment (VTA)

Daniel is an experienced ecologist with expertise in fauna, plant species identification, vegetation assessment, agriculture, conservation genetics and seed collection and preservation. He is accredited both for BioBanking assessments and Biodiversity Certification. His present research interest is in Eastern Suburbs Banksia Scrub and fragmented endangered ecological communities.

Mark Mackinnon

Qualifications: Grad. Dip. of Bushfire Protection, B Env. Sci. (Hons).

Accredited Practitioner Level 2 - Bushfire Planning & Design (BPAD). Accreditation number 36395.

MEIANZ, General firefighter departmental accreditation, Snr 1st Aid Cert, Agricultural Chemical User Permit (1080 and PAPP). Chainsaw Lev.1 (Cross-cut). Manual 4x4 Driving Ticket. Medium-Rigid Vehicle Licence, Elevated-Work-Platform (+11m) Licence. Working at Height Cert., Simple & Complex Tree Climbing Cert., Venomous Snake and Reptile Handling Cert., Lyssavirus Immunisation (bat handling prerequisite), White Card.

Mark is a passionate and enthusiastic scientist who thrives in the field of natural resource management. In the last 6 years, Mark has worked for a number of inter-state government agencies and environmental consultancies. He has experience in threatened species, fire ecology, bushfire management, pest plant and animals, and landscape restoration. In particular he specializes in ornithology and bushfire management. Mark has a number of specialized field-based skills including: simple and complex tree climbing, working at heights, general firefighter departmental fire accreditation, venomous snake and reptile handling, immunization to handle bat species, and an A - class bird banding licence with mist-net endorsement. Mark is also skilled in ArcGIS mapping, first-aid, four -wheel-driving.

D21/78776

Cox Architecture

C O X

Consultants

BUILDING SERVICES ENGINEERS

COST MANAGER

SURVEYOR

CIVIL ENGINEERS

ECOLOGICAL CONSULTANT

TOWN PLANNER

Client

SINSW

Project No.

220133.00

Project

Marsden HS Netball Facility

WEST RYDE, NSW

Drawing Title

MARSDEN NETBALL FACILITY

FOR INFORMATION

Drawing Number

02

H&H Consulting Engineers Pty Ltd *(trading as Henry & Hymas)*
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01 April 2021

School Infrastructure
Level 8, 259 George Street
Sydney, NSW 2000

Attention: Mrs Gina Gou

Dear Gina,

RE: REPURPOSED COMMUNITY SPORTS FACILITY
22A WINBOURBE STREET, WEST RYDE
FLOOD STATEMENT – PLANNING PROPOSAL - Revision 03

Introduction

Henry & Hymas has been commissioned by School Infrastructure NSW (SINSW) on behalf of the Department of Education (DOE) to prepare a flood statement to support a Planning Proposal to amend the 'land use zone' Development Standard in Ryde City Local Environmental Plan 2014 from SP2 Educational Establishment to part RE1 Public Recreation and part E2 Environmental Conservation.

The site is known as Marsden High School, 22 Winbourne Street, West Ryde.

Figure 1 – Locality Map

henry&hymas

Site
Marsden High School buildings and associated facilities currently occupy the site.

The site is located approximately 1.5km north west of Meadowbank and 5km south east of Macquarie Park. Vehicular and pedestrian access is currently via Winbourne Street and Brush Road. One (1) pedestrian refuge island is located on Winbourne Street adjacent to the school site.

There is high value biodiversity (vegetation) to the north east and scattered trees/ cleared land to the remainder of the site (refer to Figure 2 below). An open waterway exists to the north east of the site, within the vegetated area, whereafter it is piped to the south eastern corner of the site under Brush Road. Topography of the site falls from north/ north west to south east

Figure 2 – Aerial Map

Site surrounds

Ermington Public School (SP2 Educational Establishment) is located immediately south of the site. Low density residential properties surround the site to the north, east and west (R2 Low Density Residential). Maze Park (RE1 Public Recreation) is located south east of the site. There are two locally heritage listed items within vicinity of the site, being the former School residence/ 1988 Ermington School Building and Maze Park.

Summary of Existing Flooding

D21/78776

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Council's Flood Study 'Parramatta River – Ryde Sub Catchments Flood Study and Floodplain Risk Management Plan' has been reviewed, in particular the flood maps shown in Appendix A of that report.
Refer to Figure 3 below, which is an excerpt from the Parramatta River Flood Study Appendix A, showing the flooding extent and depth during the 1% AEP storm event.

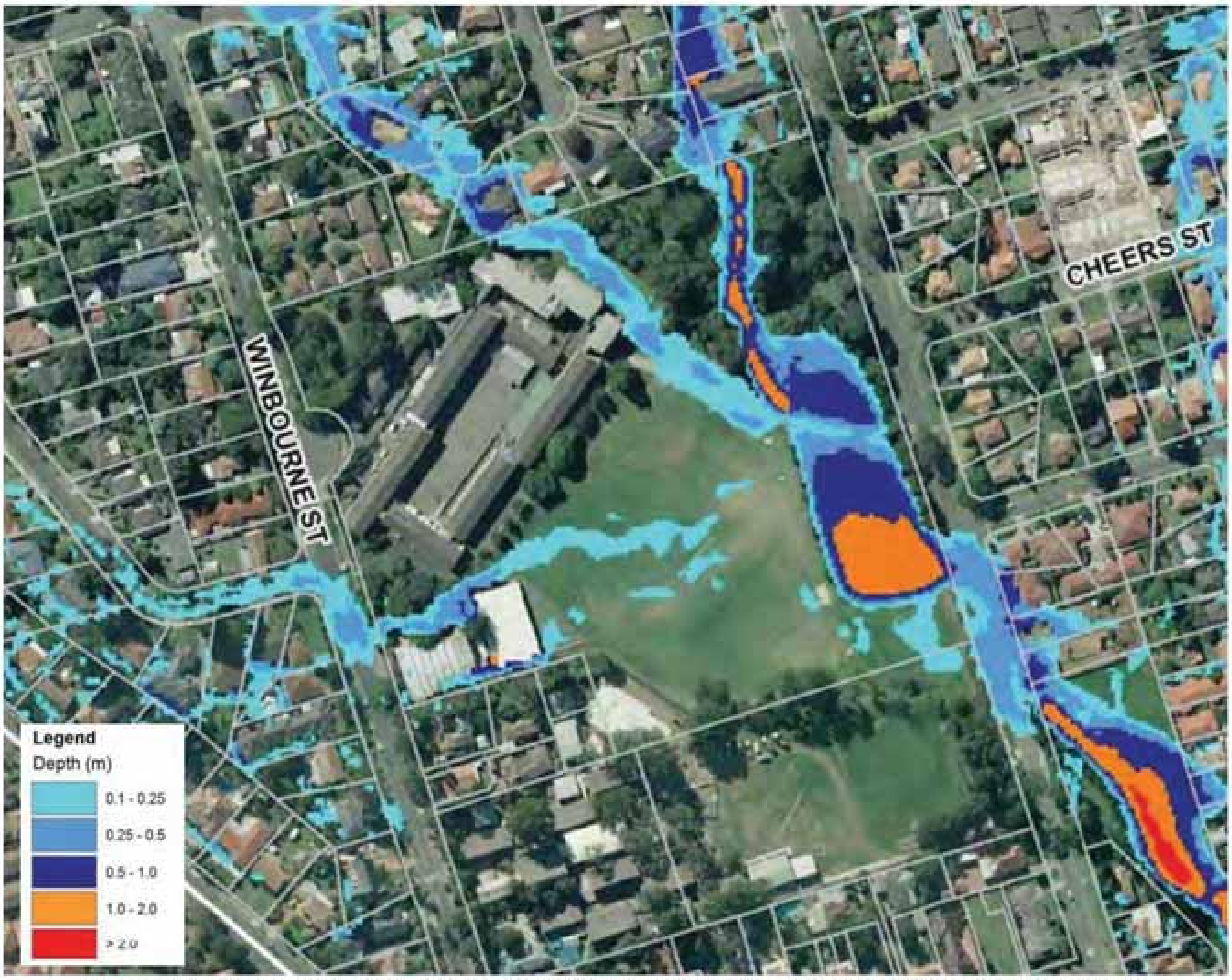

Figure 3 – Parramatta River Ryde Sub Catchments Flood Study 1% AEP Flood Depth

Figure 3 shows that the site is affected by 3 separate upstream catchments, which discharge stormwater flows through the site. These three overland flow routes converge into a flood storage basin within the eastern part of the site.

henry&hymas

The flooding is generally contained to the eastern part of the site which is dedicated as a sports field, with the exception of the western upstream catchment, which directs flows through a car park/play area which then discharges over the sports field into the flood storage basin.

Flooding and the Rezoning of Land

As a part of this planning proposal, the subject site is proposed to rezoned from SP2 Educational Establishment to part RE1 Public Recreation and part E2 Environmental Conservation.

Upon reviewing the aforementioned Flood Study and flood maps, it has been concluded that rezoning the site to RE1 Public recreation and E2 Environmental Conservation is not expected to have any adverse impacts on flood risk for the following reasons:

- RE1 zoned land is typically used for sporting activities that take place on the weekend. These activities are likely to be cancelled in wet-weather conditions. The flood risk is significantly reduced if the likelihood of the site being occupied during a flood is reduced.
- RE1 zoned land will typically have a decreased habitable floor area than the SP2 zoned land. The risk of flood damage to structures will likely be minimised if the proposed habitable floor area is to be decreased.
- E2 zoning of the land will protect and enhance the vegetated area and natural waterway. Ensuring that the natural waterway is free from debris will assist in the flow of water through the site in a storm event. Maintenance of the vegetated area will also allow for the water to infiltrate through the soil more easily.
- Due to the nature of the civil works associated with recreational facilities, all flood storage and stormwater flow requirements will be capable of being met such that there is nil or beneficial effect on flooding and stormwater drainage.

I trust this serves as an adequate summary and clarification of the flooding relating to the subject site and planning proposal.

Yours faithfully,

NICHOLAS HEAZLEWOOD
(Senior Civil Engineer)
For, and on behalf of,
H & H Consulting Engineers Pty Ltd

D21/78776

MARSDEN HIGH SCHOOL
22 WINBOURNE STREET, WEST RYDE

PRELIMINARY HERITAGE REPORT AND COMPARATIVE ANALYSIS

15 APRIL 2021

PURCELL

D21/78776

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Issue 02
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15 March 2021
Final

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15 April 2021
Revised Final following comments

PURCELL

MARSDEN HIGH SCHOOL - PRELIMINARY HERITAGE REPORT

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MARSDEN HIGH SCHOOL - PRELIMINARY HERITAGE REPORT
EXECUTIVE SUMMARY & SCOPE

EXECUTIVE SUMMARY

The following report considers the significance of Marsden High School at 22 Winbourne Street, West Ryde. This assessment has been undertaken by Purcell for School Infrastructure NSW as part of the Phase 0 scope of works to assess the buildings currently listed on the Department of Education (**DoE**) draft s.170 Heritage Register and whether their inclusion is warranted.

The assessment determines that Marsden High School as an educational Facility has historical and representative significance at a local level.

SCOPE OF THIS REPORT

As per the Phase 0 project brief, this report provides the following information:

- Desktop research (historical and social heritage of the buildings at the site)
- Physical Analysis
- Comparative Analysis of Monocrete High Schools, based on information provided by Schools Infrastructure (**SINSW**) on schools within the Metropolitan Planning Region with Monocrete buildings. The information was extracted from the Asset Management System (**AMS**) of the NSW Department of Education.
- Initial Heritage Assessment
- Recommendations

All images in this report were taken by Purcell during site visits on 21 January 2021 (Marsden High School), 23 February 2021 (Cheltenham Girls High School) or 01 March 2021 (Asquith Girls High School) unless otherwise attributed.

LIMITATIONS

This preliminary heritage advice for the purpose identified is based on a site visit on 21 January 2021. It does not include landscape, archaeological, or Aboriginal Heritage assessments. Community consultation typically undertaken to ascertain social significance is beyond the scope of this engagement. Comments regarding social significance are thereby anecdotal.

An analysis of information supplied by SINSW and search of archival material has returned limited primary reference material. Findings of Phase 0 recommend liaising with stakeholders and SINSW to develop a further understanding of the place and available information into Phase 1 of this project.

TERMINOLOGY

The conservation terminology used in this report is of a specific nature and is defined within the Australia ICOMOS Charter for the Conservation of Places of Cultural Significance, 2013 (the Burra Charter).[01]

REFERENCE MATERIAL

The following publications and guidance notes have been referenced in the preparation of this report:

- *Assessing Heritage Significance*, NSW Heritage Manual, NSW Heritage Office, 2001
- State Agency Heritage Guide, NSW Heritage Office, 2005
- Practice Note: Understanding and assessing cultural significance, Australia ICOMOS, 2013
- *Jack, Russell C, "The work of the N.S.W. Government Architect's Branch, 1958-1973". University of Sydney. Faculty of Architecture Masters Thesis (1980)*
- TKD Architects, "Government school architecture in New South Wales, Historical Study". Prepared for Department of Education January 2018.
- Willis, Julie, Goad, Phillip, Lewi, Hannah, et al, "Designing Australian Schools, A Spatial History of Innovation, Pedagogy and Social Change" (online) Melbourne School of Design, https://msd.unimelb.edu.au/research/projects/completed/designing-australian-schools#:~:text=Schools%20Search%20Menu-,Designing%20Australian%20Schools%3A%20A%20Spatial%20History%20of%20Innovation%2C%20Pedagogy%20and,schools%20across%20the%20twentieth%20century.
- NSW Historical Imagery, Search and Discovery. https://portal.spatial.nsw.gov.au/portal/apps/webappviewer/index.html?id=f7c215b873864d44bccddda8075238cb

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01 Australia ICOMOS Charter for Places of Cultural Significance, The Burra Charter, 2013 (Burra Charter) https://australia.icomos.org/publications/charters/

THE SITE

SITE LOCATION

Marsden High School (the Site) is located at 22 Winbourne St, West Ryde NSW 2114. The Site is in the City of Ryde Municipal Council Local Government Area (**LGA**), part of the Wallumedegal people's traditional lands, within the Metropolitan Local Aboriginal Land Council's responsibility. The site is between Brush Road on the east, Winbourne Street to the west, and residential housing to the north and Ermington Public School to the south.

Marsden High School, approximate future boundary shown dashed in yellow (Source: SIXMaps modified by Purcell, boundary information supplied by SINSW)

MARSDEN HIGH SCHOOL - PRELIMINARY HERITAGE REPORT

THE SITE

BUILDING IDENTIFICATION

Marsden High School consists of buildings from two main phases of development. The majority of buildings have been modified through either internal alterations, services upgrades or the addition of covered walkways.

Building	Date	Original Description	Current Use
B00A	1958	Classroom Block A	Technological & Applied Studies / Science Learning
B00B	1959	Classroom Block B	General Learning / Music / Science Learning
B00C	1959	Classroom Block C	Administration / General Learning
B00D	1959	Classroom Block D	General Learning
B00E	1959	Classroom Block E	General Learning
B00F	1958	Manual Training Block F	Technical & Applied Studies
B00G	1983	Library Block G	Library
B00H	1971	Staff / Storage - Block H	Staff / Storage
B00I	1958	Shelter - Toilet & Food Service Unit (FSU) - Block G	Pupil Facilities
B00J	1971	Block J	Art / Science Learning
B00K	1971	Block K	General Learning / Science Learning
B00L	1963	Assembly Hall	Multi Purpose Facilities

Marsden High School Buildings, future boundary shown dashed in yellow (Source: SIXMaps modified by Purcell, boundary information supplied by SINSW)

MARSDEN HIGH SCHOOL - PRELIMINARY HERITAGE REPORT
HERITAGE LISTING

STATUTORY HERITAGE LISTINGS

Marsden High School is not listed on the NSW State Heritage register.

Marsden High School is not listed as a heritage item, or as being in a Heritage Conservation Area in Schedule 5 of the City of Ryde Local Environmental Plan 2014 (**LEP**). The Buildings A, B, C, D, E, F, H, I, J, K and L are included on the Department of Education Draft s.170 Heritage and Conservation Register.

Marsden High School is within the immediate vicinity of two locally significant heritage items listed under Schedule 5 of the LEP; *Part 1 Heritage Items*:

- Former School Residence and 1887 Ermington School building (12 Winbourne Street) - Item no 174.
- Maze Park (100–108 Brush Road, Lot A, DP 35933) - Item no 338.

NON-STATUTORY HERITAGE LISTINGS

Marsden High School is not listed on the Australian Institute of Architects Register of Significant Architecture, the Register of the National Estate, or on the Register of the National Trust (NSW).

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MARSDEN HIGH SCHOOL - PRELIMINARY HERITAGE REPORT
HISTORICAL OVERVIEW

ABORIGINAL HERITAGE AND THE WALLUMEDEGAL NATION

Aboriginal people lived for thousands of years in what we call the City of Ryde. When the first Europeans settled at Sydney Cove in 1788 the traditional owners of this area were the Wallumedegal. That name was told to Captain Arthur Phillip, first governor of the convict colony of New South Wales, by Woollarawarre Bennelong who came from the clan called the Wangal on the south side of the river. Wallumedegal territory followed the north bank of the Parramatta River from Turrumburra (Lane Cove River) in the east to Burramatta at the head of the river to the west. The northern boundary would logically be the Lane Cove River and the northern neighbours therefore the Cameragal or spear clan.[02]

The Metropolitan Local Aboriginal Land Council is the Aboriginal representative body under the Land Rights Act 1983.

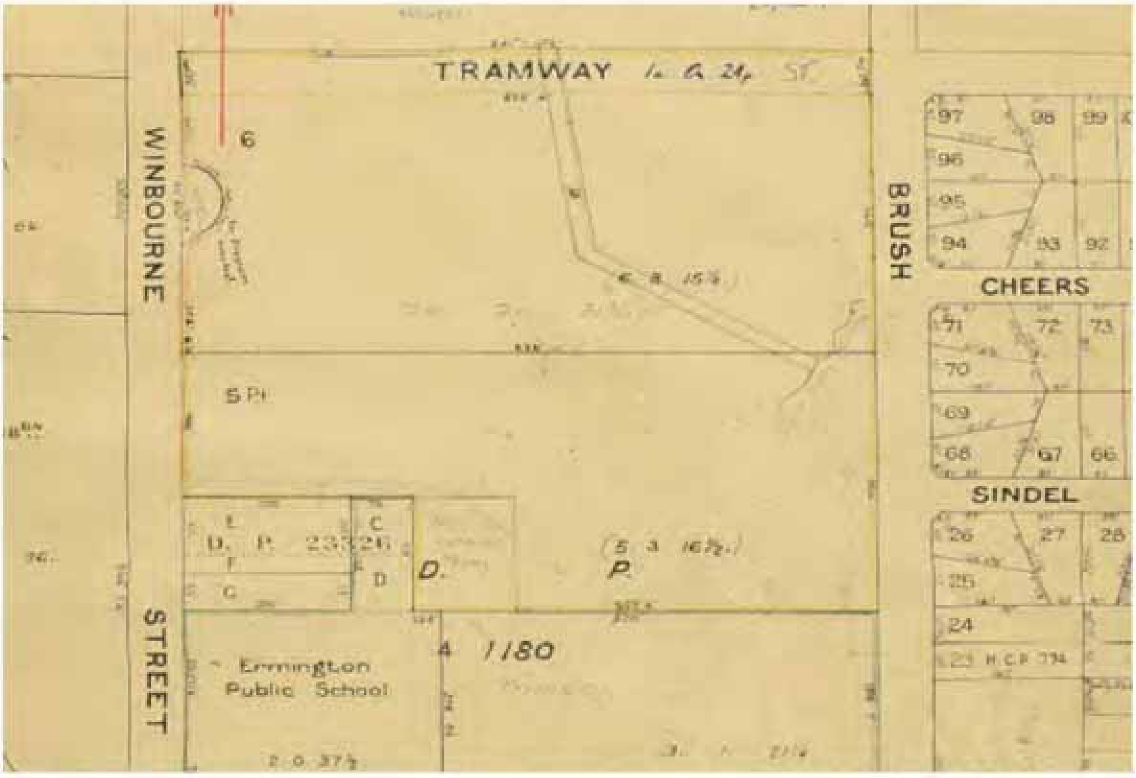
EARLY HISTORY

> *Land was granted in the West Ryde area in 1798 and 1799, these were part of the Meadowbank grants. Major Edward Darvall purchased land in 1849 and built Ryedale House and surrounded it with orchards. The land stayed in the Darvall family until the early 1900s when it was subdivided after the death of Edward Darvall's second wife Jane. It was the decision to locate the railway station at West Ryde that resulted in the area's development as a suburb. The railway from Strathfield to Hornsby was opened in 1886.*[03]

MARSDEN HIGH SCHOOL

The nearby Ermington Public School was opened in 1888 to cater to the growing local population's need for an educational facility. As the local population expanded, approval for the establishment of a secondary school was given by the Minister in July 1958. The new secondary school was planned to accommodate between 1,000 and 1,100 pupils and to be to be built in three stages.[04] In 1958, two of the site's original three plots of land were acquired for the new High School.

- Lot 6 DP 1180 was resumed from the Housing Commission on 31/1/1958.
- Part of Lot 5 DP 1180 was purchased from E. Wesgal on 30/6/1958



Plan of allotments - note although the bus turning circle is shown in the plan above, it was not created until 1962 (Source: SINSW)

02 City of Ryde, "Aboriginal History", 10 May 2017. https://www.ryde.nsw.gov.au/Library/Local-and-Family-History/Historic-Ryde/Aboriginal-History

03 City of Ryde, "History of Ryde, West Ryde", 30 May 2016. https://www.ryde.nsw.gov.au/Library/Local-and-Family-History/Historic-Ryde/History-of-Ryde

04 "Marsden High Official Opening of New Accommodation, 19th November 1971." Notes for the use of L.W. Mutton, M.L.A. (provided by SINSW)

HISTORICAL OVERVIEW

This extract from Russel Jack's 1980 thesis[05] explains the design approach within the Government Architect's Branch during this period:

> *Pre-war high school plans invariably followed a single-loaded corridor principle, usually over two stories. This planning approach continued into the 1950s. ... The planning concept of single-loaded corridors and solid construction did, however, produce schools which were reasonably well lit and cross-ventilated and which gave adequate acoustic isolation between classrooms. ... The work produced in the immediate post-war period at the [NSW Government Architect's] Branch was essentially an extension of the pre-war approach. ... Precast concrete framing members were inserted into existing designs, thus reducing construction times, saving bricks and reducing costs. Bricks were used only on end walls, and spandrels beneath windows were made from various infill materials.*

The School buildings were designed by Concrete Industries (Australia) Limited with Kevin J. Curtin as consulting architects.[06] The contract for construction of the first two stages was awarded to Monier Constructions Pty. Ltd (builders of Villawood).[07] Blocks A, F, and I (formerly G) comprised the first stage. The original plans and elevations for Stage I buildings specify the use of prefabricated 'Monocrete' panels with a 'Tyrolean' Finish; precast concrete edge beams, eaves and gutters, and exposed aggregate panels for these Stage I buildings. Monocrete was a subsidiary company of Concrete industries (Aust) Ltd who manufactured 100mm thick precast panels at their plant in Villawood. The 'Monocrete' panels were hollow and fitted between grooved posts.[08]

Stage I of the new High School opened in January 1959, with the initial enrolment comprising 352 First-Formers under the Principal, Mr. J. E. Hogan. It was originally named Ermington High School and renamed Marsden High School in March 1959 after the Reverend Samuel Marsden, whose land grant was on the western boundary of Winbourne Street opposite the school.[09]

During 1959 Stage II of the school's construction, four additional classroom Blocks (B-E), were constructed. According to the original plans, these were essentially the same as the Stage I buildings, except for the specification of 'Monier' precast panels, portals and edge beams. Monier was also a division of Concrete Industries, manufacturing precast building components at Villawood.[10]

Stage II was occupied by February 1960. The playing fields were developed throughout the following three years at an additional cost of over £15,000.[11]

In 1962 classes were enrolled in the first four years of the secondary courses, the average daily attendance was 1088.5 and the school was raised to the status of a Secondary School.[12] Also in 1962, part of Tramway Street was resumed from L.E. Threlkeld & J. Bennet (27/7/1962). In 1963 the School Assembly Hall was completed by the building contractor, H. E. King, at a cost of £53,000.[13] While the building was designed by the NSW Government Architect's Branch under Edward Herbert Farmer, the working drawings were complete by Bowe and Burrows Architects (126 Phillip Street Sydney).[14] A bus turning bay was added to Winbourne Street when a portion of Lot 6 DP 1180 was dedicated as a Public Highway in 1963. By 1964 six Forms were enrolled and the school became a full high school.[15]

05 *Jack, Russell C, The work of the N.S.W. Government Architect's Branch, 1958-1973. University of Sydney: Faculty of Architecture Masters Thesis (1980), pp.85-88*

06 *Ermington High School Stage 1 and Stage 2 Plans. Concrete Industries (Australia) Limited. Kevin J. Curtin Consulting Architects. Plan series SB1672*

07 *Publicity Officer, "Ermington High School," 20 May, 1958, (provided by SINSW)*

08 *Lewis, Miles. Australian Building: A Cultural Investigation. 7.08 Forms & Systems. p.7.08.24 https://www.mileslewis.net/australian-building/pdf/07-cement-concrete/7.08%20forms%20+%20systems.pdf*

09 *"Marsden High Official Opening of New Accommodation. 19th November 1971." Notes for the use of L.W. Mutton, M.L.A. (provided by SINSW)*

10 *Lewis, Miles. Australian Building: A Cultural Investigation. 7.08 Forms & Systems. p.7.08.21 https://www.mileslewis.net/australian-building/pdf/07-cement-concrete/7.08%20forms%20+%20systems.pdf*

11 *"An Outline History of Marsden High School and Environs". (unknown author, unknown date - provided by SINSW)*

12 *"Marsden High Official Opening of New Accommodation. 19th November 1971." Notes for the use of L.W. Mutton, M.L.A. (provided by SINSW)*

13 *Department of Public Works. "Annual Report 1962-63". p.40*

14 *Assembly Hall Ground Floor and Foundation Plan. Bowe and Burows Architects. 21 November 1963.*

15 *"Marsden High Official Opening of New Accommodation. 19th November 1971." Notes for the use of L.W. Mutton, M.L.A. (provided by SINSW)*

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Marsden High School in 1965, the main entrance to Building B00C, Building B00B (left), and a view of Buildings B00D, B00E, and B00A behind (Source: SINSW)

Similar Current view of the main entrance to Marsden High School, Buildings B00B (left) and B00C (right).

MARSDEN HIGH SCHOOL - PRELIMINARY HERITAGE REPORT
HISTORICAL OVERVIEW

SCHOOL EXPANSION 1971

The Wyndham Scheme's requirement for compulsory high school attendance up to the School Certificate, together with the unexpectedly large increase in the numbers of pupils staying on for the final two years, led to an expansion of secondary enrolments and larger high schools. Many new high schools, whose architecture reflected the curriculum requirements, were opened in the 1960s and 1970s.[16]

Marsden High School was marked for expansion and plans were drawn up by the NSW Government Architect's Branch in 1968. A Site Plan, signed by Edward H. Farmer (NSW Government Architect from 1958-1973) on 23 June 1969, shows the additional accommodation Blocks H, J and K, located to the north of the existing Blocks with a connection between Block H and Block E.[17] Stapleton Constructions built these new Blocks at a cost of $357,900 and they were opened in 1971. Alterations were also made to parts of Blocks A-E and I (formerly G) at this time.[18]

Current view of the Winbourne Street elevation of the Assembly Hall (Building B00L) is now partially obscured by trees.

LATER ADDITIONS

In 1981 sketch plans were drawn up by the NSW Government Architect's Branch under John Whyte Thomson (NSW Government Architect 1978- 1988) for a new Library.[19] Practical completion of the building was achieved during the 1984-1985 financial year at a cost of approximately $470,000.[20] The new Library was designated G and the toilet and canteen building was renamed Block I. Blocks B, C, E, H and J had alterations to a number of rooms and the Assembly Hall electrical services and ventilation were upgraded. A lift, covered walkways and ramps were installed in 2005 to connect buildings A and K with the new Library.[21]

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16 *Sydney and the Bush - A pictorial History of Education in NSW, NSW Department of Education, 1980, p.213*

17 *Site Plan Dalhuntey & Tierrey June 1974*

18 *Site Plan Dalhuntey & Tierrey June 1974*

19 *Department of Public Works. "Annual Report 1982-83", p.40*

20 *Department of Public Works. "Annual Report 1984-85", p.40*

21 *New Covered Way to Block A L & Library New PAL Lift to Library - Covered Way - Sheet 1, Government Architect, 2005*

Pupil Facilities and Food Services Unit (Building B00I - formerly G, Stage 1) with the 1971 additions behind: Buildings B00H - right, B00J - centre and B00K - left

The Library (Building B00G) with the covered walkways connecting it to Buildings B00A and B00K

DEVELOPMENT SUMMARY

SITE DEVELOPMENT

Marsden High School essentially had five stages of development:

- Stage I was occupied in January 1959;
- Stage II was completed in 1959 and occupied by February 1960;
- Stage III included the Assembly Hall completed in 1963;
- Stage IV included buildings K, J, and H completed in 1971;
- Stage V included the Library, lift, and covered ramps between the library, and buildings A and K in 1985

Marsden High School Development Stages future boundary dashed in yellow. (Source: SIXMaps modified by Purcell, boundary information supplied by SINSW).

MARSDEN HIGH SCHOOL - PRELIMINARY HERITAGE REPORT
BUILDING ANALYSIS

BUILDINGS A - E	
Date	Building B00A was constructed between July 1957 and late 1958 and occupied in January 1959 Buildings B00B-B00E were constructed between July 1958 and late 1959 and occupied by February 1960
Design and Construction	Designed by Concrete Industries (Australia) Limited, Kevin J. Curtin Consulting Architect Built by Monier, Builders of Villawood, / Monier Constructions Pty. Ltd
Type	Classroom Blocks (Buildings B00A - B00E)
Description	Buildings B00A, B00B, B00D and B00E are oriented north east / south west on either side of an uncovered sports court (originally an open assembly space). Building B00C has an entrance canopy towards the street to form the main entry point to the school. Building B00C is oriented at ninety degrees to the other buildings to close the south-west side of the sports court. The sports court surface level is below that of buildings B00A and B00B, and higher than buildings B00D and B00E to accommodate the fall in the site. Brick retaining walls are used to terrace the site. Buildings B00A - B00E are two-storey buildings with shallow pitched, concrete tiled, gable roofs and shallow precast concrete eaves to the long sides and Asbestos Cement eaves lining to the gable ends. It is unknown if these are the original roof tiles. However, there is a new section of tile roof [22]over the south western end of building B00A which was installed after a fire in that part of the building in August, 2017.[23] Externally the buildings have regularly spaced, vertical portals, Monocrete (B00A) or 'Monier' panels and horizontal precast concrete edge beams, all with 'Tyrolean' finish. Buildings B00D and B00E have an exposed aggregate finish to the south east elevations and Building B00C has the same finish to the south west elevation. Buildings B00A, B00B, B00D and B00E feature face brick gable ends to the north east and south west, building C likewise to the north west / south east. The face brick gable return ends have the same 'Tyrolean finish' as the precast panels. The connections between the buildings are generally face brick. The buildings are of Late Modern style, displaying the characteristic lack of ornament, and the use of functional features (such as windows and the reinforced concrete hoods over them) as decorative elements to accentuate the building's predominantly horizontal massing. The fenestration pattern corresponds to the use of the interior spaces. Buildings B00A, B00B, B00D and B00E have a corridor on their north west side and classrooms on the southeast side with a horizontal ribbon of timber framed windows above the Monocrete infill panels. Mostly the ribbon contains four double hung windows between the fins that extend to the soffit. However, on the north west elevations of Buildings B00A, B00B, B00D and B00E the windows are smaller and do not form a continuous ribbon. The internal floor plan is single loaded on both stories with timber-framed air-flow windows and glass louvres to the corridors. In Building B00C, the ground floor corridor is central, with offices either side. On the ground floor the walls, columns and perforated acoustic sheet ceiling to the corridor have been painted. Buildings B00A, B00B, and B00E have timber flooring, Building B00C is carpeted and B00D has vinyl sheeting to the corridor floors. Stairs are precast concrete.
Modifications	In the Stage II building works (1959-60), Building B00A was connected to Building B00B through the south elevation on both levels. During the 1969 / 1971 construction of Buildings B00H, B00J and B00K, there were some alterations to the layout of both floors of Buildings B00A-B00E and laboratory heating was installed. The new Building B00H was connected via an external walkway to Building B00E through the north east elevation by removing a store room on the first floor. The Fume Hoods were replaced in Buildings B00A and B00B in 1981. In 1985 modifications were again made to internal layouts in Buildings B00B, B00C and B00E. The former library on the ground floor at the north eastern end of Building B00E was converted to a staff common room. Sometime after this it was converted to a performance space. In 1987 an ESP system was installed throughout the school to manage the building's energy and HVAC performance. During 2005 ramps and covered walkways were installed between Buildings B00A and B00L. Air conditioning units have been installed on the precast window hoods on several buildings.

22 *EstimateOne "Marsden High School - Fire Remediation to Buildings A and B (Tender September 2018). https://estimateone.com/project/marsden-high-school-fire-remediation-to-buildings-a-and-b/*

23 *Deare, Steven. "Marsden High School at West Ryde ravaged by fire". Northern District Times. August 3, 2017. https://www.dailytelegraph.com.au/newslocal/northern-district-times/marsden-high-school-at-west-ryde-ravaged-by-fire/news-story/c9e3edb7b7901b16ba28f7c3083b1727*

BUILDINGS A - E

Buildings B00A (right), B00B and B00C (left) from the Sports Court.

Building B00C from the Sports Court (originally the Assembly Area).

Buildings B00E (left) and B00D (right) note the difference in fenestration compared to Buildings B00A, B00B, and B00C.

Building B00E (left and to the rear) and the link with B00D, viewed from B00A. Building B00I (formerly G) to the left.

Typical single-loaded corridor layout with potentially original timber floorboards.

Typical general learning classroom.

MARSDEN HIGH SCHOOL - PRELIMINARY HERITAGE REPORT

BUILDING ANALYSIS

BUILDING F	
Date	Constructed between July 1957 and late 1958 and occupied in January 1959
Design and Construction	Designed by Concrete Industries (Australia) Limited, Kevin J. Curtin Consulting Architect Built by Monier, Builders of Villawood
Type	Manual Training Block (Building B00F)
Description	The Manual Training Block (Building B00F) is to the north west of Classroom Buildings B00A and B00B and adjacent to the car park on the north western boundary. The south west gable end fronts Winbourne Street. Building B00F is a single-story building with a shallow pitched gable roof, with A/C Eaves linings. Although the original plans have the roof material annotated as 'Redlands concrete tiles', they are currently profiled sheet metal. The roof tiles are visible in a 1965 image of the school. Externally the building has regularly spaced, vertical portals and Monocrete panels with 'Tyrolean' finish. There are face brick gable ends to the north east and south west. The face brick gable return ends have the same 'Tyrolean finish' as the Monocrete panels. The building is of Late Modern style, and shares largely the same design aesthetic as the adjacent (and contemporary) Buildings B00A and B00B. There is a later addition adjacent, but separate to the north western side of the building, associated with the extraction system. Windows and doors have timber frames. The main entry to the building is a double door on the south western elevation, with glazed highlights and painted ply panels under sidelights, protected by a portico over precast concrete stairs. There are two other single door entrances, the northern entrance has precast concrete stairs, and at the central entrance a ramp and stairs have replaced the original precast stairs. The windows are generally a set of four panes, between the precast panel and the eaves, with two larger central double hung with a narrower window either side comprised of a lower fixed pane and an upper airflow pane. Adjacent to the two single doors the narrower windows are omitted, and there is a fixed pane over the door. The north eastern-most bay has no windows. Internally the building contains four classrooms/workshops that occupy the full width of the building and which consequently have good natural light and ventilation. There is a small lobby at each door that provides access to the rooms. Store rooms are located between classrooms at each doorway. The northern doorway leads to a Staff Study, Staff Toilet, a storeroom and the northern classroom. The internal walls are rendered below the windows which extend to the soffit. The ceiling is painted sheet / board material. The floor is timber throughout the lobbies, three workshops and the storerooms. The staff areas and the southern classroom are carpeted, and the staff toilets are tiled. The building originally housed two woodwork rooms and associated stores; two metalwork rooms and associated store with a cement floored area for future forges; the staff study and staff toilet.
Modifications	The south western metalwork room was converted to a Design and computer studio. The extraction system has been upgraded and a small building added adjacent, but separate to the north western side of the building, associated with the extraction system. Bars have been installed to the windows of the design and computer studio.

BUILDING F

The south elevation of Building B00F with the main entrance under the portico.

Current view of Building B00F. Note the end bay without windows where the staff toilets are.

The middle of Building B00F with the later ramp and stairs added for accessibility.

Wood Tech Learning space interior with upgraded extraction systems. The staff area is beyond the far door.

The north western side with the later addition for the upgraded extraction system.

MARSDEN HIGH SCHOOL - PRELIMINARY HERITAGE REPORT
BUILDING ANALYSIS

BUILDING G	
Date	Constructed between July 1984 and 1985
Design and Construction	Designed by the NSW Government Architect's Branch under John Whyte Thomson with Robert Ness and Associates Consultant Architects
Type	Library Block (Building B00G)
Description	The Library is a masonry building, separated into two wings by an entrance corridor. The east wing has a mezzanine level. The east wing has an external steel frame supporting the shallow pitch, pyramid hip roof. Both wings have aluminium framed glazed windows with metal mesh sunshades. The east wing has full height glazing to the corners.
Modifications	None known to the authors.

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BUILDING G	
	
The north side of Building B00G, showing the face brick walls and corner glazing.	*Current view of the north west elevation. The building is obscured by the ramps, covered walkway and landscaping.*

MARSDEN HIGH SCHOOL - PRELIMINARY HERITAGE REPORT
BUILDING ANALYSIS

BUILDING I	
Date	Constructed between July 1957 and late 1958 and occupied in January 1959 Occupied in January 1959
Design and Construction	Designed by Concrete Industries (Australia) Limited, Kevin J. Curtin Consulting Architect Built by Monier, Builders of Villawood
Type	Pupil Facilities and Food Service Unit (FSU - Canteen) Block (Building B00I)
Description	Building B00I is a single-story brick building with a shallow pitched north west / south east, concrete tiled, gable roof over the Canteen and covered shelter area. It is unknown if these are the original 'Redlands' concrete roof tiles. There is a flat, profiled, sheet metal roof over the north east / south west toilet wing that projects to the south west of the covered area. The covered area is accessed through metal clad tilt-up doors at either side of both gable ends. The building has face brick gable ends with the same 'Tyrolean finish' on the gable return ends as the Monocrete wall panels. The building is of Late Modern style, and shares largely the same design aesthetic as the adjacent (and contemporary) Buildings B00A - B00E. Internally the building contains store rooms, the canteen, girls and boys toilets, and the covered shelter area. The roof has exposed trusses with AC sheeting above. The walls are timber clad to the chair rail. The floor to the covered shelter is concrete. There are highlight windows in the gable ends in line with the exposed roof trusses. The toilets have tiled floors and tiles behind the steel wash troughs. The toilet cubicles are arranged on both long sides, with obscure glass air-flow widows above the cubicles on the exterior walls.
Modifications	Building B00I has had some modifications, however the fabric of the bathroom spaces remains in good condition. The original entrance doors to the toilets on the north east end has been infilled and extra cubicles installed. There is a newer addition to the north western side of the girls toilet, housing a shower and toilet, with a profiled metal skillion roof.

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BUILDING I

Building B00I as seen from Building B00A. Note the extension to the side. The entrance to the girls toilet is through the door to the right, with the boys toilet entrance on the opposite side.

View of Building B00I from the top level of Building B00C. The tiled and metal roof sections can be seen in this image.

The gable end windows provide light into the covered shelter.

The interior of the covered shelter area, with the Cafeteria to the right.

Tilt-up metal clad doors provide entrance to the shelter area.

The interior of the girls toilets.

MARSDEN HIGH SCHOOL - PRELIMINARY HERITAGE REPORT

BUILDING ANALYSIS

BUILDINGS H, J AND K	
Date	Constructed mid-late 1970 - late 1971
Design and Construction	Designed by the NSW Government Architect's Branch under Edward H. Farmer. Built by Stapleton Constructions
Type	General / Art / Science Learning, Staff and Storage Blocks (Buildings B00H, B00J and B00K)
Description	Buildings B00H and B00K are four-storey high masonry buildings. Building B00J is a three storey high masonry building. All have a shallow-pitched (flat) eaveless roof with aluminium barge capping and concealed gutters behind. The long elevations are broken into equally spaced bays by embedded off form concrete columns with pinkish-sandstone colour brick walls between. The balconies are cantilevered concrete with concrete balustrades topped with a handrail while the ground level has steel balustrades. Precast concrete spigots are inserted into the base of the concrete balustrades. Classrooms open directly off the balconies. The northern elevation has full-length sun louvres over the windows. Windows and doors generally have timber frames. The louvre windows form a horizontal band above the door height between the infill brick walls and the soffit.
Modifications	A room on the second floor of Building B00H was converted to a computer leaning space in 1985. An art learning space on the ground floor of Building B00J was also modified in 1985. New sinks were installed as well as shelving units in a store and a brick opening between an Art Staff room and resource room was bricked up and rendered.

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BUILDINGS H, J AND K

Current view of the north east elevation of Building B00H. Note the exposed off-form concrete.

Detail of the timber eaves to Building H.

Building B00J (centre), link between Building B00H (right).

Typical classroom in Building B00J note the timber framed louvre widows to the external corridor with off-form concrete balustrades.

Building B00K (left), B00J (right) with the lift and stairwell between.

Building B00K has exterior louvred window sunshades (as seen from inside a classroom).

MARSDEN HIGH SCHOOL - PRELIMINARY HERITAGE REPORT

BUILDING ANALYSIS

BUILDING L	
Date	Constructed between July 1962 and June 1963
Design and Construction	Designed by the NSW Government Architect's Branch under Edward H. Farmer, with working drawings by Bowe and Burrows Architects Built by H. E. King
Type	Assembly Hall (Building B00L)
Description	The exterior of the Assembly Hall (B00L) is face brick with a low pitched gable roof. The side walls to the north and south are stepped in towards the east end of the building, which steps out to house the stage. The roof steps down in line with the walls and is eaveless with aluminium barge capping and exposed gutters. Windows and doors have aluminium profile frames. The entrance faces Winbourne Street and has two sets of double swing doors with glazing to the steel framed portico which has a profiled sheet metal roof. The walls below the portico are rendered. Internally the walls are exposed brick on the sides, timber clad at the west end and on the edge of the mezzanine. The ceiling is acoustic panelling that steps down in line with the roof. The floor boards are polished timber throughout with concrete stairs to the mezzanine from the entrance lobby. The stage has a projecting timber clad awning supporting the lighting equipment. The School honour boards are installed on the walls of the main auditorium and also in the entry lobby and on the walls of the stairs.
Modifications	Upgrades to the electrical services, lighting and fans were completed in 1985.

BUILDING L

The Winbourne Street elevation is the main entrance to Building B00L and is obscured by landscape planting.

Current view of the southern side of the building showing the stepped walls and roof. The building is obscured by landscaping and the adjacent residential houses.

The timber clad awning to the proscenium arch over the stage.

View of the mezzanine.

The mezzanine above the front entrance. Note how the ceiling steps down towards the stage.

Honour boards are distributed through the Assembly Hall.

MARSDEN HIGH SCHOOL - PRELIMINARY HERITAGE REPORT

COMPARATIVE ANALYSIS

INTRODUCTION

This comparative analysis was undertaken to establish the relative heritage significance within both the Ryde LGA and the SPIE's Metropolitan Planning Region. The Historical Study of Government Schools undertaken by TKD Architects in 2018 (**TKD 2018 study**) as well as the comprehensive study by Russell Jack on the work of the NSW Government Architect's Branch (**GAB**), prepared in 1980 are referenced in this analysis. Both studies set the scene for, and context of, the construction of schools within NSW, the development of the education system and approach to school design. Both studies list schools constructed from Monocrete with the same Architect (Kevin J Curtin) and Construction Company (Concrete Industries - the developer of Monocrete) as Marsden High School (**Marsden HS**).

The Monocrete school buildings were a continuation of pre-war planning and design approaches. They were often two story buildings with single-loaded corridors.[24] The use of precast concrete was a response to the shortage of materials and the GAB's stated requirement for speed and economy.[25] The following extract from the TKD 2018 study highlights the context in which Marsden High School (designed by Concrete Industries and Kevin J. Curtin), was constructed:

> *The post-war surge in demand for school buildings and the absence of readily available building materials was met by experiments with framed construction, prefabrication and the inventive use of concrete, which was amongst the first responses to the necessity of constructing new buildings quickly and inexpensively. The firm of Concrete Industries seems to have played an important role in this. In May 1946 it announced it was well on the way to commence mass-producing a patented building unit it had developed called Monocrete. This was a 100 millimetre thick precast concrete slab of variable length and width, of which about 36% was hollow cavities. The slabs fitted into each other and were linked by steel tensioning rods. The first Monocrete school block, containing two classrooms, is understood to have been erected at Villawood Public School in the first half of 1950. Sixty-seven Monocrete classrooms had been completed by the beginning of 1954. By the second half of the decade Concrete Industries were producing a sophisticated array of precast elements. They were involved in the design and documentation of several schools in association with architect Kevin Curtin. This involvement may have been part of a broader "package deal" scheme, in which selected builders were given a high school to design and build, working in association with an architect of their own choice, to speed the process of school construction. Two of the schools resulting from this partnership were Seven Hills High School and Cheltenham Girls High School, the first buildings of which were occupied in January 1958. A surprising array of precast concrete elements were incorporated into buildings – eaves sections incorporating gutters, edge beams with canopies to shade windows, concrete columns, Monocrete wall panels, precast beams and hollow floor sections.*[26]

CHELTENHAM GIRLS HIGH SCHOOL

Cheltenham Girls High School (**CGHS**) is mentioned in the Russell Jack Thesis as one of the Monocrete Schools designed and documented by the same architect and construction company (Concrete Industries (Australia) Limited, Kevin J. Curtin Consulting Architects), as Marsden HS. It was also opened in 1958, the same year as Marsden HS. CGHS is in the Hornsby Shire Local Government Area (**LGA**), and the Epping State Electorate, both adjacent to the Ryde LGA and State electorate, where Marsden HS is located. CGHS was visited as part of this study as a comparative Monocrete school campus to Marsden HS. CGHS is the only Monocrete School on the list supplied by SINSW, that is on the DoE's section 170 Register. The list of dignitaries who attended the official opening is extensive, including the Hon. R. J. Heffron, M.L.A. (Deputy Premier and Minister for Education), E. Hearnshaw, ESQ., M.M., B.Ec., Dip, Pub, Ed. (Member for Eastwood), Harold S. Wyndham , M.A,. Ed.D., Dip Ed. Director-General of Education, and Cobden Parkes, FRIBA, FRIAIA, Government Architect.

ASQUITH GIRLS HIGH SCHOOL

Asquith Girls High School (**AGHS**), while not mentioned in either study, was also visited as part of this study. This school was chosen as it is in close proximity to Marsden HS and within the Hornsby Shire Council LGA, and Hornsby State electorate. AGHS also has a similar construction period and campus size to both Cheltenham Girls High School and Marsden High School.

The following table compares the campus layouts for Marsden, Cheltenham and Asquith Girls High Schools. They are all generally of the Finger (or linear) plan form.[27] As can be seen from the following pages, there is no 'standard' school layout. The buildings are arranged to form courtyards between them where possible, and each school layout is suited to the size, shape and slope of the site. All three schools still retain their original Monocrete buildings (with the exception of one small building at AG HS that has been replaced) The satellite views are from 2018 and do not show the roof changes to CGHS and AGHS, both since re-roofed with profiled metal sheeting.

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24 *Jack, Russell C. University of Sydney. Faculty of Architecture Masters Thesis (1980) p.86*

25 *Jack, (1980), p.92*

26 *TKD Architects, Government school architecture in New South Wales, Historical Study, Prepared for Department of Education January 2018 p.121-122*

27 *Willis, Julie, Goad, Phillip, Lewi, Hannah, et al, "Designing Australian Schools, A Spatial History of Innovation, Pedagogy and Social Change" (online) Melbourne School of Design.*

MARSDEN HIGH SCHOOL - PRELIMINARY HERITAGE REPORT

COMPARATIVE ANALYSIS

MARSDEN HIGH SCHOOL, 22 WINBOURNE STREET, WEST RYDE , NSW

Officially opened in January 1959, by Mr. J. E. Hagan (Marsden High School's new Principal), with seven Monocrete buildings

Marsden HS in 1961 (Source: NSW Historical Imagery.)

The Hall (indicated by the blue arrow) was completed in 1963. (Source: SIXMaps, 2018)

CHELTENHAM GIRLS HIGH SCHOOL, 161-175 BEECROFT ROAD, CHELTENHAM, NSW

Officially opened 28th January 1958, with six Monocrete buildings constructed by 1961 and the seventh completed before 1965.

CGHS in 1961, note the Hall is contemporaneous with the school (indicated by the yellow arrow) (Source: NSW Historical Imagery)

CGHS currently. The building indicated by the yellow arrow was completed before 1965. (Source: SIXMaps, 2018)

ASQUITH GIRLS HIGH SCHOOL, STOKES AVENUE, ASQUITH, NSW

Occupied on 3rd February 1959 before completion of the first buildings, with six Monocrete buildings completed by 1961 and another by 1965

AGHS in 1961- note the central connection between the three rows of buildings. (Source: NSW Historical Imagery)

The north west building appears to be a 'Plan A library / laboratory block'[28] (1975) and north east building is the Hall (1984). (Source: SIXMaps, 2018)

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28 TKD architects, 2018, p.160

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COMPARATIVE ANALYSIS

CHELTENHAM GIRLS HIGH SCHOOL

Front entrance with contemporaneous Hall (right). (Source: Purcell)

Administration block with semicircular awning (Source: Purcell)

Typical classroom block connection, note exposed aggregate gable end. (Source: Purcell)

Typical classroom blocks looking north west across the courtyard. Note the original tiled roof was recently replaced with a sheet metal roof. (Source: Purcell)

ASQUITH GIRLS HIGH SCHOOL

School signage is installed on the gable end, similar to Marsden HS. Note the entrance to the admin block has no awning (right). (Source: Purcell)

The sloping block was utilised to create a third level for a change room. The fenestration is similar to Marsden HS. (Source: Purcell)

Canteen and shelter (left) with later COLA over the north east courtyard The link has been recently re-clad with profiled sheet metal. (Source: Purcell)

The north west courtyard with COLA. All standard fenestration patterns are shown, stairwell (right), large and small (left). (Source: Purcell)

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MARSDEN HIGH SCHOOL - PRELIMINARY HERITAGE REPORT

COMPARATIVE ANALYSIS

As seen from the previous images, all three schools have shallow pitched, gable roofs, precast concrete eaves to the long sides and sheet material eave linings to the gable ends. All have regularly spaced, vertical portals, Monocrete (or other precast concrete) panels, horizontal precast concrete window hoods and similar fenestration. All three were constructed between 1955 and 1960.

The schools differ in the building's detailing and layout. The semicircular awning at CGHS was added later, as it is not shown on the 1961 aerial. Marsden HS's awning was constructed with Building B00A, and no awning was installed at AGHS. CGHS has glazed walls to the building connections, whereas at Marsden they are predominantly brick. AGHS has first floor connections between, and perpendicular to, the parallel rows of buildings, which the other two do not have. At CGHS and AGHS the canteen and shelter are integrated into a classroom block, whereas at Marsden HS they are in a separate building with the toilets. The Hall at CGHS was constructed within three years of the school opening as seen in the 1961 aerial image. CGHS Hall appears to be constructed of brick and Monocrete panels. AGHS has one of the standard multi-purpose centre designs used by the GAB in the 1980s,[29] whereas Marsden HS's was designed by the GAB.

OTHER SIMILAR MONOCRETE SCHOOLS

The information supplied by SINSW from the DoE's AMS included nineteen high schools (in addition to Marsden HS, CGHS, and AGHS) with three or more Monocrete buildings on campus. Of these, five could be verified as having double storey buildings similar to Marsden from Google Street View. These included Bass, James Cook Boys Technology, Kingsgrove and Kingsgrove North, and Merrylands High Schools, all opened between 1955 and 1960 and are briefly outlined in the following table.

There were at least ten other Monocrete high schools opened during this time period, with similar plan forms to the above schools. As it was not possible to verify their similarity to Marsden HS from Google Street View, they are not included in this largely desktop based assessment. These included Asquith Boys, Bankstown Girls, Birrong Boys, Blacktown Boys and Girls, Cabramatta, Chatswood, East Hills Boys, Epping Boys, Fairfield, Moorefield Girls, and Northmead Creative and Performing Arts High Schools. While Epping Boys High School is also in the Ryde LGA, it appears to have single storey Monocrete buildings, which are not directly comparable to double storey Monocrete schools.

OTHER SIMILAR MONOCRETE SCHOOLS

BASS HIGH SCHOOL

Arundle Rd, Bass Hill NSW.

Opened January 1959

9 Monocrete Buildings

Not listed on State / Local / S170 Register

Not mentioned in either, Russel Jack's Thesis or TKD Architects' Historical Study

The school in 1961 (Source: NSW Historical Images)

In 2018 (Source: SIXMaps, 2018)

The roof material was unable to be ascertained from Google Street View, although the green colour of the roof on plan view is suggestive of it's replacement with a coloured, profiled sheet metal roof. (Source: Google Street View October 2020)

29 TKD architects, 2018, p.160

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OTHER SIMILAR MONOCRETE SCHOOLS

JAMES COOK BOYS TECHNOLOGY HIGH SCHOOL

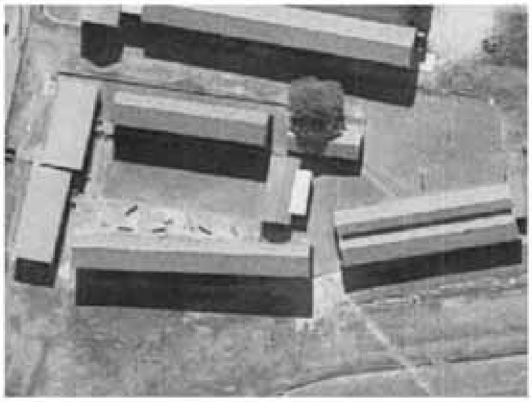
800 Princes Highway Kogarah NSW 2217

Opened January 1956

7 Monocrete Buildings

Not listed on State / Local Heritage Registers. Listed on the S170 Register

Not mentioned in either, Russel Jack's Thesis or TKD Architects' Historical Study



The school in 1961 (Source: NSW Historical Images)

In 2018 (Source: SIXMaps, 2018)

The roof tiles on the northern building (above) are still extant. (Source: Google Street View October 2020)

KINGSGROVE HIGH SCHOOL

Kingsgrove Rd, Kingsgrove NSW.

Opened January 1960,

5 Monocrete Buildings

Not listed on State / Local / S170 Register

Not mentioned in either, Russel Jack's Thesis or TKD Architects' Historical Study.

Kingsgrove High School in 1961 (Source: NSW Historical Images) and currently (Source: SIXMaps, 2018

Note the extant roof tiles. (Source: Google Street View, February 2020)

OTHER SIMILAR MONOCRETE SCHOOLS

KINGSGROVE NORTH HIGH SCHOOL

St Albans Rd, Kingsgrove NSW.

Opened January 1959,

6 Monocrete Buildings

Not listed on State / Local / S170 Register

Not mentioned in either, Russel Jack's Thesis or TKD Architects' Historical Study

The school in 1961 (Source: NSW Historical Images)

In 2018 (Source: SIXMaps, 2018)

The roof material was unable to be ascertained from Google Street View. (Source: Google Street View, October 2020)

MERRYLANDS HIGH SCHOOL

37 Bristol St, Merrylands NSW.

Opened January 1959,

11 Monocrete Buildings

Not listed on State / Local / S170 Register

Not mentioned in either, Russel Jack's Thesis or TKD Architects' Historical Study

The school in 1961 (Source: NSW Historical Images)

In 2018 (Source: SIXMaps, 2018)

The roof has been replaced with profiled metal sheeting since 2018. (Source: Google Street View, October 2020)

MARSDEN HIGH SCHOOL - PRELIMINARY HERITAGE REPORT
COMPARATIVE ANALYSIS

SUMMARY

The use of precast, modular construction materials (such as Monocrete panels) determines that all Monocrete schools generally have the same architectural features. Apart from the use of a new construction technique, these schools are not considered innovative architectural responses to the existing educational requirements in the studies referred to by this report. The use of standardised materials and construction techniques represents one method by which GAB met the requirements for speed and economy and to deal with the material shortages during the 1950s and 1960s. Other methods included the importation of prefabricated aluminium buildings, the use of aluminium framed curtain walls, portable timber classroom buildings, and early modular aluminium-clad, demountable buildings.[30] In addition, the GAB developed more innovative designs, using steel framing, precast concrete and metal roofs, to meet the architectural challenges created by the changing educational requirements.[31]

As can be seen from the images in the previous tables, the schools included appear to have retained most, if not all of their original Monocrete buildings. Analysis of the 1961 historical imagery shows that all Monocrete buildings at these schools were completed within a short time frame, as was Marsden High School. The buildings at James Cook Boys Technology and Kingsgrove High Schools appear to have retained their original roof tiles. Merrylands High School's roof has been replaced with profiled metal sheeting. It was not possible to ascertain the roof material for Bass Hill and Kingsgrove North High Schools. The common features of these double storey Monocrete buildings include rendered monocrete infill panels beneath the windows; precast concrete canopies to shade the ground floor windows; precast eaves; regularly spaced, rendered vertical piers; plain brick or exposed aggregate gable end walls and infill panels; the use of two standard window types (a four pane module spanning the vertical piers and a two pane central window); extensive glazing to stairwells; and tiled roofs. The campus layout of these schools is based on the linear (finger) type plan,[32] adjusted to suit the site requirements, and generally creating at least one courtyard between the buildings.

Marsden High School was one of at least nineteen Monocrete high schools built within the DoE's Metropolitan Planning Area between 1955 and 1960. CGHS is the only one of these Monocrete high schools included on the DoE's S.170 register, none of them are heritage listed in other Local or State registers.[33] Unlike CGHS, Marsden High School does not have any features that distinguishes it from the other comparative Monocrete high schools within the DoE's Metropolitan Planning Area portfolio.

30 *TKD Architects, 2018, pp.169-172*

31 *TKD Architects, 2018, pp.132-133*

32 *Willis, Julie, Good, Phillip, Lewi, Hannah, et al, "Designing Australian Schools, A Spatial History of Innovation, Pedagogy and Social Change" (online) Melbourne School of Design.*

33 *As accessed through the NSW Heritage Database.*

MARSDEN HIGH SCHOOL - PRELIMINARY HERITAGE REPORT

ASSESSMENT OF HERITAGE SIGNIFICANCE

An initial assessment of Marsden High School Buildings, based on the material provided by SINSW and the limited additional primary material available, was made against the NSW Heritage Criteria to determine whether the school possesses any heritage value.

Historical significance SHR criteria (a)	a) an item is important in the course, or pattern, of NSW's cultural or natural history (or the cultural or natural history of the local area) Marsden High School, and its individual buildings, has incidental connections with the program of capital works associated with the rapid expansion of Secondary Schools throughout NSW between the 1940s and 1970s, it does not demonstrate strong associations with cultural history of the area, nor the portfolio of the Department of Education or the architect Kevin J Curtin. As such the buildings do not meet the threshold for significance against this criterion. The establishment, historical development and expansion of Marsden High School reflects the historical development and expansion of the suburb's population. The school's development also reflects the changes in educational and social standards over time. It has amenity value to the local community as an educational facility. In this regard it does meet the threshold for significance against this criterion.
Historical association significance SHR criteria (b)	b) an item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history (or the cultural or natural history of the local area) Marsden High School has incidental associations with the NSW Government Architect's Branch under Edward Herbert Farmer. Is also has association with architect Kevin J. Curtin. However, the buildings are not considered to be exemplary, rare surviving or seminal works. As such the buildings do not meet the threshold for significance against this criterion.
Aesthetic significance SHR criteria (c)	c) an item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area) The buildings are not considered to be major works in the portfolio of the NSW Government Architect's Branch under Edward Herbert Farmer, nor in the portfolio of architect Kevin J. Curtin. In addition they do not individually represent creative or technical innovation or achievement. The buildings individually do not possess landmark qualities nor distinctive aesthetic attributes. As such the buildings do not meet the threshold for significance against this criterion.
Social significance SHR criteria (d)	d) an item has strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons A full assessment of social significance is beyond the scope of this study. Notwithstanding Marsden High School does not have associations with an identifiable group. By means of amenity the School itself is important to the community for its educational and community contribution. However, the buildings are not considered to have strong or special associations with the community beyond the provision of educational amenity and as such they do not meet the threshold for significance against this criterion.
Technical/Research significance SHR criteria (e)	e) an item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area) An assessment of the archaeological significance of the site is beyond the scope of this study.
Rarity SHR criteria (f)	f) an item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area) Monocrete high schools were constructed across NSW during the mid-twentieth century post-war period. There are a number of extant Monocrete school campuses that are of a similar condition, design and configuration, which are relatively intact and in good condition. Marsden High School is not considered a rare example of its type and does not meet the threshold for significance against this criterion.

Representativeness SHR criteria (g)	g) an item is important in demonstrating the principal characteristics of a class of NSW's (or a class of the local area's) • cultural or natural places; or • cultural or natural environments Marsden High School demonstrates the principal characteristics of double storey Monocrete schools constructed between 1955 and 1960. The building arrangement, along with the modular construction method and materials, define the core principles of a Monocrete school campus. In this sense, the school is representative of Monocrete school campuses constructed in NSW during this post-war period. Marsden High School demonstrates representative significance on a local level and meets the threshold for significance against this criterion.
Integrity	All of the buildings on site maintain integrity externally. Part of the Building B00A and its roof have been replaced following damage by a 2017 fire. The internal layouts have been modified somewhat from the original. Changes to fittings and fixtures of most buildings have been made in line with changing standards and requirements.

MARSDEN HIGH SCHOOL - PRELIMINARY HERITAGE REPORT
SUMMARY AND RECOMMENDATIONS

SUMMARY

Marsden High School has historical association with the period in which a large number of schools were constructed in response to the rapidly rising post-war school age population. The floor plan is based on pre-war designs which utilise single-loaded corridors. However, in response to requirements for rapid and economical construction of large numbers of schools, and concurrent with material shortages, precast concrete components were used in school construction. It is one of many types of schools built at that time in response to the DoE's requirements for all students to undertake comprehensive higher education in NSW in the late 1950s and 1960s.

Marsden High School is of historical significance to the local community for its amenity value as an educational facility as well as reprentative significance. The school is reasonably intact, and has the principal characteristics of double storey Monocrete high schools built between 1955 and 1960.

RECOMMENDATIONS

We recommend that archival photographic recording is undertaken of Marsden High School for local history archival purposes prior to any work being carried out at the school.

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Abel Ecology

Prescribed Ecological Actions Report (PEAR)

For a Planning Proposal

Marsden High School
22 Winbourne Street
West Ryde NSW 2114

Proposed recreational facility

Prepared for:	**School Infrastructure NSW**
Report No:	**AE21-REP-2253-Issue 2 Planning Proposal**
Prepared by:	**Abel Ecology**
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Disclaimer

This report has been prepared in accordance with the scope of services described in agreement between Abel Ecology and the Client.

In preparing this report, Abel Ecology has relied upon data, surveys and site inspection results taken at or under the particular time and or conditions specified herein. Abel Ecology has also relied on certain verbal information and documentation provided by the Client and/or third parties, but did not attempt to independently verify the accuracy or completeness of that information. To the extent that the conclusions and recommendations in this report are based in whole or in part on such information, they are contingent on its validity. Abel Ecology assumes no responsibility for any consequences arising from any information or condition that was concealed, withheld, misrepresented, or otherwise not fully disclosed or available to Abel Ecology.

The findings contained in this report are the result of discrete/specific methods used in accordance with normal practices and standards. To the best of our knowledge, they represent a reasonable interpretation of the general condition of the site in question. Under no circumstances, however, can it be considered that these findings represent the actual state of the site/sites at all points.

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I confirm that I have read the NSW Land and Environment Court Practice Note commencing on 14 May 2007, Division 2, Part 31 of the Uniform Civil Procedure Rules 2005 and the Expert Witness Code of Conduct in Schedule 7 to the Uniform Civil Procedure Rules 2005. I have prepared this advice in accordance with the requirements of the Practice Note and Code of Conduct and believe this report is consistent with the requirements of the Practice Note and the Code of Conduct. I agree to be bound by the Practice Note and Code of Conduct.

Document History

Report	Version	Prepared by	Technical Review by	Proofread by	Submission	
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Report	Draft A	Dr Danny Wotherspoon		Denise McNamara	Dropbox	08 Mar 21
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List of Abbreviations

ALS	Actual Lot Size
BAM	Biodiversity Assessment Method
BC Act	*Biodiversity Conservation Act 2016*
BCR	Biodiversity Conservation Regulation 2017
BDAR	Biodiversity Development Assessment Report
d.b.h.	Diameter at breast height (~1.4 metres)
EEC	Endangered Ecological Community
ESD	Ecologically Sustainable Development
LEP	Local Environmental Plan
LGA	Local Government Area
MLS	Minimum Lot Size

Note regarding maps in this report

The diagrams/site maps used in this report have been supplied by and are used with the permission of NSW Health Infrastructure.

With regard to maps provided by the Land Information Centre, Topographic maps used with the permission of © Land and Property Information, NSW.

Executive summary

The proposal is to rezone the land from SP2 to RE1 and E2.

A biodiversity survey was carried out at Marsden High School to assess the likely impacts of the proposal on species and ecological communities present on the site, and whether the proposal requires a Biodiversity Development Assessment Report (BDAR) because it is a likely trigger to entry into the Biodiversity Offsets Scheme identified in s. 7.4 of the *Biodiversity Conservation Act 2016.*

This report also describes whether there is likely to be any significant effect on any endangered ecological community, endangered population, threatened species or their habitats, as per the listings in the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act 1999) (Commonwealth legislation).

The areas to be affected are landscape plantings and mown playing fields.

The following three considerations are triggers for entry into the Biodiversity Assessment Method for a Part 3 proposal.

Threshold Trigger 1: Exceeding the clearing threshold on an area of native vegetation
Threshold Trigger 2: Development or a prescribed activity is carried out on land included in the Biodiversity Values Land Map.
Threshold Trigger 3: A "significant effect" on threatened species or ecological communities

There is no impediment to this proposal in the scope of this report. None of the three thresholds for entry into the Biodiversity Offsets Scheme are triggered by the proposal.

A report prepared using the Biodiversity Assessment Method is not recommended.

Recommendations:

- A Biodiversity Development Assessment Report (BDAR) is not required.
- Loss of trees that could in future provide hollows for fauna habitat needs to be replaced with fauna nest boxes erected within the retained forest.
- Light spill from floodlights needs to be avoided by shielding so that direct light does not shine into the forest area.

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Figure 1. Aerial view of site.

Site location

Figure 2. Topographic view of site.

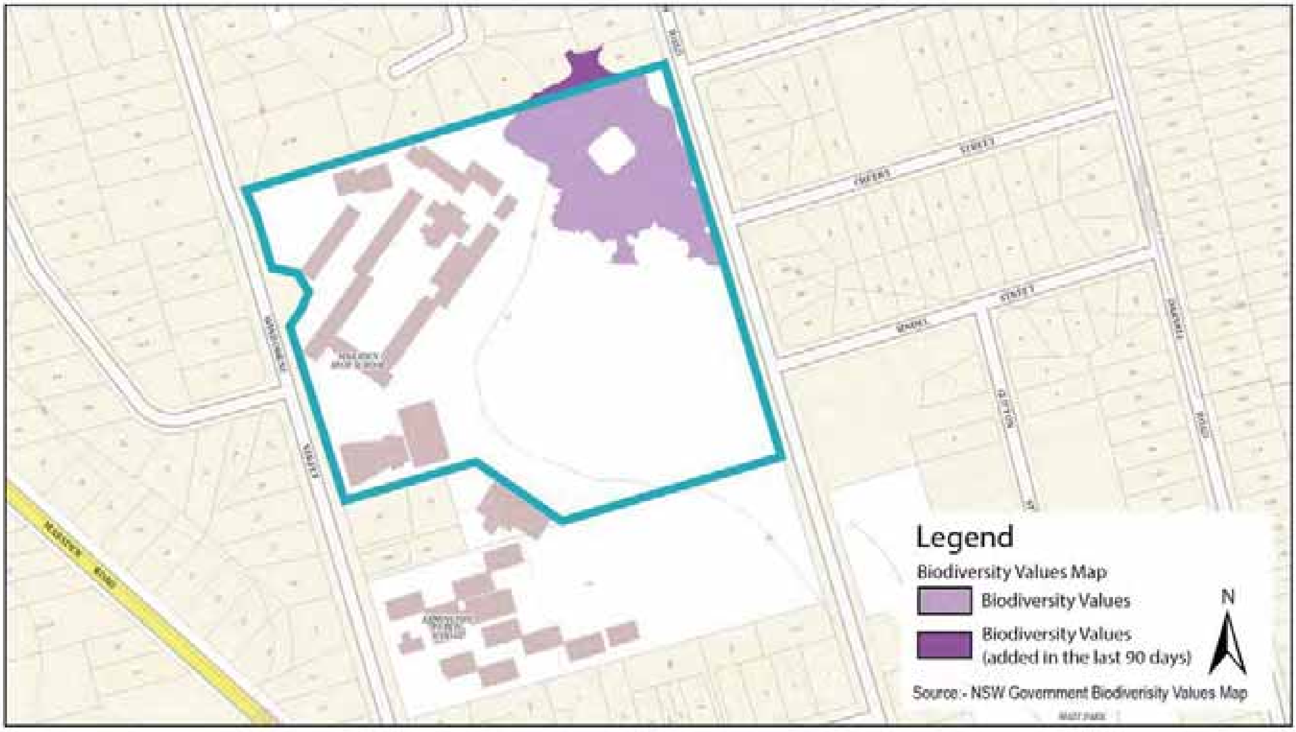

Figure 3. Locality and Biodiversity Value Map of site.

Key

Site location

https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BVMap

Figure 4. Proposal diagram

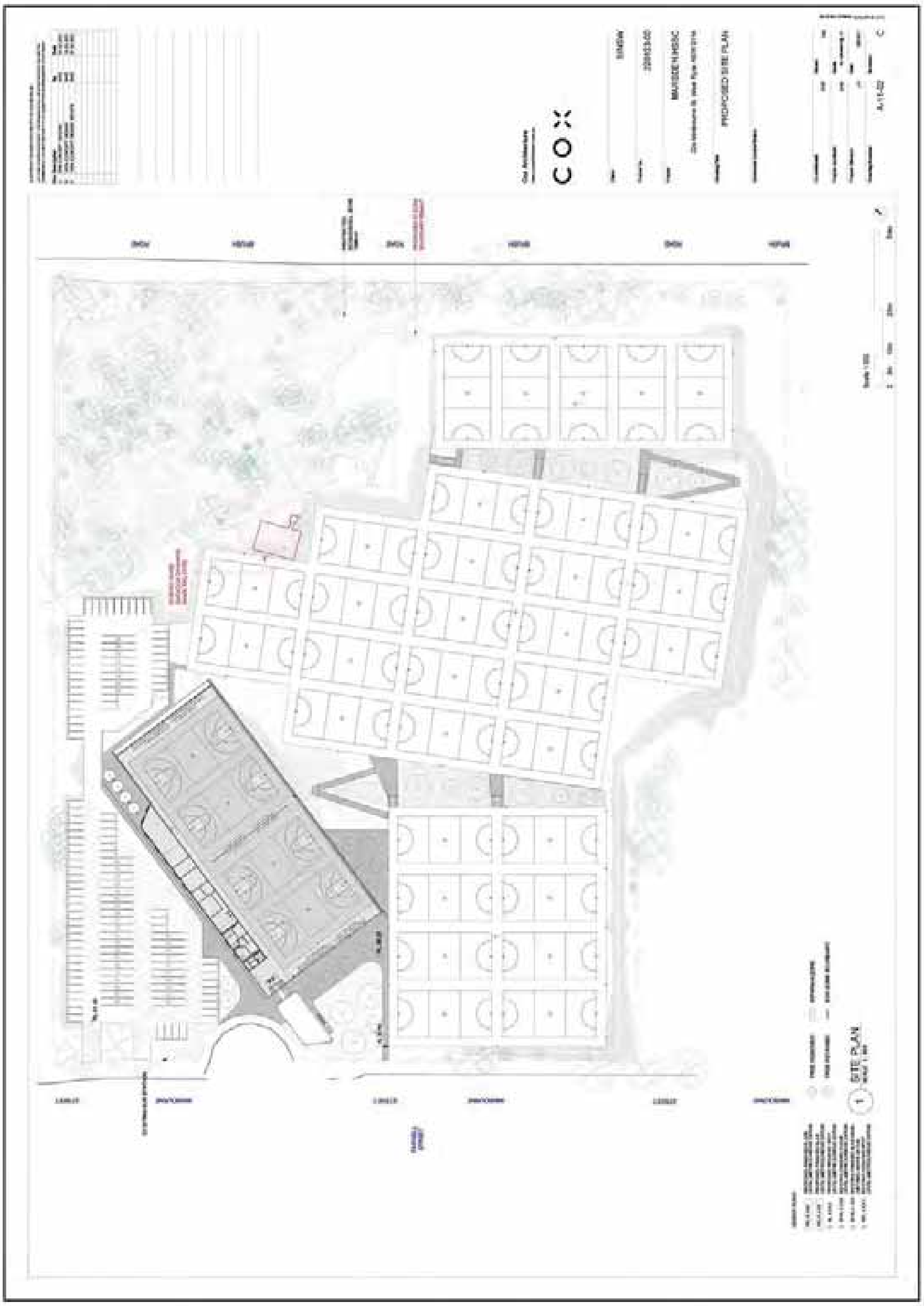

Figure 5. Proposal diagram with proposed E2 zone boundary.

Figure 6. Area of Blue Gum High Forest on the site.

The remainder of the site is mown lawns and landscape plantings.

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Figure 7. Aerial photo with Vegetation map, Ecological and bushfire constraints on the site.

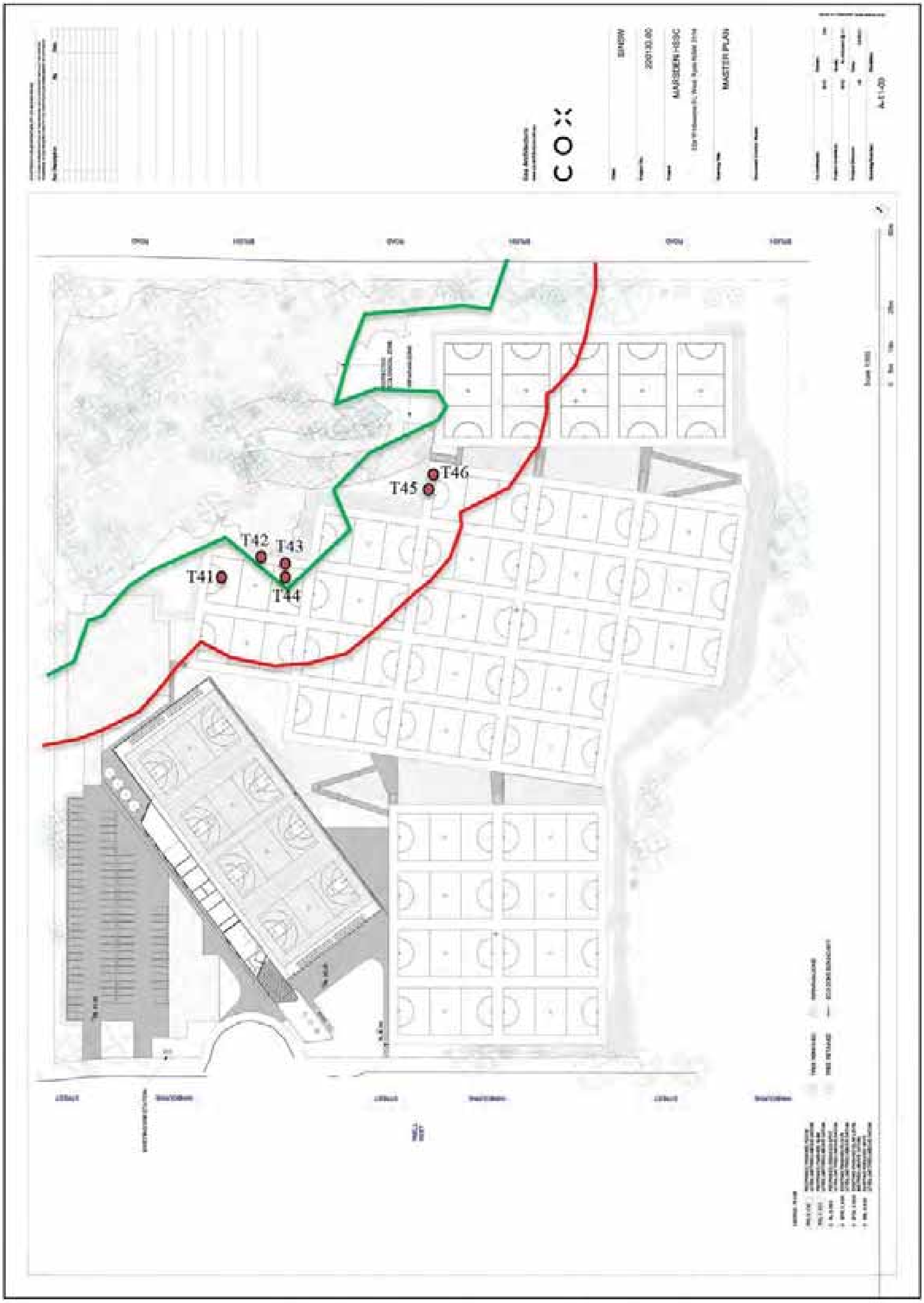

Figure 8. Vegetation and habitat map for the site.

Vegetation contributing to Bushfire Hazard
Tree site locations and numbers
Bushfire attack line 10kW/m²

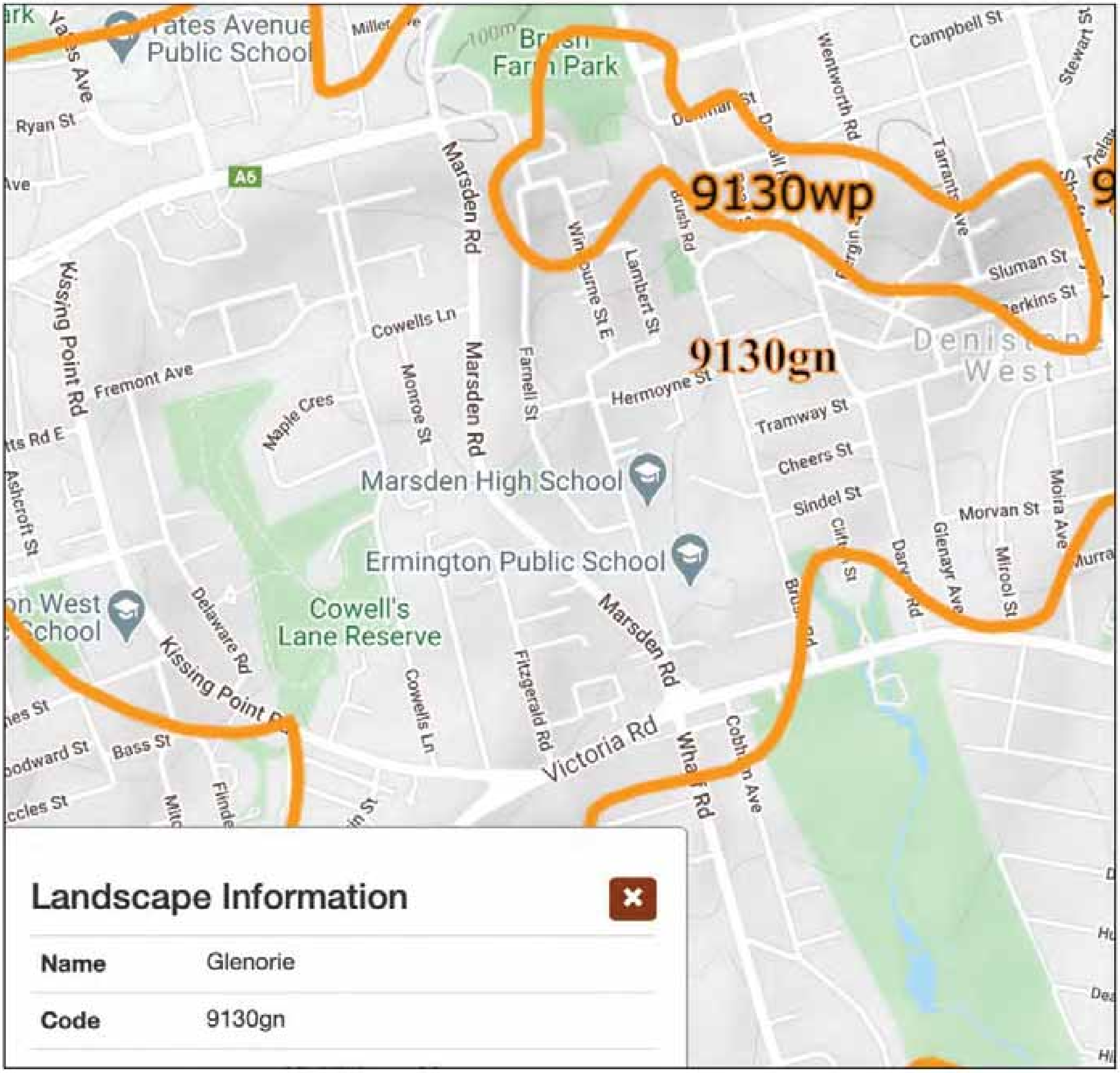

Figure 9. Soil Landscapes of site and surrounding area.

Map extract from the eSpade website: https://www.environment.nsw.gov.au/eSpade2WebApp

Figure 10. Site 1943 air photo.

1. Introduction

1.1 Legislative context

This Prescribed Ecological Actions Report meets the requirements of the *Biodiversity Conservation Act 2016* to enable a Council or other consent or determining authority to assess a proposed development or activity under Part 3 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The authority must consider the following three Biodiversity Offset Scheme Development Thresholds.

Threshold Trigger 1: Exceeding the clearing threshold on an area of native vegetation,

Threshold Trigger 2: Development or a prescribed activity is carried out on land included in the Biodiversity Values Land Map,

Threshold Trigger 3: A "significant effect" on threatened species or ecological communities.

A biodiversity survey of the proposed development site at Marsden High School ('the site' – Figure 1, Figure 2, Figure 3,) was undertaken on 14 and 22 December 2020 and 2 March 2021. This Prescribed Ecology Actions Report investigates whether the impacts of proposal to redevelop the site will trigger either of the two thresholds to entry into the Biodiversity Offsets Scheme, thereby requiring a Biodiversity Development Assessment Report.

This assessment addresses both 'endangered' and 'vulnerable', as required by the Biodiversity Conservation Act 2016 (BCA 2016). Throughout this report 'threatened' refers to those species and communities listed as 'endangered' or 'vulnerable' in Schedules 1 & 2 of the BC Act 2016.

If any of the three thresholds are triggered, then a Biodiversity Development Assessment Report (BDAR) must be prepared by an accredited assessor for the Authority to issue a consent or an approval and a calculation of offsetting required.

1.2 The proposal

The proposal (Figure 4, Figure 5) consists of rezoning the land from SP2 to RE1 and E2 to permit with consent a future development application for recreational use which may include:

a) demolition of existing structures,
b) buildings,
c) stormwater detention areas,
d) carparks and driveways,
e) outdoor courts and landscape areas,
f) link up to sewage system,
g) clearing planted and landscape native and exotic vegetation, but not affecting the area marked as purple on the Biodiversity Values Map,
h) bushfire asset protection zone,
i) utilities within the site.

Table 1. Details of lot size and size of proposed native and landscape planting vegetation clearing.

Component of site	Area m²	Proportion of the site %
Whole site	54,820	100
Extent of proposed native vegetation and exotic landscape clearing	6,387	11.3
Extent of clearing of vegetation native to NSW	3,403	6.0

1.3 Sources of information used in this assessment

Literature reviewed in order to assess possible issues relating to this site include:

- Air photo (SIX maps),
- Survey map,
- Vegetation map,
- Schedules to the BC Act 2016,
- Schedules to the EPBC Act 1999,
- OEH Atlas of NSW Wildlife.

2. Biodiversity offsets scheme thresholds 1 and 2

2.1 Threshold One: Biodiversity Conservation Regulation 2017 Development area assessment thresholds

Clearing of native vegetation is declared by clause 7.2(1) to exceed the biodiversity offsets scheme threshold if the area proposed to be cleared exceeds the minimum lot size applicable to the land to be cleared.

Clearing of native vegetation will trigger entry into the offsets scheme if clearing is greater than the assessment threshold. The minimum lot size of land can be found on the NSW planning portal https://www.planningportal.nsw.gov.au/find-a-property/property/.

As a Part 3 development proposal this criterion is relevant.

Table 2: Areas section 7.2(4) Biodiversity Conservation Regulation 2017.

	Land to be considered	**Assessment threshold**
	Minimum lot size of land	**Area of clearing**
A	Less than 1 hectare	0.25 hectare or more
B	Less than 40 hectares but not less than 1 hectare	0.5 hectare or more
C	Less than 1,000 hectares but not less than 40 hectares	1 hectare or more
D	1,000 hectares or more	2 hectares or more

The parcel of land is zoned SP2 and the minimum lot size for this lot is the actual Lot size.
The size of the lot is approximately 56,570 m^2, and row B is appropriate for this proposal. The area of clearing is less than the threshold of 0.5 hectares.

Conclusion
The proposed clearing does not exceed the threshold and entry into the BC Act offset scheme is not required as a result of clearing.

2.2 Threshold Two: Clearing or prescribed activities as listed in the Biodiversity Conservation Regulation 2017 on land included on the Biodiversity Values Map

Part of the site contains land included on the Biodiversity Values Map. The second threshold can be triggered by clearing on the Biodiversity Values Map (Figure 3).
https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BVMap

No clearing is proposed on land included in the Biodiversity Values Map.

If one of more of the following prescribed activities are included directly or indirectly on land included on the Biodiversity Values Map as part of the proposal/proposed activity the Biodiversity Offsets Scheme will apply.

The following extracts are from the *Biodiversity Conservation Regulation 2017*:

> *Part 7 Biodiversity assessment and approvals under Planning Act*
>
> *7.1 Biodiversity offsets scheme threshold (section 7.4)*
>
> *(1) Proposed development exceeds the biodiversity offsets scheme threshold for the purposes of Part 7 of the Act if it is or involves:*
>
> *(a) the clearing of native vegetation of an area declared by clause 7.2 as exceeding the threshold, or*
>
> *(b) the clearing of native vegetation, or other action prescribed by clause 6.1, on land included on the Biodiversity Values Map published under clause 7.3.*
>
> *Part 6 Biodiversity offsets scheme*
>
> *Division 6.1 General*
>
> *6.1 Additional biodiversity impacts to which scheme applies (sections 6.3 and 6.6 (2) BCR)*
>
> *(1) The impacts on biodiversity values of the following actions are prescribed (subject to subclause (2)) as biodiversity impacts to be assessed under the biodiversity offsets scheme:*
>
> *(a) the impacts of development on the following habitat of threatened species or ecological communities:*
>
> > *(i) karst, caves, crevices, cliffs and other geological features of significance,*
> >
> > *(ii) rocks,*
> >
> > *(iii) human made structures,*
> >
> > *(iv) non-native vegetation.*

Response

No impacts from the proposal will occur on karsts, caves, crevices, cliffs or other geological features of significance, or rocks, human made structures or non-native vegetation that were present on site and are habitat for threatened species or ecological communities.

3. Landscape features of the site and the locality

3.1 Site description

For the purposes of this report, the site is defined by the Lot boundaries (Figure 2). It is 5.482 ha. in size and the elevation is 30 m above sea level.

The site is sloped to the southeast, with levelled and filled playing fields.

There is an open drainage line in the northeast corner that is piped under the playing field, to discharge from the southeast corner, then piped under the road and discharge into Maze Park.

The adjacent properties to the east and west are urban residential and the site adjoins Ermington Public School to the south and residential to the north.

https://www.planningportal.nsw.gov.au/find-a-property/

3.2 History of the site

The site was cleared agricultural land in 1943 (Figure 10) and since has been developed as a High School with playing fields.

3.3 Geology

The geology on the site consists of Wianamatta Group Ashfield Shale and Bringelly Shale formations. The Ashfield Shale is comprised of laminite and dark grey shale. Bringelly Shale consists of shale, calcareous claystone, laminite, fine to medium grained lithic-quartz sandstone (Herbert, 1983).

3.4 Site Soils

Site soils are Glenorie 9030gn, shallow to moderately deep (<100 cm) Red Podzolic Soils (Dr2.11) on crests; moderately deep (70–150 cm) Red and Brown Podzolic Soils (Dr2.11, Dr2.21, Db1.11, Db1.21) on upper slopes; deep (>200 cm) Yellow Podzolic Soils (Dy5.11) and Gleyed Podzolic Soils (Dg4.11) along drainage lines.

Dominant Soil Materials
gn1□Friable dark brown loam. This is generally a dark brown, friable loam, silt loam or silty clay loam with moderately to strongly pedal structure and porous rough-faced ped fabric. This material occurs as topsoil (A1 horizon).

gn2□Hardsetting brown clay loam. This is commonly a clay loam to fine sandy clay loam with an apedal massive or weakly pedal structure and an earthy or porous, rough-faced ped fabric. This material occurs as an A2 horizon and is occasionally hardsetting when exposed at the surface.
gn3□Whole-coloured, reddish-brown, strongly pedal clay. This is medium clay with strongly pedal structure and smooth-faced, dense, ped fabric. It generally occurs as subsoil (B horizon).
Texture is generally medium clay but may range from silty clay to heavy clay.

gn4□Mottled grey plastic clay. This is a grey, mottled, medium to heavy clay with strongly pedal structure and dense, smooth ped fabric. It commonly occurs as deep subsoil.

gn5□Brownish-grey plastic silty clay. This is commonly brownish-grey, plastic silty clay which is often saturated and exhibits apedal massive structure. It usually occurs as subsoil (B horizon).
Colour is dark brown (10YR 3/3) often becoming brownish-grey (10YR 4/1) with dark brown mottles at depth. This material is moderately sticky and very plastic when moist. The pH ranges from moderately acid (pH 5.0) to slightly acid (pH 6.5). Rock and charcoal fragments are absent and roots are rare.

The mapped soil landscapes for the site and locality are displayed in Figure 9.

3.5 Landscape features

The majority of the site is a planted landscape that includes exotic and native species of trees and shrubs. The vegetation in the north east corner is remnant forest that has a mown understorey and a drainage line largely vegetated by weeds.

The proposed tree removal diagram A-11-01 - Tree Removal Plan and the tree schedule provided by Bradshaw (2020) was ground-truthed (Figure 7).

The trees tagged T1 to T40 and T50 to T83 are all planted specimens of no particular ecological significance. A number of those such as exotic conifers are incorrectly identified but that is of minor concern. The group of Acacias mapped as 47A may be removed as senescent and a hazard.

The five trees T41, T42, T43, T44 and T46 Sydney Blue Gum *Eucalyptus saligna* are at the edge of the remnant forest and part of that community but not part of the mapped Biodiversity Values Area.

The following landscape features are present on the site (Table 3).

Table 3. Site landscape features

Vegetation	The entire site has been cleared or disturbed. There are few remnant local native trees. A patch of local native vegetation has regenerated in the northeast corner of the site adjacent to a drainage line.
Non-native vegetation	The landscape has potential for foraging habitat for threatened species of bats and birds.
Human structures	Buildings to be demolished have very little potential as bat roosts.
Wetlands/dams/watercourse	A watercourse as a Strahler first order stream runs through the forest area but is piped for most of the site.
Karst, caves, crevices and other geological features of significance	None
Roads	Vehicle traffic and road mortality - no road kill was observed near the site.

3.6 Biodiversity Values area

The Biodiversity Values area is mapped to largely cover an area of regrowth Blue Gum High Forest (Figure 3). However, within the purple area of the map is cleared ground with construction erected as a shade sail and exercise equipment (Figure 5). The proposed E2 zone area (Figure 5) will more closely represent the native vegetation and provide areas for regeneration that will be protected in the future.

4. Field survey methods

4.1 BioNet Atlas of NSW Wildlife website search

Records from the BioNet Atlas of NSW Wildlife website were accessed using the following search criteria:

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Licensed Report of all Valid Records of Threatened (listed on BC Act 2016) or Commonwealth listed Entities in selected area [North: -33.75 West: 151.02 East: 151.12 South: -33.85] recorded since 01 Jan 2000 until 03 Mar 2021 returned a total of 16,391 records of 66 species.

These species (Table 4) were considered in designing field survey targets and methods. Unsuitable candidates were eliminated on the basis of habitat requirements (Appendix 4 and Appendix 5).

Table 4: BioNet threatened flora & fauna species records for a 5 km radius of the site since 1 Jan 2000.

Scientific Name	Common Name	NSW status	Comm. status	Potential habitat on site
Pseudophryne australis	Red-crowned Toadlet	V,P		No
Litoria aurea	Green and Golden Bell Frog	E1,P	V	No
Hirundapus caudacutus	White-throated Needletail	P	V,C,J,K	No
Botaurus poiciloptilus	Australasian Bittern	E1,P	E	No
Ixobrychus flavicollis	Black Bittern	V,P		No
Circus assimilis	Spotted Harrier	V,P		No
Haliaeetus leucogaster	White-bellied Sea-Eagle	V,P		No
Hieraaetus morphnoides	Little Eagle	V,P		Yes
Pandion cristatus	Eastern Osprey	V,P,3		No
Callocephalon fimbriatum	Gang-gang Cockatoo population in the Hornsby and Ku-ring-gai Local Government Areas	E2,V,P,3		Yes

Scientific Name	Common Name	NSW status	Comm. status	Potential habitat on site
Callocephalon fimbriatum	Gang-gang Cockatoo	V,P,3		Yes
^^*Calyptorhynchus lathami*	Glossy Black-Cockatoo	V,P,2		No
Glossopsitta pusilla	Little Lorikeet	V,P		Yes
Lathamus discolor	Swift Parrot	E1,P,3	CE	No
Ninox connivens	Barking Owl	V,P,3		Yes
Ninox strenua	Powerful Owl	V,P,3		Yes
Tyto longimembris	Eastern Grass Owl	V,P,3		No
Tyto novaehollandiae	Masked Owl	V,P,3		Yes
Anthochaera phrygia	Regent Honeyeater	E4A,P	CE	No
Epthianura albifrons	White-fronted Chat	V,P		Yes
Epthianura albifrons	White-fronted Chat population in the Sydney Metropolitan Catchment Management Area	E2,V,P		Yes
Daphoenositta chrysoptera	Varied Sittella	V,P		No
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V,P		No
Petroica boodang	Scarlet Robin	V,P		No
Petroica phoenicea	Flame Robin	V,P		No
Dasyurus maculatus	Spotted-tailed Quoll	V,P	E	No
Phascolarctos cinereus	Koala	V,P	V	No
Petauroides volans	Greater Glider	P	V	No
Pteropus poliocephalus	Grey-headed Flying-fox	V,P	V	Yes

Scientific Name	Common Name	NSW status	Comm. status	Potential habitat on site
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V,P		Yes
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V,P		Yes
Chalinolobus dwyeri	Large-eared Pied Bat	V,P	V	Yes
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V,P		Yes
Myotis macropus	Southern Myotis	V,P		Yes
Scoteanax rueppellii	Greater Broad-nosed Bat	V,P		Yes
Miniopterus australis	Little Bent-winged Bat	V,P		Yes
Miniopterus orianae oceanensis	Large Bent-winged Bat	V,P		Yes
Pommerhelix duralensis	Dural Land Snail	E1	E	Yes
Wahlenbergia multicaulis	Tadgell's Bluebell in the local government areas of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield	E2		Yes
Wilsonia backhousei	Narrow-leafed Wilsonia	V		No
^^Hibbertia spanantha	Julian's Hibbertia	E4A,2	CE	No
Tetratheca glandulosa		V		No
Epacris purpurascens var. purpurascens		V		No
Dillwynia tenuifolia		V		Yes
Acacia clunies-rossiae	Kanangra Wattle	V		Yes
Acacia pubescens	Downy Wattle	V	V	Yes
Lasiopetalum joyceae		V	V	No

Scientific Name	Common Name	NSW status	Comm. status	Potential habitat on site
Callistemon linearifolius	Netted Bottle Brush	V,3		Yes
Darwinia biflora		V	V	No
Eucalyptus nicholii	Narrow-leaved Black Peppermint	V	V	No
Melaleuca deanei	Deane's Paperbark	V	V	No
Rhodamnia rubescens	Scrub Turpentine	E4A		Yes
Syzygium paniculatum	Magenta Lilly Pilly	E1	V	Yes
Pomaderris prunifolia	P. prunifolia in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas	E2		Yes
Pimelea curviflora var. curviflora		V	V	No
Zannichellia palustris		E1		No

Table 5: Threatened species targeted in survey and 5 part tests.

Scientific Name	Common Name	NSW status	Comm. status	Potential habitat on site
Hieraaetus morphnoides	Little Eagle	V		Yes
Callocephalon fimbriatum	Gang-gang Cockatoo population in the Hornsby and Ku-ring-gai Local Government Areas	E2,V		Yes
Callocephalon fimbriatum	Gang-gang Cockatoo	V,P,3		Yes
Glossopsitta pusilla	Little Lorikeet	V,P		Yes
Ninox connivens	Barking Owl	V,P		Yes
Ninox strenua	Powerful Owl	V,P		Yes
Tyto novaehollandiae	Masked Owl	V,P		Yes
Epthianura albifrons	White-fronted Chat	V,P		Yes
Epthianura albifrons	White-fronted Chat population in the Sydney Metropolitan Catchment Management Area	E2,V		Yes
Pteropus poliocephalus	Grey-headed Flying-fox	V,P	V	Yes
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V,P		Yes
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V,P		Yes
Chalinolobus dwyeri	Large-eared Pied Bat	V,P	V	Yes
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V,P		Yes
Myotis macropus	Southern Myotis	V,P		Yes
Scoteanax rueppellii	Greater Broad-nosed Bat	V,P		Yes
Miniopterus australis	Little Bent-winged Bat	V,P		Yes

Scientific Name	Common Name	NSW status	Comm. status	Potential habitat on site
Miniopterus orianae oceanensis	Large Bent-winged Bat	V,P		Yes
Pommerhelix duralensis	Dural Land Snail	E1	E	Yes
Wahlenbergia multicaulis	Tadgell's Bluebell in the local government areas of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield	E2		Yes
Dillwynia tenuifolia		V		Yes
Acacia clunies-rossiae	Kanangra Wattle	V		Yes
Acacia pubescens	Downy Wattle	V	V	Yes
Callistemon linearifolius	Netted Bottle Brush	V		Yes
Rhodamnia rubescens	Scrub Turpentine	E4A		Yes
Syzygium paniculatum	Magenta Lilly Pilly	E1	V	Yes
Pomaderris prunifolia	P. prunifolia in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas	E2		Yes
Blue Gum High Forest in the Sydney Basin Bioregion	Blue Gum High Forest in the Sydney Basin Bioregion	E2	CE	Yes

Species for which suitable habitat occurs on the site within the range of the species but which did not appear in the Atlas record were added to Appendix 4 and Appendix 5.

A general survey was made for relevant threatened fauna species and comprehensive flora survey made (Table 5).

4.2 Field work effort

Over the one day of fieldwork a total of 13 hours were spent undertaking survey work on the site and surrounding habitat areas.

Table 6. Survey dates and weather conditions.

Date	Time	Temperature (°C)	Task	Hours (hrs x no. people)
14 Dec 20	0930-1330	21˚C, raining	Vegetation and fauna survey	4 x 2 = 8
22 Dec 20	0955-1340	28˚C raining	Vegetation and fauna survey	3.5 x 1 = 3.5
1 MAR 21	1520-1705	31˚C fine	Vegetation and fauna survey	1.5 x 1 = 1.5
Total				13

Survey effort was concentrated within the site boundaries, although adjacent surrounding vegetation was noted (Figure 3).

4.3 Flora survey method, vegetation community and habitat classification

A flora survey was conducted to compile vegetation descriptions and species lists for the site. A comprehensive plant survey and one quadrat survey were made for threatened species (See Appendix 5).

Vegetation quality is assessed as described below (Section 4.4). The plant communities on site were classified according to the NSW VIS.

4.4 Simplified vegetation integrity assessment

On-site vegetation may be described according to a simplified vegetation integrity classification for each vegetation zone / habitat type. The simplified vegetation integrity assessment is based upon a modified version of the vegetation integrity assessment described in the NSW Biodiversity Assessment Method (BAM) 2017. This simplified assessment is based upon a qualitative assessment; no quantitative assessment was undertaken and no vegetation integrity score is calculated. The assessment requires the assessor to compare the observed vegetation with the vegetation type presumed to be present prior to 1750 (high quality native vegetation). Vegetation with good or moderate integrity usually provide higher quality habitat for a diverse range of indigenous species.

Four main qualitative classes of vegetation integrity are recognised. There is variation within each class, and in addition the class boundaries are somewhat fluid where one grades into the other.

Good integrity vegetation
Characteristics: Relatively high indigenous species diversity, diversity of flora species growth form (mix of trees, shrubs and groundcovers etc), diversity of tree size, canopy layer regeneration observed,

fallen logs present on the ground, dead vegetative litter (leaves, twigs etc) cover present, weed invasion absent or minimal

Moderate integrity vegetation
Characteristics: Remnants and regenerating areas that have experienced disturbance but appear to retain the capability of recovery. Weed invasion may be moderate.

Poor integrity vegetation
Characteristics: The vegetation is highly disturbed. It typically consists of scattered trees/shrubs or clumps of trees and shrubs. Tree size diversity significantly reduced. The groundcover layer is comprised of a mix of indigenous species and exotic species. Fallen logs rare to absent, ground vegetative litter lacking.

Cleared class
Characteristics: Indigenous canopy species are absent and the indigenous understorey (shrubs/climbers/scramblers/groundcovers) are approximately less than 50%.

Note: some vegetation types naturally lack some of the characteristics. For example, trees are rare to absent in saltmarshes, sedge swamps, alpine herbfields and arid shrublands. However, providing the other characteristics are consistent with a natural undisturbed area of the same vegetation type then these vegetation types are classified as having "good integrity".

4.5 Fauna survey method

The methods of survey undertaken to detect the various faunal groups or their habitat are outlined below. Locations for specific survey methods are shown in Figure 6. Targeted surveys were made for threatened species based on records of sightings from the BioNet Atlas website, and the Ecologist's knowledge.

Dates, weather and temperatures of all fieldwork were recorded and are tabulated in Table 6 above.

4.5.1 Diurnal fauna searches

Searching, opportunistic observations and call recording provides an indication of types of species using a site. These methods are used to identify and record live animals, or record indirect evidence of animal presence on the site. On occasions, specific surveys may be conducted for a targeted group or species, such as searching the margins of a dam for frogs. Generally though, birds, reptiles, frogs and mammals, or evidence of them, may all be present in the same habitat at the time of survey, therefore searching for these faunal groups is generally run concurrently.

This involved:

a) Searching shelter sites, basking sites, opportunistic observation, and assessment of shelter site diversity suitability for reptiles.
b) Searching shelter sites, calling sites, egg deposition sites, spotlighting and triangulation on calling males for frogs.
c) Opportunistic observations and identification of calls of species, and search for indirect evidence such as nests, feathers, scratchings and feeding signs for birds.
d) Searching for indirect evidence, such as diggings, droppings, runways and burrows, and opportunistic observations for mammals.

While rigorous surveys are likely to find more species, high species richness for birds can be recorded in a relatively short amount of time. Bird surveys are used as a simple indicator of other parameters, such as biodiversity and the functioning of the ecosystem.

4.6 Species likely to occur

Species to be listed as 'likely to occur' or 'expected' (see Appendix 3), are common species generally found in the region, which are likely to occur on site if suitable habitat is present.

Native flora may include species local to the area (occurring in local remnants). Structure and species composition will depend upon locally occurring communities.

Expected species are common and, by definition, are not threatened species.

4.7 Limitations of the survey

This survey was conducted in the summer season. This was not suitable for winter migrants or species of winter-flowering orchids that lose their aerial stems after fruiting.

The weather conditions were variable, including rain and fine warm weather.

Species that may use the site were not detected during the survey for the following reasons:

a) The species was present during the survey but was not detected due to dormancy, inactivity or cryptic habits.
b) The species use the site at other times of the year, but was not present during the survey due to being nomadic or migratory.

4.8 Staff associated with the field work

Table 7. Staff associated with field work and analysis of field work.

	Field work	Analysis of field work
Dr Danny Wotherspoon	Vegetation and fauna survey	Dr Danny Wotherspoon, Mark Sherring
Mark Sherring	Vegetation and fauna survey	Dr Danny Wotherspoon, Mark Sherring
Alex McKenzie	Vegetation and fauna survey	Dr Danny Wotherspoon

5. Survey Results: Vegetation and habitat description

5.1 Site vegetation and habitat

The site contains three vegetation and habitat zones which are described below. Those comprise

- Mown lawns,
- Landscape gardens and tree plantings,
- Regrowth natural forest.

The distribution of vegetation/habitat zones on the site and surrounding areas is shown in Figure 6, Figure 7, Figure 8.

Hollow bearing trees are generally found in the forest zone.

There is generally a lack of fallen logs and dead wood/coarse woody debris as a result of site maintenance.

Other site habitat characteristics are described below.

Appendix 2 shows the list of flora found on the site.

5.1.1 Vegetation and habitat/zone 1 Forest

The forest area has regrown since 1943 to cover the north east corner of the site adjacent to the drainage line and along the eastern boundary of the site. Much of the understorey is mown and the drainage line is generally weedy.

Important habitat features that have significance for fauna occupation of the site are discussed below (Table 3). These include both site disturbance and natural features.

Table 8. Significant features and observations for the site.

Significant features	Observations
Frequency of large trees (approx. > 80 cm DBH)	Rare.
Tree regeneration and tree stem-size diversity	Some tree regeneration. Stem size varies by species and growth rate.
Logs, woody debris and litter cover	Logs, woody debris and leaf litter – low.
Food resources	Eucalyptus and Acacia provide food resources of blossoms and seeds. Low cover of fallen and rotting material is present near the base of larger trees.

The vegetation community is Blue Gum High Forest, a Critically Endangered Ecological Community listed under both the *NSW Biodiversity Conservation Act 2016* and the Commonwealth Environment Protection and *Biodiversity Conservation Act 1999*.

The vegetation within this zone is classified as moderate integrity vegetation. There are no threatened species within this zone.

5.1.2 Vegetation and habitat/zone 2 Landscape gardens and planted trees

A diversity of native and exotic species of trees has been planted in about the 1970s as landscaping for the site. The trees are relatively young ecologically with no hollows for fauna occupation. The garden beds and planted areas are maintained so the ground cover is mulched or mown.

Important habitat features that have significance for fauna occupation of the site are discussed below (Table 3). These include both site disturbance and natural features.

Table 9. Significant features and observations for the site.

Significant features	Observations
Frequency of large trees (approx. > 80 cm DBH)	None.
Tree regeneration and tree stem-size diversity	No tree regeneration, stem size varies by species and growth rate.
Logs, woody debris and litter cover	Logs, woody debris and leaf litter – low.
Food resources	Eucalyptus and Acacia provide food resources of blossoms and seeds. Other species provide fruits of various sorts. Low cover of fallen and rotting material is present near the base of larger trees.

The vegetation within this zone is classified as poor integrity vegetation. There are no threatened species within this zone.

5.2 Species and Communities of conservation concern

The vegetation community is Blue Gum High Forest, a Critically Endangered Ecological Community listed under both the *NSW Biodiversity Conservation Act 2016* and the Commonwealth Environment Protection and *Biodiversity Conservation Act 1999*.

The proposal avoids this area so no clearing is proposed within the biodiversity values map area.

5.3 Weeds

The *NSW Noxious Weeds Act 1993* has been repealed and the *Biosecurity Act 2015* has replaced it. The *Biosecurity Act 2015* requires each landholder and/or occupier to control biosecurity matter (weeds) on their property. The landholder and/or occupier is to develop an effective control strategy and plan to ensure they meet their General Biosecurity Duty.

The General Biosecurity Duty (GBD) is imposed on any person who deals with biosecurity matter (weeds), and who knows (or ought reasonably to know) of the biosecurity risk posed (or likely to be posed), has a biosecurity duty to ensure that the risk associated with those weeds is prevented, eliminated or minimised - so far as is reasonably practicable. A requirement is that all public and private land owners or managers and all other people who deal with weed species (biosecurity matter) must use the most appropriate approach to prevent, eliminate or minimise the negative impact (biosecurity risk) of those weeds.

Council may issue a Biosecurity Direction when any owner/occupier fails in their biosecurity duty to control weeds on their land. The owner/occupier must comply with this biosecurity direction. A penalty notice or prosecution may follow if the owner/occupier fails to comply with the Biosecurity Direction.

A range of weeds occurs within the forest area particularly along the drainage line.

6. Survey Results: Fauna

6.1 Species of conservation concern

A number of threatened species occur in the area and have potential habitat on the site (Table 5). Those species are assumed to be present for the purpose of the impact assessment. The habitat is the Blue Gum High Forest, which will be retained on the site.

6.2 Fauna results

A total of 14 species were detected, including one frog, no mammals, ten birds and three reptiles. Species listed as 'likely to occur' in the area are presented in Appendix 4. Note that the majority of the 'Expected Species' would not occur on the site due to the lack of habitat, but do occur in the area.

All the species listed as 'likely to occur' are common throughout the locality and the region. It is unlikely that protected species will be affected at a local, regional or state-wide scale by the proposal.

The habitats for threatened species that occur in the area are tabulated in Appendix 5.

The habitats for threatened species that occur in the area are tabulated in Appendix 5.

Table 10. List of fauna detected on the site

Common Name	Scientific Name	Conservation Status	Recorded AE
Frogs			
Common Eastern Froglet	1. *Crinia signifera*		W
Brown-striped Frog	1. *Limnodynastes peronii*		
Red-crowned Toadlet	1. *Pseudophryne australis*		
Bleating Tree Frog	1. *Litoria dentata*		
Eastern Dwarf Tree Frog	1. *Litoria fallax*		
Broad-palmed Frog	1. *Litoria latopalmata*		
Peron's Tree Frog	1. *Litoria peronii*		
Laughing Tree Frog	1. *Litoria tyleri*		
Verreaux's Tree Frog	1. *Litoria verreauxii*		
N=	9		1

Common Name	Scientific Name	Conservation Status	Recorded AE
Reptiles			
Broad Tailed Gecko	1. *Phyllurus platurus*		
Scaly-foot Lizard	1. *Pygopus lepidopodus*		
Red-throated Skink	1. *Acritoscincus platynota*		
Fence Skink	1. *Cryptoblepharus virgatus*		
Coppertail Skink	1. *Ctenotus taeniolatus*		
Eastern Water-skink	1. *Eulamprus quoyii*		O
Dark-flecked Garden Sunskink	1. *Lampropholis delicata*		
Pale-flecked Garden Sunskink	1. *Lampropholis guichenoti*		O
Weasel Skink	1. *Saproscincus mustelinus*		
Eastern Blue-tongued Skink	1. *Tiliqua scincoides*		O
Jacky Lizard	1. *Amphibolurus muricatus*		
Bearded Dragon	1. *Pogona barbata*		
Red Bellied Black Snake	1. *Pseudechis porphyriacus*		
N=	13		3

Common Name	Scientific Name	Conservation Status	Recorded AE
Birds			
Australian Wood Duck	1. *Chenonetta jubata*		O
Pacific Black Duck	1. *Anas superciliosa*		
White-faced Heron	1. *Egretta novaehollandiae*		
Australian White Ibis	1. *Threskiornis molucca*		
Collared Sparrowhawk	1. *Accipiter cirrocephalus*		
Brown Goshawk	1. *Accipiter fasciatus*		
Nankeen Kestrel	1. *Falco cenchroides*		
Purple Swamphen	1. *Porphyrio porphyrio*		
Dusky Moorhen	1. *Gallinula tenebrosa*		
Eurasian Coot	1. *Fulica atra*		
Masked Lapwing	1. *Vanellus miles*		
Rock Dove*	1. *Columba livia*		O
Spotted Turtle-dove*	1. *Streptopelia chinensis*		
Crested Pigeon	1. *Ocyphaps lophotes*		
Glossy Black-cockatoo	1. *Calyptorhynchus lathami*		
Yellow-tailed Black-cockatoo	1. *Calyptorhynchus funereus*		
Galah	1. *Eolophus roseicapilla*		
Long-billed Corella	1. *Cacatua tenuirostris*		O
Sulphur-crested Cockatoo	1. *Cacatua galerita*		O
Gang-gang Cockatoo	1. *Callocephalon fimbriatum*		
Scaly-breasted Lorikeet	1. *Trichoglossus chlorolepidotus*		
Rainbow Lorikeet	1. *Trichoglossus haematodus*		O
Musk Lorikeet	1. *Glossopsitta concinna*		
Australian King-parrot	1. *Alisterus scapularis*		
Crimson Rosella	1. *Platycercus elegans*		
Eastern Rosella	1. *Platycercus eximius*		
Asian Koel	1. *Eudynamys scolopaceus*		
Channel-billed Cuckoo	1. *Scythrops novaehollandiae*		
Southern Boobook	1. *Ninox novaeseelandiae*		
Tawny Frogmouth	1. *Podargus strigoides*		
Laughing Kookaburra	1. *Dacelo novaeguineae*		O
Sacred Kingfisher	1. *Todiramphus sanctus*		
Dollarbird	1. *Eurystomus orientalis*		
Satin Bowerbird	1. *Ptilonorhynchus violaceus*		
Superb Fairy-wren	1. *Malurus cyaneus*		
Variegated Fairy-wren	1. *Malurus lamberti*		
Spotted Pardalote	1. *Pardalotus punctatus*		
White-browed Scrubwren	1. *Sericornis frontalis*		
Brown Gerygone	1. *Gerygone mouki*		
White-throated Gerygone	1. *Gerygone albogularis*		

Common Name	Scientific Name	Conservation Status	Recorded AE
Birds			
White-throated Treecreeper	1. *Cormobates leucophaea*		
Brown Thornbill	1. *Acanthiza pusilla*		
Yellow Thornbill	1. *Acanthiza nana*		
Striated Thornbill	1. *Acanthiza lineata*		
Buff-rumped Thornbill	1. *Acanthiza reguloides*		
Red Wattlebird	1. *Anthochaera carunculata*		O
Little Wattlebird	1. *Anthochaera chrysoptera*		
Noisy Friarbird	1. *Philemon corniculatus*		
Bell Miner	1. *Manorina melanophrys*		
Noisy Miner	1. *Manorina melanocephala*		
Lewin's Honeyeater	1. *Meliphaga lewinii*		
Yellow-faced Honeyeater	1. *Lichenostomus chrysops*		
White-plumed Honeyeater	1. *Lichenostomus penicillatus*		
White-naped Honeyeater	1. *Melithreptus lunatus*		
New Holland Honeyeater	1. *Phylidonyris novaehollandiae*		
Eastern Spinebill	1. *Acanthorhynchus tenuirostris*		
Eastern Yellow Robin	1. *Eopsaltria australis*		
Eastern Whipbird	1. *Psophodes olivaceus*		
Golden Whistler	1. *Pachycephala pectoralis*		
Rufous Whistler	1. *Pachycephala rufiventris*		
Grey Shrike-thrush	1. *Colluricincla harmonica*		
Magpie-lark	1. *Grallina cyanoleuca*		
Rufous Fantail	1. *Rhipidura rufifrons*		
Grey Fantail	1. *Rhipidura fuliginosa*		
Willie Wagtail	1. *Rhipidura leucophrys*		
Olive-backed Oriole	1. *Oriolus sagittatus*		
Black-faced Cuckoo-shrike	1. *Coracina novaehollandiae*		
Grey Butcherbird	1. *Cracticus torquatus*		O
Australian Magpie	1. *Cracticus tibicen*		O
Pied Currawong	1. *Strepera graculina*		
Australian Raven	1. *Corvus coronoides*		
House Sparrow	1. *Passer domesticus*		
Red-browed Finch	1. *Neochmia temporalis*		
Welcome Swallow	1. *Hirundo neoxena*		
Silvereye	1. *Zosterops lateralis*		
Common Blackbird*	1. *Turdus merula*		
Common Starling*	1. *Sturnus vulgaris*		
Common Myna*	1. *Sturnus tristis*		O
N =	78		10

Common Name	Scientific Name	Conservation Status	Recorded AE
Mammals			
Brown Antechinus	1. *Antechinus stuartii*		
Long-nosed Bandicoot	1. *Perameles nasuta*		
Common Wombat	1. *Vombatus ursinus*		
Sugar Glider	1. *Petaurus breviceps*		
Common Ringtail Possum	1. *Pseudocheirus peregrinus*		
Common Brushtail Possum	1. *Trichosurus vulpecula*		
Eastern Grey Kangaroo	1. *Macropus giganteus*		
Swamp Wallaby	1. *Wallabia bicolor*		
Grey-headed Flying-fox	1. *Pteropus poliocephalus*		
Yellow-bellied Sheathtail-bat	1. *Saccolaimus flaviventris*		
White-striped Freetail-bat	1. *Austronomus australis*		
Eastern Coastal Free-tail Bat	1. *Micronomus norfolkensis*		
Large-eared Pied Bat	1. *Chalinolobus dwyeri*		
Gould's Wattled Bat	1. *Chalinolobus gouldii*		
Chocolate Wattled Bat	1. *Chalinolobus morio*		
Eastern False Pipistrelle	1. *Falsistrellus tasmaniensis*		
Golden-tipped Bat	1. *Kerivoula papuensis*		
Little Bentwing-bat	1. *Miniopterus australis*		
Large Bent-winged Bat	1. *Miniopterus orianae oceanensis*		
Southern Myotis	1. *Myotis macropus*		
Lesser Long-eared Bat	1. *Nyctophilus geoffroyi*		
Gould's Long-eared Bat	1. *Nyctophilus gouldi*		
Greater Broad-nosed Bat	1. *Scoteanax rueppellii*		
Eastern Broad-nosed Bat	1. *Scotorepens orion*		
Large Forest Bat	1. *Vespadelus darlingtoni*		
Eastern Forest Bat	1. *Vespadelus pumilus*		
Southern Forest Bat	1. *Vespadelus regulus*		
Large Forest Eptesicus	1. *Vespadelus darlingtoni*		
Little Forest Eptesicus	1. *Vespadelus vulturnus*		
Little Forest Bat	1. *Vespadelus vulturnus*		
Bush Rat	1. *Rattus fuscipes*		
House Mouse*	1. *Mus musculus*		
Black Rat*	1. *Rattus rattus*		
Dog*	1. *Canis lupus familiaris*		
Fox*	1. *Vulpes vulpes*		
Cat*	1. *Felis catus*		
Rabbit*	1. *Oryctolagus cuniculus*		
N=	37		0

Invertebrates			
Cumberland Plain Land Snail	1. *Meridolum corneovirens*	BC Act, Sch. 1, End.	
Dural Woodland Snail	1. *Pommerhelix duralensis*	BC Act, Sch. 1, End. EPBC Act, End.	
N=	2		0

Key

* = Introduced fauna
O = Observed
W = Calls heard

6.3 Fauna Summary

The number of species from each faunal group, listed as 'likely to occur' can be seen in Appendix 3.

Mammals

No mammal species were detected on the site.

Common species such as ringtail and brushtail possum and common microbats are expected to occupy the site.

The maintenance regime and highly disturbed nature of the site precludes either a great mammal species diversity or abundance.

Reptiles

Three reptile species were detected on the site.

Species not recorded during the survey but likely to occur on the site include leaf-tailed gecko and red-bellied black snake.

The maintenance regime and highly disturbed nature of the site precludes either a great reptile species diversity or abundance.

Frogs

One frog species was detected on the site.

The maintenance regime and highly disturbed nature of the site precludes either a great reptile species diversity or abundance.

Species not recorded during the survey but likely to occur on the site include Peron's Tree Frog and Striped Marsh Frog.

Birds

Bird species detected on the site totalled ten.

The maintenance regime and highly disturbed nature of the site precludes either a great bird species diversity or abundance.

Species not recorded during the survey but likely to occur on the site include mudlark (pee wee) and spur-winged plover.

6.4 Microbats

Foraging Habitat

Four threatened species of microbats are recorded in the locality. This site provides potentially suitable foraging habitat for seven of the nine possible threatened species. *Myotis macropus* (syn. *Myotis adversus*) has no suitable foraging habitat in the form of open water bodies. *Kerivoula papuensis* is only likely to forage in areas within a few kilometres of rainforest or rainforest gullies.

Roosting Habitat

This site has few tree hollows that provide suitable roosting habitat for *Falsistrellus tasmaniensis, Micronomus norfolkensis, Scoteanax rueppellii, Myotis macropus, Miniopterus australis* and *Saccolaimus flaviventris*. This site has no caves, culverts, or bridges, but does have buildings and other suitable (often human-made) structures that provide potentially suitable roosting habitat for *Chalinolobus dwyeri, Miniopterus orianae oceanensis, Myotis macropus. Kerivoula papuensis* normally roosts in hanging bird nests or trees in rainforest gullies so is very unlikely to roost in the surveyed site.

6.5 Feral fauna

Rats, foxes, feral birds such as rock pigeons and Indian Mynah, domestic dogs and cats all affect the native fauna populations.

7. Discussion of results

The majority of the site is landscaped and has been revegetated since farm use in the 1940s. Urban development has generally precluded regeneration of natural habitat. However, a small patch of Blue Gum High Forest has regenerated in the northeast corner along a drain. The forest has been subject to long term weed control by dedicated school staff, so it has resulted in a relatively high number of native plant species being recorded on the forest.

The landscape planting is diverse, including native species not locally occurring and many exotic species. Those are relatively young so provide little fauna habitat in the form of hollows in trees.

The proposal largely avoids the Blue Gum High Forest so that community is unlikely to suffer direct impacts. An indirect impact is that loss of the adjacent landscape will reduce the structural vegetation that provides some buffer value for the regenerated forest.

Connectivity both upstream and downstream is minimal or absent. Flying fauna can move to nearby patches of bushland but the nature of the proposal will have minimal effect on such fauna movements.

Weed indicator species are present, indicating a high disturbance regime on the site. Native faunal indicator species, small forest birds and kookaburra, are consistent with an open forest habitat. Feral indicator species, Red Fox, indicates that native fauna abundance is likely to be low. Ecological services for the site e.g. bioturbators, pollinators, seed dispersers are present and functioning at a low level due to mowing under the forest canopy and weed cover in the drain line.

8. Impact on biodiversity: Threshold 3

8.1 Threshold 3: Five-part test summary

Habitat requirements for locally occurring threatened faunal species, and the presence or absence of such habitat on the site, is tabulated in Appendix 4. Threatened plant species, listed in the BC Act and the EPBC Act, are shown in Appendix 5.

Under Section 7.3 of the *Biodiversity Conservation Act* several factors (listed in Appendix 1) need to be considered in deciding whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats. If there is likely to be a significant effect on threatened species, etc. the proposal must be accompanied by a Biodiversity Development Assessment Report.

While the overall proposal incorporates mitigating considerations and offsets, these are not taken into account in determining the outcome of the five-part tests.

Table 11. Summary of the five-part tests shown in full in Appendix 1.

Scientific Name	Common Name	NSW status	Comm. status	Result of five part test
Hieraaetus morphnoides	Little Eagle	V,P		No significant effect
Callocephalon fimbriatum	Gang-gang Cockatoo population in the Hornsby and Ku-ring-gai Local Government Areas	E2,V,P,3		No significant effect
Callocephalon fimbriatum	Gang-gang Cockatoo	V,P,3		No significant effect
Glossopsitta pusilla	Little Lorikeet	V,P		No significant effect
Ninox connivens	Barking Owl	V,P,3		No significant effect
Ninox strenua	Powerful Owl	V,P,3		No significant effect
Tyto novaehollandiae	Masked Owl	V,P,3		No significant effect
Pteropus poliocephalus	Grey-headed Flying-fox	V,P	V	No significant effect
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V,P		No significant effect
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V,P		No significant effect
Chalinolobus dwyeri	Large-eared Pied Bat	V,P	V	No significant effect
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V,P		No significant effect
Myotis Macropus	Southern Myotis	V,P		No significant effect
Scoteanax rueppellii	Greater Broad-nosed Bat	V,P		No significant effect
Miniopterus australis	Little Bent-winged Bat	V,P		No significant effect
Miniopterus orianae oceanensis	Large Bent-winged Bat	V,P		No significant effect
Pommerhelix duralensis	Dural Land Snail	E1	E	No significant effect

Scientific Name	Common Name	NSW status	Comm. status	Result of five part test
Wahlenbergia multicaulis	Tadgell's Bluebell in the local government areas of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield	E2		No significant effect
Dillwynia tenuifolia		V		No significant effect
Acacia clunies-rossiae	Kanangra Wattle	V		No significant effect
Acacia pubescens	Downy Wattle	V	V	No significant effect
Callistemon linearifolius	Netted Bottle Brush	V,3		No significant effect
Rhodamnia rubescens	Scrub Turpentine	E4A		No significant effect
Syzygium paniculatum	Magenta Lilly Pilly	E1	V	No significant effect
Pomaderris prunifolia	P. prunifolia in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas	E2		No significant effect
Blue Gum High Forest in the Sydney Basin Bioregion	Blue Gum High Forest in the Sydney Basin Bioregion	E2	CE	No significant effect

There is no significant effect likely, so a Biodiversity Development Assessment Report is not required.

9. Planning Instruments

9.1 *Environment Protection and Biodiversity Conservation Act 1999*

9.1.1 Protected matters

The Protected Matters Search Tool was used to find relevant Matters of National Environmental Significance (MNES) on or near the site. The outputs are shown in (Appendix 6).

Blue Gum High Forest in the Sydney Basin is protected under Commonwealth legislation by the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act 1999) and is listed as Critically Endangered. The provisions of the EPBC Act apply to this proposal. The outcome is not significant, however, and does not require referral to the Commonwealth.

9.1.2 Criteria Critically Endangered and Endangered Ecological Communities

An action has, will have, or is likely to have a significant impact on a critically endangered or endangered ecological community if it does, will, or is likely to:

a) lead to a long-term adverse effect on an ecological community, or	No, the forest will be retained.
b) reduce the extent of a community, or	No, the forest will be retained.
c) fragment an occurrence of the community, or	No, the forest will be retained.
d) adversely affect habitat critical to the survival of an ecological community, or	No, the forest will be retained.
e) modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for the community's survival, or	No, the forest will be retained.
f) result in invasive species that are harmful to the critically endangered or endangered community becoming established in an occurrence of the community*, or	No, the forest will be retained.
g) interfere with the recovery of an ecological community.	No, the forest will be retained.

(*Introducing an invasive species into the occurrence may result in that species becoming established. An invasive species may harm a critically endangered or endangered ecological community by direct competition, modification of habitat, or predation.)

The proposal avoids impact on the Blue Gum High Forest and an assessment of significance found that a significant effect is not likely.

9.2 Planning for Bushfire Protection

The proposal has been designed with an asset protection zone that extends from the intact forest such that the Blue Gum High Forest remains intact.

10. Conclusion and Recommendations

None of the three relevant thresholds for a Part 3 proposal are triggered as follows:

Threshold Trigger 1: Exceeding the clearing threshold on an area of native vegetation.
Threshold Trigger 2: Development or a prescribed activity is carried out on land included in the Biodiversity Values Land Map.
Threshold Trigger 3: A "significant effect" on threatened species or ecological communities.

Therefore, a Biodiversity Development Assessment Report (BDAR) is not required.

Recommendations

Loss of trees that could in future provide hollows for fauna habitat needs to be replaced with fauna nest boxes erected within the retained forest.

Light spill from floodlights needs to be avoided by shielding so that direct light does not shine into the forest area.

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Appendix 1. Five-part tests

While the overall proposal incorporates mitigating considerations and offsets, these are not taken into account in determining the outcome of the **five-part** tests.

The Assessment of Significance (Office of Environment and Heritage (OEH)) states that "*Proposed measures that mitigate, improve or compensate for the action, development or activity should not be considered in determining the degree of the effect on threatened species, populations or ecological communities, unless the measure has been used successfully for that species in a similar situation.*"

Species addressed are as follows:

Scientific Name	Common Name	NSW status	Comm. status	Potential habitat on site
Hieraaetus morphnoides	Little Eagle	V		Yes
Callocephalon fimbriatum	Gang-gang Cockatoo population in the Hornsby and Ku-ring-gai Local Government Areas	E2,V		Yes
Callocephalon fimbriatum	Gang-gang Cockatoo	V,P,3		Yes
Glossopsitta pusilla	Little Lorikeet	V,P		Yes
Ninox connivens	Barking Owl	V,P		Yes
Ninox strenua	Powerful Owl	V,P		Yes
Tyto novaehollandiae	Masked Owl	V,P		Yes
Pteropus poliocephalus	Grey-headed Flying-fox	V,P	V	Yes
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V,P		Yes
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V,P		Yes
Chalinolobus dwyeri	Large-eared Pied Bat	V,P	V	Yes
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V,P		Yes
Myotis macropus	Southern Myotis	V,P		Yes

Scientific Name	Common Name	NSW status	Comm. status	Potential habitat on site
Scoteanax rueppellii	Greater Broad-nosed Bat	V,P		Yes
Miniopterus australis	Little Bent-winged Bat	V,P		Yes
Miniopterus orianae oceanensis	Large Bent-winged Bat	V,P		Yes
Pommerhelix duralensis	Dural Land Snail	E1	E	Yes
Wahlenbergia multicaulis	Tadgell's Bluebell in the local government areas of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield	E2		Yes
Dillwynia tenuifolia		V		Yes
Acacia clunies-rossiae	Kanangra Wattle	V		Yes
Acacia pubescens	Downy Wattle	V	V	Yes
Callistemon linearifolius	Netted Bottle Brush	V		Yes
Rhodamnia rubescens	Scrub Turpentine	E4A		Yes
Syzygium paniculatum	Magenta Lilly Pilly	E1	V	Yes
Pomaderris prunifolia	P. prunifolia in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas	E2		Yes
Blue Gum High Forest in the Sydney Basin Bioregion	Blue Gum High Forest in the Sydney Basin Bioregion	E2	CE	Yes

7.2 Development or activity "likely to significantly affect threatened species"

1) For the purposes of this Part, development or an activity is **"likely to significantly affect threatened species"** if:
   a) it is likely to significantly affect threatened species or ecological communities, or their habitats, according to the test in section 7.3, or
   b) the development exceeds the biodiversity offsets scheme threshold if the biodiversity offsets scheme applies to the impacts of the development on biodiversity values, or
   c) it is carried out in a declared area of outstanding biodiversity value.
2) To avoid doubt, subsection (1) (b) does not apply to development that is an activity subject to environmental impact assessment under Part 5 of the *Environmental Planning and Assessment Act 1979.*

7.3 Test for determining whether proposed development or activity likely to significantly affect threatened species or ecological communities, or their habitats

1) The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:
   a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction
   b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:
      (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction
      (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,
   c) in relation to the habitat of a threatened species or ecological community:
      (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and
      (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and
      (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,
   d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),
   e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

Diurnal Raptors

Scientific name	Common name	NSW status	Comm. status
Hieraaetus morphnoides	Little Eagle	V	-

Little Eagle *Hieraaetus morphnoides*
http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20131

- Occupies open eucalypt forest, woodland or open woodland. Sheoak or *Acacia* woodlands and riparian woodlands of interior NSW are also used.
- Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter.
- Lays two or three eggs during spring, and young fledge in early summer.
- Preys on birds, reptiles and mammals, occasionally adding large insects and carrion.

Woodland Birds

Scientific name	Common name	NSW status	Comm. status
Glossopsitta pusilla	Little Lorikeet	V	-

Little Lorikeet *Glossopsitta pusilla*
http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=20111

- Forages primarily in the canopy of open *Eucalyptus* forest and woodland, yet also finds food in *Angophora*, *Melaleuca* and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity.
- Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain viable populations of the species.
- Feeds mostly on nectar and pollen, occasionally on native fruits such as mistletoe, and only rarely in orchards.
- Gregarious, travelling and feeding in small flocks (<10), though often with other lorikeets. Flocks numbering hundreds are still occasionally observed and may have been the norm in past centuries.
- Roosts in treetops, often distant from feeding areas.
- Nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts. Entrance is small (3 cm) and usually high above the ground (2–15 m). These nest sites are often used repeatedly for decades, suggesting that preferred sites are limited. Riparian trees often chosen, including species like *Allocasuarina*.

Scientific name	Common name	NSW status	Comm. status
Callocephalon fimbriatum	Gang-gang Cockatoo	V	-

Gang-gang Cockatoo *Callocephalon fimbriatum*
http://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10975

- In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests.
- In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas.
- May also occur in sub-alpine Snow Gum (*Eucalyptus pauciflora*) woodland and occasionally in temperate rainforests.
- Favours old growth forest and woodland attributes for nesting and roosting. Nests are located in hollows that are 10 cm in diameter or larger and at least 9 m above the ground in eucalypts.

Scientific name	Common name	NSW status	Comm. status
Ninox connivens	Barking Owl	V	-

Barking Owl *Ninox connivens*
https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10561

- Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g. western NSW) due to the higher density of prey found on these fertile riparian soils.
- Roosts in shaded portions of tree canopies, including tall mid storey trees with dense foliage such as *Acacia* and *Casuarina* species. During nesting season, the male perches in a nearby tree overlooking the hollow entrance.
- Preferentially hunts small arboreal mammals such as Squirrel Gliders and Common Ringtail Possums, but when loss of tree hollows decreases these prey populations the owl becomes more reliant on birds, invertebrates and terrestrial mammals such as rodents and rabbits. Can catch bats and moths on the wing, but typically hunts by sallying from a tall perch.
- Requires very large permanent territories in most habitats due to sparse prey densities. Monogamous pairs hunt over as much as 6000 hectares, with 2000 hectares being more typical in NSW habitats.
- Two or three eggs are laid in hollows of large, old trees. Living eucalypts are preferred though dead trees are also used. Nest sites are used repeatedly over years by a pair, but they may switch sites if disturbed by predators (e.g. goannas).
- Nesting occurs during mid-winter and spring, being variable between pairs and among years. As a rule of thumb, laying occurs during August and fledging in November. The female incubates for 5 weeks, roosts outside the hollow when chicks are 4 weeks old, then fledging occurs 2-3 weeks later. Young are dependent on their parents for several months.

- Territorial pairs respond strongly to recordings of Barking Owl calls from up to 6 km away, though humans rarely hear this response farther than 1.5 km. Because disturbance reduces the pair's foraging time, and can pull the female off her eggs even on cold nights, recordings should not be broadcast unnecessarily nor during the nesting season.

Scientific name	Common name	NSW status	Comm. status
Ninox strenua	Powerful Owl	V	-

Powerful Owl *Ninox strenua*
https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10562

- The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest.
- The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine *Syncarpia glomulifera*, Black Sheoak *Allocasuarina littoralis*, Blackwood *Acacia melanoxylon*, Rough-barked Apple *Angophora floribunda*, Cherry Ballart *Exocarpus cupressiformis* and a number of eucalypt species.
- The main prey items are medium-sized arboreal marsupials, particularly the Greater Glider, Common Ringtail Possum and Sugar Glider. There may be marked regional differences in the prey taken by Powerful Owls. For example, in southern NSW, Ringtail Possum make up the bulk of prey in the lowland or coastal habitat. At higher elevations, such as the tableland forests, the Greater Glider may constitute almost all of the prey for a pair of Powerful Owls. Flying foxes are important prey in some areas; birds comprise about 10-50% of the diet depending on the availability of preferred mammals. As most prey species require hollows and a shrub layer, these are important habitat components for the owl.
- Pairs of Powerful Owls demonstrate high fidelity to a large territory, the size of which varies with habitat quality and thus prey densities. In good habitats a mere 400 can support a pair; where hollow trees and prey have been depleted the owls need up to 4000 ha.
- Powerful Owls nest in large tree hollows (at least 0.5 m deep), in large eucalypts (diameter at breast height of 80-240 cm) that are at least 150 years old. While the female and young are in the nest hollow the male Powerful Owl roosts nearby (10-200 m) guarding them, often choosing a dense "grove" of trees that provide concealment from other birds that harass him.
- Powerful Owls are monogamous and mate for life. Nesting occurs from late autumn to mid-winter, but is slightly earlier in north-eastern NSW (late summer - mid autumn). Clutches consist of two dull white eggs and incubation lasts approximately 38 days.

Scientific name	Common name	NSW status	Comm. status
Tyto novaehollandiae	Masked Owl	V	-

Masked Owl *Tyto novaehollandiae*
https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10820

- Lives in dry eucalypt forests and woodlands from sea level to 1100 m.
- A forest owl, but often hunts along the edges of forests, including roadsides.
- The typical diet consists of tree-dwelling and ground mammals, especially rats.
- Pairs have a large home-range of 500 to 1000 hectares.
- Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.

Scientific name	Common name	NSW status	Comm. status
Pteropus poliocephalus	Grey-headed Flying-fox	V	V

Grey-headed Flying-fox *Pteropus poliocephalus*
http://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10697

- Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.
- Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.
- Individual camps may have tens of thousands of animals and are used for mating, and for giving birth and rearing young.
- Annual mating commences in January and conception occurs in April or May; a single young is born in October or November.
- Site fidelity to camps is high; some camps have been used for over a century.
- Can travel up to 50 km from the camp to forage; commuting distances are more often <20 km.
- Feed on the nectar and pollen of native trees, in particular *Eucalyptus*, *Melaleuca* and *Banksia*, and fruits of rainforest trees and vines.
- Also forage in cultivated gardens and fruit crops.

Insectivorous bats

Scientific name	Common name	NSW status	Comm. status
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-
Mormopterus norfolkensis	Eastern Freetail-bat	V	-
Chalinolobus dwyeri	Large-eared Pied Bat	V	V
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-
Miniopterus australis	Little Bent-winged Bat	V	
Miniopterus orianae oceanensis	Eastern Bentwing-bat	V	-
Myotis macropus	Southern Myotis	V	
Scoteanax rueppellii	Greater Broad-nosed Bat	V	Near Threatened

Yellow-bellied Sheathtail-bat *Saccolaimus flaviventris*
http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10741

- Roosts singly or in groups of up to six, in tree hollows and buildings.
- in treeless areas they are known to utilise mammal burrows.
- When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees
- Appears to defend an aerial territory.
- Breeding has been recorded from December to mid-March, when a single young is born.
- Seasonal movements are unknown.
- There is speculation about a migration to southern Australia in late summer and autumn.

Eastern Freetail-bat *Mormopterus norfolkensis*
http://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10544

- Eastern Freetail-bat occurs in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range.
- Roost mainly in tree hollows but will also roost under bark or in man-made structures.
- Usually solitary but also recorded roosting communally, probably insectivorous.

Large-eared Pied Bat *Chalinolobus dwyeri*
http://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10157

- Large-eared Pied Bat roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (Petrochelidon ariel), frequenting low to mid-elevation dry open forest and woodland close to these features.
- Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January in roof domes in sandstone caves and overhangs.
- They remain loyal to the same cave over many years.
- Found in well-timbered areas containing gullies.
- The relatively short, broad wing combined with the low weight per unit area of wing indicates manoeuvrable flight.
- This species probably forages for small, flying insects below the forest canopy.
- Likely to hibernate through the coolest months.
- It is uncertain whether mating occurs early in winter or in spring.

Eastern False Pipistrelle *Falsistrellus tasmaniensis*
http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10331

- Prefers moist habitats, with trees taller than 20 m.
- Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings. Hunts beetles, moths, weevils and other flying insects above or just below the tree canopy.
- Hibernates in winter.
- Females are pregnant in late spring to early summer.

Eastern Bentwing-bat *Miniopterus orianae oceanensis*
http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10534

- Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures.
- Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young.
- Maternity caves have very specific temperature and humidity regimes.
- At other times of the year, populations disperse within about 300 km range of maternity caves.
- Cold caves are used for hibernation in southern Australia.
- Breeding or roosting colonies can number from 100 to 150,000 individuals.
- Hunt in forested areas, catching moths and other flying insects above the tree tops.
- This species has recently been renamed to *Miniopterus orianae oceanensis* or the large bent-winged bat, from Miniopterus schreibersii subsp. oceanensis or the eastern bent-wing bat.

Greater Broad-nosed Bat *Scoteanax rueppellii*
http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10748

- Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest.
- Although this species usually roosts in tree hollows, it has also been found in buildings.
- Forages after sunset, flying slowly and directly along creek and river corridors at an altitude of 3 - 6 m. Open woodland habitat and dry open forest suits the direct flight of this species as it searches for beetles and other large, slow-flying insects.
- This species has been known to eat other bat species.
- Little is known of its reproductive cycle, however a single young is born in January.
- Prior to birth, females congregate at maternity sites located in suitable trees, where they appear to exclude males during the birth and raising of the single young.

Key

CE	Critically Endangered
E	Endangered
V	Vulnerable
P	Protected

Habitat and ecology

a. in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

No. None of these species were observed on the site.

The habitat is degraded with threatening processes that have been acting for more than 70 years so it is highly unlikely that the species remain on the site or could persist under the present threat regime.

b. in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

i. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

Not applicable. This test is for a group of threatened species.

ii. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

Not applicable. This test is for a group of threatened species.

c. **in relation to the habitat of a threatened species, population or ecological community:**

i. **the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and**

Edge effect in the form of changes to soil hydrology and nutrient status may occur on the downslope side of any construction. Edge effect as invasion by exotic vegetation is possible. Any edge effect will impact on areas previously degraded by clearing and weeds so is unlikely to have any discernable change to the local habitat.

ii. **whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and**

No. The site habitat is already fragmented.
An area of degraded continuous habitat exists downstream of the site, however no impact is expected for this area.
Discontinuous habitat will remain to the north and south of the site.

iii. **the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,**

No habitat will be removed from the Biodiversity Values forest area.

Criterion	Comment
Area and quality of habitat within the locality	The locality is an urban matrix with areas of often-degraded natural vegetation remaining in small fragments in residential areas.
Area and quality of habitat on site in relation to the area and quality of habitat in the locality	Similar habitat is available on nearby small patches.
Role of habitat to be affected in sustaining habitat connectivity in the locality	Site habitat provides some connectivity to fragmented vegetation to the north, and south. Development of the site is not expected to affect these species' ability to transfer genetic material across the landscape.
Ecological integrity of habitat to be affected on site, in relation to the ecological integrity, tenure and security of the habitat which will remain both on site and in locality	The entire site is disturbed, however canopy species remain and herbaceous species remain suppressed by mowing. The whole of the site shows signs of long term intensive disturbance but regeneration has occurred. The site condition is typical across the locality.

d. whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

No. Critical habitat has not been declared for these species.

e. whether the proposed development or activity constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

No. The proposed development will require the clearing of native vegetation as landscape planting only, which is not a key threatening process relevant to these species. Key threatening processes are listed under the TSC Act, 1995 and the Commonwealth's EPBC Act, 1999. However, the extent of clearing is scattered across the site.

Conclusion

The proposed activity is unlikely to have a significant effect on *Hieraaetus morphnoides, Callocephalon fimbriatum, Glossopsitta pusilla, Ninox connivens, Ninox strenua, Tyto novaehollandiae, Pteropus poliocephalus, Saccolaimus flaviventris, Micronomus norfolkensis, Chalinolobus dwyeri, Falsistrellus tasmaniensis, Myotis Macropus, Scoteanax rueppellii, Miniopterus australis, Miniopterus orianae oceanensis*, or *Pommerhelix duralensis*

A BDAR is not recommended.

THREATENED ECOLOGICAL COMMUNITY

Scientific name	NSW status	Comm. status
Blue Gum High Forest in the Sydney Basin Bioregion	CE	CE

Key
CE Critically Endangered

Habitat and ecology

a. in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

Not applicable. This five-part test is for a critically endangered ecological community.

b. in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

i. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

There is currently (Final Determination 2011) less than 200 ha of this community. None of the local occurrence (approximately 1ha) of this critically endangered ecological community will be either removed or modified on the site.

Area extant in total = 200ha
Area of occupancy = 3,700ha (estimate).
Local occurrence (on site) = 1 ha.

This critically endangered ecological community appears to be reasonably extensive in the locality, so its local occurrence is unlikely to be placed at risk of extinction by the proposal.

The entire site has been disturbed. Original vegetation remains as canopy trees and a regenerated diversity of natives. No recruitment is possible with the current mowing regime. The extent of the community will be reduced by loss of five trees, but works are excluded from the mapped biodiversity layer.

The five trees to be removed T41, T42, T43, T44 and T46 Sydney Blue Gum *Eucalyptus saligna* are at the edge of the remnant forest and part of that community but not part of the mapped Biodiversity Values Area.

ii. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

No.
The composition of this critically endangered ecological community will be retained on the site. This critically endangered ecological community within the site will not be substantially and adversely modified by the proposal. It also occurs reasonably commonly in the locality and the local occurrence will not be placed at risk of extinction.

c. In relation to the habitat of a threatened species, population or ecological community:

i. the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity,

The five trees to be removed T41, T42, T43, T44 and T46 Sydney Blue Gum *Eucalyptus saligna* are at the edge of the remnant forest and part of that community but not part of the mapped Biodiversity Values Area.
None of the mapped biodiversity values area which is the Blue Gum High Forest will be removed. Species of this community that occur in the landscape planting that is to be removed will not affect either the composition or function or structure of the community.

ii. whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

No.
Habitat for this critically endangered ecological community occurs to the south and north of the site. Habitat will remain off-site in the locality to the north and south of the site.

iii. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

Negligible. Species of this community that occur beyond the Biodiversity Values Area or in the landscape planting that is to be removed will not affect either the composition or function or structure of the community.

Criterion	Comment
Area and quality of habitat within the locality	The locality is an urban matrix with areas of often-degraded natural vegetation remaining in small fragments in residential areas.
Area and quality of habitat on site in relation to the area and quality of habitat in the locality	Similar habitat is available on nearby small patches.
Role of habitat to be affected in sustaining habitat connectivity in the locality	Site habitat provides some connectivity to fragmented vegetation to the north, and south. Development of the site is not expected to affect these species' ability to transfer genetic material across the landscape.
Ecological integrity of habitat to be affected on site, in relation to the ecological integrity, tenure and security of the habitat which will remain both on site and in locality.	The entire site is disturbed, however canopy species remain and herbaceous species remain suppressed by mowing. The whole of the site shows signs of long term intensive disturbance but regeneration has occurred. The site condition is typical across the locality.

d. whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

No.
Critical habitat has not been declared for this critically endangered ecological community.
None of the mapped biodiversity values area which is the Blue Gum High Forest will be removed.

e. whether the proposed development or activity constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Yes.
The proposed development will require the clearing of native vegetation being five trees at the edge of the forest and as landscape planting. Key threatening processes are listed under the TSC Act, 1995 and the Commonwealth's EPBC Act, 1999. However, the extent of clearing is scattered across the site.

Conclusion

The proposed activity is unlikely to have a significant effect on Blue Gum High Forest. Therefore, a BDAR is not recommended.

Woodland plant Species

Key
E Endangered
V Vulnerable

Scientific Name Conservation status	Common name	Conservation status	Conservation status	Recorded on site
Wahlenbergia multicaulis	Tadgell's Bluebell in the local government areas of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield	E2		No
Dillwynia tenuifolia		V		No
Acacia clunies-rossiae	Kanangra Wattle	V		No
Acacia pubescens	Downy Wattle	V	V	No
Callistemon linearifolius	Netted Bottle Brush	V		No
Rhodamnia rubescens	Scrub Turpentine	E4A		No
Syzygium paniculatum	Magenta Lilly Pilly	E1	V	No
Pomaderris prunifolia	P. prunifolia in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas	E2		No

f. in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

No.
None of these species were observed on the site.
The habitat is degraded with threatening processes that have been acting for more than 70 years so it is highly unlikely that the species remain on the site or could persist under the present threat regime.

g. in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

iii. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

Not applicable. This test is for a group of threatened species.

iv. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

Not applicable. This test is for a group of threatened species.

h. in relation to the habitat of a threatened species, population or ecological community:

iv. the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

Edge effect in the form of changes to soil hydrology and nutrient status may occur on the downslope side of any construction. Edge effect as invasion by exotic vegetation is possible. Any edge effect will impact on areas previously degraded by clearing and weeds so is unlikely to have any discernable change to the local habitat.

v. whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

No.
The site habitat is already fragmented. An area of degraded continuous habitat exists downstream of the site, however no impact is expected for this area.
Discontinuous habitat will remain to the north and south of the site.

vi. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

No habitat will be removed from the forest area.

D21/78776

Criterion	Comment
Area and quality of habitat within the locality	The locality is an urban matrix with areas of often-degraded natural vegetation remaining in small fragments in residential areas.
Area and quality of habitat on site in relation to the area and quality of habitat in the locality	Similar habitat is available on nearby small patches.
Role of habitat to be affected in sustaining habitat connectivity in the locality	Site habitat provides some connectivity to fragmented vegetation to the north, and south. Development of the site is not expected to affect these species' ability to transfer genetic material across the landscape.
Ecological integrity of habitat to be affected on site, in relation to the ecological integrity, tenure and security of the habitat which will remain both on site and in locality.	The entire site is disturbed, however canopy species remain and herbaceous species remain suppressed by mowing. The whole of the site shows signs of long term intensive disturbance but regeneration has occurred. The site condition is typical across the locality.

i. **whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),**

No.
Critical habitat has not been declared for these species.

j. **whether the proposed development or activity constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

No.
The proposed development will require the clearing of native vegetation as landscape planting only, which is not a key threatening process relevant to these species. Key threatening processes are listed under the TSC Act, 1995 and the Commonwealth's EPBC Act, 1999. However, the extent of clearing is scattered across the site.

Conclusion

The proposed activity is unlikely to have a significant effect on *Wahlenbergia multicaulis, Dillwynia tenuifolia, Acacia clunies-rossiae, Acacia pubescens, Callistemon linearifolius, Rhodamnia rubescens, Syzygium paniculatum* or *Pomaderris prunifolia*.

A BDAR is not recommended.

Appendix 2. Flora species list

The grid reference for this locality is 151.071263 East, -33.80378 North (Geographic GDA94)
GDA2020 Easting 321464.329 Northing 6257929.381

Key
* introduced species
# native species not endemic to the remnant plant community
NEALW – National Environmental Alert List Weeds
PW – Priority weeds
WONS – Weeds of National significance

Table 12: Quadrat plant list

Origin	Genus	Species	Common name
Local native	Acacia	parramattensis	Black Wattle
Local native	Acacia	mearnsii	Early Black Wattle
Local native	Acacia	implexa	Mountain Hickory Wattle
Local native	Acacia	fimbriata	Fringed Wattle
Local native	Acacia	binervia	Coastal Myall
Local native	*Acmena*	*smithii*	Lilly Pilly
Local native	Allocasuarina	torulosa	Forest She Oak
Local native	*Alocasia*	*brisbanensis*	Cunjevoi
Local native	Alpinia	caerulea	Native Ginger
Local native	*Angophora*	*costata*	Sydney Red Gum
Local native	Aphanopetalum	resinosum	Gum Vine
Local native	Brachychiton	acerifolius	Illawarra Flame Tree
Local native	Breynia	oblongifolia	Breynia
Local native	*Casuarina*	*glauca*	Swamp She-Oak
Local native	*Cayratia*	*clematidea*	Slender Grape
Local native	*Ceratopetalum*	*apetalum*	Coachwood
Local native	*Commelina*	*cyanea*	Scurvy Weed
Local native	Cordyline	stricta	

Origin	Genus	Species	Common name
Local native	Corymbia	maculata	Spotted Gum
Local native	Cyathea	australis	Tree Fern
Local native	*Dianella*	*caerulea*	Dianella
Local native	Dichondra	repens	Kidney Weed
Local native	Dodonaea	triquetra	Hop Bush
Local native	Doryanthes	excelsa	Gymea Lily
Local native	Elaeocarpus	reticulatus	Blueberry Ash
Local native	*Eucalyptus*	*saligna*	Sydney Blue Gum
Local native	Eucalyptus	punctata	Grey Gum
Local native	Eucalyptus	paniculata	Grey Ironbark
Local native	Eucalyptus	robusta	Swamp Mahogany
Local native	*Eucalyptus*	*pilularis*	Blackbutt
Local native	*Ficus*	*coronata*	Sandpaper Fig
Local native	*Ficus*	*rubiginosa*	Port Jackson Fig
Local native	*Geranium*	*homeanum*	Cranesbill
Local native	Glochidion	ferdinandi	Cheese Tree
Local native	Glycine	tabacina	Glycine
Local native	Homolanthus	populifolius	Bleeding Heart
Local native	Livistona	australis	Cabbage Tree Palm
Local native	Lomandra	longifolia	Matt Rush
Local native	*Melaleuca*	*styphelioides*	Prickly Paperbark
Local native	*Melia*	*azedarach*	White Cedar
Local native	Microlaena	stipoides	Weeping Grass
Local native	*Oplismenus*	*aemulus*	Basket Grass
Local native	*Pandorea*	*pandorana*	Wonga Wonga Vine
Local native	*Pittosporum*	*undulatum*	Sweet Pittosporum
Local native	Pittosporum	multiflorum	Orange Thorn
Local native	Pittosporum	revolutum	Rough Fruited Pittosporum

Origin	Genus	Species	Common name
Local native	Sigesbeckia	orientalis	Indian Weed
Local native	Solanum	aviculare	Kangaroo Apple
Local native	*Syncarpia*	*glomulifera*	Turpentine
Local native	Syzygium	australe	Lilly Pilly
Local native	*Toona*	*ciliata*	Red Cedar
Local native	Trema	tomentosa var aspera	Native Peach
Local native	*Tristaniopsis*	*laurina*	Water Gum
Native #	Grevillea	robusta	Silky Oak
Native #	Corymbia	citriodora	Lemon scented Gum
Native #	*Eucalyptus*	*microcorys*	Tallowwood
Native #	Archontophoenix	cunninghamiana	Bangalow Palm
Native #	Ficus	macrophylla	Moreton Bay Fig

Local native plants n=53

Table 13: General plant list for the forest

Genus	Species	Common
Acacia	parramattensis	Black Wattle
Acacia	mearnsii	Early Black Wattle
Acacia	implexa	Mountain Hickory Wattle
Acacia	fimbriata	Fringed Wattle
Acacia	binervia	Coastal Myall
Allocasuarina	torulosa	Forest She Oak
Alpinia	caerulea	Native Ginger
Aphanopetalum	resinosum	Gum Vine
Archontophoenix	cunninghamiana	Bangalow Palm
Brachychiton	acerifolius	Illawarra Flame Tree
Breynia	oblongifolia	Breynia
Cordyline	stricta	Slender Palm Lily
Corymbia	citriodora	Lemon scented Gum
Corymbia	maculata	Spotted Gum
Cyathea	australis	Tree Fern
Dichondra	repens	Kidney Weed
Dodonaea	triquetra	Hop Bush
Doryanthes	excelsa	Gymea Lily
Elaeocarpus	reticulatus	Blueberry Ash
Eucalyptus	punctata	Grey Gum
Eucalyptus	paniculata	Grey Ironbark
Eucalyptus	robusta	Swamp Mahogany
Ficus	macrophylla	Moreton Bay Fig
Glochidion	ferdinandi	Cheese Tree
Glycine	tabacina	Glycine
Grevillea	robusta	Silky Oak
Homolanthus	populifolius	Bleeding Heart

Genus	Species	Common
Livistona	australis	Cabbage Tree Palm
Lomandra	longifolia	Matt Rush
Microlaena	stipoides	Weeping Grass
Pittosporum	multiflorum	Orange Thorn
Pittosporum	revolutum	Rough Fruited Pittosporum
Sigesbeckia	orientalis	Indian Weed
Solanum	aviculare	Kangaroo Apple
Syzygium	australe	Lilly Pilly
Trema	tomentosa var aspera	Native Peach

Table 14: Exotic weed plant list

Genus	Species	Common name
Acer	negundo	Box Elder maple
Acokanthera	oblongifolia	Poison Arrow plant.
Andredera	cordifolia	Madeira Vine
Asparagus	aethiopicus	Basket Asparagus
Bidens	pillosa	Farmers Friend
Canna	edulis	Canna Lily
Cardiospermum	grandiflorum	Balloon Vine
Celtis	sinensis	Hackberry
Cestrum	parqui	Green Cestrum
Ehrhardta	erecta	Panic Veldt Grass
Fumaria	sp.	Fumitory
Jacaranda	mimosifolia	Jacaranda
Ligustrum	lucidum	Broad Leaf Privet
Loquat	eriobotrya	Loquat
Nandina	domestica	Japanese Sacred Bamboo
Ochna	serrulata	Mickey Mouse Plant
Olea	europea ssp. cuspidata	African Olive
Parieteria	judaica	Pellitory
Passiflora	suberosa	Corky Passionfruit
Phoenix	sp.	Date Palm
Phyllanthus	tenellus	Phyllanthus
Pistacia	chinensis	Chinese Pistachio
Rumex	sagittata	Turkey Rhubarb
Senna	bicapsularis	Senna
Setaria	palmifolia	Palm Grass
Sida	rhombifolia	Paddys Lucerne
Tradescantia	fluminensis	Trad

Genus	Species	Common name
Tropaeolum	majus	Nasturtium
Verbena	bonariensis	Purple Top

Table 15: Appendix 2. Tree survey Brush Road and south east corner

Tree number	Plan number	Species
801	1	Casuarina glauca
802	2	Leptospermum petersonii
803	3	Eucalyptus grandis
804	4	Eucalyptus cinerea
805	5	Casuarina glauca
806	6	Eucalyptus robusta
807	7	Acacia (implexa)
808	8	Casuarina glauca
809	9	Eucalyptus robusta
810	10	Acacia (implexa)
811	11	Eucalyptus grandis
812	12	Melaleuca leaniifolia
813	13	Eucalyptus (melanophloia or sideroxylon)
814	14	Eucalyptus grandis
815	15	Eucalyptus acmenoides
816	16	Eucalyptus acmenoides
817	17	Acacia parramattensis
818	18	Eucalyptus acmenoides (sapling)
819	19	Eucalyptus acmenoides (sapling)
820	20	Eucalyptus saligna
821	21	Olea europea subsp. Cuspidata*
822	22	Pittosporum undulatum
823	23	Acacia parramattensis
824	24	Acacia parramattensis
825	25	Acacia parramattensis
826	26	Acacia parramattensis
827	27	Grevillea robusta
828	28	Pittosporum undulatum
829	29	Eucalyptus saligna
830	30	Eucalyptus saligna
831	31	Eucalyptus acmenoides
832	32	Acacia parramattensis
833	33	Acacia parramattensis
834	34	Acacia parramattensis
835	35	Eucalyptus acmenoides (sapling)
836	36	Alphitonia excelsa

Tree number	Plan number	Species
837	37	Acacia parramattensis
838	38	Solanum mauritianum *
839	39	Acacia parramattensis (10 stems)
839	39	Acacia parramattensis
839	39	Acacia parramattensis
839	39	Acacia parramattensis
839	39	Acacia parramattensis
839	39	Acacia parramattensis
839	39	Acacia parramattensis
839	39	Acacia parramattensis
839	39	Acacia parramattensis
839	39	Acacia parramattensis
840	40	Acmena sp.
841	41	Syzygium sp. (cultivar, shrub)
842	42	Murraya paniculata (multi-stem)
843	43	Eucalyptus saligna
844	44	Eucalyptus saligna
845	45	Eucalyptus saligna
846	46	Leptospermum petersonii
847	47	Eucalyptus saligna
848	48	Eucalyptus saligna
849	49	Acacia parramattensis
850	50	Eucalyptus saligna
851	51	Pittosporum undulatum
852	52	Eucalyptus saligna
853	53	Eucalyptus deanei
854	54	Eucalyptus deanei
855	55	Eucalyptus deanei
856	56	Eucalyptus sp. - Red Gum
857	57	Eucalyptus paniculata
858	58	Eucalyptus (paniculata?)
859	59	Acacia parramattensis
860	60	Eucalyptus (paniculata?)
861	61	Pittosporum undulatum
862	62	Acacia parramattensis
863	63	Acacia parramattensis
864	64	Eucalyptus deanei

Appendix 3. Expected fauna species in the Sydney Basin

Mammals

Common name	Scientific name
White-striped Freetail-bat	*Austronomus australis*
Gould's Wattled Bat	*Chalinolobus gouldii*
Chocolate Wattled Bat	*Chalinolobus morio*
Lesser Long-eared Bat	*Nyctophilus geoffroyi*
Gould's Long-eared Bat	*Nyctophilus gouldi*
Bush Rat	*Rattus fuscipes*
Swamp Rat	*Rattus lutreolus*
Long-nosed Bandicoot	*Perameles nasuta*
Brown Antechinus	*Antechinus stuartii*
Dusky Antechinus	*Antechinus swainsonii*
Yellow-footed Antechinus	*Antechinus flavipes*
Common Wombat	*Vombatus ursinus*
Common Ringtail Possum	*Pseudocheirus peregrinus*
Sugar Glider	*Petaurus breviceps*
Feathertail Glider	*Acrobates pygmaeus*
Eastern Grey Kangaroo	*Macropus giganteus*
Large Forest Bat	*Vespadelus darlingtoni*
Little Forest Bat	*Vespadelus vulturnus*
Common Wallaroo	*Macropus robustus*
Red-necked Wallaby	*Macropus rufogriseus*
Swamp Wallaby	*Wallabia bicolor*
Common Brushtail Possum	*Trichosurus vulpecula*
Greater Glider	*Petauroides volans*
Short-beaked Echidna	*Tachyglossus aculeatus*
Fox	*Vulpes vulpes*
Black Rat	*Rattus rattus*
Rabbit	*Oryctolagus cuniculus*

Frogs

Common Name	Scientific Name
Green Tree Frog	*Litoria caerulea*
Blue Mountains Tree Frog	*Litoria citropa*
Bleating Tree Frog	*Litoria dentata*
Eastern Dwarf Tree Frog	*Litoria fallax*
Jervis Bay Tree Frog	*Litoria jervisiensis*
Broad-palmed Frog	*Litoria latopalmata*
Peron's Tree Frog	*Litoria peronii*

Common Name	Scientific Name
Leaf-green Tree Frog	*Litoria phyllochroa*
Tyler's Tree Frog	*Litoria tyleri*
Verreaux's Frog	*Litoria verreauxii*
Common Eastern Froglet	*Crinia signifera*
Eastern Banjo Frog	*Limnodynastes dumerilii*
Ornate Burrowing Frog	*Limnodynastes ornatus*
Brown-striped Frog	*Limnodynastes peronii*
Spotted Grass Frog	*Limnodynastes tasmaniensis*
Haswell's Froglet	*Paracrinia haswelli*
Smooth Toadlet	*Uperoleia laevigata*
Tyler's Toadlet	*Uperoleia tyleri*

Reptiles

Common Name	Scientific Name
Diamond Python	*Morelia spilota spilota*
Common Death Adder	*Acanthophis antarcticus*
Yellow-faced Whip Snake	*Demansia psammophis*
Common Tree Snake	*Dendrelaphis punctulatus*
Golden-crowned Snake	*Cacophis squamulosus*
Eastern Small-eyed Snake	*Cryptophis nigrescens*
Red-naped Snake	*Furina diadema*
Black-bellied Swamp Snake	*Hemiaspis signata*
Tiger Snake	*Notechis scutatus*
Red-bellied Black Snake	*Pseudechis porphyriacus*
Eastern Brown Snake	*Pseudonaja textilis*
Dwyer's Snake	*Parasuta dwyeri*
Bandy Bandy	*Vermicella annulata*
Blackish Blind Snake	*Ramphotyphlops nigrescens*
Wood Gecko	*Diplodactylus vittatus*
Lesueur's Velvet Gecko	*Oedura lesueurii*
Broad-tailed Gecko	*Phyllurus platurus*
Thick-tailed Gecko	*Underwoodisaurus milii*
Burton's Snake-lizard	*Lialis burtonis*
Common Scaly-foot	*Pygopus lepidopodus*
Jacky Lizard	*Amphibolurus muricatus*
Bearded Dragon	*Pogona barbata*
Punctate Worm-skink	*Anomalopus swansoni*
Eastern Blue-tongue	*Tiliqua scincoides*
Southern Rainbow-skink	*Carlia tetradactyla*
Cream-striped Shinning-skink	*Cryptoblepharus virgatus*
Robust Ctenotus	*Ctenotus robustus*

Common Name	Scientific Name
Copper-tailed Skink	*Ctenotus taeniolatus*
Mainland She-oak Skink	*Cyclodomorphus michaeli*
Pink-tongued Skink	*Cyclodomorphus gerrardii*
Cunningham's Skink	*Egernia cunninghami*
Black Rock Skink	*Egernia saxatilis*
White's Skink	*Liopholis whitii*
Eastern Water-skink	*Eulamprus quoyii*
Barred-sided Skink	*Eulamprus tenuis*
Dark-flecked Garden Sunskink	*Lampropholis delicata*
Pale-flecked Garden Sunskink	*Lampropholis guichenoti*
Weasel Skink	*Saproscincus mustelinus*
Red-throated Skink	*Acritoscincus platynota*
Three-toed Skink	*Saiphos equalis*
Lace Monitor	*Varanus varius*
Eastern Snake-necked Turtle	*Chelodina longicollis*

Birds

Common Name	Scientific Name
Brown Quail	*Coturnix ypsilophora*
Black Swan	*Cygnus atratus*
Australian Wood Duck	*Chenonetta jubata*
Mallard	*Anas platyrhynchos*
Pacific Black Duck	*Anas superciliosa*
Grey Teal	*Anas gracilis*
Chestnut Teal	*Anas castanea*
Australasian Grebe	*Tachybaptus novaehollandiae*
Great Crested Grebe	*Podiceps cristatus*
Hoary-headed Grebe	*Poliocephalus poliocephalus*
Little Pied Cormorant	*Microcarbo melanoleucos*
Little Black Cormorant	*Phalacrocorax sulcirostris*
Great Cormorant	*Phalacrocorax carbo*
Australian Pelican	*Pelecanus conspicillatus*
White-faced Heron	*Egretta novaehollandiae*
Little Egret	*Egretta garzetta*
White-necked Heron	*Ardea pacifica*
Great Egret	*Ardea alba*
Cattle Egret	*Ardea ibis*
Intermediate Egret	*Ardea intermedia*
Australian White Ibis	*Threskiornis molucca*
Straw-necked Ibis	*Threskiornis spinicollis*
Royal Spoonbill	*Platalea regia*

Common Name	Scientific Name
Black-shouldered Kite	*Elanus axillaris*
Whistling Kite	*Haliastur sphenurus*
Wedge-tailed Eagle	*Aquila audax*
White-bellied Sea-eagle	*Haliaeetus leucogaster*
Swamp Harrier	*Circus approximans*
Brown Goshawk	*Accipiter fasciatus*
Collared Sparrowhawk	*Accipiter cirrocephalus*
Brown Falcon	*Falco berigora*
Australian Hobby	*Falco longipennis*
Nankeen Kestrel	*Falco cenchroides*
Buff-banded Rail	*Gallirallus philippensis*
Purple Swamphen	*Porphyrio porphyrio*
Dusky Moorhen	*Gallinula tenebrosa*
Eurasian Coot	*Fulica atra*
Latham's Snipe	*Gallinago hardwickii*
Black-winged Stilt	*Himantopus himantopus*
Black-fronted Dotterel	*Elseyornis melanops*
Masked Lapwing	*Vanellus miles*
Silver Gull	*Chroicocephalus novaehollandiae*
Rock Dove	*Columba livia*
White-headed Pigeon	*Columba leucomela*
Spotted Turtle-dove	*Streptopelia chinensis*
Brown Cuckoo-dove	*Macropygia amboinensis*
Emerald Dove	*Chalcophaps indica*
Common Bronzewing	*Phaps chalcoptera*
Crested Pigeon	*Ocyphaps lophotes*
Bar-shouldered Dove	*Geopelia humeralis*
Wonga Pigeon	*Leucosarcia picata*
Topknot Pigeon	*Lopholaimus antarcticus*
Yellow-tailed Black-cockatoo	*Calyptorhynchus funereus*
Galah	*Eolophus roseicapilla*
Long-billed Corella	*Cacatua tenuirostris*
Little Corella	*Cacatua sanguinea*
Sulphur-crested Cockatoo	*Cacatua galerita*
Rainbow Lorikeet	*Trichoglossus haematodus*
Scaly-breasted Lorikeet	*Trichoglossus chlorolepidotus*
Musk Lorikeet	*Glossopsitta concinna*
Australian King-parrot	*Alisterus scapularis*
Crimson Rosella	*Platycercus elegans*
Eastern Rosella	*Platycercus eximius*
Fan-tailed Cuckoo	*Cacomantis flabelliformis*
Horsfield's Bronze-cuckoo	*Chalcites basalis*

Common Name	Scientific Name
Channel-billed Cuckoo	*Scythrops novaehollandiae*
Asian Koel	*Eudynamys scolopaceus*
Southern Boobook	*Ninox novaeseelandiae*
Barn Owl	*Tyto alba*
Tawny Frogmouth	*Podargus strigoides*
White-throated Nightjar	*Eurostopodus mystacalis*
Australian Owlet-nightjar	*Aegotheles cristatus*
White-throated Needletail	*Hirundapus caudacutus*
Laughing Kookaburra	*Dacelo novaeguineae*
Sacred Kingfisher	*Todiramphus sanctus*
Rainbow Bee-eater	*Merops ornatus*
Dollarbird	*Eurystomus orientalis*
Superb Lyrebird	*Menura novaehollandiae*
Satin Bowerbird	*Ptilonorhynchus violaceus*
Superb Fairy-wren	*Malurus cyaneus*
Variegated Fairy-wren	*Malurus lamberti*
Spotted Pardalote	*Pardalotus punctatus*
White-browed Scrubwren	*Sericornis frontalis*
Large-billed Scrubwren	*Sericornis magnirostra*
Brown Gerygone	*Gerygone mouki*
White-throated Gerygone	*Gerygone albogularis*
White-throated Treecreeper	*Cormobates leucophaea*
Brown Thornbill	*Acanthiza pusilla*
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*
Yellow Thornbill	*Acanthiza nana*
Striated Thornbill	*Acanthiza lineata*
Buff-rumped Thornbill	*Acanthiza reguloides*
Red Wattlebird	*Anthochaera carunculata*
Little Wattlebird	*Anthochaera chrysoptera*
Noisy Friarbird	*Philemon corniculatus*
Bell Miner	*Manorina melanophrys*
Noisy Miner	*Manorina melanocephala*
Lewin's Honeyeater	*Meliphaga lewinii*
Yellow-faced Honeyeater	*Lichenostomus chrysops*
White-plumed Honeyeater	*Lichenostomus penicillatus*
Brown-headed Honeyeater	*Melithreptus brevirostris*
White-naped Honeyeater	*Melithreptus lunatus*
New Holland Honeyeater	*Phylidonyris novaehollandiae*
Eastern Spinebill	*Acanthorhynchus tenuirostris*
Scarlet Honeyeater	*Myzomela sanguinolenta*
Jacky Winter	*Microeca fascinans*
Rose Robin	*Petroica rosea*

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Common Name	Scientific Name
Eastern Yellow Robin	*Eopsaltria australis*
Eastern Whipbird	*Psophodes olivaceus*
Crested Shrike-tit	*Falcunculus frontatus*
Golden Whistler	*Pachycephala pectoralis*
Rufous Whistler	*Pachycephala rufiventris*
Grey Shrike-thrush	*Colluricincla harmonica*
Black-faced Monarch	*Monarcha melanopsis*
Leaden Flycatcher	*Myiagra rubecula*
Restless Flycatcher	*Myiagra inquieta*
Magpie-lark	*Grallina cyanoleuca*
Rufous Fantail	*Rhipidura rufifrons*
New Zealand Fantail	*Rhipidura fuliginosa*
Willie Wagtail	*Rhipidura leucophrys*
Spangled Drongo	*Dicrurus bracteatus*
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
White-bellied Cuckoo-shrike	*Coracina papuensis*
Olive-backed Oriole	*Oriolus sagittatus*
Dusky Woodswallow	*Artamus cyanopterus*
Grey Butcherbird	*Cracticus torquatus*
Australian Magpie	*Cracticus tibicen*
Pied Currawong	*Strepera graculina*
Australian Raven	*Corvus coronoides*
White-winged Chough	*Corcorax melanorhamphos*
Apostlebird	*Struthidea cinerea*
Eurasian Skylark	*Alauda arvensis*
Australasian Pipit	*Anthus novaeseelandiae rogersi*
House Sparrow	*Passer domesticus*
Red-browed Finch	*Neochmia temporalis*
Double-barred Finch	*Taeniopygia bichenovii*
Mistletoebird	*Dicaeum hirundinaceum*
Welcome Swallow	*Hirundo neoxena*
Tree Martin	*Petrochelidon nigricans*
Fairy Martin	*Petrochelidon ariel*
Cicadabird	*Coracina tenuirostris*
Red-whiskered Bulbul	*Pycnonotus jocosus*
Australian Reed-warbler	*Acrocephalus australis*
Little Grassbird	*Megalurus gramineus*
Golden-headed Cisticola	*Cisticola exilis*
Silvereye	*Zosterops lateralis*
Eurasian Blackbird	*Turdus merula*
Common Starling	*Sturnus vulgaris*
Common Myna	*Sturnus tristis*

Appendix 4. Habitat requirements for locally-occurring threatened fauna species

Birds

Common name *Scientific name* Schedule listing	Preferred habitat	Comment
Australasian Bittern *Botaurus poiciloptilus* BC Act, Sch. 2, Vul.	Inhabits wetlands that generally have permanent fresh water and dense vegetation of sedges, rushes and reeds.	No suitable natural habitat occurs on the site.
Spotted Harrier *Circus assimilis* BC Act Sch. 2, Vul.	Occurs in grassy open woodland including acacia and mallee remnants, inland riparian woodland, grassland. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands.	No suitable natural habitat occurs on the site.
Little Eagle *Hieraaetus morphnoides* BC Act Sch. 2, Vul.	Occupies open Eucalypt forest, woodland or open woodland. She-oak or acacia woodlands and riparian woodlands are also used. Builds a stick nests in winter in tall living trees within remnant patches	Suitable natural habitat occurs on the site.
Square-tailed Kite *Lophoictinia isura* BC Act, Sch. 2, Vul.	Inhabits coastal forest and woodlands. Most commonly associated with ridge and gully forests dominated by Woollybutt, Spotted Gum or Peppermint Gum.	Suitable natural habitat occurs on the site.
Gang-gang Cockatoo *Callocephalon fimbriatum* BC Act, Sch. 2, Vul.	In summer, occupies tall montane forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In winter, occurs at lower altitudes in drier, more open eucalypt forests and woodlands – also in urban areas including parks and gardens. Requires tree hollows for nesting	Suitable natural habitat occurs on the site.
Glossy Black-cockatoo *Calyptorhynchus lathami* BC Act, Sch. 2, Vul.	Found in open forests with Allocasuarina species and hollows for nesting.	No suitable natural habitat occurs on the site.
Little Lorikeet *Glossopsitta pusilla* BC Act, Sch. 2, Vul.	Inhabits the open forests and dead timber alongside watercourses. Also occurs in eucalypt forest in mountainous regions.	Suitable foraging habitat occurs on the site.
Swift Parrot *Lathamus discolor* BC Act, Sch. 2, Vul. EPBC Act, End.	Occurs in a variety of Eucalypt forests. Migrates from Tasmania to the mainland during the winter/autumn months to feed mostly on winter flowering Eucalypts	No suitable foraging habitat occurs on the site.
Barking Owl *Ninox connivens* BC Act, Sch. 2, Vul.	Found in open forests, woodlands, dense scrubs, river red gums and other large trees near watercourses.	Suitable natural habitat occurs on the site.

Common name *Scientific name* Schedule listing	Preferred habitat	Comment
Powerful Owl *Ninox strenua* BC Act. Sch. 2. Vul.	Pairs occupy permanent territories in mountain forests, gullies and forest margins, sparser hilly woodlands, coastal forests, woodlands and scrubs.	Suitable natural habitat occurs on the site.
Masked Owl *Tyto novaehollandiae* BC Act. Sch. 2. Vul.	Forests, open woodlands and farms with large trees, e.g. river red gums adjacent to cleared country.	Suitable natural habitat occurs on the site.
Sooty Owl *Tyto tenebricosa* BC Act. Sch. 2. Vul.	Tall, wet forests in sheltered mountain gullies, usually with an east and Southeast aspect.	No suitable natural habitat occurs on the site.
Speckled Warbler *Pyrrholaemus sagittatus* BC Act Sch. 2. Vul.	Inhabits Eucalypt dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy	No suitable natural habitat occurs on the site.
Varied Sittella *Daphoenositta chrysoptera* BC Act Sch. 2. Vul.	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland	No suitable natural habitat occurs on the site.
Dusky Woodswallow *Artamus cyanopterus cyanopterus* BC Act Sch. 2. Vul.	Often reported in woodlands and dry open sclerophyll forests, usually dominated by eucalypts, including mallee associations. It has also been recorded in shrublands and heathlands and various modified habitats, including regenerating forests; very occasionally in moist forests or rainforests.	No suitable natural habitat occurs on the site.
Flame Robin *Petroica phoenicea* BC Act Sch. 2. Vul.	In NSW it breeds in upland moist eucalypt forests and woodlands, often on ridges and slopes, in areas of open understorey. It migrates in winter to more open lowland habitats such as grassland with scattered trees and open woodland on the inland slopes and plains	No suitable natural habitat occurs on the site.
Diamond Firetail *Stagonopleura guttata* BC Act Sch. 2. Vul	Mostly inhabits grassy eucalypt woodlands, also occurring in open forest and riparian areas within these. Feeds exclusively on the ground, occurring in flocks between five to 40+ birds	No suitable natural habitat occurs on the site.

Mammals

Common name *Scientific name* Schedule listing	Preferred habitat	Comment
Spotted-tailed Quoll *Dasyurus maculatus* BC Act, Sch. 2, Vul. EPBC Act, End.	Occurs mostly in sclerophyll forest and woodlands as well as coastal heath lands and rainforests. Requires suitable den sites such as hollows or caves and large areas of intact vegetation.	No suitable natural habitat occurs on the site.
Koala *Phascolarctos cinereus* BC Act, Sch. 2, Vul.	Eucalypt forests rich in Swamp Mahogany (E. robusta), Forest Red Gum (E. tereticornis), and Grey Gum (E. punctata).	No suitable natural habitat occurs on the site.
Yellow-bellied Glider *Petaurus australis* BC Act, Sch. 2, Vul.	Restricted to tall, mature sclerophyll forests in regions of high rainfall. Requires nesting hollows and a year-round supply of flowering trees.	No suitable natural habitat occurs on the site.
Squirrel Glider *Petaurus norfolcensis* BC Act, Sch. 2, Vul.	Inhabits dry sclerophyll forest and woodland. Requires abundant hollow-bearing trees and a mix of Eucalypts, acacias and Banksias. At least one floral species should flower heavily in the winter and one or more species of Eucalypts need to be smooth-barked.	No suitable natural habitat occurs on the site.
Grey-headed Flying-fox *Pteropus poliocephalus* BC Act, Sch. 2, Vul. EPBC Act, Vul.	Found in rainforest, wet and dry sclerophyll forest and mangroves. Camps are usually in gullies, close to water and in vegetation with a dense canopy. Feeds on a wide variety of flowering and fruiting plants.	Suitable foraging habitat occurs on the site.
Eastern Coastal Free-tail Bat *Micronomus norfolkensis* BC Act, Sch. 2, Vul.	Dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roosts mainly in tree hollows but will also roost under bark or in man-made structures.	Suitable foraging habitat occurs on the site.
Large-eared Pied Bat *Chalinolobus dwyeri* BC Act, Sch. 2, Vul.	Found in well-timbered areas containing gullies.	Suitable foraging habitat occurs on the site.
Eastern False Pipistrelle *Falsistrellus tasmaniensis* BC Act, Sch. 2, Vul.	Little known of habitat. Has been found roosting in stem holes of living Eucalypts	Suitable foraging habitat occurs on the site.

Common name *Scientific name* Schedule listing	Preferred habitat	Comment
Large Bent-winged Bat *Miniopterus orianae oceanensis* BC Act, Sch. 2, Vul.	Well-timbered valleys. Roosts in caves and storm-water channels and similar structures. Does not roost in tree hollows.	Suitable foraging habitat occurs on the site.
Southern Myotis *Myotis macropus* BC Act, Sch. 2, Vul.	Requires open areas of water over which it hunts. Roosts in caves, under bridges and buildings and sometimes in dense foliage in rainforests. May roost in tree hollows.	No suitable natural habitat occurs on the site.
Greater Broad-nosed Bat *Scoteanax rueppellii* BC Act, Sch. 2, Vul. EPBC Act, Lower risk (near threatened)	Found in woodlands, moist and dry sclerophyll forests and rainforests. Prefers gullies. Roosts in tree hollows only.	Suitable foraging habitat occurs on the site.

Invertebrates

Common name *Scientific name* Schedule listing	Preferred habitat	Comment
Cumberland Plain Land Snail *Meridolum corneovirens* BC Act, Sch. 1, End. EPBC Act, Vul.	Found amongst logs and debris in Cumberland Plain and Castlereagh woodlands.	Suitable natural habitat occurs on the site.
Dural Woodland Snail *Pommerhelix duralensis* EPBC Act, End.	Forested habitats that have good native cover and woody debris. Under rocks or inside curled-up bark. It does not burrow nor climb.	Suitable natural habitat occurs on the site.

Appendix 5. Habitat requirements for locally-occurring threatened plant species

Botanical name **Conservation status**	**Habitat description**	**Suitable habitat on site**
Acacia asparagoides ROTAP, 2R	Grows in dry sclerophyll forest or occasionally heath on sandstone.	No
Acacia baueri subsp. aspera ROTAP, 2RC – BC Act, Sch. 2, Vul.	Grows in low heath, often on exposed sandstone ridges.	No
Acacia bynoeana ROTAP, 3VC - BC Act, Sch. 1, End. EPBC Act, Vul.	Grows mainly in heath and dry sclerophyll forest, in sandy soils.	No
Acacia clunies-rossiae ROTAP, 2RC - t BC Act, Sch. 2, Vul.	Grows in dry sclerophyll forest, in valleys, on slopes and ridges, and along creeks.	Yes
Acacia flocktoniae ROTAP, 2VC - BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in dry sclerophyll forest on sandstone.	No
Acacia gordonii ROTAP, 2K BC Act, Sch. 1, End. EPBC Act, End.	Grows in dry sclerophyll forest and heath on sandstone outcrops.	No
Acacia pubescens ROTAP, 3VCa BC Act, Sch. 2, Vul. EPBC Act, Vul.	Usually grows in dry sclerophyll forest and woodland in clay soils. Often in roadside and railside bushland remnants.	Yes
Acacia terminalis subsp. terminalis ROTAP, 2RCi BC Act, Sch. 1, End. EPBC Act, End.	Scattered or locally common in scrub and open eucalypt woodland or forest, usually in sandy soil on creek banks, hillslopes or in shallow soil in rock crevices and sandstone platforms on cliffs.	No
Acrophyllum australe ROTAP, 2VCi BC Act, – Sch. 2, Vul. EPBC Act, Vul.	Grows in damp crevices in sandstone, usually near waterfalls. Restricted to the Blue Mtns, near Springwood, Linden, Woodford and Lawson.	No
Allocasuarina glareicola ROTAP, 2E BC Act, Sch. 1, End. EPBC Act, End.	Grows in open forest on lateritic soil; restricted to a few small populations in or near Castlereagh S.F., NE of Penrith.	No
Almaleea incurvata ROTAP, 2RC – t	Grows in swamps dominated by sedges and/or shrubs, on sandstone; restricted to the Blue Mtns.	No
Amperea xiphoclada var. papillata ROTAP, 3KC	Grows with other native sedges and rushes in swamps on sandstone at altitudes of greater than 600 m.	No
Ancistrachne maidenii ROTAP, 2KC - BC Act, Sch. 2, Vul.	Grows on sandstone soils; north of Sydney.	No

Botanical name Conservation status	Habitat description	Suitable habitat on site
Angophora crassifolia ROTAP, 2RCa	Locally frequent but restricted to the Ku-ring-gai Plateau region.	No
Asterolasia elegans ROTAP, 2ECa BC Act, Sch. 1, End. EPBC Act, End.	Grows in wet sclerophyll forest on moist hillsides, known from only one locality, north of Maroota.	No
Atkinsonia ligustrina ROTAP, 2RCa	Occurs in woodland and heath in exposed sites, a single plant often parasitic on the roots of many nearby plants; confined to a small area in the Blue Mtns.	No
Banksia conferta var. penicillata BC Act, Sch. 1, End.	Grows in dry sclerophyll forest or woodland, restricted to small populations in the Blue Mtns on sandstone cliffs or steep slopes and around rocky outcrops.	No
Blandfordia cunninghamii ROTAP, 3RCi	Grows in damp shallow sandy and peaty soils, often on sandstone cliff edges; chiefly in the Blue Mtns and Illawarra areas.	No
Blechnum gregsonii ROTAP, 2RCa	Pendent clumps found in cool rainforest, often in damp places near waterfalls, sometimes epiphytic; chiefly in the Blue Mtns and Illawarra coastal ranges.	No
Boronia fraseri ROTAP, 2RCa (UBBS 97 Recommend)	Grows mainly in wet sclerophyll forest and in rainforest in gullies on sandstone, chiefly in the Sydney region.	No
Boronia serrulata ROTAP, 2RC -	Grows in moist heath in sandy situations, chiefly in a coastal band in the Sydney district; record for the SWS in Jacobs & Pickard (1981) not substantiated.	No
Brasenia schreberi ROTAP, 3RC- +	Widespread but rarely common, found in shallow freshwater lagoons or backwaters.	No
Callistemon linearifolius ROTAP, 2RCi BC Act, Sch. 2, Vul.	Grows in dry sclerophyll forest on the coast and adjacent ranges, chiefly from Georges R. to the Hawkesbury R.	Yes
Callistemon shiressii ROTAP, 3RC -	Grows on shale ridges, in moist eucalypt forest and rainforest gullies, occasionally along riverbanks; chiefly from Colo R. to Gosford district, also Howes Valley to Bulga district.	No
Carex klaphakei BC Act, Sch. 1, End.	Known only from a few localities on Central Tablelands near Blackheath, Mt Werong and Penrose at 600–1200 m alt.	No
Chamaesyce psammogeton BC Act, Sch. 1, End.	Grows on dunes and sea strandlines.	No
Cryptostylis hunteriana BC Act, Sch. 2, Vul. EPBC Act, Vul.	Does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland.	No

Botanical name **Conservation status**	**Habitat description**	**Suitable habitat on site**
Cynanchum elegans ROTAP, 3ECi BC Act, Sch. 1, End. EPBC Act, End.	Rare, recorded from rainforest gullies scrub and scree slopes; from the Gloucester district to the Wollongong area and inland to Mt Dangar.	No
Cyphanthera scabrella ROTAP, 2RC -	Grows in dry or wet sclerophyll forest in sandstone-derived soil; restricted to Bilpin-Mt Wilson area in Blue Mtns.	No
Darwinia biflora ROTAP, 2VCa BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in heath on sandstone or in the understorey of woodland on shale-capped ridges; Cheltenham to Hawkesbury R., rare.	No
Darwinia diminuta ROTAP, 2RCi	Grows in heath or dry sclerophyll forest in poorly drained sandy soil; Manly to Ingleside and Loftus to Helensburgh, rare.	No
Darwinia fascicularis subsp. oligantha BC Act, Sch. 1, End. Pop. (Baulkham Hills)	Grows in heath or shallow soils; higher parts of the Blue Mtns.	No
Darwinia grandiflora ROTAP, 2RCi	Grows in dry sclerophyll forest and woodland on poorly drained sandy soil; Woronora Plateau and Illawarra region, rare.	No
Darwinia peduncularis ROTAP, 3RCi BC Act, Sch. 2, Vul.	Grows in dry sclerophyll forest on sandstone hillsides and ridges; Hornsby to Hawkesbury R. and west to Glen Davis, rare.	No
Deyeuxia appressa ROTAP, 2E BC Act, Sch. 1, End. EPBC Act, End.	Grows on wet ground; in the Hornsby area.	No
Deyeuxia microseta ROTAP, 3KC -	Grows in montane sclerophyll forest, especially wetter areas.	No
Dillwynia tenuifolia ROTAP, 2RCa BC Act, Sch. 2, Vul.	Grows in dry sclerophyll woodland on sandstone, shale or laterite; from Cumberland Plain, Blue Mtns to Howes Valley area.	Yes
Discaria pubescens ROTAP, 3RCa	In woodland and forest, often in rocky situations; widespread, but considered endangered.	No
Diuris aequalis ROTAP, 3VC - BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows among grass in sclerophyll forest, mainly in the ranges and tablelands; chiefly from Braidwood to Kanangra and Liverpool.	No
Epacris hamiltonii ROTAP, 2ECi BC Act, Sch. 1, End. EPBC Act, End.	Grows in skeletal sandy soils in sheltered damp rock situations on sandstone in the Blackheath area.	No
Epacris muelleri ROTAP, – 3RC -	Grows on skeletal soils on damp rock faces on sandstone in the Blue Mtns and Wollemi N.P.	No

Botanical name Conservation status	Habitat description	Suitable habitat on site
Epacris purpurascens var. purpurascens BC Act. Sch. 2. Vul.	Grows in sclerophyll forest, scrubs and swamps on sandstone from Gosford and Sydney districts.	No
Epacris sparsa ROTAP, 2VCi BC Act. Sch. 2. Vul. EPBC Act. Vul.	Grows in sandy soil among rocks beside Grose R.	No
Epacris sparsa ROTAP, 2VCi BC Act. Sch. 2. Vul. EPBC Act. Vul.	Rare and localized, in mallee shrubland on skeletal sandy soil on sandstone; sporadic occurrences between Linden and Berrima.	No
Eucalyptus baeuerlenii ROTAP, 3RCa	Locally frequent but restricted, in wet forest or woodland in sheltered often sloping sites; from Wentworth Falls to Budawang Ra.	No
Eucalyptus benthamii ROTAP, 2VCi BC Act. Sch. 2. Vul. EPBC Act. Vul.	Restricted but locally abundant, in wet forest on sandy alluvial soils along valley floors; confined to the lower Nepean R. area.	No
Eucalyptus burgessiana ROTAP, 2RCa	Locally frequent but restricted, in mallee shrubland on skeletal sand on sandstone; restricted to lower Blue Mtns.	No
Eucalyptus camfieldii ROTAP, 2VCi BC Act. Sch. 2. Vul. EPBC Act. Vul.	Rare and localized, in coastal shrub heath on sandy soils on sandstone, often of restricted drainage; from Gosford to Royal N.P.	No
Eucalyptus cannonii ROTAP, 2VCi BC Act. Sch. 2. Vul.	Locally frequent but restricted, in sclerophyll woodland on shallow soil on rises; Rylstone to upper Wolgan Valley.	No
Eucalyptus copulans ROTAP, 2E BC Act. Sch. 1. End. EPBC Act. End.	Locally frequent but restricted, in sclerophyll woodland on shallow soil on rises; Rylstone to upper Wolgan Valley.	No
Eucalyptus cunninghamii ROTAP, 2RCa	Restricted but locally frequent, in mallee heath skeletal sandy soil on sandstone; confined to central Blue Mtns.	No
Eucalyptus sp. 'Cattai' BC Act. Sch. 1, End.	Grows as isolated trees or small groups of trees in scrub, heath and low woodland, in sandstone-derived soils.	No
Eucalyptus leuhmanniana ROTAP, 2RCa	Locally abundant but restricted, in mallee heath on shallow infertile sandy soils of poor drainage on sandstone; confined to coastal plateau between the Hawkesbury R. and Bulli.	No
Euphrasia bowdeniae ROTAP, 2VCit BC Act Sch. 2. Vul. EPBC Act. Vul.	Grows on sandstone cliffs in shallow soil on ledges or sometimes trailing over rock, in higher parts of Blue Mountains.	No

Botanical name Conservation status	Habitat description	Suitable habitat on site
Genoplesium baueri BC Act, Sch. 1, End.	Prefers sandy dry Eucalyptus habitats	No
Grammitis stenophylla BC Act, Sch. 1, End.	Prefers moist shaded gullies, typically grows on rocks near moss.	No
Grevillea caleyi BC Act, Sch. 1, End. EPBC Act, End.	Grows on sandy soil with lateritic influences, typically on ridges.	No
Microtis angusii BC Act, Sch. 1, End. EPBC Act, End.	Difficult to determine, growing among weeds and on a disturbed soil. Possibly prefers sandy soils with lateritic influences.	No
Gonocarpus longifolius ROTAP, 3RC -	Grows in shrub communities on sandstone; mainly on the ranges from Armidale to the Blue Mtns, east of Rylstone.	No
Goodenia rostrivalvis ROTAP, 2RCa	Grows on damp south-facing sandstone cliffs in Blue Mtns, in the Wentworth Falls area, rare.	No
Grevillea juniperina subsp. juniperina BC Act, Sch. 2, Vul.	Grows in open dry sclerophyll (eucalypt-dominated) forest or woodland, at altitudes of less than about 50 m, in sandy to clay-loam soils and red pseudolateritic gravels.	No
Grevillea longifolia ROTAP, 2RC -	Grows in moist areas of sclerophyll forest, often near creeks, on Hawkesbury sandstone; chiefly the southern half of Sydney Basin, and Woronora Plateau; possibly also in Lawson area.	No
Grevillea obtusiflora BC Act, Sch. 1, End. EPBC Act, End.	Grows in sandy loam soils in open low scrub beneath dry sclerophyll forest in the Kandos area.	No
Grevillea parviflora subsp. parviflora BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in heathy associations or shrubby woodland, in sandy or light clay soils usually over shale substrates.	No
Gyrostemon thesioides ROTAP, 2KC - BC Act Sch. 1, End.	Grows on hillsides and riverbanks, only from sites near Georges (30 yrs ago) and Nepean Rivers (90 yrs ago). May already be extinct.	No
Hakea constablei ROTAP, 2RCa	In dry sclerophyll forest on rocky outcrops, scattered in the Blue Mtns between 500–1100 m alt., from Bell to Mt Wilson, rare.	No
Haloragodendron lucasii BC Act, Sch. 1, End. EPBC Act, End.	Grows in dry sclerophyll open forest on sheltered slopes near creeks on sandstone; confined to Sydney area, rare.	No
Hibbertia hermannifolia ROTAP, 3RCa	Open forest on sandstone; confined to Bents Basin (Nepean R), Yarrowitch district and the coastal ranges south from Wadbilliga N.P.; rare.	No
Hibbertia nitida ROTAP, 2RC -	Widespread on sandstone in the Sydney district.	No

Botanical name Conservation status	Habitat description	Suitable habitat on site
Hibbertia superans BC Act, Sch. 1, End.	Occurs in both open woodland and heathland, and appears to prefer open disturbed areas, such as tracksides.	No
Hymenophyllum lyallii (was *Sphaerocionium lyallii*) ROTAP, 3RC – +	Grows on rocks or trees in moist rainforest in the Blue Mtns and ranges of the south coast.	No
Hymenophyllum pumilum ROTAP, 3RC -	Epiphytic in cooler rainforest of the Blue Mtns and adjacent ranges; uncommon.	No
Isopogon fletcheri ROTAP, 2VCa BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in dry sclerophyll forest and heath on sandstone; confined to sheltered moist positions on the escarpment in the Blackheath district of the Blue Mtns, rare.	No
Isotoma sessiliflora (was *Hypsela sessiliflora*) ROTAP, 2X BC Act, Sch. 1, End.	Grows in damp places, on the Cumberland Plain, very rare.	No
Keraudrenia corollata var. denticulata ROTAP, 3RC -	Mostly on sandstone. Rare; recorded from near Grafton and west of Sydney.	No
Kunzea cambagei ROTAP, 2VCa BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in heath; known mainly from near Mt Werong and Berrima.	No
Kunzea rupestris ROTAP, 2VCa BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in heath on rock platforms; known only from between Lower Portland and Ku-ring-gai Chase N.P.	No
Lasiopetalum joyceae ROTAP, 2RC - BC ACT, Sch. 2, Vul. EPBC Act, Vul.	Grows in heath on sandstone; Hornsby Plateau.	No
Leionema lachnaeoides ROTAP, 2ECi BC Act, Sch. 1, End. EPBC Act, End.	Rare, from higher Blue Mtns, on barren rocky situations.	No
Lepidosperma evansianum BC Act, Sch. 2, Vul.	Grows on wet sandstone cliff faces.	No
Lepidosperma evansianum BC Act, Sch. 2, Vul. *Leptospermum rupicola* ROTAP, -3RC -	Grows in shrubby communities and heath on sandstone cliffs and escarpments.	No
Leucopogon exolasius ROTAP, 2VC - BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in woodland on sandstone, restricted to the Woronora and Grose Rivers and Stokes Creek, Royal N.P.	No

Botanical name Conservation status	Habitat description	Suitable habitat on site
Leucopogon fletcheri subsp. fletcheri ROTAP, 2RC - BC Act, Sch. 1, End.	Grows in woodland on lateritic soils; rare, in the Springwood area.	No
Lissanthe sapida ROTAP, 3RCa	Grows in open woodland and dry sclerophyll forest, on rocky sandstone ridges and hillsides on sandy soil; occasional, from Bargo to Coloul Ra. and Blackheath.	No
Lomandra brevis ROTAP, 2RC -	Grows in dry sclerophyll forest on sandstone-derived soils in the Sydney region; not common.	No
Lomandra fluviatilis ROTAP, 3RCa	Grows in creek beds on sandy soils; in the Royal N.P. to Colo R	No
Marsdenia viridiflora subsp. viridiflora BC Act, Sch. 1, End. Pop.	Grows in woodland and scrub; north from the Razorback Ra. (Bankstn, Blacktn, Camden, Campbelltn, Fairfield, Holroyd, Liverpool & Penrith LGAs)	No
Melaleuca deanei ROTAP, 3RC- BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in wet heath on sandstone; uncommon, in coastal districts from Berowra to Nowra.	No
Micromyrtus blakelyi ROTAP, 2VCi BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in heath in depressions on sandstone rock platforms; restricted to areas near the Hawkesbury R.	No
Micromyrtus minutiflora ROTAP, 2V BC Act, Sch. 1, End. EPBC Act, Vul.	Grows in dry sclerophyll forest in western part of the Cumberland Plain; rare.	No
Monotoca ledifolia ROTAP, 3RC - *Notochloe microdon* ROTAP, 2RC -	Grows in exposed sites in dry sclerophyll forest and shrubland on sandstone in the Woronora Plateau and Blue Mtns area.	No
Notochloe microdon ROTAP, 2RC -	Grows in moist shady areas of the Blue Mtns district.	No
Olearia cordata ROTAP, 2VCi BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in dry sclerophyll forest and open shrubland, on sandstone; chiefly from Wisemans Ferry to Wollombi.	No
Olearia quercifolia ROTAP, 3RC -	Grows in swampy or moist terrain; confined to the Blue Mtns.	No
Ozothamnus adnatus ROTAP, 3KC-	Grows in sclerophyll forest and woodland, usually on sandy soil; rare, south from Guyra district.	No

Botanical name **Conservation status**	**Habitat description**	**Suitable habitat on site**
Persoonia acerosa ROTAP, 2VC - BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in heath or dry sclerophyll forest on sandstone; central Blue Mtns south to Hill Top.	No
Persoonia bargoensis ROTAP, 2V BC Act, Sch. 1, End. EPBC Act, Vul.	Grows in woodland to dry sclerophyll forest, on sandstone and laterite; restricted to the Bargo area.	No
Persoonia hirsuta/revoluta ROTAP, 3KCi BC Act, Sch. 1, End. EPBC Act, End.	Grows in woodland to dry sclerophyll forest on sandstone; both subspecies occurring as isolated individuals or very small populations.	No
Persoonia laxa BC Act, Sch. 1, Ext. EPBC Act, Ext.	Considered extinct. Probably prefers heath or sclerophyll forest with sandy soils.	No
Persoonia mollis subsp. maxima ROTAP, 2E BC Act, Sch. 1, End. EPBC Act, End.	Grows in dry to wet sclerophyll forest on Hawkesbury sandstone, Cowan–Hornsby area.	No
Persoonia nutans ROTAP, 2ECi BC Act, Sch. 1, End. EPBC Act, End.	Grows in woodland to dry sclerophyll forest on laterite and alluvial sand; confined to the Cumberland Plain.	No
Pherosphaera fitzgeraldii (was *Microstrobos fitzgeraldii*) ROTAP, 2ECi BC Act, Sch. 1, End.	Usually grows on wet rocks within the spray of waterfalls or on ledges or in caves near waterfalls; restricted to southerly aspects on sandstone near waterfalls in the Katoomba to Wentworth Falls area of the Blue Mtns.	No
Philotheca obovalis (was *Eriostemon obovalis*) ROTAP, 3RCa	Grows in heath and dry sclerophyll forest on sandstone; chiefly in the Blue Mountains, also recorded for Kydra Mountain.	No
Pilularia novae-hollandiae BC Act, Sch. 1, End.	Widespread but not common in seasonally dry depressions and margins of marshes; may grow submerged.	No
Pimelea curviflora var. curviflora BC Act, Sch. 2, Vul. EPBC Act, Vul.	Confined to coastal areas around Sydney on sandstone.	No
Pimelea spicata ROTAP, 3ECi BC Act, Sch. 1, End. EPBC Act, End.	Grows on the coast from Lansdowne to Shellharbour and inland to Penrith; rare.	No
Platysace clelandii ROTAP, 2RCa	Grows among sandstone boulders in dry sclerophyll forest, from Glen Davis to Berowra.	No

Botanical name Conservation status	Habitat description	Suitable habitat on site
Pomaderris brunnea ROTAP, 2VC - BC Act, Sch. 2, Vul. EPBC Act, Vul.	In open forest, confined to the Colo R. and upper Nepean R.	No
Pomaderris prunifolia BC Act, Sch. 1, End.	Forest and woodland	Yes
Prostanthera cryptandroides BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows chiefly in the Lithgow to Sandy Hollow districts.	No
Prostanthera marifolia BC Act, Sch. 4, Ext A. EPBC Act, CE.	Occurs in sandy soils with clay-loam and ironstone on ridge tops.	No
Pseudanthus divaricatissimus ROTAP, 3RCa	Mostly from Muswellbrook to Bega, with outlying populations near Urbenville and Dubbo (Goonoo State Forest).	No
Pterostylis gibbosa ROTAP, 2E (X-WSyd) BC Act, Sch. 1, End. EPBC Act, End.	Grows among grass in sclerophyll forest; rare, chiefly in the southern parts of the central coast, with a disjunct population in the Hunter Valley.	No
Pterostylis saxicola ROTAP, (2E) BC Act, Sch. 1, End. EPBC Act, End.	Grows in shallow soil over sandstone sheets, often near streams; rare, from Picnic Point to Picton area.	No
Pultenaea sp. 'Genowlan Point' (NSW 417813) BC Act, Sch. 1, Crit. End. EPBC Act, Crit. End.	It is endemic to New South Wales and is only found at Genowlan Point in the Capertee Valley. At Genowlan Point, Pultenaea sp. 'Genowlan Point' (Allen s.n., 29 Nov. 1997) is restricted to well drained stoney soils.	No
Pultenaea glabra EPBC Act, Vul.	Grows in dry sclerophyll forest on sandstone; higher Blue Mtns and Glen Davis area.	No
Pultenaea parviflora ROTAP, 2E BC Act, Sch. 1, End. EPBC Act, Vul.	Grows in dry sclerophyll forest on Wianamatta Shale, laterite or alluvium, Cumberland Plain.	No
Pultenaea pedunculata BC Act, Sch. 1, End.	Grows in dry sclerophyll forest and disturbed sites on a variety of soils on the South Coast and edge of the Southern Tableland, but with disjunct restricted populations on Wianamatta Shale on the Cumberland Plain in N.S.W.	No
Pultenaea villifera var. villifera ROTAP, 3RC - BC Act, Sch. 1, End. Pop. (Lower Blue Mountains)	Grows in dry sclerophyll forest on sandy soil; lower Blue Mtns to Eden district.	No

Botanical name **Conservation status**	**Habitat description**	**Suitable habitat on site**
Rhizanthella slateri ROTAP, 3KC - BC Act, Sch. 2, Vul. EPBC Act, End.	Grows in sclerophyll forest in shallow to deep loams. Collections tend to be accidental and it is not possible to determine distribution accurately; recorded for the Blue Mtns, also Bulahdelah south to Dharug N.P.	No
Rhodamnia rubescens BC Act, Sch. 1, End.	Forest	Yes
Rupicola apiculata ROTAP, 2RCa	Grows in skeletal sandy soils in damp situations on sandstone rock ledges between 700–1100 m alt.; restricted to the Blue Mtns.	No
Rupicola ciliata ROTAP, 2RC – t	Grows in skeletal sandy soils in rock crevices, on rock ledges and beneath cliff overhangs in Kurrajong Heights, Bilpin to lower Yarramun Creek areas in the Blue Mtns.	No
Rupicola sprengelioides ROTAP, 2RC – t	Restricted to skeletal sandy soils on sandstone ledges, cliff faces and rocky ground, in the Burragorang Valley.	No
Sprengelia monticola ROTAP, 2RC – t	Grows on wet rock faces and ledges or cliff bases on sandstone in the Blue Mtns.	No
Syzygium paniculatum BC Act, Sch. 1, End. EPBC Act, Vul.	Rainforest and open forest near riparian zones.	Yes
Tetratheca glandulosa ROTAP, - 2VC - BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in sandy or rocky heath or scrub, from Mangrove Mtn to the Blue Mtns and Sydney.	No
Tetratheca neglecta ROTAP, 3RC -	Grows in sandy heath and dry sclerophyll forest; chiefly in the Sydney district, south to Robertson.	No
Thesium australe ROTAP, 3VCi BC Act, -Sch. 2, Vul. EPBC Act, Vul.	Grows in grassland or woodland, often in damp sites; widespread but rare and possibly endangered.	No
Tylophora woollsii ROTAP, 2E BC Act, Sch. 1, End. EPBC Act, End.	Grows in wet sclerophyll forest and rainforest in the Clouds Creek area near Nymboida and in sclerophyll forest near Parramatta; rare.	No
Velleia perfoliata ROTAP, 2VC - BC Act, Sch. 2, Vul. EPBC Act, Vul.	Grows in heath on shallow sandy soil over sandstone; confined to the Hawkesbury district to the upper Hunter Valley.	No
Veronica lithophila (was *Parahebe lithophila*) ROTAP, 2RC -	Grows on cliffs or rock exposures, in pockets of soil over sandstone or quartzite; Blue Mtns-Colong region at 650–870 m alt., uncommon.	No
Wahlenbergia multicaulis BC Act, Sch. 1, End.	Woodland	Yes
Wilsonia backhousei BC Act, Sch. 2, Vul.	Grows in coastal saltmarshes; chiefly in the Sydney district, also common at Jervis Bay.	No

Botanical name Conservation status	Habitat description	Suitable habitat on site
Zannichellia palustris BC Act, Sch. 1, End.	A submerged aquatic plant. Grows in fresh or slightly saline stationary or slowly flowing water.	No
Zieria covenyi BC Act, Sch. 1, End. EPBC Act, End.	Grows in eucalypt woodland on sandy soils; known only from Narrow Neck Peninsular in the Blue Mtns N.P.	No
Zieria involucrata ROTAP, 2VCa BC Act, Sch. 1, End. EPBC Act, Vul.	Grows in wet sclerophyll forest, chiefly in the Lower Blue Mtns; rare.	No
Zieria murphyi ROTAP, 2VC-	Grows in dry sclerophyll forest in sandy soils; on the ranges from Mt Tomah to Penrose district.	No
Zieria prostrata BC Act, Sch. 1, End. EPBC Act, End.	Restricted to low coastal heaths, near Coffs Harbour; rare.	No

Key	
BC Act 2016: Sch1 = Schedule 1: Endangered species Part 1: endangered species Part 2: endangered populations Part 3: endangered ecological communities Part 4: species presumed extinct Sch2 = Schedule 2: Vulnerable species **EPBC Act 1999:** CE = Critically Endangered E = Endangered V = Vulnerable EP = Endangered Population	**ROTAP Codes** 1 Known by one collection only 2 Geographic range in Australia < 100Km 3 Geographic range in Australia > 100Km E Endangered V Vulnerable R Rare X Extinct K Poorly known C Reserved a > or = 1000 plants reserved i < 1000 plants reserved t Total known population reserved - Reserved population size unknown + Overseas occurrence

Appendix 6. Matters of National Environmental Significance

The Protected Matters Search Tool was used to find relevant Matters of National Environmental Significance (MNES) on or near the site.

One Listed Threatened Ecological Communities are recorded in the area that occurs on the site: Blue Gum High Forest in the Sydney Basin Bioregion.

This ecological community is protected under Commonwealth legislation by the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act 1999) and is listed as Critically Endangered.

Australian Government

Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

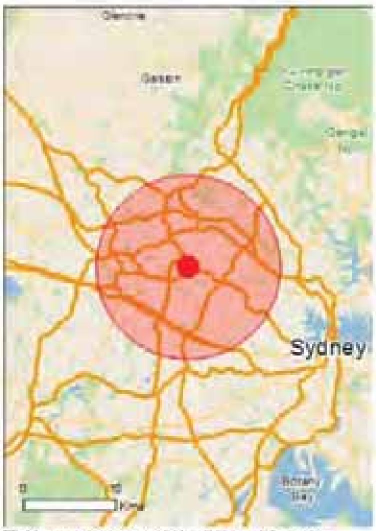
This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 04/03/21 12:07:43

- Summary
- Details
  - Matters of NES
  - Other Matters Protected by the EPBC Act
  - Extra Information
- Caveat
- Acknowledgements



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2015

Coordinates
Buffer: 10.0Km

Appendix 7. Company Profile

Abel Ecology has been in the biodiversity consulting business since 1991, starting in the Sydney Region, and progressively more state wide in New South Wales since 1998, and now also in Victoria.

During this time extensive expertise has been gained with regard to Master Planning, Environmental Impact assessments including flora and fauna, bushfire reports, Vegetation Management Plans, Management of threatened species, Review of Environmental Factors, Species Impact Statements, Biodiversity Development Assessment Reports and as Expert Witness in the Land and Environment Court.

We have done consultancy work for industrial and commercial developments, golf courses, civil engineering projects, tourist developments as well as residential and rural projects. This process has also generated many connections with relevant government departments and city councils in NSW. Our team consists of four scientists and two administrative staff, plus casual assistants as required.

Licences

- NPWS s132C Scientific licence number is SL100780 expires 31 July 2021
- NPWS GIS data licence number is CON95034
- DG NSW Dept of Primary Industries Animal Care and Ethics Committee Approval expires 8 November 2021
- DG NSW Dept of Primary Industries Animal Research Authority expires 8 November 2021

The Consultancy Team

Dr Danny Wotherspoon

Grad Dip Bushfire Protection (University of Western Sydney 2012)
PhD (researching Cumberland Plain vegetation and fauna habitat, at Centre for Integrated Catchment Management, University of Western Sydney, 2008)
Planning for Bushfire Protection Certificate course (University of Technology, 2006)
Consulting Planners Bushfire Training Course (Planning Institute of Australia, 2003)
MA (Macquarie University, 1991)
Wildlife Photography Certificate (Sydney Technical College, 1987)
Herpetological Techniques Certificate (Sydney Technical College, 1986)
Applied Herpetology Certificate (Sydney Technical College, 1980)
Dip Ed (University of New England, 1978)
BSc (Zoology, Ecology) University of New England 1974)

Dr Daniel McDonald

B. Ag Sc; M. Agr; PhD (The University of Sydney)
Cert IV – GIS (Riverina TAFE)
Daniel is an accredited Biobanking Assessor (0075) and an accredited BAM assessor (BAAS17056)
Quantified Tree Risk Assessment (QTRA) and Visual Tree Assessment (VTA). White Card

Daniel is an experienced ecologist with expertise in fauna, plant species identification, vegetation assessment, agriculture, arboriculture, conservation genetics and seed collection and preservation. He is accredited both for BAM assessments, BioBanking assessments and Biodiversity Certification. His present research interest is in Eastern Suburbs Banksia Scrub and fragmented endangered ecological communities.

Mark Mackinnon

Qualifications: B Env. Sci. (Hons), Grad Dip Bushfire Protection.

MEIANZ, White Card

Accredited Practitioner Level 2 - Bushfire Planning & Design (BPAD), Accreditation number 36395.

Mark is a passionate and enthusiastic scientist who thrives in the field of natural resource management. In the last 6 years, Mark has worked for a number of inter-state government agencies and environmental consultancies. He has experience in threatened species, fire ecology, bushfire management, pest plant and animals, and landscape restoration. In particular he specializes in ornithology and bushfire management. Mark has a number of specialized field-based skills including: simple and complex tree climbing, working at heights, general firefighter departmental fire accreditation, venomous snake and reptile handling, immunization to handle bat species, and an A - class bird banding licence with mist-net endorsement. Mark is also skilled in ArcGIS mapping, first-aid, four -wheel-driving.

Dr Alison Hewitt
B. Sc. (Hons), PhD.
MESA, MAPS, MASBS, Snr 1st Aid cert, White card.
Alison has researched and published on the reproductive biology and ecology of Australian Melaleuca species, native plant responses to fire and the vegetation of western Sydney. Alison's interests include plant ecology and flora survey methodology, bush regeneration, plant identification and gardening. Alison teaches Botany and Ecology sessionally with Western Sydney University.

Dr Stephanie A Clark
BAppSc (Biochemistry), MSc, PhD

Member of the IUCN SSC Mollusc Specialist Group. Research Associate at both the Field Museum of Natural History, Chicago, IL, USA and The Australian Museum, Sydney, NSW.

Stephanie has been interested in the taxonomy, systematics and conservation of invertebrates particularly molluscs since the late 1970's when she first started volunteering at the Australian Museum.

She has been an ecological consultant specialising in invertebrates since 1997. She has worked for private developers, mining companies, local community groups and local, state and federal government agencies in three countries (Australia, USA and Canada) and has been an expert witness for the NSW Land and Environment Court.

Stephanie's PhD researched the taxonomy, systematics and conservation of the NSW listed snail Meridolum corneovirens (Cumberland Plain Land Snail). She has given presentations to local, national and international conferences in Australia, Germany and USA. She has field experience in 16 countries, all states of Australia and 40 US states. Stephanie's has published more than 30 scientific papers in national and international journals and described more than 155 species and 10 genera.

Mark Sherring

BM, MAABR, Cert. Hort., Cert. Bush Regen, Cert. Rural Ops, White Card.

Member of the Australian Association of Bush Regenerators

Mark has extensive knowledge and experience of plant species in New South Wales. He has built up his expert knowledge on NSW native plant species over the many years that he has practised as a Botanist. He is regularly asked to contribute to the extensive (ongoing) flora surveys of the Sydney Basin and Blue Mountains carried out by the Royal Botanic Gardens, Sydney. Mark has extensive field survey experience, having worked for over ten years in various plant-related roles. His role in Abel Ecology is to provide expert advice on flora and on the full range of flora management issues encountered and in the design and management of environmental monitoring projects.

D21/78776

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Report on
Detailed Site Investigation (Contamination)

Marsden High School Repurposed to Netball Facility
Marsden High School, West Ryde

Prepared for
School Infrastructure New South Wales (SINSW)

Project 99872.01
February 2021

Integrated Practical Solutions

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Document History

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The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

	Signature	Date
Author	pp Lisa Teng	17 February 2021
Reviewer		17 February 2021

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Report on Detailed Site Investigation (Contamination)
Marsden High School Repurposed to Netball Facility
Marsden High School, West Ryde

1. Introduction

Douglas Partners Pty Ltd (DP) has been engaged by School Infrastructure New South Wales (SINSW) complete this detailed site investigation (contamination) (DSI) for a proposed redevelopment of Marsden High School, West Ryde (the site) into a netball facility. The site is shown on Drawing 1, Appendix A.

The investigation was undertaken in accordance with DP's proposal SYD201127 dated 16 October 2020.

It is understood that the school will be relocated to a nearby campus as part of wider education upgrades in the Ryde Local Government area. The existing school grounds are proposed to be developed to a new netball facility once the school has relocated. Specific details of the development have not been confirmed at this early stage.

It is understood that the report will be used to support the initial master planning phase and concept / schematic design process of the project. Therefore, a limited sampling programme was adopted for the DSI.

DP previously completed a report titled *Preliminary (Contamination) Site Investigation* (The PSI) (DP, 2020) for SINSW to assess the potential for contamination at the site based on past and present land uses. The PSI recommended an intrusive soil investigation and depending on the proposed development design, a preliminary waste classification. This current DSI addresses that recommendation.

This report must be read in conjunction with all appendices including the notes provided in Appendix B.

The PSI was undertaken concurrently with an intrusive geotechnical investigation[1] which is reported under a separate cover.

The following key guidelines were consulted in the preparation of this report:

- NEPC National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM] (NEPC, 2013); and
- NSW EPA Guidelines for Consultants Reporting on Contaminated Land (NSW EPA, 2020).

[1] Douglas Partners Pty Ltd, *'Report on Geotechnical Assessment, Marsden High School Repurposed to Netball Facility, Marsden High School, Ryde*, dated February 2021, reference: 99872.00.R.002 (DP, 2021).

2. Scope of Work

The scope of works comprised an intrusive investigation as described below:

- Drilling of 23 boreholes across the site using a track mounted drilling rig;
- Collection of soil samples for contamination testing from all boreholes at regular intervals and where signs of contamination were observed;
- Screening of all soil samples for volatile organic compounds (VOC) using a photo-ionisation detector (PID);
- Dispatch and analysis of 45 selected soil samples and quality control samples for analysis of a combination of the following contaminants and parameters at a NATA accredited laboratory:
  - Metals / metalloids (arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc);
  - Total recoverable hydrocarbons (TRH);
  - Benzene, toluene, ethylbenzene and xylenes (BTEX);
  - Polycyclic aromatic hydrocarbons (PAH);
  - Organochlorine pesticides (OCP);
  - Organophosphorus pesticides (OPP);
  - Polychlorinated biphenyls (PCB);
  - Total phenols;
  - Asbestos;
  - pH; and
  - Cation exchange capacity (CEC).
- Field sampling and laboratory analysis generally consistent with standard environmental protocols, including a quality assurance and quality control (QA / QC) plan consisting of 10% replicate sampling, trip spikes, trip blanks, appropriate chain-of-custody procedures and laboratory QA / QC testing;
- Interpretation of the analytical results against the adopted site assessment criteria (SAC);
- Data quality assessment;
- Updating the conceptual site model (CSM); and
- Preparation of this report detailing the methodology and results of the investigation with reference to EPA approved guidelines.

The investigation was undertaken in accordance with project specific data quality objectives (DQO) as discussed in Appendix D.

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3. Site Information

Site Address	Marsden High School, West Ryde
Legal Description	Lot 1, Deposited Plan 220808
Area	Approximately 5.5 ha
Zoning	Zone SP2 Infrastructure
Local Council Area	Ryde City Council
Current Use	High School
Surrounding Uses	North - Residential East - Residential and Public Park South - Ermington Public School West - Residential

The site boundary is shown on Figure 1.

Figure 1: Site Location

4. Environmental Setting

Regional Topography	The areas the surrounding site generally slope sharply in north-east and south-east directions towards Archers Creek which runs along the eastern side of the site.
Site Topography	The overall site slopes down from the north western corner to the south east towards Archer Creek. The surface levels across the site fall from about RL 42 m relative to Australian Height Datum (AHD) near the north western corner to about RL 30 m, AHD on the south eastern corner.
Soil Landscape	Reference to Sydney 1:100,000 Soils Landscape Sheet indicates that the site is within Glenorie soil landscape which typically comprises undulating to rolling low hills on Wianamatta Group shales.
Geology	Reference to Sydney 1:100,000 Geology Sheet indicates that the site is underlain by Wianamatta Group Ashfield Shale; black to dark-grey shale and laminate sedimentary rock the from Triassic age.
Acid Sulfate Soils	Reference to the 1:25 000 Acid Sulphate Soils (ASS) Risk map indicates that the site is in an area of no known occurrence of acid sulphate soils.
Surface Water	Archers Creek is present along the eastern portion of the site and flows south-east downgradient, surface water is expected to infiltrate into exposed soils, sheet east into Archers Creek and stormwater drains at Brush Road.
Groundwater	No registered groundwater bores are located within 1 km of the site. No free groundwater was observed during previous investigations at the site (refer to Section 6).

Further Detail on the environmental setting is provided in DP (2020).

5. Previous Reports and Site History

5.1 Preliminary (Contamination) Site Investigation (DP, 2020)

DP (2020) comprised a desktop study and search of the relevant site history documentation including a review of the title deeds, historical aerial photography and previous investigation reports, and a search of the public registers and planning records.

The site history information suggests that the site has been owned by the NSW Government and used as a school since at least the 1960s. Information from historical aerial photographs suggest that the site has continued to be developed since the 1960's into the school as it is currently. Prior to becoming a school, the site appeared to have been vacant since at least the 1930s and it is unknown what the site may have been used for prior to this, but aerial imagery indicates the site may have been used for agricultural purposes.

Based on the outcomes of the PSI it was considered that the risk of significant or widespread contamination at the site is low to moderate; given the risk of asbestos on the ground or in the fill, other potential contaminants in the fill and some possible low level application of herbicides and pesticides at the site.

In order to achieve an outcome stating that the site is suitable or can be made suitable for the proposed development (as required under SEPP55), it was recommended that an intrusive investigation be undertaken. It was recommended that the intrusive works include a soil and groundwater assessment and depending on the proposed development design, a preliminary waste classification. Given the intrusive investigation was proposed to be undertaken prior to demolition of the buildings on site, a limited sampling program was recommended with additional sampling following demolition to assess the areas within the footprints of the buildings. An updated hazardous material building survey was also recommended for the site prior to renovation or demolition works.

6. Preliminary Conceptual Site Model

A Conceptual Site Model (CSM) is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM provides the framework for identifying how the site became contaminated and how potential receptors may be exposed to contamination either in the present or the future i.e., it enables an assessment of the potential source - pathway - receptor linkages (complete pathways).

Potential Sources

The PSI identified the following potential sources of contamination and associated contaminants of potential concern (COPC).

- S1: Fill: Associated with levelling and forming the site;
  - COPC include metals, total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene, xylene (BTEX), polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), organochlorine pesticides (OCP), organophosphorus pesticides (OPP), phenols and asbestos.
- S2: Previous and current general site maintenance and previous agricultural activities (including low level application of pesticides, fertilisers and herbicides);
  - COPC include OPP, OCP, metals and herbicides.
- S3: Former buildings and renovations of current buildings on-site;
  - COPC include asbestos, synthetic mineral fibres (SMF), lead (in paint) and PCB.
- S4: Unsealed carparks on-site;
  - COPC include metals (lead), TRH, BTEX and PAH.

Potential Receptors

The following potential human receptors have been identified:

- R1: Current users [secondary school];

- R2: Construction and maintenance workers;
- R3: End users [public (open space)]; and
- R4: Adjacent site users [primary school and residential].

The following potential environmental receptors have been identified:

- R5: Surface water [Archer Creek];
- R6: Groundwater; and
- R7: Terrestrial ecology.

Potential Pathways

The following potential pathways have been identified:

- P1: Ingestion and dermal contact;
- P2: Inhalation of dust and/or vapours;
- P3: Surface water run-off;
- P4: Leaching of contaminants and vertical migration into groundwater;
- P5: Lateral migration of groundwater providing base flow to water bodies; and
- P6: Contact with terrestrial ecology.

Summary of Potentially Complete Exposure Pathways

A 'source - pathway - receptor' approach has been used to assess the potential risks of harm being caused to human or environmental receptors from contamination sources on or in the vicinity of the site, via exposure pathways (potential complete pathways). The possible pathways between the above sources (S1 to S4) and receptors (R1 to R7) are provided in below Table 1.

Table 1: Summary of Potentially Complete Exposure Pathways

Source and COPC	Transport Pathway	Receptor	Risk Management Action
S1: Fill COPC: Metals, TRH, BTEX, PAH, OPP, OCP, PCB and asbestos. S2: Previous and current general site maintenance	P1: Ingestion and dermal contact P2: Inhalation of dust and/or vapours	R1: Current users [secondary school] R2: Construction and maintenance workers R3: End users [public (open space)] R4: Adjacent site users [primary school and residential]	An intrusive investigation is recommended to assess possible contamination including testing of the soil and groundwater. This can be undertaken in a staged manner whereby the soil results may inform
	P3: Surface water run-off	R5: Surface water [Archer Creek]	

Source and COPC	Transport Pathway	Receptor	Risk Management Action
and agricultural use COPC: OPPs, OCPs, metals and herbicides*.	P4: Lateral migration of groundwater providing base flow to water bodies		the need for a groundwater assessment.
	P5: Leaching of contaminants and vertical migration into groundwater	R6: Groundwater	
S4: Unsealed carparks COPC: metals, TRH, BTEX and PAHs.	P6: Contact with terrestrial ecology	R7: Terrestrial ecology	
S3: Former buildings and renovations of current buildings on site COPC: Asbestos, SMF, lead (in paint) and PCB	P1: Ingestion and dermal contact P2: Inhalation of dust and/or vapours	R1: Current users [secondary school] R2: Construction and maintenance workers R3: End users [public (open space)] R4: Adjacent site users [primary school and residential]	To complement the asbestos register previously generated, a hazardous building materials survey is recommended to update the current register and identify any SMF, lead paint and PCB in the buildings.
	P5: Leaching of contaminants and vertical migration into groundwater	R6: Groundwater	As mentioned above, an intrusive investigation is recommended to assess the potential impact on the soil and, if impacted, asses the risk to groundwater.

*Herbicide contamination is most likely to occur via spills where they are stored and mixed / diluted. Therefore contamination would most likely have occurred in maintenance related buildings and not the grounds and fields. As the school is currently operating, sampling of areas where herbicides may have been stored / mixed was not possible and therefore samples collected during the assessment were not analysed for herbicides.

7. Sampling and Analysis Quality Plan

7.1 Data Quality Objectives

The PSI was devised with reference to the seven-step data quality objective process which is provided in Appendix B Schedule B2, NEPC (2013). The DQO process is outlined in Appendix D.

7.2 Soil Sampling Rationale

A systematic sampling strategy to determine borehole locations was adopted. Locations were based on areas of access and the CSM with the rationale provided below. Borehole locations are shown on Drawing 1, in Appendix A.

Based on EPA (1995) over 60 sampling points would be required for a site of approximately 5.5 ha for site characterisation based on the detection of circular hot spots using a systemic grid sampling pattern. Given the limited nature of this investigation as the school is currently operating, a sampling density of approximately 35% of the recommended sampling points for the site was adopted. A total of 23 test locations (BH01 to BH23) were therefore positioned across accessible areas of the site excluding the footprint of the operating school buildings in the north-west of the site due to access constraints.

Soil samples were collected from each borehole at depths of approximately 0.1 m, 0.5 m, 1.0 m and every 0.5 m thereafter, and changes in lithology or signs of contamination.

The general sampling methods are described in the field work methodology, included in Appendix E.

8. Site Assessment Criteria

The site assessment criteria (SAC) applied in the current investigation are informed by the CSM (Section 6) which identified human and environmental receptors to potential contamination on the site. Analytical results are assessed (as a Tier 1 assessment) against the SAC comprising primarily the investigation and screening levels of Schedule B1 of NEPC (2013).

The investigation and screening levels applied in the current investigation comprise levels adopted for a generic recreational land use scenario. The derivation of the SAC is included in Appendix G and the adopted SAC are listed on the summary analytical results tables in Appendix H.

9. Results

9.1 Field Work Results

The borehole logs for this assessment are included in Appendix F. The logs recorded the following general sub-surface profile:

- **HARDSTAND:** asphaltic concrete over roadbase was observed in BH3 to BH5, BH11 and BH14 to depths of between 0.1 m and 0.25 m bgl. Concrete hardstand was observed in BH19 to a depth of 0.07 m bgl;
- **TOPSOIL:** INSERT DESCRIPTION was observed in BH1, BH2, BH6, BH8 to BH10, BH13, BH15, BH16 and BH18 to depths of between 0.1 m and 0.3 m bgl;
- **FILL:** clayey fill with silty sand or gravelly sand with some sandstone cobbles to depths of between 0.3 m and 3.0 m bgl; overlying;
- **RESIDUAL CLAY:** stiff to very stiff and hard clay to depths of between 0.7 m and 4.9 m bgl; overlying; and
- **WEATHERED ROCK:** Very low to low strength, weathered shale and sandstone to borehole termination depths of between 0.3 m and 4.95 m bgl.

Fill was observed to depths of between 0.02 m and 3 m bgl and anthropogenic inclusions were observed in filling including brick (BH19), glass (BH04) and ash (BH07).

The PID screening indicated that the sub-surface conditions were generally absent of VOC with all recorded values less than 5 ppm.

Free groundwater was observed whilst drilling BH07 at 3.7 m bgl. It should be noted that groundwater levels are affected by climatic conditions and soil permeability and will therefore vary with time.

There were no other apparent records of visual or olfactory evidence (e.g., staining, odours, free phase product) to suggest the presence of contamination within the soils or groundwater observed in the investigation.

Photographs of the field work during the assessment are attached in Appendix C.

9.2 Laboratory Analytical Results

The results of laboratory analysis are summarised in the following tables in Appendix H:

- Table H1: Summary of Results - Metals, TRH, BTEX and PAH;
- Table H2: Summary of Results - Phenols, OCP, OPP, PCB and asbestos;
- Table H3: Summary of Waste Classification Assessment;
- Table H4: Population Statistics for Nickel Concentrations in Samples; and
- Table H5: Pro UCL 95% Upper Confidence Limit Output.

The laboratory certificates of analysis together with the chain of custody and sample receipt information are provided in Appendix J.

10. Discussion

10.1 Contamination

As shown in the attached Tables H1 and H2, Appendix H, concentrations of the analytes in the soil samples were all less than the adopted SAC. Concentrations of BTEX, phenol, OCP, OPP, PCB and asbestos were below the PQL. Concentrations of TRH and PAH were above the practical quantitation limits (PQL) but below the SAC. Heavy metals were detected in all soil samples; however, the reported concentrations were within the adopted SAC in all samples tested with the exception of the following:

- Nickel in samples BH3/0-0.1 m (57 mg/kg) and BH11/0-0.1 m (54 mg/kg) exceeded the SAC (EIL) criterion of 45 mg/kg.

However, the calculated 95% upper confidence limit of the mathematical average (UCL) for the zinc results falls below the EIL criterion. Therefore, in general accordance with NSW EPA (2014), the 95% UCL zinc concentration has been adopted in this report. The population statistics are shown in Table H4, Appendix H.

10.2 Preliminary Waste Classification

The following Table 2 presents the results of the six step procedure outlined in NSW EPA (2014) for determining the type of waste and the waste classification. This process applies to the fill (including surface soils) at the site, which do not meet the definition of Virgin Excavated Natural Material (VENM).

Table 2: Six Step Classification Procedure

Step	Comments	Rationale
1. Is the waste special waste?	No	No asbestos-containing materials (ACM), clinical or related waste, or waste tyres were observed in the boreholes; Asbestos was not detected by the analytical laboratory.
2. Is the waste liquid waste?	No	The fill comprised a soil matrix.
3. Is the waste "pre-classified"?	No	The fill is not pre-classified with reference to NSW EPA (2014).
4. Does the waste possess hazardous waste characteristics?	No	The fill was not observed to contain or considered at risk to contain explosives, gases, flammable solids, oxidising agents, organic peroxides, toxic substances, corrosive substances, coal tar, batteries, lead paint or dangerous goods containers.

Step	Comments	Rationale
5. Determining a wastes classification using chemical assessment	Conducted	Refer to Table H3 (Appendix H).
6. Is the waste putrescible or non-putrescible?	Non-putrescible	The fill does not contain materials considered to be putrescible [a].

Note: a wastes that are generally not classified as putrescible include soils, timber, garden trimmings, agricultural, forest and crop materials, and natural fibrous organic and vegetative materials (NSW EPA, 2014).

As shown in the attached Table H3, the majority of the results were within the CT1 criteria for general solid waste within the exception of the highlighted results. Samples BH3/0-0.1 m (nickel 57 mg/kg), BH9/0-0.1 m (lead 110 mg/kg) and BH11/0-0.1 m (nickel 54 mg/kg) exceeded the CT1 criteria. Therefore, TCLP analysis was undertaken on these selected samples and the results were within the SCC1 and TCLP1 criteria for general solid waste as defined in EPA (2014). As such, fill described in Section 9.1 is preliminarily classified as general solid waste (non-putrescible, SCC1, TCLP1). This is not a formal waste classification, which needs to be confirmed through additional investigations or sampling during construction works.

10.3 VENM Assessment

The following **Error! Reference source not found.** presents the results of the assessment of natural soils and bedrock at the site with reference to the VENM definition in the POEO Act and the EPA[2] website.
https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste/virgin-excavated-natural-material

Table 3: VENM Classification Procedure

Item	Comments	Rationale
1. Is the material natural?	Yes	Natural materials logged in the boreholes as per Section 9.1. These materials underlie the fill at the site.
2. Is the material impacted by manufactured chemicals or process residues?	No	There were no visual or olfactory indicators of chemical contamination of the materials in the boreholes Concentrations of contaminants were considered to be typical of background concentrations (Table H3).
3. Are the materials acid sulfate soils?	No	Refer to Section 4.
4. Are there current or previous land uses that have (or may	No	Previous land uses may have impacted on surface soils overlying the materials. Low chemical concentrations indicate no likely impact on the natural materials.

[2] https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste/virgin-excavated-natural-material

Item	Comments	Rationale
have) contaminated the materials?		

As shown in the attached Table H3, the recorded concentrations in natural samples were below typical background concentrations. As such, it is considered that natural materials that underlie the site are likely to be classified as VENM. This is not a formal VENM classification, which needs to be confirmed through further visual and/or analytical confirmation during construction works.

10.4 Data Quality Assurance and Quality Control

The data quality assurance and quality control (QA / QC) results are included in Appendix I. Based on the results of the field QA and field and laboratory QC, and evaluation against the data quality indicators (DQI) it is concluded that the field and laboratory test data obtained are reliable and useable for this assessment.

11. Conclusions and Recommendations

Based on the site observations, field and laboratory analytical results, the risk of widespread gross chemical contamination is considered to be low and it is therefore considered that the site is suitable (from a contamination perspective) for the proposed netball facility, subject to the following:

- For buildings requiring demolition, the removal and disposal of the identified hazardous materials by an appropriately licensed and qualified contractor, at an appropriately licensed disposal facility;
- Validation / clearance of the demolition works area by a qualified occupational hygienist upon completion of demolition and removal of the buildings, confirming that there are no residual asbestos-containing materials or other hazardous materials remaining on the site;
- Additional investigation in building footprints (post demolition) including the analysis for herbicides within the footprint of the groundskeeping area of the school buildings; and
- Implementation of an Unexpected Finds Protocol such that any finds of contamination (e.g., asbestos) can be documented and managed under an appropriate management procedure.

The current results indicate that the fill is likely to be classified as general solid waste (non-putrescible). Given the laboratory results to date, consideration may be given to further investigating the potential to classify some of the fill (in particular, the deeper fill) under the NSW EPA excavated natural material (ENM) resource recovery order. The classification above is preliminary and subject to confirmation prior to removal of soils from the site.

Similarly, natural soils which underlie the site are likely to be classified as VENM, subject to further visual and / or analytical confirmation.

12. References

CRC CARE. (2017). *Risk-based Management and Remediation Guidance for Benzo(a)pyrene*. Technical Report no. 39: Cooperative Research Centre for Contamination Assessment and Remediation of the Environment.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]*. Australian Government Publishing Services Canberra: National Environment Protection Council.

NSW EPA. (1995). *Contaminated Sites, Sampling Design Guidelines*. NSW Environment Protection Authority.

NSW EPA. (2014). *Waste Classification Guidelines, Part 1: Classifying Waste*. NSW Environment Protection Authority.

NSW EPA. (2020). *Guidelines for Consultants Reporting on Contaminated Land*. Contaminated Land Guidelines: NSW Environment Protection Authority.

13. Limitations

Douglas Partners (DP) has prepared this report (or services) for this project at Marsden High School, West Ryde in accordance with DP's proposal SYD201127.P.001.Rev0 dated 16 October 2020 and acceptance received from SINSW01425/20 dated 20 October 2020. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of School Infrastructure NSW for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

The assessment of atypical safety hazards arising from this advice is restricted to the environmental components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

Asbestos has not been detected by observation or by laboratory analysis, either on the surface of the site, or in filling materials at the test locations sampled and analysed. Building demolition materials, such as brick, glass and ash, were, however, located in previous below-ground filling, and these are considered as indicative of the possible presence of hazardous building materials (HBM), including asbestos.

Although the sampling plan adopted for this investigation is considered appropriate to achieve the stated project objectives, there are necessarily parts of the site that have not been sampled and analysed. This is either due to undetected variations in ground conditions or to budget constraints (as discussed above), or to parts of the site being inaccessible and not available for inspection/sampling as the school is currently operating, or to vegetation preventing visual inspection and reasonable access in the north eastern portion of the site. It is therefore considered possible that HBM, including asbestos, may be present in unobserved or untested parts of the site, between and beyond sampling locations, and hence no warranty can be given that asbestos is not present.

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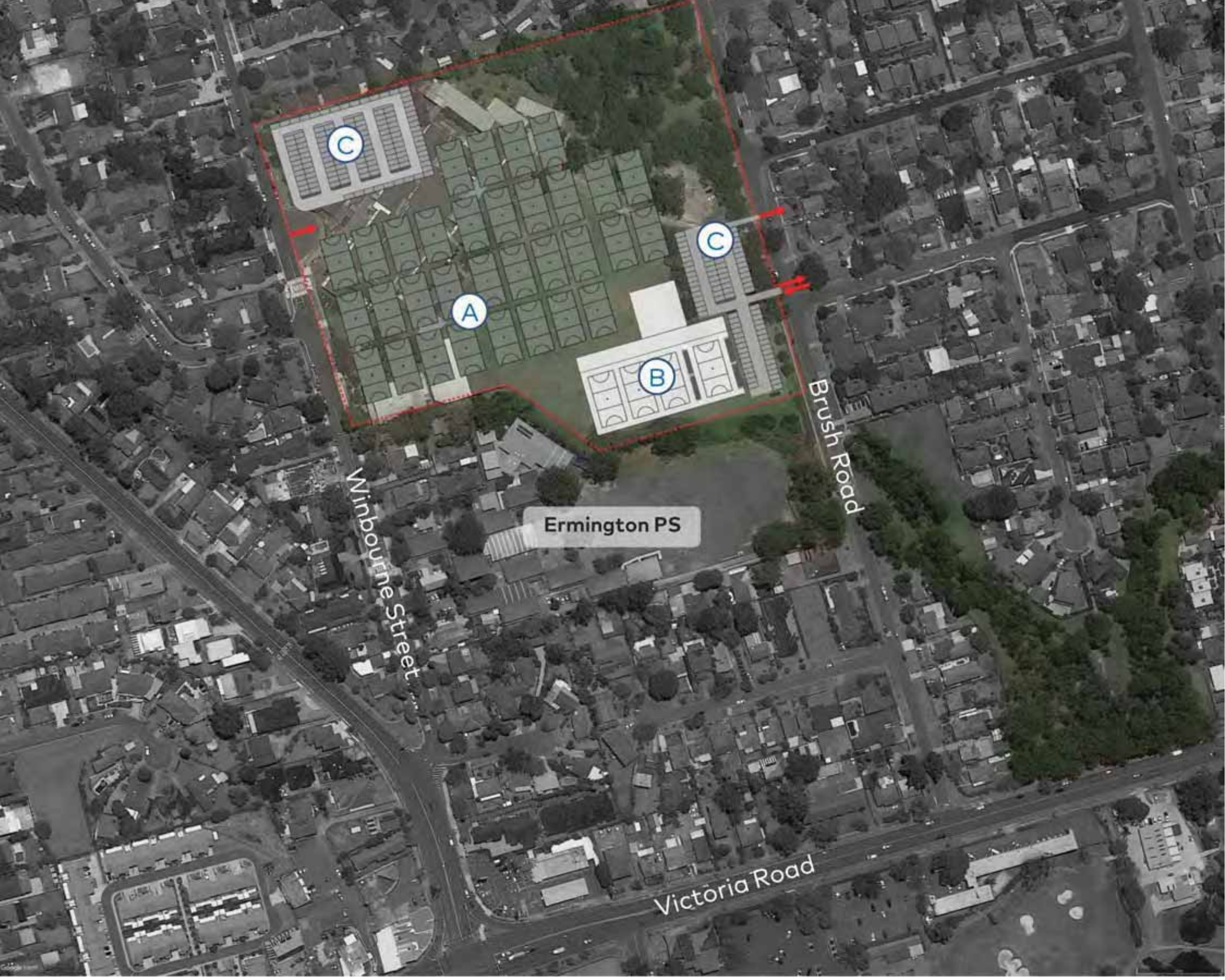
Appendix A

Drawing

D21/78776

As close to existing buildings as possible, roughly within this footprint
Edge of biodiversity area
Centre of oval
SW detention basin
A
B
C
Future landscaped area
Car park footprint
This is the alternative building footprint location
Brush Road
Winbo
Ermington PS

D21/78776


C
C
A
B
Ermington PS
Winbourne Street
Brush Road
Victoria Road

Appendix B

Notes About this Report

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

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This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Appendix C

Site Photographs

Photo 1: Drilling works in the north western portion of site.

Photo 2: Drilling works within Marsden High School Courtyard.

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs**		PROJECT:	99872.01
	Marsden High School Repurposed to Netball Facility		PLATE No:	1
	Marsden High School, West Ryde		REV:	0
	CLIENT	School Infrastructure New South Wales (SINSW)	DATE	28/01/2021

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Photo 3: Drilling works in sports field.

Photo 4: Drilling works in the hardstand playing court.

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs**	PROJECT:	99872.01
	Marsden High School Repurposed to Netball Facility	PLATE No:	2
	Marsden High School, West Ryde	REV:	0
	CLIENT: School Infrastructure New South Wales (SINSW)	DATE	28/01/2021

Photo 5: Archers Creek present in the eastern portion of site.

Photo 6: Drilling works in the eastern portion of site.

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs**	PROJECT:	99872.01
	Marsden High School Repurposed to Netball Facility	PLATE No:	3
	Marsden High School, West Ryde	REV:	0
	CLIENT: School Infrastructure New South Wales (SINSW)	DATE	28/01/2021

Photo 7: Archers Creek as it flows into the channel beneath the south eastern portion of site.

Appendix D

Data Quality Objectives and Data Quality Indicators

Appendix D
Data Quality Objectives and Data Quality Indicators
Marsden High School, West Ryde

D1.0 Data Quality Objectives

The DSI has been devised broadly in accordance with the seven-step data quality objective (DQO) process which is provided in Appendix B, Schedule B2 of NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013).

Step	Summary
1: State the problem	The objective of the investigation is to confirm the contamination status of the site with respect to the proposed land use. The report is being undertaken support the initial master planning phase and concept / schematic design process of the project. A preliminary conceptual site model (CSM) has been prepared (Section 6) for the proposed development. The project team consisted of experienced environmental engineers and scientists working in the roles of Project Principal, Project Reviewer, Project Manager, Field staff.
2: Identify the decisions / goal of the study	The site history has identified possible contaminating previous uses which are identified in the CSM (Section 6). The CSM identifies the associated contaminants of potential concern (COPC) and the likely impacted media. The site assessment criteria (SAC) for each of the COPC are detailed in Section 8. The decision is to establish whether or not the results fall below the SAC. On this basis, an assessment of the site's suitability from a contamination perspective and whether (or not) further assessment and / or remediation will be derived.
3: Identify the information inputs	Inputs to the investigation will be the results of analysis of samples to measure the concentration of COPC identified in the CSM (Section 6) at the site using NATA accredited laboratories and methods, where possible. The SAC for each of the COPC are detailed in Section 8. A photoionization detector (PID) will be used on-site to screen soils for VOC. PID readings will be used to inform sample selection for laboratory analysis.
4: Define the study boundaries	The lateral boundaries of the investigation area are shown on Drawing 1, Appendix A. The vertical boundaries are to the extent of contamination impact as determined from the site history assessment and site observations. The assessment is limited to the timeframe over which the field investigation was undertaken. Constraints to the assessment are identified and discussed in the Sampling and Analysis Quality Plan of the report, Section 7.
5: Develop the analytical approach (or decision rule)	The decision rule is to compare all analytical results with SAC (Section 8, based on NEPC (2013)). Where guideline values are absent, other sources of guideline values accepted by NEPC (2013) shall be adopted where possible. Where a sample result exceeds the adopted criterion, a further site-specific assessment will be made as to the risk posed by the presence of that contaminant(s).

Step	Summary
	Initial comparisons will be with individual results then, where required, summary statistics (including mean, standard deviation and 95% upper confidence limit (UCL) of the arithmetic mean (95% UCL)) to assess potential risks posed by the site contamination. Quality control results are to be assessed according to their relative percent difference (RPD) values. For field duplicates, triplicates and laboratory results, RPDs should generally be below 30%; for field blanks and rinsates, results should be at or less than the limits of reporting (NEPC, 2013). The field and laboratory quality assurance assessment is included in Appendix I.
6: Specify the performance or acceptance criteria	Baseline condition: Contaminants at the site and/or statistical analysis of data (in line with NEPC (2013)) exceed human health and environmental SAC and poses a potentially unacceptable risk to receptors (null hypothesis). Alternative condition: Contaminants at the site and statistical analysis of data (in line with NEPC (2013)) complies with human health and environmental SAC and as such, does not pose a potentially unacceptable risk to receptors (alternative hypothesis). Unless conclusive information from the collected data is sufficient to reject the null hypothesis, it is assumed that the baseline condition is true. Uncertainty that may exist due to the above potential decision errors shall be mitigated as follows: As well as a primary screening exercise, the use of the 95% UCL as per NEPC (2013) may be applied, ie: 95% is the defined confidence level associated with the UCL on the geometric mean for contaminant data. The resultant 95%UCL shall subsequently be screened against the corresponding SAC. The statistical assessment will only be able to be applied to certain datasets, such as those obtained via systematic sampling. Identification of areas for targeted sampling will be via professional judgement and errors will not be able to have a probability assigned to them.
7: Optimise the design for obtaining data	As the purpose of the sampling program is to assess for potential contamination across the site, the sampling program is reliant on professional judgement to identify and sample the potentially affected areas. Further details regarding the proposed sampling plan are presented in Section 7.

D1.0 References

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]*. Australian Government Publishing Services Canberra: National Environment Protection Council.

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Appendix E

Field Work Methodology

Appendix E
Field Work Methodology
Marsden High School, West Ryde

E1.0 Guidelines

The following key guidelines were consulted for the field work methodology:

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013).

E2.0 Soil Sampling

Soil sampling is carried out in accordance with DP standard operating procedures. The general sampling and sample management procedures comprise:

- Collect soil samples directly from the nominated sample depth using a solid flight auger;
- Transfer samples in laboratory-prepared glass jars with Teflon lined lids by hand, capping immediately and minimising headspace within the sample jar;
- Collect replicate samples in zip-lock bags for PID screening;
- Wear a new disposable nitrile glove for each sample point thereby minimising potential for cross-contamination;
- Collect 10% replicate samples for QC purposes;
- Label sample containers with individual and unique identification details, including project number, sample location and sample depth (where applicable);
- Place samples into a cooled, insulated and sealed container for transport to the laboratory; and
- Use chain of custody documentation.

E2.1 Field Testing

Field testing is carried out in accordance with DP standard operating procedures. The general sampling and sample management procedures comprise:

PID Field Test

- Calibrate the PID with isobutylene gas at 100 ppm and with fresh air prior to commencement of each successive day's field work;
- Allow the headspace in the PID zip-lock bag samples to equilibrate; and
- Screen for volatile organic compounds (VOC) using the PID.

E3.0 References

HEPA. (2020). *PFAS National Environmental Management Plan (NEMP)*. Version 2.0: Heads of EPAs Australia and New Zealand and Australian Government Department of the Environment.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]*. Australian Government Publishing Services Canberra: National Environment Protection Council.

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Appendix F

Logs and Explanatory Notes

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BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Marsden H.S. Repurpose to Netball Facility
LOCATION: Marsden High School, Ryde

SURFACE LEVEL: 44.8 AHD
EASTING: 321285.9
NORTHING: 6258035.6
DIP/AZIMUTH: 90°/--

BORE No: BH 01
PROJECT No: 99872.00
DATE: 18/1/2021
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling Type	Sampling Depth	Sample	Results & Comments
0.0–0.2	FILL/TOPSOIL/SILT: low plasticity, brown, trace rootlets, w<PL, generally in a firm condition	A/E	0.0–0.1		
0.2	CLAY CI-CH: medium to high plasticity, red-brown, w<PL, apparently stiff, residual		0.3		
		A/E	0.4–0.5		
	Below 0.5m: very stiff, trace roots	S	0.5–0.95	B	Bulk Sample 0.3-1.0m 5,8,10 N = 18
			1.0		
		A/E	1.0–1.1		
		S	1.5–1.95		5,9,14 N = 23
1.7	CLAY CI: medium plasticity, pale grey with some yellow-brown and red-brown, trace roots and iron indurated gravel, w<PL, very stiff, relict rock structure, extremely weathered Ashfield Shale				
	Below 2.5m: apparently hard				
3.0	SHALE: dark grey, low strength, Ashfield Shale	S	3.0–3.09		8/90 refusal
3.09	Bore discontinued at 3.09m SPT refusal on low strength shale				

RL scale: 44, 43, 42, 41, 40. Depth scale: 1, 2, 3, 4.

RIG: Hanjin D13-8 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid Flight Auger (TC-bit) to 3.0m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

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BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)	**SURFACE LEVEL:** 33.7 AHD	**BORE No:** BH 02	
PROJECT: Marsden H.S. Repurpose to Netball Facility	**EASTING:** 321400	**PROJECT No:** 99872.00	
LOCATION: Marsden High School, Ryde	**NORTHING:** 6258068.8	**DATE:** 19/1/2021	
	DIP/AZIMUTH: 90°/--	**SHEET** 1 OF 1	

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		FILL/TOPSOIL/Silty CLAY: medium plasticity, dark brown, trace rootlets, w<PL, generally in a firm condition		A/E	0.0–0.1				
	0.3	FILL/CLAY: medium plasticity, dark brown, trace fine sandstone gravel, w<PL, generally in a stiff condition		A/E	0.4–0.5				
33				S	0.5–0.95		2,3,5 N = 8		
	1			A/E	1.0–1.1				
	1.3	CLAY CI-CH: medium to high plasticity, yellow-brown, w<PL, firm, residual Below 1.5m: red-brown mottled yellow-brown, trace fine ironstone gravel		A/E	1.4–1.5				
32				S	1.5–1.95		2,3,3 N = 6		
	2								
31									
	3			S	3.0–3.45		5,7,17 N = 24		
	3.3	Sandy CLAY CL: low to medium plasticity, red-brown, fine to medium sand, trace iron indurated bands, w<PL, very stiff, residual							
30									
	3.9	SANDSTONE: pale grey, low to medium strength, possibly Mittagong Formation or Hawkesbury Sandstone							
	4.0	Bore discontinued at 4.0m Auger refusal on inferred medium strength sandstone							
29									

RIG: Hanjin D13-8 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 4.0m

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

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BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Marsden H.S. Repurpose to Netball Facility
LOCATION: Marsden High School, Ryde

SURFACE LEVEL: 35.8 AHD
EASTING: 321361.6
NORTHING: 6257997.7
DIP/AZIMUTH: 90°/--

BORE No: BH 03
PROJECT No: 99872.00
DATE: 18/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.04	ASPHALTIC CONCRETE		A/E	0.0				
	0.1	FILL/ROADBASE/Sandy GRAVEL: dark grey, fine igneous gravel, fine to medium sand, moist, generally in a dense condition			0.1				
	0.3	FILL/Sandy CLAY: low to medium plasticity, pale grey and yellow-brown, fine to medium sand, w~PL, generally in a firm condition, reworked natural		A/E	0.4 0.5				
35	0.7	CLAY CI: medium plasticity, pale grey and red-brown, trace fine sand, w<PL, stiff, residual		S	0.8		6,12 refusal		
	0.9	SANDSTONE: pale grey, low to medium strength, possibly Mittagong Formation or Hawkesbury Sandstone							
	1	Bore discontinued at 0.9m Auger refusal on inferred medium strength sandstone							1
34	2								2
33	3								3
32	4								4
31									

RIG: Hanjin D13-8 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid Flight Auger (TC-bit) to 0.9m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Marsden H.S. Repurpose to Netball Facility
LOCATION: Marsden High School, Ryde

SURFACE LEVEL: 36.7 AHD
EASTING: 321346.4
NORTHING: 6257950.9
DIP/AZIMUTH: 90°/--

BORE No: BH 04
PROJECT No: 99872.00
DATE: 18/1/2021
SHEET 1 OF 1

Depth (m)	Description of Strata	Type	Depth	Results & Comments
0.08	ASPHALTIC CONCRETE	A/E	0.0–0.1	
0.14	FILL/ROADBASE/Sandy GRAVEL: dark grey, fine igneous gravel, fine to medium sand, moist, generally in a dense condition			
	FILL/CLAY: medium plasticity, grey-brown and orange brown, trace fine to medium sand, w>PL, generally in a soft condition	A/E*	0.4–0.5	
0.65	FILL/CLAY: medium plasticity, orange-brown, w~PL, generally in a soft condition, potentially reworked natural	S	0.65–0.95	0,1,3 N = 4
	At 1.05m: trace glass			
1.5	CLAY CI: medium plasticity, red-brown with some pale grey, with iron indurated bands, w<PL, stiff, residual	S	1.5–1.95	3,5,7 N = 12
		A/E	2.0–2.1	
3.0	CLAY CL-CI: low to medium plasticity, pale grey with some orange-brown, w<PL, hard, relict rock structure, extremely weathered shale	S	3.0–3.38	5,8,13/80 refusal
3.3	SHALE: dark grey, very low to low strength, Ashfield Shale			
3.38	Bore discontinued at 3.38m SPT refusal on very low strength shale			

RL scale: 36, 35, 34, 33, 32. Depth scale: 1, 2, 3, 4.

RIG: Hanjin D13-8 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid Flight Auger (TC-bit) to 3.0m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: *Field replicate BD1/20210118 taken at 0.4-0.5m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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D21/78776

BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Marsden H.S. Repurpose to Netball Facility
LOCATION: Marsden High School, Ryde

SURFACE LEVEL: 34.1 AHD
EASTING: 321395.6
NORTHING: 6257906.1
DIP/AZIMUTH: 90°/--

BORE No: BH 05
PROJECT No: 99872.00
DATE: 18/1/2021
SHEET 1 OF 1

Depth (m)	Description of Strata	Type	Depth	Sample	Results & Comments
0.025	ASPHALTIC CONCRETE	C	0.0 – 0.11		
0.11	FILL/ROADBASE/Sandy GRAVEL: fine to medium, dark grey, igneous, cemented road base				
	FILL/CLAY: medium plasticity, dark grey-brown, with fine to medium igneous gravel, w~PL, generally in a firm condition	S	0.5 – 0.95		2,3,2 N = 5
		A/E	0.9 – 1.0		
1.2	FILL/CLAY: high plasticity, dark grey-brown, w~PL, generally in a very soft condition, reworked natural	A/E	1.4 – 1.5	B (0.4 – 2.4)	Bulk sample 0.4-2.4m
		S	1.5 – 1.95		0,0,0 N = 0
		A/E	2.0 – 2.1		
2.4	CLAY CI-CL: low to medium plasticity, red-brown and pale grey, with some iron indurated bands, w<PL, hard, relict rock texture, extremely weathered shale	A/E*	2.4 – 2.5		
		A/E	2.9 – 3.0		
3.1	SHALE: grey and red, very low strength, Ashfield Shale	S	3.0 – 3.45		7,13,17 N = 30
4.5	SHALE: dark grey, low strength, Ashfield Shale	S	4.5 – 4.6		15/100 refusal
4.6	Bore discontinued at 4.6m SPT refusal on low strength shale				

RL scale: 34, 33, 32, 31, 30. Water: none shown. Well Construction Details: none shown.

RIG: Hanjin D13-8 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Diacore to 0.11m; Solid Flight Auger (TC-bit) to 4.5m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: *Field replicate BD4/20210118 taken at 2.4-2.5m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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D21/78776

BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Marsden H.S. Repurpose to Netball Facility
LOCATION: Marsden High School, Ryde

SURFACE LEVEL: 33.6 AHD
EASTING: 321407.6
NORTHING: 6257911.3
DIP/AZIMUTH: 90°/--

BORE No: BH 05A
PROJECT No: 99872.00
DATE: 19/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		FILL/TOPSOIL/SILT: low plasticity, brown, with rootlets, w<PL, generally in a firm condition							
	0.3	FILL/CLAY: high plasticity, dark grey-brown, w~PL, generally in a very soft condition, reworked natural		B	0.3 – 1.3		Bulk sample 0.3-1.3m		
	1.3	Bore discontinued at 1.3m Target depth reached							

RIG: Hanjin D13-8 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid Flight Auger (TC-bit) to 1.3m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Marsden H.S. Repurpose to Netball Facility
LOCATION: Marsden High School, Ryde

SURFACE LEVEL: 31.9 AHD
EASTING: 321481.1
NORTHING: 6257873.8
DIP/AZIMUTH: 90°/--

BORE No: BH 06
PROJECT No: 99872.00
DATE: 19/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.1	FILL/TOPSOIL/SILT: low plasticity, dark grey-brown, trace rootlets, w<PL, generally in a firm condition							
	0.3	SANDSTONE: pale grey and yellow, medium strength, possibly Mittagong Formation or Hawkesbury Sandstone							
		Bore discontinued at 0.3m Auger refusal on inferred medium strength sandstone							
31	1								1
30	2								2
29	3								3
28	4								4
27									

RIG: Hanjin D13-8 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid Flight Auger (TC-bit) to 0.3m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Marsden H.S. Repurpose to Netball Facility
LOCATION: Marsden High School, Ryde

SURFACE LEVEL: 30.5 AHD
EASTING: 321567.2
NORTHING: 6257893.2
DIP/AZIMUTH: 90°/--

BORE No: BH 07
PROJECT No: 99872.00
DATE: 19/1/2021
SHEET 1 OF 1

Depth (m)	Description of Strata
0.0	FILL/CLAY: medium plasticity, red-brown, with silt, trace rootlets, w<PL, generally in a firm condition, reworked natural
	Below 1.5m: trace ash, generally in a very stiff condition
2.4	FILL/CLAY: medium to high plasticity, pale grey, yellow-brown and red-brown, w<PL, generally in a firm condition, reworked natural
2.7	CLAY CH: high plasticity, dark grey, trace rootlets, w<PL, stiff, alluvial
	Below 4.5m: very soft
4.9 – 4.94	SANDSTONE: pale grey, low strength
4.94	Bore discontinued at 4.94m SPT refusal on low strength sandstone

Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments
A/E	0.0 – 0.1		
A/E	0.4 – 0.5		
S	0.5 – 0.95		4,2,2 N = 4
A/E	1.0 – 1.1		
A/E	1.4 – 1.5		
S	1.5 – 1.95		10,10,13 N = 23
A/E	2.0 – 2.1		
A/E	2.4 – 2.5		
A/E	2.9 – 3.0		
S	3.0 – 3.45		6,8,9 N = 17
A/E*	3.5 – 3.6		
S	4.5 – 4.94		0,0,1/140 refusal

Water: 19-01-21 (water level at approx. 3.7m)

Well Construction Details: (none)

RIG: Hanjin D13-8 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid Flight Auger (TC-bit) to 4.9m
WATER OBSERVATIONS: Groundwater level observed as 3.70m after the hole had been left open for 6 hours
REMARKS: *Field replicate BD5/20210119 taken at 3.5-3.6m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Marsden H.S. Repurpose to Netball Facility
LOCATION: Marsden High School, Ryde

SURFACE LEVEL: 28.7 AHD
EASTING: 321531
NORTHING: 6258004.8
DIP/AZIMUTH: 90°/--

BORE No: BH 08
PROJECT No: 99872.00
DATE: 19/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Water	Well Construction Details
	0.1	FILL/Silty SAND: fine to medium sand, brown, with medium igneous gravel, trace rootlets, dry, generally in a loose condition			
28	1.2	FILL/CLAY: medium plasticity, brown, with silt, w<PL, generally in a firm condition			
27 / 26	3.0	FILL/CLAY: medium plasticity, orange-brown, trace fine ironstone gravel, w<PL, generally in a very stiff condition Below 2.4m: trace fine igneous gravel			
	3.5	CLAY CI-CH: medium to high plasticity, pale grey with some orange-brown, trace fine to medium ironstone gravel, w<PL, very stiff, residual			
	3.6	Sandy CLAY CL-CI: low to medium plasticity, pale grey, fine to medium, w<PL, residual			
25	3.7	SANDSTONE: pale grey, low to medium strength, possibly Mittagong Formation or Hawkesbury Sandstone			
24		Bore discontinued at 3.7m Auger refusal on inferred medium to high strength sandstone			

Sampling & In Situ Testing

Type	Depth	Sample	Results & Comments
A/E	0.0–0.1		
A/E	0.4–0.5		
S	0.5–0.95		4,2,4 N = 6
A/E	1.0–1.1		
A/E	1.4–1.5		
S	1.5–1.95		10,10,13 N = 23
A/E*	2.0–2.1		
A/E	2.4–2.5		
A/E	2.9–3.0		
S	3.0–3.45		6,8,9 N = 17
A	3.6–3.7		

RIG: Hanjin D13-8 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid Flight Auger (TC-bit) to 3.7m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: *Field replicate BD10/20210119 taken at 2.0-2.1m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)	**SURFACE LEVEL:** 41.7 AHD	**BORE No:** BH 09
PROJECT: Marsden H.S. Repurpose to Netball Facility	**EASTING:** 321507.4	**PROJECT No:** 99872.00
LOCATION: Marsden High School, Ryde	**NORTHING:** 6258097	**DATE:** 19/1/2021
	DIP/AZIMUTH: 90°/--	**SHEET** 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		FILL/SILT: low plasticity, dark brown, trace rootlets and sandstone gravel, w<PL, generally in a firm condition		A/E	0.0 - 0.1				
	0.3	CLAY CI-CH: medium to high plasticity, red-brown, trace rootlets, w<PL, apparently very stiff, residual		A/E	0.4 - 0.5				
41									
	1.0			A/E*	0.9 - 1.0				
		Bore discontinued at 1.0m Target depth reached							
40	2								
39	3								
38	4								
37									

RIG: Hanjin D13-8 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 1.0m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Field replicate BD8/20210119 taken at 0.9-1.0m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Marsden H.S. Repurpose to Netball Facility
LOCATION: Marsden High School, Ryde

SURFACE LEVEL: 32.7 AHD
EASTING: 321444.4
NORTHING: 6258059.9
DIP/AZIMUTH: 90°/--

BORE No: BH 10
PROJECT No: 99872.00
DATE: 19/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		FILL/TOPSOIL/Silty CLAY: medium plasticity, brown, trace rootlets, w<PL, generally in a firm condition		A/E	0.0–0.1				
	0.2	CLAY CI-CH: medium to high plasticity, red-brown, w<PL, apparently stiff, residual		A/E	0.4–0.5				
32									
	1			A/E	0.9–1.0				1
				A/E	1.4–1.5				
	1.5	Bore discontinued at 1.5m Target depth reached							
31									
	2								2
30									
	3								3
29									
	4								4
28									

RIG: Hanjin D13-8 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid Flight Auger (TC-bit) to 1.5m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Marsden H.S. Repurpose to Netball Facility
LOCATION: Marsden High School, Ryde

SURFACE LEVEL: 39.1 AHD
EASTING: 321316.3
NORTHING: 6257984.5
DIP/AZIMUTH: 90°/--

BORE No: BH 11
PROJECT No: 99872.00
DATE: 18/1/2021
SHEET 1 OF 1

Depth (m)	Description of Strata	Type	Sample Depth	Results & Comments	Water	Well Construction Details
0.02	ASPHALTIC CONCRETE	A/E	0.0–0.1			
0.2	FILL/ROADBASE/Sandy GRAVEL: dark grey, fine igneous gravel, fine to medium sand, moist, generally in a dense condition					
0.6	FILL/CLAY: medium plasticity, dark grey-brown, trace fine to medium sand, w~PL, generally in a firm condition	A/E*	0.4–0.5			
1.2	FILL/CLAY: medium to high plasticity, grey and yellow-brown, w~PL, generally in a firm condition, possibly natural	A/E	0.9–1.0			
2.0	CLAY CI-CH: medium to high plasticity, pale grey mottled yellow-brown, w<PL, apparently stiff, residual	A/E	1.4–1.5			
	Below 1.8m: apparently very stiff	A/E	1.9–2.0			
	Bore discontinued at 2.0m Target depth reached					

RIG: Hanjin D13-8 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid Flight Auger (TC-bit) to 2.0m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: *Field replicate BD2/20210118 taken at 0.4-0.5m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Marsden H.S. Repurpose to Netball Facility
LOCATION: Marsden High School, Ryde

SURFACE LEVEL: 37.1 AHD
EASTING: 321510.8
NORTHING: 6258058.3
DIP/AZIMUTH: 90°/--

BORE No: BH 12
PROJECT No: 99872.00
DATE: 19/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water	Well Construction Details
37		FILL/CLAY: low to medium plasticity, brown, with fine to coarse igneous gravel in the upper 0.3m, w<PL, generally in a firm condition		A/E	0.0 0.1				
				A/E	0.4 0.5				
36	1			A/E	0.9 1.0				1
				A/E	1.4 1.5				
	1.8	CLAY CI-CH: medium to high plasticity, red-brown, trace fine to medium sand and ironstone gravel, w<PL, apparently firm, residual		A/E	1.9 2.0				
35	2								2
				A/E	2.4 2.5				
	2.5	Bore discontinued at 2.5m Target depth reached							
34	3								3
33	4								4

RIG: Hanjin D13-8 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid Flight Auger (TC-bit) to 2.5m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Marsden H.S. Repurpose to Netball Facility
LOCATION: Marsden High School, Ryde

SURFACE LEVEL: 33 AHD
EASTING: 321436.9
NORTHING: 6257995.6
DIP/AZIMUTH: 90°/--

BORE No: BH 13
PROJECT No: 99872.00
DATE: 19/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water	Well Construction Details
33		FILL/TOPSOIL/Sandy CLAY: low plasticity, grey, fine to medium, w<PL, generally in a firm condition		A/E	0.0–0.1				
	0.15	FILL/CLAY: medium plasticity, dark grey and red, w<PL, generally in a very stiff condition, possibly reworked natural		A/E	0.4–0.5				
32	1			A/E	0.9–1.0				1
	1.2	CLAY CH: high plasticity, dark grey mottled red, w<PL, apparently stiff, residual		A/E	1.4–1.5				
	1.5	Bore discontinued at 1.5m Target depth reached							
31	2								2
30	3								3
29	4								4

RIG: Hanjin D13-8 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid Flight Auger (TC-bit) to 1.5m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Marsden H.S. Repurpose to Netball Facility
LOCATION: Marsden High School, Ryde

SURFACE LEVEL: 37.6 AHD
EASTING: 321318.5
NORTHING: 6257937.7
DIP/AZIMUTH: 90°/--

BORE No: BH 14
PROJECT No: 99872.00
DATE: 18/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.08	ASPHALTIC CONCRETE		A/E	0.0 – 0.1				
	0.25	FILL/Sandy GRAVEL: dark grey, fine igneous gravel, fine to medium sand, moist, generally in a dense condition							
37	1.0	CLAY CI-CH: medium to high plasticity, red-brown with some pale grey, w<PL, apparently stiff, residual		A/E	0.4 – 0.5				
				A/E	0.9 – 1.0				
		Bore discontinued at 1.0m Target depth reached							

RIG: Hanjin D13-8 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid Flight Auger (TC-bit) to 1.0m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Marsden H.S. Repurpose to Netball Facility
LOCATION: Marsden High School, Ryde

SURFACE LEVEL: 34 AHD
EASTING: 321404
NORTHING: 6257950.1
DIP/AZIMUTH: 90°/--

BORE No: BH 15
PROJECT No: 99872.00
DATE: 18/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water	Well Construction Details
34		FILL/TOPSOIL/SILT: low plasticity, brown, trace fine to medium sand and rootlets, w<PL, generally in a firm condition		A/E	0.0 0.1				
	0.2	CLAY CH: high plasticity, yellow-brown, w<PL, apparently firm, residual		A/E	0.4 0.5				
		Below 0.8m: apparently stiff		A/E	0.9 1.0				
33	1 1.0	Bore discontinued at 1.0m Target depth reached							1
32	2								2
31	3								3
30	4								4

RIG: Hanjin D13-8 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid Flight Auger (TC-bit) to 1.5m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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D21/78776

BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Marsden H.S. Repurpose to Netball Facility
LOCATION: Marsden High School, Ryde

SURFACE LEVEL: 32.8 AHD
EASTING: 321466.1
NORTHING: 6257976.5
DIP/AZIMUTH: 90°/--

BORE No: BH 16
PROJECT No: 99872.00
DATE: 19/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		FILL/TOPSOIL/Silty CLAY: medium plasticity, brown, trace rootlets and fine to medium gravel, w<PL, generally in a loose condition		A/E	0.0 – 0.1				
	0.3	FILL/CLAY: medium plasticity, red-brown and brown, w<PL, generally in a firm condition, reworked natural		A/E	0.4 – 0.5				
32				A/E	0.9 – 1.0				
	1								
				A/E	1.4 – 1.5				
31				A/E	1.9 – 2.0				
	2								
	2.1	CLAY CI-CH: medium to high plasticity, grey with some orange, w<PL, apparently stiff, residual		A/E	2.4 – 2.5				
	2.5	Bore discontinued at 2.5m Target depth reached							
30									
	3								
29									
	4								
28									

RIG: Hanjin D13-8 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid Flight Auger (TC-bit) to 2.5m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Marsden H.S. Repurpose to Netball Facility
LOCATION: Marsden High School, Ryde

SURFACE LEVEL: 32.4 AHD
EASTING: 321444.8
NORTHING: 6257939.6
DIP/AZIMUTH: 90°/--

BORE No: BH 17
PROJECT No: 99872.00
DATE: 18/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		FILL/Clayey SILT: low to medium plasticity, brown, trace rootlets, w<PL, generally in a firm condition		A/E	0.0–0.1				
32				A/E*	0.4–0.5				
	1			A/E	0.9–1.0				1
	1.2	CLAY CI-CH: medium to high plasticity, red-brown, w<PL, apparently stiff, residual							
31				A/E	1.4–1.5				
	2 / 2.0			A/E	1.9–2.0				2
		Bore discontinued at 2.0m Target depth reached							
30									
	3								3
29									
	4								4
28									

RIG: Hanjin D13-8 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid Flight Auger (TC-bit) to 1.5m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: *Field replicate BD3/20210118 taken at 0.4-0.5m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Marsden H.S. Repurpose to Netball Facility
LOCATION: Marsden High School, Ryde

SURFACE LEVEL: 31.6 AHD
EASTING: 321501.8
NORTHING: 6257953.1
DIP/AZIMUTH: 90°/--

BORE No: BH 18
PROJECT No: 99872.00
DATE: 19/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.1	FILL/TOPSOIL/Silty CLAY: medium plasticity, brown, trace rootlets, w<PL, generally in a firm condition		A/E	0.0 – 0.1				
31	1.0	CLAY CH: high plasticity, red brown with some grey, w<PL, apparently stiff, residual		A/E*	0.4 – 0.5				
				A/E	0.9 – 1.0				
		Bore discontinued at 1.0m Target depth reached							

RIG: Hanjin D13-8 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased

TYPE OF BORING: Solid Flight Auger (TC-bit) to 1.0m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: *Field replicate BD7/20210119 taken at 0.4-0.5m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Marsden H.S. Repurpose to Netball Facility
LOCATION: Marsden High School, Ryde

SURFACE LEVEL: 39.4 AHD
EASTING: 321338.3
NORTHING: 6257898.1
DIP/AZIMUTH: 90°/--

BORE No: BH 19
PROJECT No: 99872.00
DATE: 18/1/2021
SHEET 1 OF 1

Depth (m)	Description of Strata	Type	Depth	Sample	Results & Comments	Water	Well Construction Details
0.074	CONCRETE: with 5mm diameter steel reinforcement at 0.07m depth	C	0.0 – 0.07				
	FILL/CLAY: medium plasticity, grey-brown, trace sand, rootlets and bricks to -0.15m, w<PL, generally in a firm condition	A/E	0.4 – 0.5				
		A/E	0.9 – 1.0				
	Below 1.0m: trace medium sandstone gravel	A/E	1.4 – 1.5				
1.6	CLAY CI-CH: medium to high plasticity, red-brown, w<PL, apparently stiff, residual	A/E	1.9 – 2.0				
		A/E	2.4 – 2.5				
2.5	Bore discontinued at 2.5m Target depth reached						

RIG: Hanjin D13-8 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Diacore to 0.074m, Solid Flight Auger (TC-bit) to 2.5m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Marsden H.S. Repurpose to Netball Facility
LOCATION: Marsden High School, Ryde

SURFACE LEVEL: 31.4 AHD
EASTING: 321492.2
NORTHING: 6257919.5
DIP/AZIMUTH: 90°/--

BORE No: BH 20
PROJECT No: 99872.00
DATE: 19/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		FILL/Silty CLAY: medium plasticity, dark brown, w<PL, generally in a firm condition		A/E	0.0–0.1				
31				A/E	0.4–0.5				
	0.5	FILL/CLAY: medium plasticity, red-brown, w<PL, generally in a stiff condition, possibly natural							
	1			A/E	0.9–1.0				
30				A/E	1.4–1.5				
	2			A/E	1.9–2.0				
	2.2	CLAY CI-CH: medium to high plasticity, grey mottled red-brown, w<PL, apparently very stiff, residual							
29				A/E	2.4–2.5				
	2.5	Bore discontinued at 2.5m Target depth reached							
	3								
28									
	4								
27									

RIG: Hanjin D13-8 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid Flight Auger (TC-bit) to 2.5m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Marsden H.S. Repurpose to Netball Facility
LOCATION: Marsden High School, Ryde

SURFACE LEVEL: 29.7 AHD
EASTING: 321558
NORTHING: 6257943.8
DIP/AZIMUTH: 90°/--

BORE No: BH 21
PROJECT No: 99872.00
DATE: 19/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		FILL/TOPSOIL/Silty CLAY: low to medium plasticity, brown, trace rootlets, w<PL, generally in a firm condition		A/E	0.0–0.1				
	0.2	CLAY CI-CH: medium to high plasticity, red-brown mottled grey, w<PL, apparently stiff, residual		A/E	0.4–0.5				
29	1			A/E	0.9–1.0				
	1.1	Bore discontinued at 1.1m Target depth reached							
28	2								
27	3								
26	4								
25									

RIG: Hanjin D13-8 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid Flight Auger (TC-bit) to 1.1m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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D21/78776

BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Marsden H.S. Repurpose to Netball Facility
LOCATION: Marsden High School, Ryde

SURFACE LEVEL: 33.4 AHD
EASTING: 321443.8
NORTHING: 6257902.1
DIP/AZIMUTH: 90°/--

BORE No: BH 22
PROJECT No: 99872.00
DATE: 18/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		FILL/Clayey SILT: brown, trace rootlets and fine sand, w<PL, generally in a firm condition		A/E	0.0 – 0.1				
33				A/E	0.4 – 0.5				
	0.8	CLAY CI-CH: medium to high plasticity, red-brown, w<PL, apparently stiff, residual		A/E	0.9 – 1.0				
32				A/E	1.4 – 1.5				
	1.5	Bore discontinued at 1.5m Target depth reached							
31									
30									
29									

RIG: Hanjin D13-8 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid Flight Auger (TC-bit) to 1.5m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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D21/78776

BOREHOLE LOG

CLIENT: School Infrastructure New South Wales (SINSW)
PROJECT: Marsden H.S. Repurpose to Netball Facility
LOCATION: Marsden High School, Ryde

SURFACE LEVEL: 30.9 AHD
EASTING: 321531.1
NORTHING: 6257901.3
DIP/AZIMUTH: 90°/--

BORE No: BH 23
PROJECT No: 99872.00
DATE: 19/1/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		FILL/Sandy SILT: low plasticity, grey-brown, fine to medium sand, trace fine to medium shale gravel, w<PL, generally in a firm condition		A/E	0.0–0.1				
				A/E	0.4–0.5				
	0.7	SANDSTONE: pale yellow-grey, inferred low strength							
	0.8	Bore discontinued at 0.8m Target depth reached							
30	1								1
29	2								2
28	3								3
27	4								4
26									

RIG: Hanjin D13-8 **DRILLER:** Geosense **LOGGED:** TM **CASING:** Uncased
TYPE OF BORING: Solid Flight Auger (TC-bit) to 0.8m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U,	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Sampling Methods

Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:

  4,6,7
  N=13

- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:

  15, 30/40 mm

Sampling Methods

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.

Soil Descriptions

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are generally based on Australian Standard AS1726:2017, Geotechnical Site Investigations. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Type	Particle size (mm)
Boulder	>200
Cobble	63 - 200
Gravel	2.36 - 63
Sand	0.075 - 2.36
Silt	0.002 - 0.075
Clay	<0.002

The sand and gravel sizes can be further subdivided as follows:

Type	Particle size (mm)
Coarse gravel	19 - 63
Medium gravel	6.7 - 19
Fine gravel	2.36 – 6.7
Coarse sand	0.6 - 2.36
Medium sand	0.21 - 0.6
Fine sand	0.075 - 0.21

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

The proportions of secondary constituents of soils are described as follows:

In fine grained soils (>35% fines)

Term	Proportion of sand or gravel	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	>30%	Sandy Clay
With	15 – 30%	Clay with sand
Trace	0 - 15%	Clay with trace sand

In coarse grained soils (>65% coarse)
- with clays or silts

Term	Proportion of fines	Example
And	Specify	Sand (70%) and Clay (30%)
Adjective	>12%	Clayey Sand
With	5 - 12%	Sand with clay
Trace	0 - 5%	Sand with trace clay

In coarse grained soils (>65% coarse)
- with coarser fraction

Term	Proportion of coarser fraction	Example
And	Specify	Sand (60%) and Gravel (40%)
Adjective	>30%	Gravelly Sand
With	15 - 30%	Sand with gravel
Trace	0 - 15%	Sand with trace gravel

The presence of cobbles and boulders shall be specifically noted by beginning the description with 'Mix of Soil and Cobbles/Boulders' with the word order indicating the dominant first and the proportion of cobbles and boulders described together.

Soil Descriptions

Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	VS	<12
Soft	S	12 - 25
Firm	F	25 - 50
Stiff	St	50 - 100
Very stiff	VSt	100 - 200
Hard	H	>200
Friable	Fr	-

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

Relative Density	Abbreviation	Density Index (%)
Very loose	VL	<15
Loose	L	15-35
Medium dense	MD	35-65
Dense	D	65-85
Very dense	VD	>85

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Extremely weathered material – formed from in-situ weathering of geological formations. Has soil strength but retains the structure or fabric of the parent rock;
- Alluvial soil – deposited by streams and rivers;
- Estuarine soil – deposited in coastal estuaries;
- Marine soil – deposited in a marine environment;
- Lacustrine soil – deposited in freshwater lakes;
- Aeolian soil – carried and deposited by wind;
- Colluvial soil – soil and rock debris transported down slopes by gravity;
- Topsoil – mantle of surface soil, often with high levels of organic material.
- Fill – any material which has been moved by man.

Moisture Condition – Coarse Grained Soils

For coarse grained soils the moisture condition should be described by appearance and feel using the following terms:

- Dry (D) Non-cohesive and free-running.
- Moist (M) Soil feels cool, darkened in colour.

  Soil tends to stick together.

  Sand forms weak ball but breaks easily.
- Wet (W) Soil feels cool, darkened in colour.

  Soil tends to stick together, free water forms when handling.

Moisture Condition – Fine Grained Soils

For fine grained soils the assessment of moisture content is relative to their plastic limit or liquid limit, as follows:

- 'Moist, dry of plastic limit' or 'w <PL' (i.e. hard and friable or powdery).
- 'Moist, near plastic limit' or 'w = PL (i.e. soil can be moulded at moisture content approximately equal to the plastic limit).
- 'Moist, wet of plastic limit' or 'w >PL' (i.e. soils usually weakened and free water forms on the hands when handling).
- 'Wet' or 'w =LL' (i.e. near the liquid limit).
- 'Wet' or 'w >LL' (i.e. wet of the liquid limit).

Rock Descriptions

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Rock Strength

Rock strength is defined by the Unconfined Compressive Strength and it refers to the strength of the rock substance and not the strength of the overall rock mass, which may be considerably weaker due to defects.

The Point Load Strength Index $Is_{(50)}$ is commonly used to provide an estimate of the rock strength and site specific correlations should be developed to allow UCS values to be determined. The point load strength test procedure is described by Australian Standard AS4133.4.1-2007. The terms used to describe rock strength are as follows:

Strength Term	Abbreviation	Unconfined Compressive Strength MPa	Point Load Index * $Is_{(50)}$ MPa
Very low	VL	0.6 - 2	0.03 - 0.1
Low	L	2 - 6	0.1 - 0.3
Medium	M	6 - 20	0.3 - 1.0
High	H	20 - 60	1 - 3
Very high	VH	60 - 200	3 - 10
Extremely high	EH	>200	>10

* Assumes a ratio of 20:1 for UCS to $Is_{(50)}$. It should be noted that the UCS to $Is_{(50)}$ ratio varies significantly for different rock types and specific ratios should be determined for each site.

Degree of Weathering

The degree of weathering of rock is classified as follows:

Term	Abbreviation	Description
Residual Soil	RS	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.
Extremely weathered	XW	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible
Highly weathered	HW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Moderately weathered	MW	The whole of the rock material is discoloured , usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable, but shows little or no change of strength from fresh rock.
Slightly weathered	SW	Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
Fresh	FR	No signs of decomposition or staining.
Note: If HW and MW cannot be differentiated use DW (see below)		
Distinctly weathered	DW	Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching or may be decreased due to deposition of weathered products in pores.

Rock Descriptions

Degree of Fracturing

The following classification applies to the spacing of natural fractures in diamond drill cores. It includes bedding plane partings, joints and other defects, but excludes drilling breaks.

Term	Description
Fragmented	Fragments of <20 mm
Highly Fractured	Core lengths of 20-40 mm with occasional fragments
Fractured	Core lengths of 30-100 mm with occasional shorter and longer sections
Slightly Fractured	Core lengths of 300 mm or longer with occasional sections of 100-300 mm
Unbroken	Core contains very few fractures

Rock Quality Designation

The quality of the cored rock can be measured using the Rock Quality Designation (RQD) index, defined as:

$$\text{RQD \%} = \frac{\text{cumulative length of 'sound' core sections} \geq 100 \text{ mm long}}{\text{total drilled length of section being assessed}}$$

where 'sound' rock is assessed to be rock of low strength or stronger. The RQD applies only to natural fractures. If the core is broken by drilling or handling (i.e. drilling breaks) then the broken pieces are fitted back together and are not included in the calculation of RQD.

Stratification Spacing

For sedimentary rocks the following terms may be used to describe the spacing of bedding partings:

Term	Separation of Stratification Planes
Thinly laminated	< 6 mm
Laminated	6 mm to 20 mm
Very thinly bedded	20 mm to 60 mm
Thinly bedded	60 mm to 0.2 m
Medium bedded	0.2 m to 0.6 m
Thickly bedded	0.6 m to 2 m
Very thickly bedded	> 2 m

Symbols & Abbreviations

Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

C	Core drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

Water

▷	Water seep
▽	Water level

Sampling and Testing

A	Auger sample
B	Bulk sample
D	Disturbed sample
E	Environmental sample
U_{50}	Undisturbed tube sample (50mm)
W	Water sample
pp	Pocket penetrometer (kPa)
PID	Photo ionisation detector
PL	Point load strength Is(50) MPa
S	Standard Penetration Test
V	Shear vane (kPa)

Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

Defect Type

B	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	Lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

h	horizontal
v	vertical
sh	sub-horizontal
sv	sub-vertical

Coating or Infilling Term

cln	clean
co	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

Coating Descriptor

ca	calcite
cbs	carbonaceous
cly	clay
fe	iron oxide
mn	manganese
slt	silty

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

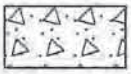
Symbols & Abbreviations

Graphic Symbols for Soil and Rock

General

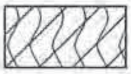
 Asphalt

 Road base

 Concrete

 Filling

Soils

 Topsoil

 Peat

 Clay

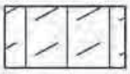
 Silty clay

 Sandy clay

 Gravelly clay

 Shaly clay

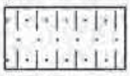
 Silt

 Clayey silt

 Sandy silt

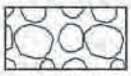
 Sand

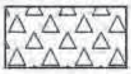
 Clayey sand

 Silty sand

 Gravel

 Sandy gravel

 Cobbles, boulders

 Talus

Sedimentary Rocks

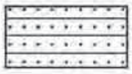
 Boulder conglomerate

 Conglomerate

 Conglomeratic sandstone

 Sandstone

 Siltstone

 Laminite

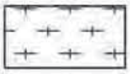
 Mudstone, claystone, shale

 Coal

 Limestone

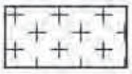
Metamorphic Rocks

 Slate, phyllite, schist

 Gneiss

 Quartzite

Igneous Rocks

 Granite

 Dolerite, basalt, andesite

 Dacite, epidote

 Tuff, breccia

 Porphyry

D21/78776

Appendix G

Site Assessment Criteria

Appendix G
Site Assessment Criteria
Marsden High School, West Ryde

G1.0 Introduction

G1.1 Guidelines

The following key guidelines were consulted for deriving the site assessment criteria (SAC):

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013).
- CRC CARE *Health screening levels for petroleum hydrocarbons in soil and groundwater* (CRC CARE, 2011).

G1.2 General

The SAC applied in the current investigation are informed by the CSM which identified human and environmental receptors to potential contamination on the site. Analytical results are assessed (as a Tier 1 assessment) against the SAC comprising primarily the investigation and screening levels of Schedule B1 of NEPC (2013).

The following inputs are relevant to the selection and/or derivation of the SAC:

- Land use: recreational.
  - o Corresponding to land use category 'C', defined as public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and footpaths.
- Land use: commercial / industrial.
  - o Corresponding to land use category 'D', defined as commercial / industrial such as shops, offices, factories and industrial sites for vapour intrusion HSL only.
- Soil type: clay.

G2.0 Soils

G2.1 Health Investigation and Screening Levels

The generic health investigation levels (HIL) and health screening levels (HSL) are considered to be appropriate for the assessment of human health risk via all relevant pathways of exposure associated with contamination at the site. The adopted soil HIL and HSL for the contaminants of concern are in Table 1 and Table 2.

Table 1: Health Investigation Levels (mg/kg)

Contaminant	HIL-C
Metals	
Arsenic	300
Cadmium	90
Chromium (VI)	300
Copper	17 000
Lead	600
Mercury (inorganic)	80
Nickel	1200
Zinc	30 000
PAH	
B(a)P TEQ	3
Total PAH	300
Phenols	
Phenol	40 000
Pentachlorophenol	120
OCP	
DDT+DDE+DDD	400
Aldrin and dieldrin	10
Chlordane	70
Endosulfan	340
Endrin	20
Heptachlor	10
HCB	10
Methoxychlor	400
OPP	
Chlorpyrifos	250
PCB	
PCB	1

Table 2: Health Screening Levels (mg/kg)

Contaminant	HSL-D	HSL-D
CLAY	**0 m to <1 m**	**1 m to <2 m**
Benzene	4	6
Toluene	NL	NL
Ethylbenzene	NL	NL
Xylenes	NL	NL
Naphthalene	NL	NL
TRH F1	310	480
TRH F2	NL	NL

Notes: TRH F1 is TRH C_6-C_{10} minus BTEX
TRH F2 is TRH >C_{10}-C_{16} minus naphthalene
The soil saturation concentration (Csat) is defined as the soil concentration at which the porewater phase cannot dissolve any more of an individual chemical. The soil vapour that is in equilibrium with the porewater will be at its maximum. If the derived soil HSL exceeds Csat, a soil vapour source concentration for a petroleum mixture could not exceed a level that would results in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'

The HSL for direct contact derived from CRC CARE (2011) are in Table 3.

Table 3: Health Screening Levels for Direct Contact (mg/kg)

Contaminant	DC HSL-C
Benzene	120
Toluene	18 000
Ethylbenzene	5300
Xylenes	15 000
Naphthalene	1900
TRH F1	5100
TRH F2	3800
TRH F3	5300
TRH F4	7400

Notes: TRH F1 is TRH C_6-C_{10} minus BTEX
TRH F2 is TRH >C_{10}-C_{16} minus naphthalene

G2.2 Asbestos in Soil

Based on the CSM and/or current site access limitations, a detailed asbestos assessment was not considered to be warranted at this stage. However, due to the history of widespread use of ACM products across Australia, ACM can be encountered unexpectedly and sporadically at a site. Therefore, the presence or absence of asbestos at a limit of reporting of 0.1 g/kg (AS:4964) has been adopted for this investigation as an initial screen.

G2.3 Ecological Investigation Levels

Ecological investigation levels (EIL) and added contaminant limits (ACL), where appropriate, have been derived in NEPC (2013) for arsenic, copper, chromium (III), nickel, lead, zinc, DDT and naphthalene. The adopted EIL, derived using the interactive (excel) calculation spreadsheet on the NEPM toolbox website are shown in Table 5, with inputs into their derivation shown in Table 4.

Table 4: Inputs to the Derivation of the Ecological Investigation Levels

Variable	Input	Rationale
Age of contaminants	"Aged" (>2 years)	
pH	5.22	Average pH of measured results from analytical laboratory results.
CEC	5.46 $cmol_c/kg$	Average CEC of measured results from analytical laboratory results.
Clay content	10%	Assumed based on lithology encountered during investigation.
Traffic volumes	High	The site is located in an established residential setting.
State / Territory	NSW	

Table 5: Ecological Investigation Levels (mg/kg)

Contaminant	EIL-A-B-C
Metals	
Arsenic	100
Copper	130
Nickel	45
Chromium III	410
Lead	1100
Zinc	280
PAH	
Naphthalene	170
OCP	
DDT	180

G2.4 Ecological Screening Levels

Ecological screening levels (ESL) are used to assess the risk of selected petroleum hydrocarbon compounds, BTEX and benzo(a)pyrene to terrestrial ecosystems. The adopted ESL are shown in Table 6.

Table 6: Ecological Screening Levels (mg/kg)

Contaminant	Soil Type	EIL-A-B-C
Benzene	Fine	65
Toluene	Fine	105
Ethylbenzene	Fine	125
Xylenes	Fine	45
TRH F1	Coarse/ Fine	180*
TRH F2	Coarse/ Fine	120*
TRH F3	Fine	1300
TRH F4	Fine	5600
B(a)P	Fine	0.7

Notes: ESL are of low reliability except where indicated by * which indicates that the ESL is of moderate reliability
TRH F1 is TRH C_6-C_{10} minus BTEX
TRH F2 is TRH >C_{10}-C_{16} including naphthalene

G2.5 Management Limits

In addition to appropriate consideration and application of the HSL and ESL, there are additional considerations which reflect the nature and properties of petroleum hydrocarbons, including:

- Formation of observable light non-aqueous phase liquids (LNAPL);
- Fire and explosion hazards;
- Effects on buried infrastructure eg: penetration of, or damage to, in-ground services.

The adopted management limits are in Table 7.

Table 7: Management Limits (mg/kg)

Contaminant	Soil Type	ML-A-B-C
TRH F1	Fine	800
TRH F2	Fine	1000
TRH F3	Fine	3500
TRH F4	Fine	10 000

Notes: TRH F1 is TRH C_6-C_{10} including BTEX
TRH F2 is TRH F2 >C_{10}-C_{16} naphthalene

G3.0 References

ANZECC. (2000). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Australia and New Zealand Environment and Conservation Council.

ANZG. (2018). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Canberra, ACT: Australian and New Zealand Governments and Australian state and territory governments.

CRC CARE. (2011). *Health screening levels for petroleum hydrocarbons in soil and groundwater*. Parts 1 to 3, Technical Report No. 10: Cooperative Research Centre for Contamination Assessment and Remediation of the Environment.

HEPA. (2020). *PFAS National Environmental Management Plan (NEMP)*. Version 2.0: Heads of EPAs Australia and New Zealand and Australian Government Department of the Environment.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]*. Australian Government Publishing Services Canberra: National Environment Protection Council.

NHMRC. (2008). *Guidelines for Managing Risks In Recreational Water*.

NHMRC, NRMMC. (2016). *Australian Drinking Water Guidelines 6 2011, Version 3.2*. Canberra: National Health and Medical Research Council, National Resource Management Ministerial Council.

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Appendix H

Summary of Laboratory Results

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Geotechnics / Environment / Groundwater

Table H1: Summary of Laboratory Results – Site Assessment Criteria for Metals, TRH, BTEX and PAH

				Metals								TRH						BTEX				PAH			
				Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	F1 ((C6-C10)-BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene b	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs
			PQL	4	0.4	1	1	1	0.1	1	1	25	50	25	50	100	100	0.2	0.5	1	1	1	0.05	0.5	0.5
Site Assessment Criteria - Recreational Land Use																									
HIL C - Recreational / Open Space				300	90	300	17,000	600	80	1200	30,000													3	300
HSL D - Commercial / Industrial 0- <1m / 1-2m Fine														310 / 480	NL			4 / 8	NL	NL	NL	NL			
EIL/ESL - Urban Residential and Public Open Space Fine				100		410	130	1100		45	280		120	180	120	1,300	5,600	65	105	125	45	170	0.7		
Management Limit - R / P / POS Fine														800	1,000	3,500	10,000								
Direct Contact - HSL C - Recreational / Open Space														5,100	3,800	5,300	7,400	120	18,000	5,300	15,000	1,900			
Laboratory Results																									
Sample ID	Depth	Matrix	Sample Date	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
BH1	0 - 0.1 m	FILL	18/01/2021	6	<0.4	14	11	58	<0.1	4	33	<25	69	<25	69	160	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.5
BH1	0.4 - 0.5 m	CLAY	18/01/2021	8	<0.4	12	8	12	<0.1	2	8	<25	<50	<25	<50	500	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.5
BH2	0.4 - 0.5 m	FILL	18/01/2021	4	<0.4	12	12	16	<0.1	7	14	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.5
BH3	1.4 - 1.5 m	CLAY	18/01/2021	4	<0.4	10	8	14	<0.1	2	7	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.5
BH3	0 - 0.1 m	FILL	18/01/2021	<4	<0.4	89	48	9	<0.1	57	33	<25	<50	<25	<50	870	2100	<0.2	<0.5	<1	<1	<1	0.07	<0.5	<0.5
BH4	0.4 - 0.5 m	FILL	18/01/2021	7	<0.4	16	14	16	<0.1	9	19	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.5
BD1/20210118*	0.4 - 0.5 m	FILL	18/01/2021	6	<0.4	15	14	14	<0.1	6	11	<25	<50	<25	<50	<100	240	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.5
BH4	2 - 2.1 m	CLAY	18/01/2021	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
BH5	1 - 1.1 m	FILL	18/01/2021	8	<0.4	17	13	22	<0.1	7	27	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.07	<0.5	<0.5
BH5	2 - 2.1 m	FILL	18/01/2021	4	<0.4	16	8	17	<0.1	4	8	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.5
BH5	2.9 - 3 m	CLAY	18/01/2021	10	<0.4	21	11	19	<0.1	2	10	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.5
BH6	0 - 0.1 m	FILL	18/01/2021	4	<0.4	8	4	19	<0.1	2	14	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.5
BH7	0.4 - 0.5 m	FILL	18/01/2021	5	<0.4	12	48	38	<0.1	6	34	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.1	<0.5	<0.5
BH7 - [TRIPLICATE]	0.4 - 0.5 m	FILL	18/01/2021	5	<0.4	14	20	42	<0.1	4	26	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
BH7	1.4 - 1.5 m	FILL	18/01/2021	6	<0.4	12	19	28	<0.1	7	82	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.1	<0.5	<0.5

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Table H1: Summary of Laboratory Results – Site Assessment Criteria for Metals, TRH, BTEX and PAH

				Metals							
				Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc
			PQL	4	0.4	1	1	1	0.1	1	1
Site Assessment Criteria - Recreational Land Use											
HIL C - Recreational / Open Space				300	90	300	17,000	600	80	1200	30,000
HSL D - Commercial / Industrial 0- <1m / 1-2m Fine											
EIL/ESL - Urban Residential and Public Open Space Fine				100		410	130	1100		45	280
Management Limit - R / P / POS Fine											
Direct Contact - HSL C - Recreational / Open Space											
Laboratory Results											
Sample ID	Depth	Matrix	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
BH7	2.4 - 2.5 m	FILL	19/01/2021	6	<0.4	20	13	29	<0.1	4	11
BH8	0 - 0.1 m	FILL	19/01/2021	<4	<0.4	11	22	21	<0.1	7	41
BH8	0.4 - 0.5 m	FILL	19/01/2021	6	<0.4	13	23	16	<0.1	11	44
BH8	2 - 2.1 m	FILL	19/01/2021	10	<0.4	6	29	15	<0.1	6	47
BH8	3.5 - 3.6 m	CLAY	19/01/2021	<4	<0.4	7	7	27	<0.1	3	13
BD1/20210119*	3.5 - 3.6 m	CLAY	19/01/2021	6	<0.4	8	10	20	<0.1	3	19
BH9	0 - 0.1 m	FILL	19/01/2021	7	<0.4	15	38	110	0.4	12	220
BH9	0.4 - 0.5 m	CLAY	19/01/2021	NT	NT	NT	NT	NT	NT	NT	NT
BH10	0 - 0.1 m	FILL	19/01/2021	5	<0.4	12	16	23	<0.1	13	36
BH11	0 - 0.1 m	FILL	19/01/2021	<4	<0.4	98	20	7	<0.1	**54**	32
BH11	0.4 - 0.5 m	FILL	19/01/2021	9	<0.4	23	11	23	0.2	4	10
BD2/20210119*	0.4 - 0.5 m	FILL	19/01/2021	9	<0.4	23	12	22	<0.1	6	14
BH11	0.9 - 1 m	FILL	19/01/2021	9	<0.4	16	11	20	<0.1	1	9
BH12	0.4 - 0.5 m	FILL	19/01/2021	7	<0.4	10	14	22	<0.1	4	16
BH13	0 - 0.1 m	FILL	19/01/2021	<4	<0.4	6	8	10	<0.1	3	28
BH13	0.9 - 1 m	FILL	19/01/2021	<4	<0.4	12	16	15	<0.1	7	17
BH13	1.4 - 1.5 m	CLAY	19/01/2021	NT	NT	NT	NT	NT	NT	NT	NT

			TRH						BTEX				PAH			
Sample ID	Depth	Matrix	TRH C6 - C10	TRH >C10-C16	F1 ((C6-C10)-BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene b	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs
		PQL	25	50	25	50	100	100	0.2	0.5	1	1	1	0.05	0.5	0.5
HIL C - Recreational / Open Space															3	300
HSL D - Commercial / Industrial 0- <1m / 1-2m Fine					310 / 480	NL			4 / 8	NL	NL	NL	NL			
EIL/ESL - Urban Residential and Public Open Space Fine				120	180	120	1,300	5,600	65	105	125	45	170	0.7		
Management Limit - R / P / POS Fine					800	1,000	3,500	10,000								
Direct Contact - HSL C - Recreational / Open Space					5,100	3,800	5,300	7,400	120	18,000	5,300	15,000	1,900			
			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
BH7	2.4 - 2.5 m	FILL	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.5
BH8	0 - 0.1 m	FILL	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.06	<0.5	<0.5
BH8	0.4 - 0.5 m	FILL	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.5
BH8	2 - 2.1 m	FILL	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.5
BH8	3.5 - 3.6 m	CLAY	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.5
BD1/20210119*	3.5 - 3.6 m	CLAY	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.5
BH9	0 - 0.1 m	FILL	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.5
BH9	0.4 - 0.5 m	CLAY	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
BH10	0 - 0.1 m	FILL	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.5
BH11	0 - 0.1 m	FILL	<25	<50	<25	<50	170	580	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.5
BH11	0.4 - 0.5 m	FILL	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.5
BD2/20210119*	0.4 - 0.5 m	FILL	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.5
BH11	0.9 - 1 m	FILL	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.5
BH12	0.4 - 0.5 m	FILL	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.1	<0.5	<0.5
BH13	0 - 0.1 m	FILL	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.5
BH13	0.9 - 1 m	FILL	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.5
BH13	1.4 - 1.5 m	CLAY	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT

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Table H1: Summary of Laboratory Results – Site Assessment Criteria for Metals, TRH, BTEX and PAH

				Metals								TRH						BTEX				PAH			
				Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	F1 ((C6-C10)-BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene b	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs
			PQL	4	0.4	1	1	1	0.1	1	1	25	50	25	50	100	100	0.2	0.5	1	1	1	0.05	0.5	0.5
Site Assessment Criteria - Recreational Land Use																									
HIL C - Recreational / Open Space				300	90	300	17,000	600	80	1200	30,000													3	300
HSL D - Commercial / Industrial 0- <1m / 1-2m Fine														310 / 480	NL			4 / 6	NL	NL	NL	NL			
EIL/ESL - Urban Residential and Public Open Space Fine				100		410	130	1100		45	280		120	180	120	1,300	5,600	65	105	125	45	170	0.7		
Management Limit - R / P / POS Fine														800	1,000	3,500	10,000								
Direct Contact - HSL C - Recreational / Open Space														5,100	3,800	5,300	7,400	120	18,000	5,300	15,000	1,900			
Laboratory Results																									
Sample ID	Depth	Matrix	Sample Date	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
BH14	0.4 - 0.5 m	CLAY	18/01/2021	10	<0.4	18	11	17	<0.1	2	7	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.5
BH15	0 - 0.1 m	FILL	18/01/2021	12	<0.4	8	19	28	<0.1	4	33	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.5
BH16	0 - 0.1 m	FILL	18/01/2021	15	<0.4	11	16	28	<0.1	6	29	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.5
BH16	0.9 - 1 m	FILL	18/01/2021	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
BH17	0.4 - 0.5 m	FILL	18/01/2021	10	<0.4	21	16	38	0.1	9	41	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.07	<0.5	<0.5
BH18	0 - 0.1 m	FILL	18/01/2021	25	<0.4	11	42	29	<0.1	6	40	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.5
BH19	0.4 - 0.5 m	FILL	18/01/2021	7	<0.4	20	12	42	<0.1	6	22	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.5
BH19	1.4 - 1.5 m	FILL	18/01/2021	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
BH20	0 - 0.1 m	FILL	18/01/2021	7	<0.4	17	12	24	<0.1	7	30	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.08	<0.5	<0.5
BH21	0 - 0.1 m	FILL	18/01/2021	8	<0.4	14	25	25	<0.1	7	44	<25	<50	<25	<50	100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.5
BD/20210119*	0 - 0.1 m	FILL	18/01/2021	8	<0.2	12	18	22	<0.05	7.8	33	<20	<50	<20	<50	<100	<120	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.2	<0.8
BH22	0.4 - 0.5 m	FILL	18/01/2021	8	<0.4	17	3	15	<0.1	2	18	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.5
BH23	0.4 - 0.5 m	FILL	18/01/2021	9	<0.4	12	17	24	<0.1	3	30	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.4	0.6	0.6

Lab result
HIL/HSL value EIL/ESL value

HIL/HSL exceedance; EIL/ESL exceedance; HIL/HSL and EIL/ESL exceedance; ML exceedance; ML and HIL/HSL or EIL/ESL exceedance

Indicates that asbestos has been detected by the lab below the PQL, refer to the lab report; Blue = DC exceedance

Bold = Lab detections; NT = Not tested; NL = Non limiting; NC = No criteria; NA = Not applicable; NAD = No asbestos detected at the reporting limit

Notes:

HIL/HSL/DC: NEPC, Schedule B1 - HIL C (undefined), HSL A/B (undefined), DC HSL B (undefined)
EIL/ESL: NEPC, Schedule B1 - EIL UR/POS (undefined), ESL UR/POS (undefined)
ML: NEPC, Schedule B1 - ML R/P/POS (undefined)
a: QA/QC replicate of sample listed directly below the primary sample
b: Reported naphthalene laboratory result obtained from BTEXN suite
c: Ecological criteria applies to DDT only
*: Blind replicates are reported below the primary parent sample

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Table H2: Summary of Laboratory Results – Site Assessment Criteria for Phenol, OCP, OPP, PCB and Asbestos

				Phenol	OCP											OPP	PCB	Asbestos		
				Phenol	DDT+DDE+DDD	DDD	DDE	DDT	Aldrin & Dieldrin	Total Chlordane	Total Endosulfan	Endrin	Heptachlor	Hexachlorobenzene	Methoxychlor	Chlorpyriphos	Total PCB	Asbestos ID in soil >0.1g/kg	Trace Analysis	Asbestos (40 g)
			PQL	5	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			
Site Assessment Criteria - Recreational Land Use																				
HSL C - Recreational / Open Space				120*	400				10	70	340	20	10	10	400	250	1			
HSL D - Commercial / Industrial 0- <1m / 1-2m Fine																			No Asbestos	
EIL/ESL - Urban Residential and Public Open Space Fine					180			180												
Management Limit - R / P / POS Fine																				
Direct Contact - HSL C - Recreational / Open Space																				
Laboratory Results																				
Sample ID	Depth	Matrix	Sample Date	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	-	-	-
BH1	0 - 0.1 m	FILL	18/01/2021	<5 120 NC	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
BH1	0.4 - 0.5 m	CLAY	18/01/2021	NT 120 NC	NT 400 180	NT NC NC	NT NC NC	NT NC 180	NT 10 NC	NT 70 NC	NT 340 NC	NT 20 NC	NT 10 NC	NT 10 NC	NT 400 NC	NT 250 NC	NT 1 NC	NT	NT	NT
BH2	0.4 - 0.5 m	FILL	18/01/2021	<5 120 NC	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
BH2	1.4 - 1.5 m	CLAY	18/01/2021	NT 120 NC	NT 400 180	NT NC NC	NT NC NC	NT NC 180	NT 10 NC	NT 70 NC	NT 340 NC	NT 20 NC	NT 10 NC	NT 10 NC	NT 400 NC	NT 250 NC	NT 1 NC	NT	NT	NT
BH3	0 - 0.1 m	FILL	18/01/2021	<5 120 NC	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
BH4	0.4 - 0.5 m	FILL	18/01/2021	<5 120 NC	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
BD1/20210118*	0.4 - 0.5 m	FILL	18/01/2021	<5 120 NC	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NT	NT	NT
BH4	2 - 2.1 m	CLAY	18/01/2021	NT 120 NC	NT 400 180	NT NC NC	NT NC NC	NT NC 180	NT 10 NC	NT 70 NC	NT 340 NC	NT 20 NC	NT 10 NC	NT 10 NC	NT 400 NC	NT 250 NC	NT 1 NC	NT	NT	NT
BH5	1 - 1.1 m	FILL	18/01/2021	<5 120 NC	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
BH5	2 - 2.1 m	FILL	18/01/2021	NT 120 NC	NT 400 180	NT NC NC	NT NC NC	NT NC 180	NT 10 NC	NT 70 NC	NT 340 NC	NT 20 NC	NT 10 NC	NT 10 NC	NT 400 NC	NT 250 NC	NT 1 NC	NAD	NAD	NAD
BH5	2.9 - 3 m	CLAY	18/01/2021	NT 120 NC	NT 400 180	NT NC NC	NT NC NC	NT NC 180	NT 10 NC	NT 70 NC	NT 340 NC	NT 20 NC	NT 10 NC	NT 10 NC	NT 400 NC	NT 250 NC	NT 1 NC	NT	NT	NT
BH6	0 - 0.1 m	FILL	19/01/2021	<5 120 NC	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
BH7	0.4 - 0.5 m	FILL	19/01/2021	<5 120 NC	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
BH7 - [TRIPLICATE]	0.4 - 0.5 m	FILL	19/01/2021	NT 120 NC	NT 400 180	NT NC NC	NT NC NC	NT NC 180	NT 10 NC	NT 70 NC	NT 340 NC	NT 20 NC	NT 10 NC	NT 10 NC	NT 400 NC	NT 250 NC	NT 1 NC	NT	NT	NT
BH7	1.4 - 1.5 m	FILL	19/01/2021	NT 120 NC	NT 400 180	NT NC NC	NT NC NC	NT NC 180	NT 10 NC	NT 70 NC	NT 340 NC	NT 20 NC	NT 10 NC	NT 10 NC	NT 400 NC	NT 250 NC	NT 1 NC	NAD	NAD	NAD
BH7	2.4 - 2.5 m	FILL	19/01/2021	NT 120 NC	NT 400 180	NT NC NC	NT NC NC	NT NC 180	NT 10 NC	NT 70 NC	NT 340 NC	NT 20 NC	NT 10 NC	NT 10 NC	NT 400 NC	NT 250 NC	NT 1 NC	NT	NT	NT

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Table H2: Summary of Laboratory Results – Site Assessment Criteria for Phenol, OCP, OPP, PCB and Asbestos

				Phenol	OCP											OPP	PCB	Asbestos		
				Phenol	DDT+DDE+DDD [1]	DDD	DDE	DDT	Aldrin & Dieldrin	Total Chlordane	Total Endosulfan	Endrin	Heptachlor	Hexachlorobenzene	Methoxychlor	Chlorpyriphos	Total PCB	Asbestos ID in soil >0.1g/kg	Trace Analysis	Asbestos (50 g)
			PQL	5	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			
Site Assessment Criteria - Recreational Land Use																				
HSL C - Recreational / Open Space				120*	400				10	70	340	20	10	10	400	250	1			
HSL D - Commercial / Industrial 0- <1m / 1-2m Fine																			No Asbestos	
EIL/ESL - Urban Residential and Public Open Space Fine					180			180												
Management Limit - R / P / POS Fine																				
Direct Contact - HSL C - Recreational / Open Space																				
Laboratory Results																				
Sample ID	Depth	Matrix	Sample Date	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	-	-	-
BH8	0 - 0.1 m	FILL	19/01/2021	<5 120 NC	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
BH8	0.4 - 0.5 m	FILL	19/01/2021	NT 120 NC	NT 400 180	NT NC NC	NT NC NC	NT NC 180	NT 10 NC	NT 70 NC	NT 340 NC	NT 20 NC	NT 10 NC	NT 10 NC	NT 400 NC	NT 250 NC	NT 1 NC	NAD	NAD	NAD
BH8	2 - 2.1 m	FILL	19/01/2021	NT 120 NC	NT 400 180	NT NC NC	NT NC NC	NT NC 180	NT 10 NC	NT 70 NC	NT 340 NC	NT 20 NC	NT 10 NC	NT 10 NC	NT 400 NC	NT 250 NC	NT 1 NC	NAD	NAD	NAD
BH8	3.5 - 3.6 m	CLAY	19/01/2021	NT 120 NC	NT 400 180	NT NC NC	NT NC NC	NT NC 180	NT 10 NC	NT 70 NC	NT 340 NC	NT 20 NC	NT 10 NC	NT 10 NC	NT 400 NC	NT 250 NC	NT 1 NC	NT	NT	NT
BD10/20210119*	3.5 - 3.6 m	CLAY	19/01/2021	NT 120 NC	NT 400 180	NT NC NC	NT NC NC	NT NC 180	NT 10 NC	NT 70 NC	NT 340 NC	NT 20 NC	NT 10 NC	NT 10 NC	NT 400 NC	NT 250 NC	NT 1 NC	NT	NT	NT
BH9	0 - 0.1 m	FILL	19/01/2021	<5 120 NC	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
BH9	0.4 - 0.5 m	CLAY	19/01/2021	NT 120 NC	NT 400 180	NT NC NC	NT NC NC	NT NC 180	NT 10 NC	NT 70 NC	NT 340 NC	NT 20 NC	NT 10 NC	NT 10 NC	NT 400 NC	NT 250 NC	NT 1 NC	NT	NT	NT
BH10	0 - 0.1 m	FILL	19/01/2021	<5 120 NC	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
BH11	0 - 0.1 m	FILL	18/01/2021	<5 120 NC	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
BH11	0.4 - 0.5 m	FILL	18/01/2021	NT 120 NC	NT 400 180	NT NC NC	NT NC NC	NT NC 180	NT 10 NC	NT 70 NC	NT 340 NC	NT 20 NC	NT 10 NC	NT 10 NC	NT 400 NC	NT 250 NC	NT 1 NC	NAD	NAD	NAD
BD2/20210118*	0.4 - 0.5 m	FILL	18/01/2021	NT 120 NC	NT 400 180	NT NC NC	NT NC NC	NT NC 180	NT 10 NC	NT 70 NC	NT 340 NC	NT 20 NC	NT 10 NC	NT 10 NC	NT 400 NC	NT 250 NC	NT 1 NC	NT	NT	NT
BH11	0.8 - 1 m	FILL	18/01/2021	NT 120 NC	NT 400 180	NT NC NC	NT NC NC	NT NC 180	NT 10 NC	NT 70 NC	NT 340 NC	NT 20 NC	NT 10 NC	NT 10 NC	NT 400 NC	NT 250 NC	NT 1 NC	NAD	NAD	NAD
BH12	0.4 - 0.5 m	FILL	19/01/2021	<5 120 NC	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
BH13	0 - 0.1 m	FILL	18/01/2021	<5 120 NC	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
BH13	0.8 - 1 m	FILL	19/01/2021	NT 120 NC	NT 400 180	NT NC NC	NT NC NC	NT NC 180	NT 10 NC	NT 70 NC	NT 340 NC	NT 20 NC	NT 10 NC	NT 10 NC	NT 400 NC	NT 250 NC	NT 1 NC	NT	NT	NT
BH13	1.4 - 1.5 m	CLAY	19/01/2021	NT 120 NC	NT 400 180	NT NC NC	NT NC NC	NT NC 180	NT 10 NC	NT 70 NC	NT 340 NC	NT 20 NC	NT 10 NC	NT 10 NC	NT 400 NC	NT 250 NC	NT 1 NC	NT	NT	NT
BH14	0.4 - 0.5 m	CLAY	18/01/2021	<5 120 NC	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
BH15	0 - 0.1 m	FILL	18/01/2021	<5 120 NC	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD

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Table H2: Summary of Laboratory Results – Site Assessment Criteria for Phenol, OCP, OPP, PCB and Asbestos

				Phenol	OCP											OPP	PCB	Asbestos		
				Phenol	DDT+DDE+DDD [c]	DDD	DDE	DDT	Aldrin & Dieldrin	Total Chlordane	Total Endosulfan	Endrin	Heptachlor	Hexachlorobenzene	Methoxychlor	Chlorpyriphos	Total PCB	Asbestos ID in soil >0.1g/kg	Trace Analysis	Asbestos (50 g)
			PQL	5	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			
Site Assessment Criteria - Recreational Land Use																				
HIL C - Recreational / Open Space				120*	400				10	70	340	20	10	10	400	250	1			
HSL D - Commercial / Industrial 0- <1m / 1-2m Fine																			No Asbestos	
EIL/ESL - Urban Residential and Public Open Space Fine					180			180												
Management Limit - R / P / POS Fine																				
Direct Contact - HSL C - Recreational / Open Space																				
Laboratory Results																				
Sample ID	Depth	Matrix	Sample Date	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	-	-	-
BH16	0 - 0.1 m	FILL	19/01/2021	<5 120 NC	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
BH16	0.9 - 1 m	FILL	19/01/2021	NT 120 NC	NT 400 180	NT NC NC	NT NC NC	NT NC 180	NT 10 NC	NT 70 NC	NT 340 NC	NT 20 NC	NT 10 NC	NT 10 NC	NT 400 NC	NT 250 NC	NT 1 NC	NT	NT	NT
BH17	0.4 - 0.5 m	FILL	19/01/2021	<5 120 NC	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
BH18	0 - 0.1 m	FILL	19/01/2021	NT 120 NC	NT 400 180	NT NC NC	NT NC NC	NT NC 180	NT 10 NC	NT 70 NC	NT 340 NC	NT 20 NC	NT 10 NC	NT 10 NC	NT 400 NC	NT 250 NC	NT 1 NC	NAD	NAD	NAD
BH19	0.4 - 0.5 m	FILL	18/01/2021	<5 120 NC	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
BH19	1.4 - 1.5 m	FILL	18/01/2021	NT 120 NC	NT 400 180	NT NC NC	NT NC NC	NT NC 180	NT 10 NC	NT 70 NC	NT 340 NC	NT 20 NC	NT 10 NC	NT 10 NC	NT 400 NC	NT 250 NC	NT 1 NC	NT	NT	NT
BH20	0 - 0.1 m	FILL	18/01/2021	<5 120 NC	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
BH21	0 - 0.1 m	FILL	19/01/2021	<5 120 NC	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
BD6/20210119*	0 - 0.1 m	FILL	19/01/2021	<0.5 120 NC	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.2 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.2 250 NC	<1 1 NC	NT	NT	NT
BH22	0.4 - 0.5 m	FILL	18/01/2021	NT 120 NC	NT 400 180	NT NC NC	NT NC NC	NT NC 180	NT 10 NC	NT 70 NC	NT 340 NC	NT 20 NC	NT 10 NC	NT 10 NC	NT 400 NC	NT 250 NC	NT 1 NC	NAD	NAD	NAD
BH23	0.4 - 0.5 m	FILL	18/01/2021	NT 120 NC	NT 400 180	NT NC NC	NT NC NC	NT NC 180	NT 10 NC	NT 70 NC	NT 340 NC	NT 20 NC	NT 10 NC	NT 10 NC	NT 400 NC	NT 250 NC	NT 1 NC	NAD	NAD	NAD

Lab result
HIL/HSL value EIL/ESL value

HIL/HSL exceedance EIL/ESL exceedance HIL/HSL and EIL/ESL exceedance ML exceedance ML and HIL/HSL or EIL/ESL exceedance

Indicates that asbestos has been detected by the lab below the PQL, refer to the lab report Blue = DC exceedance

Bold = Lab detections NT = Not tested NL = Non limiting NC = No criteria NA = Not applicable NAD = No asbestos detected at the reporting limit

Notes:

HIL/HSL/DC	NEPC, Schedule B1 - HIL C (undefined), HSL A/B (undefined), DC HSL B (undefined)
EIL/ESL	NEPC, Schedule B1 - EIL UR/POS (undefined), ESL UR/POS (undefined)
ML	NEPC, Schedule B1 - ML R/P/POS (undefined)
a	QA/QC replicate of sample listed directly below the primary sample
b	Reported naphthalene laboratory result obtained from BTEXN suite
c	Ecological criteria applies to DDT only
*	Blind replicates are reported below the primary parent sample

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Table H3: Summary of Laboratory Results – Metals, TRH, BTEX, PAH, Phenol, OCP, OPP, PCB and Asbestos

[illegible]

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Table H2: Summary of Laboratory Results – Metals, TRH, BTEX, PAH, Phenol, OCP, OPP, PCB and Asbestos

				PAH										Phenol	OCP		OPP	PCB	Asbestos		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Notes:

[illegible]

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	Count	Nickel

Table H4: Population Statistics for Nickel Concentrations

	Count	Nickel
1	1	4
2	2	2
3	3	7
4	4	2
5	5	57
6	6	5
7	7	6
8	8	7
9	9	4
10	10	3
11	11	3
12	12	5
13	13	4
14	14	7
15	15	4
16	16	7
17	17	11
18	18	8
19	19	2
20	20	2
21	21	12
22	22	13
23	23	54
24	24	4
25	25	5
26	26	1
27	27	4
28	28	3
29	29	7
30	30	2
31	31	4
32	32	5
33	33	8
34	34	5
35	35	5
36	36	7
37	37	7
38	38	7.5
39	39	2
40	40	3

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Row				
1	UCL Statistics for Uncensored Full Data Sets			
2				
3	User Selected Options			
4	Date/Time of Computation	ProUCL 5.19/2/2021 11:18:53 AM		
5	From File	WorkSheet.xls		
6	Full Precision	OFF		
7	Confidence Coefficient	95%		
8	Number of Bootstrap Operations	2000		
9				
10				
11	Nickel			
12				
13	General Statistics			
14	Total Number of Observations	40	Number of Distinct Observations	14
15			Number of Missing Observations	0
16	Minimum	1	Mean	7.713
17	Maximum	57	Median	5
18	SD	11.44	Std. Error of Mean	1.809
19	Coefficient of Variation	1.484	Skewness	3.907
20				
21	Normal GOF Test			
22	Shapiro Wilk Test Statistic	0.446	Shapiro Wilk GOF Test	
23	5% Shapiro Wilk Critical Value	0.94	Data Not Normal at 5% Significance Level	
24	Lilliefors Test Statistic	0.365	Lilliefors GOF Test	
25	5% Lilliefors Critical Value	0.139	Data Not Normal at 5% Significance Level	
26	Data Not Normal at 5% Significance Level			
27				
28	Assuming Normal Distribution			
29	95% Normal UCL		95% UCLs (Adjusted for Skewness)	
30	95% Student's-t UCL	10.76	95% Adjusted-CLT UCL (Chen-1995)	11.88
31			95% Modified-t UCL (Johnson-1978)	10.95
32				
33	Gamma GOF Test			
34	A-D Test Statistic	2.938	Anderson-Darling Gamma GOF Test	
35	5% A-D Critical Value	0.77	Data Not Gamma Distributed at 5% Significance Level	
36	K-S Test Statistic	0.244	Kolmogorov-Smirnov Gamma GOF Test	
37	5% K-S Critical Value	0.143	Data Not Gamma Distributed at 5% Significance Level	
38	Data Not Gamma Distributed at 5% Significance Level			
39				
40	Gamma Statistics			
41	k hat (MLE)	1.337	k star (bias corrected MLE)	1.254
42	Theta hat (MLE)	5.767	Theta star (bias corrected MLE)	6.152
43	nu hat (MLE)	107	nu star (bias corrected)	100.3
44	MLE Mean (bias corrected)	7.713	MLE Sd (bias corrected)	6.888
45			Approximate Chi Square Value (0.05)	78.19
46	Adjusted Level of Significance	0.044	Adjusted Chi Square Value	77.46
47				
48	Assuming Gamma Distribution			
49	95% Approximate Gamma UCL (use when n>=50))	9.893	95% Adjusted Gamma UCL (use when n<50)	9.986
50				
51	Lognormal GOF Test			
52	Shapiro Wilk Test Statistic	0.903	Shapiro Wilk Lognormal GOF Test	
53	5% Shapiro Wilk Critical Value	0.94	Data Not Lognormal at 5% Significance Level	

	A–E	F	G–K	L
54	Lilliefors Test Statistic	0.157	Lilliefors Lognormal GOF Test	
55	5% Lilliefors Critical Value	0.139	Data Not Lognormal at 5% Significance Level	
56	Data Not Lognormal at 5% Significance Level			
57				
58	Lognormal Statistics			
59	Minimum of Logged Data	0	Mean of logged Data	1.625
60	Maximum of Logged Data	4.043	SD of logged Data	0.79
61				
62	Assuming Lognormal Distribution			
63	95% H-UCL	9.136	90% Chebyshev (MVUE) UCL	9.722
64	95% Chebyshev (MVUE) UCL	11.02	97.5% Chebyshev (MVUE) UCL	12.81
65	99% Chebyshev (MVUE) UCL	16.34		
66				
67	Nonparametric Distribution Free UCL Statistics			
68	Data do not follow a Discernible Distribution (0.05)			
69				
70	Nonparametric Distribution Free UCLs			
71	95% CLT UCL	10.69	95% Jackknife UCL	10.76
72	95% Standard Bootstrap UCL	10.57	95% Bootstrap-t UCL	18.19
73	95% Hall's Bootstrap UCL	26.98	95% Percentile Bootstrap UCL	10.8
74	95% BCA Bootstrap UCL	12.41		
75	90% Chebyshev(Mean, Sd) UCL	13.14	95% Chebyshev(Mean, Sd) UCL	15.6
76	97.5% Chebyshev(Mean, Sd) UCL	19.01	99% Chebyshev(Mean, Sd) UCL	25.71
77				
78	Suggested UCL to Use			
79	95% Chebyshev (Mean, Sd) UCL	15.6		
80				
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
82	Recommendations are based upon data size, data distribution, and skewness.			
83	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
84	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
85				

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Appendix I

Quality Analysis and Quality Controls

Appendix I
Quality Analysis and Quality Controls
Marsden High School, Ryde

I1.0 Field and Laboratory Data Quality Assurance and Quality Control

The field and laboratory data quality assurance and quality control (QA/QC) procedures and results are summarised in the following Table 1. Reference should be made to the field work methodology and the laboratory results / certificates of analysis for further details. The relative percentage difference (RPD) results, along with the other filed QC samples are included at the end of this appendix.

Table 1: Field and Laboratory Quality Control

Item	Evaluation / Acceptance Criteria	Compliance
Analytical laboratories used	NATA accreditation	C
Holding times	Various based on type of analysis	C
Intra-laboratory replicates	5% of primary samples; <30% RPD	C*
Inter-laboratory replicates	5% of primary samples; <30% RPD	PC*
Trip Spikes	1 per sampling event; 60-140% recovery	PC**
Trip Blanks	1 per sampling event; <PQL	PC**
Laboratory / Reagent Blanks	1 per batch; <PQL	C
Matrix Spikes	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Surrogate Spikes	All organics analysis; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Control Samples	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Standard Operating Procedures (SOP)	Adopting SOP for all aspects of the sampling field work	C

Notes:
C = compliance; PC = partial compliance; NC = non-compliance
* Inter-laboratory replicates were 3% of primary samples. However, there was 13% laboratory replicates in total. See comments below.
** See comments below

The RPD results were all within the acceptable range, with the exception of those indicated in Table QA1. The exceedances are not, however, considered to be of concern given that:

- The number of replicate pairs being collected from fill soils which by its nature is heterogeneous;
- Replicates, rather than homogenised duplicates, were used to minimise risk of volatile loss, hence greater variability can be expected;
- Most of the recorded concentrations being relatively close to the PQL;
- The majority of RPDs within a replicate pair being within the acceptable limits; and
- All other QA/QC parameters met the DQIs.

One trip spike and one trip blank were taken into the field and submitted with the samples to the laboratory. As the trip blank concentrations were all <PQL and the trip spike recovery was within the acceptance criteria of 60 – 140% recovery (see Table QA2 and QA3 respectively), a partial compliance was observed. However, given the results it was considered that appropriate sample storage, handling and transportation was achieved and this partial compliance is unlikely to affect data quality.

In summary, the QC data is determined to be of sufficient quality to be considered acceptable for the assessment.

I2.0 Data Quality Indicators

The reliability of field procedures and analytical results was assessed against the following data quality indicators (DQIs) as outlined in NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013):

- Completeness: a measure of the amount of usable data from a data collection activity;
- Comparability: the confidence (qualitative) that data may be considered to be equivalent for each sampling and analytical event;
- Representativeness: the confidence (qualitative) of data representativeness of media present on-site;
- Precision: a measure of variability or reproducibility of data; and
- Accuracy: a measure of closeness of the data to the 'true' value.

Table 2: Data Quality Indicators

Data Quality Indicator	Method(s) of Achievement
Completeness	Systematic and selected target locations sampled.
	Preparation of borehole logs, sample location plan and chain of custody records.
	Laboratory sample receipt information received confirming receipt of samples intact and appropriateness of the chain of custody.
	Samples analysed for contaminants of potential concern (COPC) identified in the Conceptual Site Model (CSM).
	Completion of chain of custody (COC) documentation.
	NATA accredited laboratory results certificates provided by the laboratory.
	Satisfactory frequency and results for field and laboratory quality control (QC) samples as discussed in Section 1.
Comparability	Using appropriate techniques for sample recovery, storage and transportation, which were the same for the duration of the project.
	Experienced sampler(s) used.
	Use of NATA registered laboratories, with test methods the same or similar between laboratories.
	Satisfactory results for field and laboratory QC samples.
Representativeness	Target media sampled.
	Sample numbers recovered and analysed are considered to be representative of the target media and complying with DQOs.
	Samples were extracted and analysed within holding times.
	Samples were analysed in accordance with the COC.
Precision	Field staff followed standard operating procedures.
	Acceptable RPD between original samples and replicates.
	Satisfactory results for all other field and laboratory QC samples.
Accuracy	Field staff followed standard operating procedures.
	Satisfactory results for all field and laboratory QC samples.

Based on the above, it is considered that the DQIs have been generally complied with.

13.0 Conclusion

Based on the results of the field QA and field and laboratory QC, and evaluation against the DQIs it is concluded that the field and laboratory test data obtained are reliable and useable for this assessment.

I4.0 References

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]*. Australian Government Publishing Services Canberra: National Environment Protection Council.

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Table QA1: Relative Percentage Difference Results – Intra-laboratory and Inter-laboratory Replicates

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		OPP	PCB	Asbestos			Complete PAH suite												TRH		Complete OCP suite										Complete OPP suite			
Hexachlorobenzene	Methoxychlor	Chlorpyrifos	Total PCB	Asbestos ID in soil <0.1g/kg	Trace Analysis	Asbestos (50 g)	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Phenanthrene	Pyrene	TRH C6 - C9	C10-C36 recoverable hydrocarbons	alpha-BHC	beta-BHC	Bromophos-ethyl	Chlorpyrifos-methyl	delta-BHC	Dieldrin	Dimethoate	Endrin Aldehyde	Lindane	Heptachlor Epoxide	Azinphos methyl (Guthion)	Ethion	Fenitrothion	Ronnel (Fenchlorphos)
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
<0.1	<0.1	<0.1	<0.1	NT	NT	NT	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<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	<0.1	<0.1	<0.1	NAD	NAD	NAD	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<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	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%
NT	NT	NT	NT	NT	NT	NT	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	0.1	<0.1	<25	<50	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
NT	NT	NT	NT	NT	NT	NT	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
-	-	-	-	-	-	-	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%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NT	NT	NT	NT	NT	NT	NT	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
NT	NT	NT	NT	NAD	NAD	NAD	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
-	-	-	-	-	-	-	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%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NT	NT	NT	NT	NT	NT	NT	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
NT	NT	NT	NT	NAD	NAD	NAD	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
-	-	-	-	-	-	-	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%	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Table QA2: Trip Blank Results - Soils (mg/kg)

Sample ID	Benzene	Toluene	Ethylbenzene	m+p-Xylene	o-Xylene
Trip Blank	<0.2	<0.5	<1	<2	<1

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Table QA3: Trip Spike Results – Soils (% Recovery)

Sample ID	Benzene	Toluene	Ethylbenzene	m+p-Xylene	o-Xylene
Trip Spike	99	98	98	99	98

Appendix J

Laboratory Certificates of Analysis

Chain of Custody Documentation

Sample Receipt Advice

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 260039

Client Details	
Client	Douglas Partners Pty Ltd
Attention	Lisa Teng
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details	
Your Reference	**99872.01, Marsden High School West Ryde**
Number of Samples	45 soil
Date samples received	21/01/2021
Date completed instructions received	21/01/2021

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details	
Date results requested by	29/01/2021
Date of Issue	29/01/2021

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Asbestos Approved By
Analysed by Asbestos Approved Identifier: Lucy Zhu
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Diego Bigolin, Team Leader, Inorganics
Dragana Tomas, Senior Chemist
Hannah Nguyen, Senior Chemist
Ken Nguyen, Reporting Supervisor
Lucy Zhu, Asbestos Supervisor
Manju Dewendrage, Chemist
Steven Luong, Organics Supervisor

Authorised By

Nancy

Nancy Zhang, Laboratory Manager

Client Reference: 99872.01, Marsden High School West Ryde

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		260039-1	260039-2	260039-3	260039-4	260039-5
Your Reference	UNITS	BH1	BH1	BH2	BH3	BH4
Depth		0-0.1	0.4-0.5	0.4-0.5	0-0.1	0.4-0.5
Date Sampled		18/01/2021	18/01/2021	19/01/2021	18/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	115	112	103	117	110

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		260039-7	260039-8	260039-9	260039-10	260039-11
Your Reference	UNITS	BH5	BH5	BH5	BH6	BH7
Depth		1-1.1	2-2.1	2.9-3.	0-0.1	0.4-0.5
Date Sampled		18/01/2021	18/01/2021	18/01/2021	19/01/2021	19/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	108	116	102	114	102

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vTRH(C6-C10)/BTEXN in Soil						
Our Reference		260039-12	260039-13	260039-14	260039-15	260039-16
Your Reference	UNITS	BH7	BH7	BH8	BH8	BH8
Depth		1.4-1.5	2.4-2.5	0-0.1	0.4-0.5	2-2.1
Date Sampled		19/01/2021	19/01/2021	19/01/2021	19/01/2021	19/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	108	115	98	112	111

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		260039-17	260039-18	260039-20	260039-21	260039-22
Your Reference	UNITS	BH8	BH9	BH10	BH11	BH11
Depth		3.5-3.6	0-0.1	0-0.1	0-0.1	0.4-0.5
Date Sampled		19/01/2021	19/01/2021	19/01/2021	18/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	110	111	114	108	105

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vTRH(C6-C10)/BTEXN in Soil						
Our Reference		260039-23	260039-24	260039-25	260039-26	260039-28
Your Reference	UNITS	BH11	BH12	BH13	BH13	BH14
Depth		0.9-1.0	0.4-0.5	0-0.1	0.9-1.0	0.4-0.5
Date Sampled		18/01/2021	19/01/2021	19/01/2021	19/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	100	103	106	108	107

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		260039-29	260039-30	260039-32	260039-33	260039-34
Your Reference	UNITS	BH15	BH16	BH17	BH18	BH19
Depth		0-0.1	0-0.1	0.4-0.5	0-0.1	0.4-0.5
Date Sampled		18/01/2021	19/01/2021	19/01/2021	19/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	103	103	101	96	102

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vTRH(C6-C10)/BTEXN in Soil						
Our Reference		260039-36	260039-37	260039-38	260039-39	260039-40
Your Reference	UNITS	BH20	BH21	BH22	BH23	BD1/20210118
Depth		0-0.1	0-0.1	0.4-0.5	0.4-0.5	-
Date Sampled		18/01/2021	19/01/2021	18/01/2021	19/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	101	93	103	100	105

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		260039-41	260039-42	260039-43	260039-44	260039-45
Your Reference	UNITS	BD10/20210119	BD2/20210118	Trip Spike	Trip Blank	BH2
Depth		-	-	-	-	1.4-1.5
Date Sampled		19/01/2021	18/01/2021	18/01/2021	18/01/2021	19/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
TRH C_6 - C_9	mg/kg	<25	<25		<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25		<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25		<25	<25
Benzene	mg/kg	<0.2	<0.2	99%	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	98%	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	98%	<1	<1
m+p-xylene	mg/kg	<2	<2	99%	<2	<2
o-Xylene	mg/kg	<1	<1	98%	<1	<1
naphthalene	mg/kg	<1	<1		<1	<1
Total +ve Xylenes	mg/kg	<3	<3		<3	<3
Surrogate aaa-Trifluorotoluene	%	108	108	101	115	108

svTRH (C10-C40) in Soil						
Our Reference		260039-1	260039-2	260039-3	260039-4	260039-5
Your Reference	UNITS	BH1	BH1	BH2	BH3	BH4
Depth		0-0.1	0.4-0.5	0.4-0.5	0-0.1	0.4-0.5
Date Sampled		18/01/2021	18/01/2021	19/01/2021	18/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	27/01/2021	27/01/2021	27/01/2021	28/01/2021	27/01/2021
TRH C_{10} - C_{14}	mg/kg	73	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	120	<100	<100	150	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	770	<100
TRH >C_{10}-C_{16}	mg/kg	69	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	69	<50	<50	<50	<50
TRH >C_{16}-C_{34}	mg/kg	160	100	<100	870	<100
TRH >C_{34}-C_{40}	mg/kg	<100	<100	<100	2,100	<100
Total +ve TRH (>C10-C40)	mg/kg	230	100	<50	3,000	<50
Surrogate o-Terphenyl	%	90	102	97	113	101

svTRH (C10-C40) in Soil						
Our Reference		260039-7	260039-8	260039-9	260039-10	260039-11
Your Reference	UNITS	BH5	BH5	BH5	BH6	BH7
Depth		1-1.1	2-2.1	2.9-3.	0-0.1	0.4-0.5
Date Sampled		18/01/2021	18/01/2021	18/01/2021	19/01/2021	19/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10}-C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16}-C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34}-C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	102	103	102	100	98

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svTRH (C10-C40) in Soil						
Our Reference		260039-12	260039-13	260039-14	260039-15	260039-16
Your Reference	UNITS	BH7	BH7	BH8	BH8	BH8
Depth		1.4-1.5	2.4-2.5	0-0.1	0.4-0.5	2-2.1
Date Sampled		19/01/2021	19/01/2021	19/01/2021	19/01/2021	19/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	27/01/2021	27/01/2021	28/01/2021	28/01/2021	28/01/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10}-C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16}-C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34}-C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	102	102	100	99	97

svTRH (C10-C40) in Soil						
Our Reference		260039-17	260039-18	260039-20	260039-21	260039-22
Your Reference	UNITS	BH8	BH9	BH10	BH11	BH11
Depth		3.5-3.6	0-0.1	0-0.1	0-0.1	0.4-0.5
Date Sampled		19/01/2021	19/01/2021	19/01/2021	18/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	120	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10}-C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16}-C_{34}	mg/kg	<100	<100	<100	170	<100
TRH >C_{34}-C_{40}	mg/kg	<100	<100	<100	550	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	720	<50
Surrogate o-Terphenyl	%	97	100	98	101	94

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svTRH (C10-C40) in Soil						
Our Reference		260039-23	260039-24	260039-25	260039-26	260039-28
Your Reference	UNITS	BH11	BH12	BH13	BH13	BH14
Depth		0.9-1.0	0.4-0.5	0-0.1	0.9-1.0	0.4-0.5
Date Sampled		18/01/2021	19/01/2021	19/01/2021	19/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10}-C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16}-C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34}-C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	97	97	98	96	95

svTRH (C10-C40) in Soil						
Our Reference		260039-29	260039-30	260039-32	260039-33	260039-34
Your Reference	UNITS	BH15	BH16	BH17	BH18	BH19
Depth		0-0.1	0-0.1	0.4-0.5	0-0.1	0.4-0.5
Date Sampled		18/01/2021	19/01/2021	19/01/2021	19/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10}-C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16}-C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34}-C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	96	98	92	98	95

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svTRH (C10-C40) in Soil						
Our Reference		260039-36	260039-37	260039-38	260039-39	260039-40
Your Reference	UNITS	BH20	BH21	BH22	BH23	BD1/20210118
Depth		0-0.1	0-0.1	0.4-0.5	0.4-0.5	-
Date Sampled		18/01/2021	19/01/2021	18/01/2021	19/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10}-C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16}-C_{34}	mg/kg	<100	100	<100	<100	<100
TRH >C_{34}-C_{40}	mg/kg	<100	<100	<100	<100	240
Total +ve TRH (>C10-C40)	mg/kg	<50	100	<50	<50	240
Surrogate o-Terphenyl	%	94	95	94	93	90

svTRH (C10-C40) in Soil				
Our Reference		260039-41	260039-42	260039-45
Your Reference	UNITS	BD10/20210119	BD2/20210118	BH2
Depth		-	-	1.4-1.5
Date Sampled		19/01/2021	18/01/2021	19/01/2021
Type of sample		soil	soil	soil
Date extracted	-	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100
TRH >C_{10}-C_{16}	mg/kg	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50
TRH >C_{16}-C_{34}	mg/kg	<100	<100	<100
TRH >C_{34}-C_{40}	mg/kg	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50
Surrogate o-Terphenyl	%	93	92	91

Client Reference: 99872.01, Marsden High School West Ryde

PAHs in Soil						
Our Reference		260039-1	260039-2	260039-3	260039-4	260039-5
Your Reference	UNITS	BH1	BH1	BH2	BH3	BH4
Depth		0-0.1	0.4-0.5	0.4-0.5	0-0.1	0.4-0.5
Date Sampled		18/01/2021	18/01/2021	19/01/2021	18/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	0.07	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	0.3	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	99	100	99	93	98

Client Reference: 99872.01, Marsden High School West Ryde

PAHs in Soil						
Our Reference		260039-7	260039-8	260039-9	260039-10	260039-11
Your Reference	UNITS	BH5	BH5	BH5	BH6	BH7
Depth		1-1.1	2-2.1	2.9-3.	0-0.1	0.4-0.5
Date Sampled		18/01/2021	18/01/2021	18/01/2021	19/01/2021	19/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.2	<0.1	<0.1	<0.1	0.2
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	0.2
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	0.2
Benzo(a)pyrene	mg/kg	0.07	<0.05	<0.05	<0.05	0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	0.3	<0.05	<0.05	<0.05	0.93
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	99	96	104	99	98

Client Reference: 99872.01, Marsden High School West Ryde

PAHs in Soil						
Our Reference		260039-12	260039-13	260039-14	260039-15	260039-16
Your Reference	UNITS	BH7	BH7	BH8	BH8	BH8
Depth		1.4-1.5	2.4-2.5	0-0.1	0.4-0.5	2-2.1
Date Sampled		19/01/2021	19/01/2021	19/01/2021	19/01/2021	19/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.2	<0.1	0.1	<0.1	<0.1
Pyrene	mg/kg	0.2	<0.1	0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.1	<0.05	0.06	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	1.2	<0.05	0.3	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	98	98	97	94	95

Client Reference: 99872.01, Marsden High School West Ryde

PAHs in Soil						
Our Reference		260039-17	260039-18	260039-20	260039-21	260039-22
Your Reference	UNITS	BH8	BH9	BH10	BH11	BH11
Depth		3.5-3.6	0-0.1	0-0.1	0-0.1	0.4-0.5
Date Sampled		19/01/2021	19/01/2021	19/01/2021	18/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	0.1	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
*Surrogate p-*Terphenyl-d14	%	92	95	92	93	96

Client Reference: 99872.01, Marsden High School West Ryde

PAHs in Soil						
Our Reference		260039-23	260039-24	260039-25	260039-26	260039-28
Your Reference	UNITS	BH11	BH12	BH13	BH13	BH14
Depth		0.9-1.0	0.4-0.5	0-0.1	0.9-1.0	0.4-0.5
Date Sampled		18/01/2021	19/01/2021	19/01/2021	19/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.1	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	0.76	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	93	96	96	97	95

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PAHs in Soil						
Our Reference		260039-29	260039-30	260039-32	260039-33	260039-34
Your Reference	UNITS	BH15	BH16	BH17	BH18	BH19
Depth		0-0.1	0-0.1	0.4-0.5	0-0.1	0.4-0.5
Date Sampled		18/01/2021	19/01/2021	19/01/2021	19/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	0.07	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	0.2	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	96	95	96	97	96

PAHs in Soil						
Our Reference		260039-36	260039-37	260039-38	260039-39	260039-40
Your Reference	UNITS	BH20	BH21	BH22	BH23	BD1/20210118
Depth		0-0.1	0-0.1	0.4-0.5	0.4-0.5	-
Date Sampled		18/01/2021	19/01/2021	18/01/2021	19/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	0.3	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	1.2	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	1.0	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	0.5	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	0.4	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	0.6	<0.2
Benzo(a)pyrene	mg/kg	0.06	<0.05	<0.05	0.4	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	0.2	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	0.2	<0.1
Total +ve PAH's	mg/kg	0.3	<0.05	<0.05	6.0	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	0.6	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	0.6	<0.5
Surrogate p-Terphenyl-d14	%	95	97	96	96	94

PAHs in Soil				
Our Reference		260039-41	260039-42	260039-45
Your Reference	UNITS	BD10/20210119	BD2/20210118	BH2
Depth		-	-	1.4-1.5
Date Sampled		19/01/2021	18/01/2021	19/01/2021
Type of sample		soil	soil	soil
Date extracted	-	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021
Naphthalene	mg/kg	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	0.2	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	94	95	94

Client Reference: 99872.01, Marsden High School West Ryde

Organochlorine Pesticides in soil						
Our Reference		260039-1	260039-3	260039-4	260039-5	260039-7
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Depth		0-0.1	0.4-0.5	0-0.1	0.4-0.5	1-1.1
Date Sampled		18/01/2021	19/01/2021	18/01/2021	18/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	106	107	100	107	107

Client Reference: 99872.01, Marsden High School West Ryde

Organochlorine Pesticides in soil						
Our Reference		260039-10	260039-11	260039-14	260039-18	260039-20
Your Reference	UNITS	BH6	BH7	BH8	BH9	BH10
Depth		0-0.1	0.4-0.5	0-0.1	0-0.1	0-0.1
Date Sampled		19/01/2021	19/01/2021	19/01/2021	19/01/2021	19/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	107	107	105	102	101

Client Reference: 99872.01, Marsden High School West Ryde

Organochlorine Pesticides in soil						
Our Reference		260039-21	260039-24	260039-25	260039-28	260039-29
Your Reference	UNITS	BH11	BH12	BH13	BH14	BH15
Depth		0-0.1	0.4-0.5	0-0.1	0.4-0.5	0-0.1
Date Sampled		18/01/2021	19/01/2021	19/01/2021	18/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	100	105	104	104	102

Organochlorine Pesticides in soil						
Our Reference		260039-30	260039-32	260039-34	260039-36	260039-37
Your Reference	UNITS	BH16	BH17	BH19	BH20	BH21
Depth		0-0.1	0.4-0.5	0.4-0.5	0-0.1	0-0.1
Date Sampled		19/01/2021	19/01/2021	18/01/2021	18/01/2021	19/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	102	106	106	103	105

Organochlorine Pesticides in soil		
Our Reference		260039-40
Your Reference	UNITS	BD1/20210118
Depth		-
Date Sampled		18/01/2021
Type of sample		soil
Date extracted	-	27/01/2021
Date analysed	-	28/01/2021
alpha-BHC	mg/kg	<0.1
HCB	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1
Surrogate TCMX	%	105

Client Reference: 99872.01, Marsden High School West Ryde

Organophosphorus Pesticides in Soil						
Our Reference		260039-1	260039-3	260039-4	260039-5	260039-7
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Depth		0-0.1	0.4-0.5	0-0.1	0.4-0.5	1-1.1
Date Sampled		18/01/2021	19/01/2021	18/01/2021	18/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	106	107	100	107	107

Client Reference: 99872.01, Marsden High School West Ryde

Organophosphorus Pesticides in Soil						
Our Reference		260039-10	260039-11	260039-14	260039-18	260039-20
Your Reference	UNITS	BH6	BH7	BH8	BH9	BH10
Depth		0-0.1	0.4-0.5	0-0.1	0-0.1	0-0.1
Date Sampled		19/01/2021	19/01/2021	19/01/2021	19/01/2021	19/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	107	107	105	102	101

Client Reference: 99872.01, Marsden High School West Ryde

Organophosphorus Pesticides in Soil						
Our Reference		260039-21	260039-24	260039-25	260039-28	260039-29
Your Reference	UNITS	BH11	BH12	BH13	BH14	BH15
Depth		0-0.1	0.4-0.5	0-0.1	0.4-0.5	0-0.1
Date Sampled		18/01/2021	19/01/2021	19/01/2021	18/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	100	105	104	104	102

Organophosphorus Pesticides in Soil						
Our Reference		260039-30	260039-32	260039-34	260039-36	260039-37
Your Reference	UNITS	BH16	BH17	BH19	BH20	BH21
Depth		0-0.1	0.4-0.5	0.4-0.5	0-0.1	0-0.1
Date Sampled		19/01/2021	19/01/2021	18/01/2021	18/01/2021	19/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	102	106	106	103	105

Organophosphorus Pesticides in Soil		
Our Reference		260039-40
Your Reference	UNITS	BD1/20210118
Depth		-
Date Sampled		18/01/2021
Type of sample		soil
Date extracted	-	27/01/2021
Date analysed	-	28/01/2021
Dichlorvos	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Diazinon	mg/kg	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Fenitrothion	mg/kg	<0.1
Malathion	mg/kg	<0.1
Chlorpyriphos	mg/kg	<0.1
Parathion	mg/kg	<0.1
Bromophos-ethyl	mg/kg	<0.1
Ethion	mg/kg	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1
Surrogate TCMX	%	105

Client Reference: 99872.01, Marsden High School West Ryde

PCBs in Soil						
Our Reference		260039-1	260039-3	260039-4	260039-5	260039-7
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Depth		0-0.1	0.4-0.5	0-0.1	0.4-0.5	1-1.1
Date Sampled		18/01/2021	19/01/2021	18/01/2021	18/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	106	107	100	107	107

PCBs in Soil						
Our Reference		260039-10	260039-11	260039-14	260039-18	260039-20
Your Reference	UNITS	BH6	BH7	BH8	BH9	BH10
Depth		0-0.1	0.4-0.5	0-0.1	0-0.1	0-0.1
Date Sampled		19/01/2021	19/01/2021	19/01/2021	19/01/2021	19/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	107	107	105	102	101

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PCBs in Soil						
Our Reference		260039-21	260039-24	260039-25	260039-28	260039-29
Your Reference	UNITS	BH11	BH12	BH13	BH14	BH15
Depth		0-0.1	0.4-0.5	0-0.1	0.4-0.5	0-0.1
Date Sampled		18/01/2021	19/01/2021	19/01/2021	18/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	100	105	104	104	102

PCBs in Soil						
Our Reference		260039-30	260039-32	260039-34	260039-36	260039-37
Your Reference	UNITS	BH16	BH17	BH19	BH20	BH21
Depth		0-0.1	0.4-0.5	0.4-0.5	0-0.1	0-0.1
Date Sampled		19/01/2021	19/01/2021	18/01/2021	18/01/2021	19/01/2021
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	102	106	106	103	105

PCBs in Soil		
Our Reference		260039-40
Your Reference	UNITS	BD1/20210118
Depth		-
Date Sampled		18/01/2021
Type of sample		soil
Date extracted	-	27/01/2021
Date analysed	-	28/01/2021
Aroclor 1016	mg/kg	<0.1
Aroclor 1221	mg/kg	<0.1
Aroclor 1232	mg/kg	<0.1
Aroclor 1242	mg/kg	<0.1
Aroclor 1248	mg/kg	<0.1
Aroclor 1254	mg/kg	<0.1
Aroclor 1260	mg/kg	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1
Surrogate TCMX	%	105

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Acid Extractable metals in soil						
Our Reference		260039-1	260039-2	260039-3	260039-4	260039-5
Your Reference	UNITS	BH1	BH1	BH2	BH3	BH4
Depth		0-0.1	0.4-0.5	0.4-0.5	0-0.1	0.4-0.5
Date Sampled		18/01/2021	18/01/2021	19/01/2021	18/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Arsenic	mg/kg	6	8	4	<4	7
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	14	12	12	69	14
Copper	mg/kg	11	8	12	49	14
Lead	mg/kg	66	12	16	5	16
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	4	2	7	57	5
Zinc	mg/kg	33	5	15	33	10

Acid Extractable metals in soil						
Our Reference		260039-7	260039-8	260039-9	260039-10	260039-11
Your Reference	UNITS	BH5	BH5	BH5	BH6	BH7
Depth		1-1.1	2-2.1	2.9-3.	0-0.1	0.4-0.5
Date Sampled		18/01/2021	18/01/2021	18/01/2021	19/01/2021	19/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Arsenic	mg/kg	8	4	10	4	5
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	17	16	21	8	12
Copper	mg/kg	12	8	11	4	46
Lead	mg/kg	22	17	19	19	38
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	7	4	3	3	5
Zinc	mg/kg	27	6	10	19	24

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Acid Extractable metals in soil						
Our Reference		260039-12	260039-13	260039-14	260039-15	260039-16
Your Reference	UNITS	BH7	BH7	BH8	BH8	BH8
Depth		1.4-1.5	2.4-2.5	0-0.1	0.4-0.5	2-2.1
Date Sampled		19/01/2021	19/01/2021	19/01/2021	19/01/2021	19/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Arsenic	mg/kg	6	6	<4	6	10
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	13	20	11	13	8
Copper	mg/kg	19	13	22	23	29
Lead	mg/kg	39	20	21	19	15
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	7	4	7	11	8
Zinc	mg/kg	82	11	41	49	47

Acid Extractable metals in soil						
Our Reference		260039-17	260039-18	260039-20	260039-21	260039-22
Your Reference	UNITS	BH8	BH9	BH10	BH11	BH11
Depth		3.5-3.6	0-0.1	0-0.1	0-0.1	0.4-0.5
Date Sampled		19/01/2021	19/01/2021	19/01/2021	18/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Arsenic	mg/kg	<4	7	5	<4	8
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	7	15	12	68	23
Copper	mg/kg	7	38	19	20	11
Lead	mg/kg	27	110	25	7	23
Mercury	mg/kg	<0.1	0.4	<0.1	<0.1	0.3
Nickel	mg/kg	2	12	13	54	4
Zinc	mg/kg	12	220	39	32	14

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Acid Extractable metals in soil						
Our Reference		260039-23	260039-24	260039-25	260039-26	260039-28
Your Reference	UNITS	BH11	BH12	BH13	BH13	BH14
Depth		0.9-1.0	0.4-0.5	0-0.1	0.9-1.0	0.4-0.5
Date Sampled		18/01/2021	19/01/2021	19/01/2021	19/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Arsenic	mg/kg	8	7	<4	<4	10
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	16	13	6	12	19
Copper	mg/kg	11	14	8	16	11
Lead	mg/kg	20	22	15	15	17
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	1	4	3	7	2
Zinc	mg/kg	6	16	26	17	7

Acid Extractable metals in soil						
Our Reference		260039-29	260039-30	260039-32	260039-33	260039-34
Your Reference	UNITS	BH15	BH16	BH17	BH18	BH19
Depth		0-0.1	0-0.1	0.4-0.5	0-0.1	0.4-0.5
Date Sampled		18/01/2021	19/01/2021	19/01/2021	19/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Arsenic	mg/kg	12	15	10	25	7
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	8	11	21	11	20
Copper	mg/kg	10	15	18	42	12
Lead	mg/kg	28	26	38	29	42
Mercury	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Nickel	mg/kg	4	5	8	5	5
Zinc	mg/kg	33	29	41	40	22

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Acid Extractable metals in soil						
Our Reference		260039-36	260039-37	260039-38	260039-39	260039-40
Your Reference	UNITS	BH20	BH21	BH22	BH23	BD1/20210118
Depth		0-0.1	0-0.1	0.4-0.5	0.4-0.5	-
Date Sampled		18/01/2021	19/01/2021	18/01/2021	19/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Arsenic	mg/kg	7	6	6	8	6
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	17	14	17	12	15
Copper	mg/kg	12	25	3	17	14
Lead	mg/kg	24	25	15	24	14
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	7	7	2	3	6
Zinc	mg/kg	35	44	16	20	11

Acid Extractable metals in soil					
Our Reference		260039-41	260039-42	260039-45	260039-46
Your Reference	UNITS	BD10/20210119	BD2/20210118	BH2	BH7 - [TRIPLICATE]
Depth		-	-	1.4-1.5	0.4-0.5
Date Sampled		19/01/2021	18/01/2021	19/01/2021	19/01/2021
Type of sample		soil	soil	soil	soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Arsenic	mg/kg	6	9	4	5
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	8	23	10	14
Copper	mg/kg	10	12	9	20
Lead	mg/kg	20	22	14	42
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	5	2	4
Zinc	mg/kg	10	14	7	26

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Misc Soil - Inorg						
Our Reference		260039-1	260039-3	260039-4	260039-5	260039-7
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Depth		0-0.1	0.4-0.5	0-0.1	0.4-0.5	1-1.1
Date Sampled		18/01/2021	19/01/2021	18/01/2021	18/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg						
Our Reference		260039-10	260039-11	260039-14	260039-18	260039-20
Your Reference	UNITS	BH6	BH7	BH8	BH9	BH10
Depth		0-0.1	0.4-0.5	0-0.1	0-0.1	0-0.1
Date Sampled		19/01/2021	19/01/2021	19/01/2021	19/01/2021	19/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg						
Our Reference		260039-21	260039-24	260039-25	260039-28	260039-29
Your Reference	UNITS	BH11	BH12	BH13	BH14	BH15
Depth		0-0.1	0.4-0.5	0-0.1	0.4-0.5	0-0.1
Date Sampled		18/01/2021	19/01/2021	19/01/2021	18/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg						
Our Reference		260039-30	260039-32	260039-34	260039-36	260039-37
Your Reference	UNITS	BH16	BH17	BH19	BH20	BH21
Depth		0-0.1	0.4-0.5	0.4-0.5	0-0.1	0-0.1
Date Sampled		19/01/2021	19/01/2021	18/01/2021	18/01/2021	19/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg		
Our Reference		260039-40
Your Reference	UNITS	BD1/20210118
Depth		-
Date Sampled		18/01/2021
Type of sample		soil
Date prepared	-	27/01/2021
Date analysed	-	27/01/2021
Total Phenolics (as Phenol)	mg/kg	<5

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Moisture						
Our Reference		260039-1	260039-2	260039-3	260039-4	260039-5
Your Reference	UNITS	BH1	BH1	BH2	BH3	BH4
Depth		0-0.1	0.4-0.5	0.4-0.5	0-0.1	0.4-0.5
Date Sampled		18/01/2021	18/01/2021	19/01/2021	18/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Moisture	%	12	17	22	4.2	22

Moisture						
Our Reference		260039-7	260039-8	260039-9	260039-10	260039-11
Your Reference	UNITS	BH5	BH5	BH5	BH6	BH7
Depth		1-1.1	2-2.1	2.9-3.	0-0.1	0.4-0.5
Date Sampled		18/01/2021	18/01/2021	18/01/2021	19/01/2021	19/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Moisture	%	20	22	19	4.5	12

Moisture						
Our Reference		260039-12	260039-13	260039-14	260039-15	260039-16
Your Reference	UNITS	BH7	BH7	BH8	BH8	BH8
Depth		1.4-1.5	2.4-2.5	0-0.1	0.4-0.5	2-2.1
Date Sampled		19/01/2021	19/01/2021	19/01/2021	19/01/2021	19/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Moisture	%	12	20	6.1	14	13

Moisture						
Our Reference		260039-17	260039-18	260039-20	260039-21	260039-22
Your Reference	UNITS	BH8	BH9	BH10	BH11	BH11
Depth		3.5-3.6	0-0.1	0-0.1	0-0.1	0.4-0.5
Date Sampled		19/01/2021	19/01/2021	19/01/2021	18/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Moisture	%	13	11	12	9.8	25

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Moisture						
Our Reference		260039-23	260039-24	260039-25	260039-26	260039-28
Your Reference	UNITS	BH11	BH12	BH13	BH13	BH14
Depth		0.9-1.0	0.4-0.5	0-0.1	0.9-1.0	0.4-0.5
Date Sampled		18/01/2021	19/01/2021	19/01/2021	19/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Moisture	%	29	12	4.7	18	21

Moisture						
Our Reference		260039-29	260039-30	260039-32	260039-33	260039-34
Your Reference	UNITS	BH15	BH16	BH17	BH18	BH19
Depth		0-0.1	0-0.1	0.4-0.5	0-0.1	0.4-0.5
Date Sampled		18/01/2021	19/01/2021	19/01/2021	19/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Moisture	%	5.7	13	17	24	17

Moisture						
Our Reference		260039-36	260039-37	260039-38	260039-39	260039-40
Your Reference	UNITS	BH20	BH21	BH22	BH23	BD1/20210118
Depth		0-0.1	0-0.1	0.4-0.5	0.4-0.5	-
Date Sampled		18/01/2021	19/01/2021	18/01/2021	19/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	27/01/2021	27/01/2021	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Moisture	%	16	14	8.1	8.4	21

Moisture				
Our Reference		260039-41	260039-42	260039-45
Your Reference	UNITS	BD10/20210119	BD2/20210118	BH2
Depth		-	-	1.4-1.5
Date Sampled		19/01/2021	18/01/2021	19/01/2021
Type of sample		soil	soil	soil
Date prepared	-	27/01/2021	27/01/2021	27/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021
Moisture	%	13	25	16

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Asbestos ID - soils						
Our Reference		260039-1	260039-3	260039-4	260039-5	260039-7
Your Reference	UNITS	BH1	BH2	BH3	BH4	BH5
Depth		0-0.1	0.4-0.5	0-0.1	0.4-0.5	1-1.1
Date Sampled		18/01/2021	19/01/2021	18/01/2021	18/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Sample mass tested	g	Approx. 35g	Approx. 30g	Approx. 35g	Approx. 30g	Approx. 30g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils						
Our Reference		260039-8	260039-10	260039-11	260039-12	260039-14
Your Reference	UNITS	BH5	BH6	BH7	BH7	BH8
Depth		2-2.1	0-0.1	0.4-0.5	1.4-1.5	0-0.1
Date Sampled		18/01/2021	19/01/2021	19/01/2021	19/01/2021	19/01/2021
Type of sample		soil	soil	soil	soil	soil
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Sample mass tested	g	Approx. 35g	Approx. 35g	Approx. 35g	Approx. 35g	Approx. 35g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

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Asbestos ID - soils						
Our Reference		260039-15	260039-16	260039-18	260039-20	260039-21
Your Reference	UNITS	BH8	BH8	BH9	BH10	BH11
Depth		0.4-0.5	2-2.1	0-0.1	0-0.1	0-0.1
Date Sampled		19/01/2021	19/01/2021	19/01/2021	19/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Sample mass tested	g	Approx. 35g	Approx. 35g	Approx. 35g	Approx. 35g	Approx. 35g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown fine-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils						
Our Reference		260039-22	260039-23	260039-24	260039-25	260039-28
Your Reference	UNITS	BH11	BH11	BH12	BH13	BH14
Depth		0.4-0.5	0.9-1.0	0.4-0.5	0-0.1	0.4-0.5
Date Sampled		18/01/2021	18/01/2021	19/01/2021	19/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Sample mass tested	g	Approx. 25g	Approx. 30g	Approx. 40g	Approx. 40g	Approx. 30g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Red coarse-grained soil & rocks	Brown fine-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

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Asbestos ID - soils						
Our Reference		260039-29	260039-30	260039-32	260039-33	260039-34
Your Reference	UNITS	BH15	BH16	BH17	BH18	BH19
Depth		0-0.1	0-0.1	0.4-0.5	0-0.1	0.4-0.5
Date Sampled		18/01/2021	19/01/2021	19/01/2021	19/01/2021	18/01/2021
Type of sample		soil	soil	soil	soil	soil
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Sample mass tested	g	Approx. 40g	Approx. 35g	Approx. 30g	Approx. 30g	Approx. 30g
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils					
Our Reference		260039-36	260039-37	260039-38	260039-39
Your Reference	UNITS	BH20	BH21	BH22	BH23
Depth		0-0.1	0-0.1	0.4-0.5	0.4-0.5
Date Sampled		18/01/2021	19/01/2021	18/01/2021	19/01/2021
Type of sample		soil	soil	soil	soil
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Sample mass tested	g	Approx. 35g	Approx. 35g	Approx. 40g	Approx. 40g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown fine-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Misc Inorg - Soil						
Our Reference		260039-2	260039-9	260039-13	260039-17	260039-26
Your Reference	UNITS	BH1	BH5	BH7	BH8	BH13
Depth		0.4-0.5	2.9-3.	2.4-2.5	3.5-3.6	0.9-1.0
Date Sampled		18/01/2021	18/01/2021	19/01/2021	19/01/2021	19/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
Date analysed	-	28/01/2021	28/01/2021	28/01/2021	28/01/2021	28/01/2021
pH 1:5 soil:water	pH Units	5.1	4.9	5.4	5.8	4.9

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CEC						
Our Reference		260039-2	260039-9	260039-13	260039-17	260039-26
Your Reference	UNITS	BH1	BH5	BH7	BH8	BH13
Depth		0.4-0.5	2.9-3.	2.4-2.5	3.5-3.6	0.9-1.0
Date Sampled		18/01/2021	18/01/2021	19/01/2021	19/01/2021	19/01/2021
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Date analysed	-	29/01/2021	29/01/2021	29/01/2021	29/01/2021	29/01/2021
Exchangeable Ca	meq/100g	1.6	0.4	5.7	0.3	0.2
Exchangeable K	meq/100g	0.4	0.2	0.5	0.1	0.2
Exchangeable Mg	meq/100g	1.5	1.8	4.5	2.8	3.1
Exchangeable Na	meq/100g	0.29	1.8	0.22	0.88	0.59
Cation Exchange Capacity	meq/100g	3.8	4.3	11	4.1	4.1

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Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Metals-020	Determination of various metals by ICP-AES.
Metals-020	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.

Method ID	Methodology Summary
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

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QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	260039-3
Date extracted	-			28/01/2021	1	28/01/2021	28/01/2021		28/01/2021	28/01/2021
Date analysed	-			29/01/2021	1	29/01/2021	29/01/2021		29/01/2021	29/01/2021
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	127	117
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	127	117
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	122	114
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	130	114
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	130	127
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	125	114
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	129	117
naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0		
Surrogate aaa-Trifluorotoluene	%		Org-023	132	1	115	113	2	121	103

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	260039-21
Date extracted	-				11	28/01/2021	28/01/2021		28/01/2021	28/01/2021
Date analysed	-				11	29/01/2021	29/01/2021		29/01/2021	29/01/2021
TRH C_6 - C_9	mg/kg	25	Org-023		11	<25	<25	0	125	105
TRH C_6 - C_{10}	mg/kg	25	Org-023		11	<25	<25	0	125	105
Benzene	mg/kg	0.2	Org-023		11	<0.2	<0.2	0	123	102
Toluene	mg/kg	0.5	Org-023		11	<0.5	<0.5	0	125	105
Ethylbenzene	mg/kg	1	Org-023		11	<1	<1	0	130	114
m+p-xylene	mg/kg	2	Org-023		11	<2	<2	0	123	102
o-Xylene	mg/kg	1	Org-023		11	<1	<1	0	127	105
naphthalene	mg/kg	1	Org-023		11	<1	<1	0		
Surrogate aaa-Trifluorotoluene	%		Org-023		11	102	106	4	114	92

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-				20	28/01/2021	28/01/2021			
Date analysed	-				20	29/01/2021	29/01/2021			
TRH C_6 - C_9	mg/kg	25	Org-023		20	<25	<25	0		
TRH C_6 - C_{10}	mg/kg	25	Org-023		20	<25	<25	0		
Benzene	mg/kg	0.2	Org-023		20	<0.2	<0.2	0		
Toluene	mg/kg	0.5	Org-023		20	<0.5	<0.5	0		
Ethylbenzene	mg/kg	1	Org-023		20	<1	<1	0		
m+p-xylene	mg/kg	2	Org-023		20	<2	<2	0		
o-Xylene	mg/kg	1	Org-023		20	<1	<1	0		
naphthalene	mg/kg	1	Org-023		20	<1	<1	0		
Surrogate aaa-Trifluorotoluene	%		Org-023		20	114	98	15		

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QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-				29	28/01/2021	28/01/2021			
Date analysed	-				29	29/01/2021	29/01/2021			
TRH C_6 - C_9	mg/kg	25	Org-023		29	<25	<25	0		
TRH C_6 - C_{10}	mg/kg	25	Org-023		29	<25	<25	0		
Benzene	mg/kg	0.2	Org-023		29	<0.2	<0.2	0		
Toluene	mg/kg	0.5	Org-023		29	<0.5	<0.5	0		
Ethylbenzene	mg/kg	1	Org-023		29	<1	<1	0		
m+p-xylene	mg/kg	2	Org-023		29	<2	<2	0		
o-Xylene	mg/kg	1	Org-023		29	<1	<1	0		
naphthalene	mg/kg	1	Org-023		29	<1	<1	0		
Surrogate aaa-Trifluorotoluene	%		Org-023		29	103	114	10		

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	260039-3
Date extracted	-			27/01/2021	1	27/01/2021	27/01/2021		27/01/2021	27/01/2021
Date analysed	-			27/01/2021	1	27/01/2021	27/01/2021		27/01/2021	27/01/2021
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	73	77	5	113	123
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	120	170	34	78	84
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	100	0	92	110
TRH >C_{10}-C_{16}	mg/kg	50	Org-020	<50	1	69	75	8	113	123
TRH >C_{16}-C_{34}	mg/kg	100	Org-020	<100	1	160	220	32	78	84
TRH >C_{34}-C_{40}	mg/kg	100	Org-020	<100	1	<100	100	0	92	110
Surrogate o-Terphenyl	%		Org-020	90	1	90	106	16	89	98

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	260039-21
Date extracted	-				11	27/01/2021	27/01/2021		27/01/2021	27/01/2021
Date analysed	-				11	27/01/2021	27/01/2021		28/01/2021	28/01/2021
TRH C_{10} - C_{14}	mg/kg	50	Org-020		11	<50	<50	0	125	125
TRH C_{15} - C_{28}	mg/kg	100	Org-020		11	<100	<100	0	80	102
TRH C_{29} - C_{36}	mg/kg	100	Org-020		11	<100	<100	0	92	#
TRH >C_{10}-C_{16}	mg/kg	50	Org-020		11	<50	<50	0	125	125
TRH >C_{16}-C_{34}	mg/kg	100	Org-020		11	<100	<100	0	80	102
TRH >C_{34}-C_{40}	mg/kg	100	Org-020		11	<100	<100	0	92	#
Surrogate o-Terphenyl	%		Org-020		11	98	100	2	94	96

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-				20	27/01/2021	27/01/2021			
Date analysed	-				20	28/01/2021	28/01/2021			
TRH C_{10} - C_{14}	mg/kg	50	Org-020		20	<50	<50	0		
TRH C_{15} - C_{28}	mg/kg	100	Org-020		20	<100	<100	0		
TRH C_{29} - C_{36}	mg/kg	100	Org-020		20	<100	<100	0		
TRH >C_{10}-C_{16}	mg/kg	50	Org-020		20	<50	<50	0		
TRH >C_{16}-C_{34}	mg/kg	100	Org-020		20	<100	<100	0		
TRH >C_{34}-C_{40}	mg/kg	100	Org-020		20	<100	<100	0		
Surrogate o-Terphenyl	%		Org-020		20	98	99	1		

Client Reference: 99872.01, Marsden High School West Ryde

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-				29	27/01/2021	27/01/2021			
Date analysed	-				29	28/01/2021	28/01/2021			
TRH C_{10} - C_{14}	mg/kg	50	Org-020		29	<50	<50	0		
TRH C_{15} - C_{28}	mg/kg	100	Org-020		29	<100	<100	0		
TRH C_{29} - C_{36}	mg/kg	100	Org-020		29	<100	<100	0		
TRH >C_{10}-C_{16}	mg/kg	50	Org-020		29	<50	<50	0		
TRH >C_{16}-C_{34}	mg/kg	100	Org-020		29	<100	<100	0		
TRH >C_{34}-C_{40}	mg/kg	100	Org-020		29	<100	<100	0		
Surrogate o-Terphenyl	%		Org-020		29	96	96	0		

Client Reference: 99872.01, Marsden High School West Ryde

QUALITY CONTROL: PAHs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	260039-3
Date extracted	-			27/01/2021	1	27/01/2021	27/01/2021		27/01/2021	27/01/2021
Date analysed	-			28/01/2021	1	28/01/2021	28/01/2021		28/01/2021	28/01/2021
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	97	97
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0		
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	103	103
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	102	104
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	97	97
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0		
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	100	99
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	100	102
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0		
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	108	106
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0		
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	<0.05	<0.05	0	117	119
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0		
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0		
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0		
Surrogate p-Terphenyl-d14	%		Org-022/025	90	1	99	99	0	91	92

QUALITY CONTROL: PAHs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	260039-21
Date extracted	-				11	27/01/2021	27/01/2021		27/01/2021	27/01/2021
Date analysed	-				11	28/01/2021	28/01/2021		28/01/2021	28/01/2021
Naphthalene	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0	97	97
Acenaphthylene	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0		
Acenaphthene	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0	103	101
Fluorene	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0	100	100
Phenanthrene	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0	107	101
Anthracene	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0		
Fluoranthene	mg/kg	0.1	Org-022/025		11	0.2	0.4	67	107	104
Pyrene	mg/kg	0.1	Org-022/025		11	0.2	0.3	40	105	105
Benzo(a)anthracene	mg/kg	0.1	Org-022/025		11	0.1	0.2	67		
Chrysene	mg/kg	0.1	Org-022/025		11	0.1	0.2	67	106	106
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025		11	0.2	0.3	40		
Benzo(a)pyrene	mg/kg	0.05	Org-022/025		11	0.1	0.2	67	124	119
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0		
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0		
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025		11	<0.1	0.1	0		
Surrogate p-Terphenyl-d14	%		Org-022/025		11	98	100	2	93	93

Client Reference: 99872.01, Marsden High School West Ryde

QUALITY CONTROL: PAHs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-				20	27/01/2021	27/01/2021			
Date analysed	-				20	28/01/2021	28/01/2021			
Naphthalene	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Acenaphthylene	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Acenaphthene	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Fluorene	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Phenanthrene	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Anthracene	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Fluoranthene	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Pyrene	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Benzo(a)anthracene	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Chrysene	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025		20	<0.2	<0.2	0		
Benzo(a)pyrene	mg/kg	0.05	Org-022/025		20	<0.05	<0.05	0		
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Surrogate p-Terphenyl-d14	%		Org-022/025		20	92	94	2		

QUALITY CONTROL: PAHs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-				29	27/01/2021	27/01/2021			
Date analysed	-				29	28/01/2021	28/01/2021			
Naphthalene	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Acenaphthylene	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Acenaphthene	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Fluorene	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Phenanthrene	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Anthracene	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Fluoranthene	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Pyrene	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Benzo(a)anthracene	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Chrysene	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025		29	<0.2	<0.2	0		
Benzo(a)pyrene	mg/kg	0.05	Org-022/025		29	<0.05	<0.05	0		
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Surrogate p-Terphenyl-d14	%		Org-022/025		29	96	97	1		

Client Reference: 99872.01, Marsden High School West Ryde

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	260039-3
Date extracted	-			27/01/2021	1	27/01/2021	27/01/2021		27/01/2021	27/01/2021
Date analysed	-			28/01/2021	1	28/01/2021	28/01/2021		28/01/2021	28/01/2021
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	101	104
HCB	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0		
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	104	104
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0		
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	111	111
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0		
Aldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	95	97
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	110	112
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0		
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0		
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0		
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	111	113
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	95	95
Endrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	93	95
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0		
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	105	108
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0		
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0		
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	116	120
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0		
Surrogate TCMX	%		Org-022/025	102	1	106	107	1	104	106

Client Reference: 99872.01, Marsden High School West Ryde

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	260039-21
Date extracted	-				11	27/01/2021	27/01/2021		27/01/2021	27/01/2021
Date analysed	-				11	28/01/2021	28/01/2021		28/01/2021	28/01/2021
alpha-BHC	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0	104	103
HCB	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0		
beta-BHC	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0	108	108
gamma-BHC	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0		
Heptachlor	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0	117	107
delta-BHC	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0		
Aldrin	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0	99	95
Heptachlor Epoxide	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0	107	110
gamma-Chlordane	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0		
alpha-chlordane	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0		
Endosulfan I	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0		
pp-DDE	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0	111	113
Dieldrin	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0	107	107
Endrin	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0	91	120
Endosulfan II	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0		
pp-DDD	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0	106	110
Endrin Aldehyde	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0		
pp-DDT	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0		
Endosulfan Sulphate	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0	95	103
Methoxychlor	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0		
Surrogate TCMX	%		Org-022/025		11	107	107	0	102	99

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QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-				20	27/01/2021	27/01/2021			
Date analysed	-				20	28/01/2021	28/01/2021			
alpha-BHC	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
HCB	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
beta-BHC	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
gamma-BHC	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Heptachlor	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
delta-BHC	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Aldrin	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Heptachlor Epoxide	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
gamma-Chlordane	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
alpha-chlordane	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Endosulfan I	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
pp-DDE	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Dieldrin	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Endrin	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Endosulfan II	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
pp-DDD	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Endrin Aldehyde	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
pp-DDT	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Endosulfan Sulphate	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Methoxychlor	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Surrogate TCMX	%		Org-022/025		20	101	102	1		

Client Reference: 99872.01, Marsden High School West Ryde

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-				29	27/01/2021	27/01/2021			
Date analysed	-				29	28/01/2021	28/01/2021			
alpha-BHC	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
HCB	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
beta-BHC	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
gamma-BHC	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Heptachlor	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
delta-BHC	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Aldrin	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Heptachlor Epoxide	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
gamma-Chlordane	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
alpha-chlordane	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Endosulfan I	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
pp-DDE	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Dieldrin	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Endrin	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Endosulfan II	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
pp-DDD	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Endrin Aldehyde	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
pp-DDT	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Endosulfan Sulphate	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Methoxychlor	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Surrogate TCMX	%		Org-022/025		29	102	105	3		

Client Reference: 99872.01, Marsden High School West Ryde

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	260039-3
Date extracted	-			27/01/2021	1	27/01/2021	27/01/2021		27/01/2021	27/01/2021
Date analysed	-			28/01/2021	1	28/01/2021	28/01/2021		28/01/2021	28/01/2021
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	124	120
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0		
Diazinon	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0		
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0		
Ronnel	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	109	114
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	117	119
Malathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	84	87
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	101	103
Parathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	118	112
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0		
Ethion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	139	135
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0		
Surrogate TCMX	%		Org-022/025	102	1	106	107	1	104	106

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	260039-21
Date extracted	-				11	27/01/2021	27/01/2021		27/01/2021	27/01/2021
Date analysed	-				11	28/01/2021	28/01/2021		28/01/2021	28/01/2021
Dichlorvos	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0	92	122
Dimethoate	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0		
Diazinon	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0		
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0		
Ronnel	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0	112	114
Fenitrothion	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0	87	109
Malathion	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0	127	124
Chlorpyriphos	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0	105	111
Parathion	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0	86	116
Bromophos-ethyl	mg/kg	0.1	Org-022		11	<0.1	<0.1	0		
Ethion	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0	103	137
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025		11	<0.1	<0.1	0		
Surrogate TCMX	%		Org-022/025		11	107	107	0	102	99

Client Reference: 99872.01, Marsden High School West Ryde

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-				20	27/01/2021	27/01/2021			
Date analysed	-				20	28/01/2021	28/01/2021			
Dichlorvos	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Dimethoate	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Diazinon	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Ronnel	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Fenitrothion	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Malathion	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Chlorpyriphos	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Parathion	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Bromophos-ethyl	mg/kg	0.1	Org-022		20	<0.1	<0.1	0		
Ethion	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025		20	<0.1	<0.1	0		
Surrogate TCMX	%		Org-022/025		20	101	102	1		

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-				29	27/01/2021	27/01/2021			
Date analysed	-				29	28/01/2021	28/01/2021			
Dichlorvos	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Dimethoate	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Diazinon	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Ronnel	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Fenitrothion	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Malathion	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Chlorpyriphos	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Parathion	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Bromophos-ethyl	mg/kg	0.1	Org-022		29	<0.1	<0.1	0		
Ethion	mg/kg	0.1	Org-022/025		29	<0.1	<0.1	0		
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025		29	<0.1	0.2	67		
Surrogate TCMX	%		Org-022/025		29	102	105	3		

Client Reference: 99872.01, Marsden High School West Ryde

QUALITY CONTROL: PCBs in Soil					Duplicate					Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD		LCS-2	260039-3
Date extracted	-			27/01/2021	1	27/01/2021	27/01/2021			27/01/2021	27/01/2021
Date analysed	-			28/01/2021	1	28/01/2021	28/01/2021			28/01/2021	28/01/2021
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0		[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0		[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0		[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0		[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0		[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0		120	120
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0		[NT]	[NT]
Surrogate TCMX	%		Org-021	102	1	106	107	1		104	106

QUALITY CONTROL: PCBs in Soil					Duplicate					Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD		LCS-3	260039-21
Date extracted	-			[NT]	11	27/01/2021	27/01/2021			27/01/2021	27/01/2021
Date analysed	-			[NT]	11	28/01/2021	28/01/2021			28/01/2021	28/01/2021
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0		[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0		[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0		[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0		[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0		[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0		100	120
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0		[NT]	[NT]
Surrogate TCMX	%		Org-021	[NT]	11	107	107	0		102	99

QUALITY CONTROL: PCBs in Soil					Duplicate					Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD		[NT]	[NT]
Date extracted	-			[NT]	20	27/01/2021	27/01/2021			[NT]	[NT]
Date analysed	-			[NT]	20	28/01/2021	28/01/2021			[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	20	<0.1	<0.1	0		[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	20	<0.1	<0.1	0		[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	20	<0.1	<0.1	0		[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	20	<0.1	<0.1	0		[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	20	<0.1	<0.1	0		[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	20	<0.1	<0.1	0		[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	20	<0.1	<0.1	0		[NT]	[NT]
Surrogate TCMX	%		Org-021	[NT]	20	101	102	1		[NT]	[NT]

Client Reference: 99872.01, Marsden High School West Ryde

QUALITY CONTROL: PCBs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	29	27/01/2021	27/01/2021		[NT]	[NT]
Date analysed	-			[NT]	29	28/01/2021	28/01/2021		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	29	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	29	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	29	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	29	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	29	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	29	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	29	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	[NT]	29	102	105	3	[NT]	[NT]

Client Reference: 99872.01, Marsden High School West Ryde

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	260039-3
Date prepared	-			28/01/2021	1	28/01/2021	28/01/2021		28/01/2021	28/01/2021
Date analysed	-			28/01/2021	1	28/01/2021	28/01/2021		28/01/2021	28/01/2021
Arsenic	mg/kg	4	Metals-020	<4	1	6	6	0	104	80
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	106	80
Chromium	mg/kg	1	Metals-020	<1	1	14	14	0	103	84
Copper	mg/kg	1	Metals-020	<1	1	11	12	9	106	99
Lead	mg/kg	1	Metals-020	<1	1	66	63	5	102	81
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	94	104
Nickel	mg/kg	1	Metals-020	<1	1	4	4	0	105	82
Zinc	mg/kg	1	Metals-020	<1	1	33	31	6	103	81

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	260039-21
Date prepared	-				11	28/01/2021	28/01/2021		28/01/2021	28/01/2021
Date analysed	-				11	28/01/2021	28/01/2021		28/01/2021	28/01/2021
Arsenic	mg/kg	4	Metals-020		11	5	5	0	109	81
Cadmium	mg/kg	0.4	Metals-020		11	<0.4	<0.4	0	111	86
Chromium	mg/kg	1	Metals-020		11	12	15	22	108	107
Copper	mg/kg	1	Metals-020		11	46	16	97	110	108
Lead	mg/kg	1	Metals-020		11	38	36	5	106	73
Mercury	mg/kg	0.1	Metals-021		11	<0.1	<0.1	0	103	109
Nickel	mg/kg	1	Metals-020		11	5	4	22	109	73
Zinc	mg/kg	1	Metals-020		11	24	22	9	109	#

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-				20	28/01/2021	28/01/2021			
Date analysed	-				20	28/01/2021	28/01/2021			
Arsenic	mg/kg	4	Metals-020		20	5	5	0		
Cadmium	mg/kg	0.4	Metals-020		20	<0.4	<0.4	0		
Chromium	mg/kg	1	Metals-020		20	12	12	0		
Copper	mg/kg	1	Metals-020		20	19	21	10		
Lead	mg/kg	1	Metals-020		20	25	27	8		
Mercury	mg/kg	0.1	Metals-021		20	<0.1	<0.1	0		
Nickel	mg/kg	1	Metals-020		20	13	14	7		
Zinc	mg/kg	1	Metals-020		20	39	42	7		

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QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-				29	28/01/2021	28/01/2021			
Date analysed	-				29	28/01/2021	28/01/2021			
Arsenic	mg/kg	4	Metals-020		29	12	13	8		
Cadmium	mg/kg	0.4	Metals-020		29	<0.4	<0.4	0		
Chromium	mg/kg	1	Metals-020		29	8	9	12		
Copper	mg/kg	1	Metals-020		29	10	14	33		
Lead	mg/kg	1	Metals-020		29	28	30	7		
Mercury	mg/kg	0.1	Metals-021		29	<0.1	<0.1	0		
Nickel	mg/kg	1	Metals-020		29	4	4	0		
Zinc	mg/kg	1	Metals-020		29	33	33	0		

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QUALITY CONTROL: Misc Soil - Inorg					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	260039-3
Date prepared	-			27/01/2021	1	27/01/2021	27/01/2021		27/01/2021	27/01/2021
Date analysed	-			27/01/2021	1	27/01/2021	27/01/2021		27/01/2021	27/01/2021
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	1	<5	<5	0	100	98

QUALITY CONTROL: Misc Soil - Inorg					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	260039-21
Date prepared	-			[NT]	11	27/01/2021	27/01/2021		27/01/2021	27/01/2021
Date analysed	-			[NT]	11	27/01/2021	27/01/2021		27/01/2021	27/01/2021
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	[NT]	11	<5	<5	0	99	99

QUALITY CONTROL: Misc Soil - Inorg					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	20	27/01/2021	27/01/2021		[NT]	[NT]
Date analysed	-			[NT]	20	27/01/2021	27/01/2021		[NT]	[NT]
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	[NT]	20	<5	<5	0	[NT]	[NT]

QUALITY CONTROL: Misc Soil - Inorg					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	29	27/01/2021	27/01/2021		[NT]	[NT]
Date analysed	-			[NT]	29	27/01/2021	27/01/2021		[NT]	[NT]
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	[NT]	29	<5	<5	0	[NT]	[NT]

QUALITY CONTROL: Misc Inorg - Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date prepared	-			28/01/2021	9	28/01/2021	28/01/2021		28/01/2021	[NT]
Date analysed	-			28/01/2021	9	28/01/2021	28/01/2021		28/01/2021	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	9	4.9	5.0	2	100	[NT]

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QUALITY CONTROL: CEC						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	260039-9
Date prepared	-			29/01/2021	2	29/01/2021	29/01/2021		29/01/2021	29/01/2021
Date analysed	-			29/01/2021	2	29/01/2021	29/01/2021		29/01/2021	29/01/2021
Exchangeable Ca	meq/100g	0.1	Metals-020	<0.1	2	1.6	1.5	6	105	104
Exchangeable K	meq/100g	0.1	Metals-020	<0.1	2	0.4	0.3	29	105	91
Exchangeable Mg	meq/100g	0.1	Metals-020	<0.1	2	1.5	1.4	7	107	106
Exchangeable Na	meq/100g	0.1	Metals-020	<0.1	2	0.29	0.35	19	111	79

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Asbestos: A portion of the supplied sample was sub-sampled for asbestos analysis according to Envirolab procedures.
We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g of sample in its own container.
Note: Samples were sub-sampled from jars provided by the client.

Acid Extractable Metals in Soil:
- The laboratory RPD acceptance criteria has been exceeded for 260039-11 for Cu. Therefore a triplicate result has been issued as laboratory sample number 260039-46.
- # Percent recovery is not possible to report due to the inhomogeneous nature of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

TRH_S_NEPM:
Percent recovery for the matrix spike is not possible to report as the high concentration of analytes in sample/s 260039-21ms have caused interference.

D21/78776

Douglas Partners
Geotechnics | Environment | Groundwater

21/01/21 COC updated rec'd 1432 a

F.14 - CHAIN OF CUSTODY DESPATCH SHEET

Project No: 99872.01	**Suburb:** West Ryde	**To:**	Envirolab Services Pty Ltd
Project Name: Marsden High School	**Order Number**		12 Ashley Street, Chatswood, NSW 2067
Project Manager: Lisa Teng	**Sampler:** TM	**Attn:**	Aileen Hie
Emails: lisa.Teng@douglaspartners.com.a		**Phone:**	
Date Required: Standard ☐		**Email:**	Ahie@envirolab.com.au
Prior Storage: Fridge/freezer	Do samples contain 'potential' HBM? No ☐	(If YES, then handle, transport and store in accordance with FPM HAZID)	

Sample ID	Depth Range	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: COMBO 8A	COMBO 3A	COMBO 3	pH and CEC	hold	TRH BTEX	Combo 8			Notes/preservation
BH1	0-0.1	1	18/01/21			x									
BH1	0.4-0.5	2	18/01/21					x	x						
BH2	0.4-0.5	3	19/01/21			x									
4b ~~BH2~~	~~1.4-1.5~~	~~[illegible]~~	19/01/21					x							
BH3	0-0.1	4	18/01/21			x									
BH4	0.4-0.5	5	18/01/21			x									
BH4	2-2.1	6	18/01/21							x					
BH5	1-1.1	7	18/01/21			x									
BH5	2-2.1	8	18/01/21				x								
BH5	2.9-3.0	9	18/01/21					x	x						
BH6	0-0.1	10	19/01/21			x									
BH7	0.4-0.5	11	19/01/21			x									
BH7	1.4-1.5	12	19/01/21				x								
BH7	2.4-2.5	13	19/01/21					x	x						
BH8	0-0.1	14	19/01/21			X									
PQL (S) mg/k													ANZECC PQLs req'd for all water analytes ☐		

ENVIROLAB
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 260039
Date Received: 21/01/21
Time Received: 16:40
Received By: M
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Lab Report/Reference No:

Metals to Analyse: 8HM unless specified here:

Total number of samples in container: **Relinquished by:** **Transported to laboratory by:**

Send Results to: Douglas Partners Pty Ltd **Address:** **Phone:** **Fax:**

Signed: **Received by:** Envirolab M **Date & Time:** 21/01/21 16:40

D21/78776

Douglas Partners Geotechnics | Environment | Groundwater

F.14 - CHAIN OF CUSTODY DESPATCH SHEET

Project No: 99872.01	**Suburb:** West Ryde	**To:** Envirolab Services Pty Ltd	
Project Name: Marsden High School	**Order Number**	12 Ashley Street, Chatswood, NSW 2067	
Project Manager: Lisa Teng	**Sampler:** TM	**Attn:** Aileen Hie	
Emails: .isa.Teng@douglaspartners.com.a		**Phone:**	
Date Required: Standard ☐		**Email:** Ahie@envirolab.com.au	
Prior Storage: Fridge/freezer	Do samples contain 'potential' HBM? No ☐	(If YES, then handle, transport and store in accordance with FPM HAZID)	

Sample ID	Depth Range	Lab ID	Date Sampled	Sample Type S - soil W - water	Container Type G - glass P - plastic	Analytes COMBO 8A	COMBO 3A	COMBO 3	pH and CEC	HOLD					Notes/preservation
BH8	0.4-0.5	15	19/01/21	S	G		x								
BH8	2-2.1	16	19/01/21	S	G		x								
BH8	3.5-3.6	17	19/01/21	S	G			x	x						
BH9	0-0.1	18	19/01/21	S	G	X									
BH9	0.4-0.5	19	19/01/21	S	G					x					Envirolab Services 12 Ashley St Chatswood NSW 2067 Ph: (02) 9910 6200
BH10	0-0.1	20	19/01/21	S	G	X									ENVIROLAB
BH11	0-0.1	21	18/01/21	S	G	X									Job No: 260039
BH11	0.4-0.5	22	18/01/21	S	G		X								Date Received: 21/01/21
BH11	0.9-1.0	23	18/01/21	S	G		X								Time Received: 16:40
BH12	0.4-0.5	24	19/01/21	S	G	X									Received By:
BH13	0-0.1	25	19/01/21	S	G	X									Temp: Cool/Ambient
BH13	0.9-1.0	26	19/01/21	S	G			X	X						Cooling: Ice/Icepack
BH13	1.4-1.5	27	19/01/21	S	G					X					Security: Intact/Broken/None
BH14	0.4-0.5	28	18/01/21	S	G	X									
BH15	0-0.1	29	18/01/21	S	G	X									
PQL (S) mg/k															ANZECC PQLs req'd for all water analytes ☐

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Lab Report/Reference No:

Metals to Analyse: 8HM unless specified here:

Total number of samples in container: **Relinquished by:** **Transported to laboratory by:**

Send Results to: Douglas Partners Pty Ltd **Address:** **Phone:** **Fax:**

Signed: **Received by:** Envirolab **Date & Time:** 21/01/21 16:40

D21/78776

Douglas Partners
Geotechnics | Environment | Groundwater

F.14 - CHAIN OF CUSTODY DESPATCH SHEET

Project No: 99872.01	**Suburb:** West Ryde	**To:** Envirolab Services Pty Ltd	
Project Name: Marsden High School	**Order Number**	12 Ashley Street, Chatswood, NSW 2067	
Project Manager: Lisa Teng	**Sampler:** TM	**Attn:** Aileen Hie	
Emails: isa.Teng@douglaspartners.com.a		**Phone:**	
Date Required: Standard ☐		**Email:** Ahie@envirolab.com.au	
Prior Storage: Fridge/freezer	Do samples contain 'potential' HBM? No ☐	(If YES, then handle, transport and store in accordance with FPM HAZID)	

Sample ID	Depth Range	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: COMBO 8A	COMBO 3A	COMBO 3	pH and CEC	hold	TRH BTEX	Combo 8			Notes/preservation
BH16	0-0.1	30	19/01/21	S	G	x									
BH16	0.9-1.0	31	19/01/21	S	G					X					
BH17	0.4-0.5	32	19/01/21	S	G	X									
BH18	0-0.1	33	19/01/21	S	G		x								
BH19	0.4-0.5	34	18/01/21	S	G	X									
BH19	1.4-1.5	35	18/01/21	S	G					X					
BH20	0-0.1	36	18/01/21	S	G	x									
BH21	0-0.1	37	19/01/21	S	G	X									
BH22	0.4-0.5	38	18/01/21	S	G		x								
BH23	0.4-0.5	39	19/01/21	S	G		x								
BD1/20210118	-	40	18/01/21	S	G							x			
BD10/20210119	-	41	19/01/21	S	G			x							
BD2/20210118	-	42	18/01/21	S	G			x							
BD6/20210119	-		19/01/21	S	G							x			SEND AS INTERLAB TO SGS
Trip Spike		43	18-19/01/21	S	G						x				
PQL (S) mg/k															

ENVIROLAB Envirolab Services
12 Ashley St
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Ph: (02) 9910 6200
Job No: 260039
Date Received: 21/01/21
Time Received: 16:40
Received By:
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

ANZECC PQLs req'd for all water analytes ☐

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Lab Report/Reference No:

Metals to Analyse: 8HM unless specified here:

Total number of samples in container: **Relinquished by:** **Transported to laboratory by:**

Send Results to: Douglas Partners Pty Ltd **Address:** **Phone:** **Fax:**

Signed: **Received by:** Envirolab **Date & Time:** 21/01/21 16:40

D21/78776

Douglas Partners
Geotechnics | Environment | Groundwater

F.14 - CHAIN OF CUSTODY DESPATCH SHEET

Project No:	99872.01	**Suburb:**	West Ryde	**To:**	Envirolab Services Pty Ltd
Project Name:	Marsden High School	**Order Number**			12 Ashley Street, Chatswood, NSW 2067
Project Manager:	Lisa Teng	**Sampler:**	TM	**Attn:**	Aileen Hie
Emails:	Lisa.Teng@douglaspartners.com.a			**Phone:**	
Date Required:	Standard ☐			**Email:**	Ahie@envirolab.com.au

Prior Storage: Fridge/freezer Do samples contain 'potential' HBM? No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Sample ID	Depth Range	Lab ID	Date Sampled	Sample Type: S - soil W - water	Container Type: G - glass P - plastic	Analytes: COMBO 8A	COMBO 3A	COMBO 3	pH and CEC	hold	TRH BTEX	Combo 8			Notes/preservation
Trip Blank	-	44	18-19/01/21	S	G						x				
BH2	1.4-1.5	45	19/01/21												
		extra received.													
PQL (S) mg/k															ANZECC PQLs req'd for all water analytes ☐

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 260039
Date Received: 21/01/21
Time Received: 16:40
Received By: M
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit
Metals to Analyse: 8HM unless specified here:
Lab Report/Reference No:
Total number of samples in container: **Relinquished by:** **Transported to laboratory by:**
Send Results to: Douglas Partners Pty Ltd **Address:** **Phone:** **Fax:**
Signed: **Received by:** Envirolab M **Date & Time:** 21/01/21 16:40.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details	
Client	Douglas Partners Pty Ltd
Attention	Lisa Teng

Sample Login Details	
Your reference	99872.01, Marsden High School West Ryde
Envirolab Reference	260039
Date Sample Received	21/01/2021
Date Instructions Received	21/01/2021
Date Results Expected to be Reported	29/01/2021

Sample Condition	
Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	45 soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	16.4
Cooling Method	Ice
Sampling Date Provided	YES

Comments
extra 250ml jar sample received labelled BH 19/01/21

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone:** 02 9910 6200
Fax: 02 9910 6201	**Fax:** 02 9910 6201
Email: ahie@envirolab.com.au	**Email:** jhurst@envirolab.com.au

Analysis Underway, details on the following page:

D21/78776

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12 Ashley St Chatswood NSW 2067
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customerservice@envirolab.com.au
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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Acid Extractable metalsin soil	Misc Soil - Inorg	Asbestos ID - soils	Misc Inorg - Soil	CEC	On Hold
BH1-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH1-0.4-0.5	✓	✓	✓				✓			✓	✓	
BH2-0.4-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH3-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH4-0.4-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH4-2-2.1												✓
BH5-1-1.1	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH5-2-2.1	✓	✓	✓				✓		✓			
BH5-2.9-3.	✓	✓	✓				✓			✓	✓	
BH6-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH7-0.4-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH7-1.4-1.5	✓	✓	✓				✓		✓			
BH7-2.4-2.5	✓	✓	✓				✓			✓	✓	
BH8-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH8-0.4-0.5	✓	✓	✓				✓		✓			
BH8-2-2.1	✓	✓	✓				✓		✓			
BH8-3.5-3.6	✓	✓	✓				✓			✓	✓	
BH9-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH9-0.4-0.5												✓
BH10-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH11-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH11-0.4-0.5	✓	✓	✓				✓		✓			
BH11-0.9-1.0	✓	✓	✓				✓		✓			
BH12-0.4-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH13-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH13-0.9-1.0	✓	✓	✓				✓			✓	✓	
BH13-1.4-1.5												✓
BH14-0.4-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH15-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH16-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH16-0.9-1.0												✓
BH17-0.4-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓			

D21/78776

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www.envirolab.com.au

Sample ID	vTRHC6-C10/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Acid Extractable metalsin soil	Misc Soil - Inorg	Asbestos ID - soils	Misc Inorg - Soil	CEC	On Hold
BH18-0-0.1	✓	✓	✓				✓		✓			
BH19-0.4-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH19-1.4-1.5												✓
BH20-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH21-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓			
BH22-0.4-0.5	✓	✓	✓				✓		✓			
BH23-0.4-0.5	✓	✓	✓				✓		✓			
BD1/20210118	✓	✓	✓	✓	✓	✓	✓	✓				
BD10/20210119	✓	✓	✓				✓					
BD2/20210118	✓	✓	✓				✓					
Trip Spike	✓											
Trip Blank	✓											
BH2-1.4-1.5	✓	✓	✓				✓					

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 260039-B

Client Details

Client	Douglas Partners Pty Ltd
Attention	Lisa Teng
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	99872.01, Marsden High School West Ryde
Number of Samples	45 soil
Date samples received	21/01/2021
Date completed instructions received	02/02/2021

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	09/02/2021
Date of Issue	05/02/2021

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Ken Nguyen, Reporting Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

D21/78776

Metals in TCLP USEPA1311				
Our Reference		260039-B-4	260039-B-18	260039-B-21
Your Reference	UNITS	BH3	BH9	BH11
Depth		0-0.1	0-0.1	0-0.1
Date Sampled		18/01/2021	19/01/2021	18/01/2021
Type of sample		soil	soil	soil
Date extracted	-	04/02/2021	04/02/2021	04/02/2021
Date analysed	-	04/02/2021	04/02/2021	04/02/2021
pH of soil for fluid# determ.	pH units	9.0	8.3	9.2
pH of soil TCLP (after HCl)	pH units	1.8	1.7	1.9
Extraction fluid used	-	1	1	1
pH of final Leachate	pH units	5.2	5.0	5.3
Lead in TCLP	mg/L	[illegible]	<0.03	[illegible]
Nickel in TCLP	mg/L	0.02	[illegible]	<0.02

Method ID	Methodology Summary
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP) using Zero Headspace Extraction (zHE) using AS4439 and USEPA 1311.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using in house method INORG-004. Please note that the mass used may be scaled down from the default based on sample mass available.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

QUALITY CONTROL: Metals in TCLP USEPA1311					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			04/02/2021	[NT]	[NT]	[NT]	[NT]	04/02/2021	[NT]
Date analysed	-			04/02/2021	[NT]	[NT]	[NT]	[NT]	04/02/2021	[NT]
Lead in TCLP	mg/L	0.03	Metals-020 ICP-AES	<0.03	[NT]	[NT]	[NT]	[NT]	90	[NT]
Nickel in TCLP	mg/L	0.02	Metals-020 ICP-AES	<0.02	[NT]	[NT]	[NT]	[NT]	92	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Ming To

From: Aileen Hie
Sent: Tuesday, 2 February 2021 1:25 PM
To: Ming To
Subject: FW: Additional TCLP

Ref: 260039-B
TAT: Standard
Due: 09/02/2021 MT

From: Lisa Teng <Lisa.Teng@douglaspartners.com.au>
Sent: Tuesday, 2 February 2021 1:19 PM
To: Aileen Hie <AHie@envirolab.com.au>
Subject: RE: Additional TCLP

CAUTION: This email originated from outside of the organisation. Do not act on instructions, click links or open attachments unless you recognise the sender and know the content is authentic and safe.

Hi aileen,

Sorry – I must have quoted the interlab job number.

Correct job numbers are:
ELS 260039 Marsden High School
4 - BH3/0-0.1 nickel TCLP
18 - BH9/0-0.1 Lead TCLP
21 - BH11/0-0.1 nickel TCLP

ELS 260173 Meadowbank Public School
- BH4/0.1-0.2 Nickel TCLP
- BH7/0.1-0.2 B(a)P TCLP
- BH11/0.9-1.0 B(a)P TCLP

Lisa Teng | Environmental Engineer
Douglas Partners Pty Ltd | ABN 75 053 980 117 | www.douglaspartners.com.au
96 Hermitage Road West Ryde NSW 2114 | PO Box 472 West Ryde NSW 1685
P: 02 9809 0666 | M: 0437 976 196 | E: Lisa.Teng@douglaspartners.com.au

From: Aileen Hie <AHie@envirolab.com.au>
Sent: Tuesday, 2 February 2021 1:13 PM
To: Lisa Teng <Lisa.Teng@douglaspartners.com.au>
Subject: RE: Additional TCLP

SGS

ANALYTICAL REPORT

ilac-MRA NATA

Accreditation No. 2562

CLIENT DETAILS		LABORATORY DETAILS	
Contact	Lisa Teng	Manager	Huong Crawford
Client	DOUGLAS PARTNERS PTY LTD	Laboratory	SGS Alexandria Environmental
Address	96 Hermitage Road West Ryde NSW 2114	Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	02 9809 0666	Telephone	+61 2 8594 0400
Facsimile	02 9809 4095	Facsimile	+61 2 8594 0499
Email	lisa.teng@douglaspartners.com.au	Email	au.environmental.sydney@sgs.com
Project	**99872.01 Marsden High School**	SGS Reference	**SE215773 R0**
Order Number	(Not specified)	Date Received	22 Jan 2021
Samples	1	Date Reported	01 Feb 2021

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

SIGNATORIES

Akheeqar BENIAMEEN
Chemist

Bennet LO
Senior Organic Chemist/Metals Chemis

Dong LIANG
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ANALYTICAL REPORT

SE215773 R0

Parameter	Units	LOR	Sample Number: SE215773.001 Sample Matrix: Soil Sample Date: 19 Jan 2021 Sample Name: BD6/20210119

VOC's in Soil Method: AN433 Tested: 28/1/2021

Monocyclic Aromatic Hydrocarbons

Benzene	mg/kg	0.1	<0.1
Toluene	mg/kg	0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2
o-xylene	mg/kg	0.1	<0.1

Polycyclic VOCs

Naphthalene	mg/kg	0.1	<0.1

Surrogates

d4-1,2-dichloroethane (Surrogate)	%	-	83
d8-toluene (Surrogate)	%	-	91
Bromofluorobenzene (Surrogate)	%	-	67

Totals

Total Xylenes	mg/kg	0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6

Volatile Petroleum Hydrocarbons in Soil Method: AN433 Tested: 28/1/2021

TRH C6-C10	mg/kg	25	<25
TRH C6-C9	mg/kg	20	<20

Surrogates

d4-1,2-dichloroethane (Surrogate)	%	-	83
d8-toluene (Surrogate)	%	-	91
Bromofluorobenzene (Surrogate)	%	-	67

			Sample Number	SE215773.001
			Sample Matrix	Soil
			Sample Date	19 Jan 2021
			Sample Name	BD6/20210119
Parameter	Units	LOR		

Volatile Petroleum Hydrocarbons in Soil Method: AN433 Tested: 28/1/2021 (continued)

VPH F Bands

Parameter	Units	LOR	SE215773.001
Benzene (F0)	mg/kg	0.1	<0.1
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25

TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403 Tested: 28/1/2021

Parameter	Units	LOR	SE215773.001
TRH C10-C14	mg/kg	20	<20
TRH C15-C28	mg/kg	45	<45
TRH C29-C36	mg/kg	45	55
TRH C37-C40	mg/kg	100	<100
TRH C10-C36 Total	mg/kg	110	<110
TRH >C10-C40 Total (F bands)	mg/kg	210	<210

TRH F Bands

Parameter	Units	LOR	SE215773.001
TRH >C10-C16	mg/kg	25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120

PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 Tested: 28/1/2021

Parameter	Units	LOR	SE215773.001
Naphthalene	mg/kg	0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1
Fluorene	mg/kg	0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1
Anthracene	mg/kg	0.1	<0.1
Fluoranthene	mg/kg	0.1	0.1
Pyrene	mg/kg	0.1	0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1
Chrysene	mg/kg	0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8

Parameter	Units	LOR	Sample Number SE215773.001 Sample Matrix Soil Sample Date 19 Jan 2021 Sample Name BD6/20210119

PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 Tested: 28/1/2021 (continued)

Surrogates

d5-nitrobenzene (Surrogate)	%	-	110
2-fluorobiphenyl (Surrogate)	%	-	89
d14-p-terphenyl (Surrogate)	%	-	93

Speciated Phenols in Soil Method: AN420 Tested: 28/1/2021

Phenol	mg/kg	0.5	<0.5
2-methyl phenol (o-cresol)	mg/kg	0.5	<0.5
3/4-methyl phenol (m/p-cresol)	mg/kg	1	<1
Total Cresol	mg/kg	1.5	<1.5
2-chlorophenol	mg/kg	0.5	<0.5
2,4-dimethylphenol	mg/kg	0.5	<0.5
2,6-dichlorophenol	mg/kg	0.5	<0.5
2,4-dichlorophenol	mg/kg	0.5	<0.5
2,4,6-trichlorophenol	mg/kg	0.5	<0.5
2-nitrophenol	mg/kg	0.5	<0.5
4-nitrophenol	mg/kg	1	<1
2,4,5-trichlorophenol	mg/kg	0.5	<0.5
2,3,4,6/2,3,5,6-tetrachlorophenol	mg/kg	1	<1
Pentachlorophenol	mg/kg	0.5	<0.5
2,4-dinitrophenol	mg/kg	2	<2
4-chloro-3-methylphenol	mg/kg	2	<2

Surrogates

2,4,6-Tribromophenol (Surrogate)	%	-	86
d5-phenol (Surrogate)	%	-	81

OC Pesticides in Soil Method: AN420 Tested: 28/1/2021

Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1
Lindane	mg/kg	0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1
Aldrin	mg/kg	0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2
Endrin	mg/kg	0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1
Isodrin	mg/kg	0.1	<0.1
Mirex	mg/kg	0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1

Parameter	Units	LOR	Sample Number: SE215773.001 Sample Matrix: Soil Sample Date: 19 Jan 2021 Sample Name: BD6/20210119
OC Pesticides in Soil Method: AN420 Tested: 28/1/2021 (continued)			
Surrogates			
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	87
OP Pesticides in Soil Method: AN420 Tested: 28/1/2021			
Dichlorvos	mg/kg	0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2
Malathion	mg/kg	0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2
Methidathion	mg/kg	0.5	<0.5
Ethion	mg/kg	0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2
Total OP Pesticides*	mg/kg	1.7	<1.7
Surrogates			
2-fluorobiphenyl (Surrogate)	%	-	89
d14-p-terphenyl (Surrogate)	%	-	93
PCBs in Soil Method: AN420 Tested: 28/1/2021			
Arochlor 1016	mg/kg	0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1

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ANALYTICAL REPORT

SE215773 R0

Parameter	Units	LOR	Sample Number: SE215773.001 Sample Matrix: Soil Sample Date: 19 Jan 2021 Sample Name: BD6/20210119
PCBs in Soil Method: AN420 Tested: 28/1/2021 (continued)			
Surrogates			
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	87
Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES Method: AN040/AN320 Tested: 28/1/2021			
Arsenic, As	mg/kg	1	6
Cadmium, Cd	mg/kg	0.3	<0.3
Chromium, Cr	mg/kg	0.5	13
Copper, Cu	mg/kg	0.5	18
Nickel, Ni	mg/kg	0.5	7.5
Lead, Pb	mg/kg	1	32
Zinc, Zn	mg/kg	2	53
Mercury in Soil Method: AN312 Tested: 28/1/2021			
Mercury	mg/kg	0.05	<0.05
Moisture Content Method: AN002 Tested: 28/1/2021			
% Moisture	%w/w	1	15.5

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Mercury in Soil Method: ME-(AU)-[ENV]AN312

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Mercury	LB217507	mg/kg	0.05	<0.05	0%	99%	89%

Moisture Content Method: ME-(AU)-[ENV]AN002

Parameter	QC Reference	Units	LOR	DUP %RPD
% Moisture	LB217482	%w/w	1	3 - 4%

OC Pesticides in Soil Method: ME-(AU)-[ENV]AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Hexachlorobenzene (HCB)	LB217481	mg/kg	0.1	<0.1	0%	NA	NA
Alpha BHC	LB217481	mg/kg	0.1	<0.1	0%	NA	NA
Lindane	LB217481	mg/kg	0.1	<0.1	0%	NA	NA
Heptachlor	LB217481	mg/kg	0.1	<0.1	0%	70%	66%
Aldrin	LB217481	mg/kg	0.1	<0.1	0%	68%	64%
Beta BHC	LB217481	mg/kg	0.1	<0.1	0%	NA	NA
Delta BHC	LB217481	mg/kg	0.1	<0.1	0%	69%	65%
Heptachlor epoxide	LB217481	mg/kg	0.1	<0.1	0%	NA	NA
o,p'-DDE	LB217481	mg/kg	0.1	<0.1	0%	NA	NA
Alpha Endosulfan	LB217481	mg/kg	0.2	<0.2	0%	NA	NA
Gamma Chlordane	LB217481	mg/kg	0.1	<0.1	0%	NA	NA
Alpha Chlordane	LB217481	mg/kg	0.1	<0.1	0%	NA	NA
trans-Nonachlor	LB217481	mg/kg	0.1	<0.1	0%	NA	NA
p,p'-DDE	LB217481	mg/kg	0.1	<0.1	0%	NA	NA
Dieldrin	LB217481	mg/kg	0.2	<0.2	0%	73%	69%
Endrin	LB217481	mg/kg	0.2	<0.2	0%	74%	70%
o,p'-DDD	LB217481	mg/kg	0.1	<0.1	0%	NA	NA
o,p'-DDT	LB217481	mg/kg	0.1	<0.1	0%	NA	NA
Beta Endosulfan	LB217481	mg/kg	0.2	<0.2	0%	NA	NA
p,p'-DDD	LB217481	mg/kg	0.1	<0.1	0%	NA	NA
p,p'-DDT	LB217481	mg/kg	0.1	<0.1	0%	74%	62%
Endosulfan sulphate	LB217481	mg/kg	0.1	<0.1	0%	NA	NA
Endrin Aldehyde	LB217481	mg/kg	0.1	<0.1	0%	NA	NA
Methoxychlor	LB217481	mg/kg	0.1	<0.1	0%	NA	NA
Endrin Ketone	LB217481	mg/kg	0.1	<0.1	0%	NA	NA
Isodrin	LB217481	mg/kg	0.1	<0.1	0%	NA	NA
Mirex	LB217481	mg/kg	0.1	<0.1	0%	NA	NA
Total CLP OC Pesticides	LB217481	mg/kg	1	<1	0%	NA	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Tetrachloro-m-xylene (TCMX) (Surrogate)	LB217481	%	-	88%	1 - 8%	76%	77%

SGS

QC SUMMARY

SE215773 R0

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

OP Pesticides in Soil   Method: ME-(AU)-[ENV]AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Dichlorvos	LB217481	mg/kg	0.5	<0.5	0%	130%	115%
Dimethoate	LB217481	mg/kg	0.5	<0.5	0%	NA	NA
Diazinon (Dimpylate)	LB217481	mg/kg	0.5	<0.5	0%	98%	116%
Fenitrothion	LB217481	mg/kg	0.2	<0.2	0%	NA	NA
Malathion	LB217481	mg/kg	0.2	<0.2	0%	NA	NA
Chlorpyrifos (Chlorpyrifos Ethyl)	LB217481	mg/kg	0.2	<0.2	0%	91%	112%
Parathion-ethyl (Parathion)	LB217481	mg/kg	0.2	<0.2	0%	NA	NA
Bromophos Ethyl	LB217481	mg/kg	0.2	<0.2	0%	NA	NA
Methidathion	LB217481	mg/kg	0.5	<0.5	0%	NA	NA
Ethion	LB217481	mg/kg	0.2	<0.2	0%	91%	90%
Azinphos-methyl (Guthion)	LB217481	mg/kg	0.2	<0.2	0%	NA	NA
Total OP Pesticides*	LB217481	mg/kg	1.7	<1.7	0%	NA	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
2-fluorobiphenyl (Surrogate)	LB217481	%	-	94%	2 - 3%	92%	88%
d14-p-terphenyl (Surrogate)	LB217481	%	-	92%	2 - 3%	86%	83%

PAH (Polynuclear Aromatic Hydrocarbons) in Soil   Method: ME-(AU)-[ENV]AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Naphthalene	LB217481	mg/kg	0.1	<0.1	0%	94%	109%
2-methylnaphthalene	LB217481	mg/kg	0.1	<0.1	0%	NA	NA
1-methylnaphthalene	LB217481	mg/kg	0.1	<0.1	0%	NA	NA
Acenaphthylene	LB217481	mg/kg	0.1	<0.1	0%	96%	108%
Acenaphthene	LB217481	mg/kg	0.1	<0.1	0%	101%	106%
Fluorene	LB217481	mg/kg	0.1	<0.1	0%	NA	NA
Phenanthrene	LB217481	mg/kg	0.1	<0.1	41 - 68%	95%	107%
Anthracene	LB217481	mg/kg	0.1	<0.1	0 - 7%	93%	104%
Fluoranthene	LB217481	mg/kg	0.1	<0.1	52 - 72%	92%	106%
Pyrene	LB217481	mg/kg	0.1	<0.1	45 - 71%	100%	105%
Benzo(a)anthracene	LB217481	mg/kg	0.1	<0.1	0 - 77%	NA	NA
Chrysene	LB217481	mg/kg	0.1	<0.1	4 - 89%	NA	NA
Benzo(b&j)fluoranthene	LB217481	mg/kg	0.1	<0.1	25 - 78%	NA	NA
Benzo(k)fluoranthene	LB217481	mg/kg	0.1	<0.1	0 - 25%	NA	NA
Benzo(a)pyrene	LB217481	mg/kg	0.1	<0.1	26 - 68%	110%	105%
Indeno(1,2,3-cd)pyrene	LB217481	mg/kg	0.1	<0.1	0 - 50%	NA	NA
Dibenzo(ah)anthracene	LB217481	mg/kg	0.1	<0.1	0%	NA	NA
Benzo(ghi)perylene	LB217481	mg/kg	0.1	<0.1	0 - 49%	NA	NA
Carcinogenic PAHs, BaP TEQ <LOR=0	LB217481	TEQ (mg/kg)	0.2	<0.2	0 - 60%	NA	NA
Carcinogenic PAHs, BaP TEQ <LOR=LOR	LB217481	TEQ (mg/kg)	0.3	<0.3	0 - 44%	NA	NA
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	LB217481	TEQ (mg/kg)	0.2	<0.2	0 - 66%	NA	NA
Total PAH (18)	LB217481	mg/kg	0.8	<0.8	20 - 102%	NA	NA
Total PAH (NEPM/WHO 16)	LB217481	mg/kg	0.8	<0.8			

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
d5-nitrobenzene (Surrogate)	LB217481	%	-	92%	2 - 3%	90%	109%
2-fluorobiphenyl (Surrogate)	LB217481	%	-	94%	2 - 3%	92%	88%
d14-p-terphenyl (Surrogate)	LB217481	%	-	92%	2 - 3%	86%	83%

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QC SUMMARY

SE215773 R0

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

PCBs in Soil **Method: ME-(AU)-[ENV]AN420**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Arochlor 1016	LB217481	mg/kg	0.2	<0.2	0%	NA	NA
Arochlor 1221	LB217481	mg/kg	0.2	<0.2	0%	NA	NA
Arochlor 1232	LB217481	mg/kg	0.2	<0.2	0%	NA	NA
Arochlor 1242	LB217481	mg/kg	0.2	<0.2	0%	NA	NA
Arochlor 1248	LB217481	mg/kg	0.2	<0.2	0%	NA	NA
Arochlor 1254	LB217481	mg/kg	0.2	<0.2	0%	NA	NA
Arochlor 1260	LB217481	mg/kg	0.2	<0.2	0%	132%	120%
Arochlor 1262	LB217481	mg/kg	0.2	<0.2	0%	NA	NA
Arochlor 1268	LB217481	mg/kg	0.2	<0.2	0%	NA	NA
Total PCBs (Arochlors)	LB217481	mg/kg	1	<1	0%	NA	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Tetrachloro-m-xylene (TCMX) (Surrogate)	LB217481	%	-	88%	1 - 8%	76%	77%

Speciated Phenols in Soil **Method: ME-(AU)-[ENV]AN420**

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Phenol	LB217481	mg/kg	0.5	<0.5	92%
2-methyl phenol (o-cresol)	LB217481	mg/kg	0.5	<0.5	NA
3/4-methyl phenol (m/p-cresol)	LB217481	mg/kg	1	<1	NA
Total Cresol	LB217481	mg/kg	1.5	<1.5	NA
2-chlorophenol	LB217481	mg/kg	0.5	<0.5	NA
2,4-dimethylphenol	LB217481	mg/kg	0.5	<0.5	NA
2,6-dichlorophenol	LB217481	mg/kg	0.5	<0.5	NA
2,4-dichlorophenol	LB217481	mg/kg	0.5	<0.5	84%
2,4,6-trichlorophenol	LB217481	mg/kg	0.5	<0.5	84%
2-nitrophenol	LB217481	mg/kg	0.5	<0.5	NA
4-nitrophenol	LB217481	mg/kg	1	<1	NA
2,4,5-trichlorophenol	LB217481	mg/kg	0.5	<0.5	NA
2,3,4,6/2,3,5,6-tetrachlorophenol	LB217481	mg/kg	1	<1	NA
Pentachlorophenol	LB217481	mg/kg	0.5	<0.5	72%
2,4-dinitrophenol	LB217481	mg/kg	2	<2	NA
4-chloro-3-methylphenol	LB217481	mg/kg	2	<2	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
2,4,6-Tribromophenol (Surrogate)	LB217481	%	-	89%	91%
d5-phenol (Surrogate)	LB217481	%	-	92%	92%

SGS

QC SUMMARY

SE215773 R0

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES **Method: ME-(AU)-[ENV]AN040/AN320**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Arsenic, As	LB217499	mg/kg	1	<1	3 - 12%	105%	85%
Cadmium, Cd	LB217499	mg/kg	0.3	<0.3	0%	93%	85%
Chromium, Cr	LB217499	mg/kg	0.5	<0.5	5 - 10%	100%	85%
Copper, Cu	LB217499	mg/kg	0.5	<0.5	1 - 2%	105%	85%
Nickel, Ni	LB217499	mg/kg	0.5	<0.5	1 - 7%	99%	71%
Lead, Pb	LB217499	mg/kg	1	<1	3 - 4%	103%	82%
Zinc, Zn	LB217499	mg/kg	2	<2.0	1 - 4%	100%	73%

TRH (Total Recoverable Hydrocarbons) in Soil **Method: ME-(AU)-[ENV]AN403**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
TRH C10-C14	LB217481	mg/kg	20	<20	0%	93%	98%
TRH C15-C28	LB217481	mg/kg	45	<45	0%	85%	98%
TRH C29-C36	LB217481	mg/kg	45	<45	0%	73%	85%
TRH C37-C40	LB217481	mg/kg	100	<100	0%	NA	NA
TRH C10-C36 Total	LB217481	mg/kg	110	<110	0%	NA	NA
TRH >C10-C40 Total (F bands)	LB217481	mg/kg	210	<210	0%	NA	NA

TRH F Bands

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
TRH >C10-C16	LB217481	mg/kg	25	<25	0%	90%	98%
TRH >C10-C16 - Naphthalene (F2)	LB217481	mg/kg	25	<25	0%	NA	NA
TRH >C16-C34 (F3)	LB217481	mg/kg	90	<90	0%	80%	95%
TRH >C34-C40 (F4)	LB217481	mg/kg	120	<120	0%	75%	NA

VOC's in Soil **Method: ME-(AU)-[ENV]AN433**

Monocyclic Aromatic Hydrocarbons

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Benzene	LB217480	mg/kg	0.1	<0.1	0%	82%	64%
Toluene	LB217480	mg/kg	0.1	<0.1	0%	83%	65%
Ethylbenzene	LB217480	mg/kg	0.1	<0.1	0%	80%	66%
m/p-xylene	LB217480	mg/kg	0.2	<0.2	0%	80%	67%
o-xylene	LB217480	mg/kg	0.1	<0.1	0%	81%	67%

Polycyclic VOCs

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Naphthalene	LB217480	mg/kg	0.1	<0.1	0%	NA	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
d4-1,2-dichloroethane (Surrogate)	LB217480	%	-	109%	0 - 20%	104%	79%
d8-toluene (Surrogate)	LB217480	%	-	122%	1 - 20%	116%	85%
Bromofluorobenzene (Surrogate)	LB217480	%	-	108%	0 - 20%	91%	60%

Totals

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Total Xylenes	LB217480	mg/kg	0.3	<0.3	0%	NA	NA
Total BTEX	LB217480	mg/kg	0.6	<0.6	0%	NA	NA

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Volatile Petroleum Hydrocarbons in Soil **Method: ME-(AU)-[ENV]AN433**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
TRH C6-C10	LB217480	mg/kg	25	<25	0%	87%	64%
TRH C6-C9	LB217480	mg/kg	20	<20	0%	88%	66%

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
d4-1,2-dichloroethane (Surrogate)	LB217480	%	-	109%	0 - 20%	104%	79%
d8-toluene (Surrogate)	LB217480	%	-	122%	1 - 20%	116%	85%
Bromofluorobenzene (Surrogate)	LB217480	%	-	108%	0 - 20%	91%	80%

VPH F Bands

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Benzene (F0)	LB217480	mg/kg	0.1	<0.1	0%	NA	NA
TRH C6-C10 minus BTEX (F1)	LB217480	mg/kg	25	<25	0%	90%	62%

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analysis by ASS or ICP as per USEPA Method 200.8.
AN040/AN320	A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.
AN312	Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid, mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). F2 is reported directly and also corrected by subtracting Naphthalene (from VOC method AN433) where available.
AN403	Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Recoverable Hydrocarbons - Silica (TRH-Si) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents .
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC's are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.

FOOTNOTES

IS	Insufficient sample for analysis.	LOR	Limit of Reporting
LNR	Sample listed, but not received.	↑↓	Raised or Lowered Limit of Reporting
*	NATA accreditation does not cover the performance of this service.	QFH	QC result is above the upper tolerance
**	Indicative data, theoretical holding time exceeded.	QFL	QC result is below the lower tolerance
***	Indicates that both * and ** apply.	-	The sample was not analysed for this analyte
		NVL	Not Validated

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calcuated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety.

D21/78776

SGS

STATEMENT OF QA/QC PERFORMANCE

SE215773 R0

CLIENT DETAILS

Contact	Lisa Teng
Client	DOUGLAS PARTNERS PTY LTD
Address	96 Hermitage Road West Ryde NSW 2114
Telephone	02 9809 0666
Facsimile	02 9809 4095
Email	lisa.teng@douglaspartners.com.au
Project	**99872.01 Marsden High School**
Order Number	(Not specified)
Samples	1

LABORATORY DETAILS

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Laboratory	SGS Alexandria Environmental
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Telephone	+61 2 8594 0400
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Email	au.environmental.sydney@sgs.com
SGS Reference	**SE215773 R0**
Date Received	22 Jan 2021
Date Reported	01 Feb 2021

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met with the exception of the following:

Duplicate	PAH (Polynuclear Aromatic Hydrocarbons) in Soil	5 items
Matrix Spike	VOC's in Soil	1 item

SAMPLE SUMMARY

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	Client	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	1 Soil
Date documentation received	22/1/2021	Type of documentation received	COC
Number of eskies/boxes received		Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	17°C
Sufficient sample for analysis	Yes	Turnaround time requested	Standard

SGS

HOLDING TIME SUMMARY

SE215773 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BD6/20210119	SE215773.001	LB217507	19 Jan 2021	22 Jan 2021	16 Feb 2021	28 Jan 2021	16 Feb 2021	01 Feb 2021

Moisture Content

Method: ME-(AU)-[ENV]AN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BD6/20210119	SE215773.001	LB217482	19 Jan 2021	22 Jan 2021	02 Feb 2021	28 Jan 2021	02 Feb 2021	01 Feb 2021

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BD6/20210119	SE215773.001	LB217481	19 Jan 2021	22 Jan 2021	02 Feb 2021	28 Jan 2021	09 Mar 2021	01 Feb 2021

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BD6/20210119	SE215773.001	LB217481	19 Jan 2021	22 Jan 2021	02 Feb 2021	28 Jan 2021	09 Mar 2021	01 Feb 2021

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BD6/20210119	SE215773.001	LB217481	19 Jan 2021	22 Jan 2021	02 Feb 2021	28 Jan 2021	09 Mar 2021	01 Feb 2021

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BD6/20210119	SE215773.001	LB217481	19 Jan 2021	22 Jan 2021	02 Feb 2021	28 Jan 2021	09 Mar 2021	01 Feb 2021

Speciated Phenols in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BD6/20210119	SE215773.001	LB217481	19 Jan 2021	22 Jan 2021	02 Feb 2021	28 Jan 2021	09 Mar 2021	01 Feb 2021

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BD6/20210119	SE215773.001	LB217499	19 Jan 2021	22 Jan 2021	18 Jul 2021	28 Jan 2021	18 Jul 2021	01 Feb 2021

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BD6/20210119	SE215773.001	LB217481	19 Jan 2021	22 Jan 2021	02 Feb 2021	28 Jan 2021	09 Mar 2021	01 Feb 2021

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BD6/20210119	SE215773.001	LB217480	19 Jan 2021	22 Jan 2021	02 Feb 2021	28 Jan 2021	09 Mar 2021	01 Feb 2021

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BD6/20210119	SE215773.001	LB217480	19 Jan 2021	22 Jan 2021	02 Feb 2021	28 Jan 2021	09 Mar 2021	01 Feb 2021

SGS

SURROGATES

SE215773 R0

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	BD6/20210119	SE215773.001	%	60 - 130%	87

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BD6/20210119	SE215773.001	%	60 - 130%	89
d14-p-terphenyl (Surrogate)	BD6/20210119	SE215773.001	%	60 - 130%	93

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BD6/20210119	SE215773.001	%	70 - 130%	89
d14-p-terphenyl (Surrogate)	BD6/20210119	SE215773.001	%	70 - 130%	93
d5-nitrobenzene (Surrogate)	BD6/20210119	SE215773.001	%	70 - 130%	110

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	BD6/20210119	SE215773.001	%	60 - 130%	87

Speciated Phenols in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2,4,6-Tribromophenol (Surrogate)	BD6/20210119	SE215773.001	%	70 - 130%	86
d5-phenol (Surrogate)	BD6/20210119	SE215773.001	%	50 - 130%	81

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BD6/20210119	SE215773.001	%	60 - 130%	67
d4-1,2-dichloroethane (Surrogate)	BD6/20210119	SE215773.001	%	60 - 130%	83
d8-toluene (Surrogate)	BD6/20210119	SE215773.001	%	60 - 130%	91

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BD6/20210119	SE215773.001	%	60 - 130%	67
d4-1,2-dichloroethane (Surrogate)	BD6/20210119	SE215773.001	%	60 - 130%	83
d8-toluene (Surrogate)	BD6/20210119	SE215773.001	%	60 - 130%	91

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METHOD BLANKS

SE215773 R0

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number		Parameter	Units	LOR	Result
LB217507.001		Mercury	mg/kg	0.05	<0.05

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB217481.001		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1
		Alpha BHC	mg/kg	0.1	<0.1
		Lindane	mg/kg	0.1	<0.1
		Heptachlor	mg/kg	0.1	<0.1
		Aldrin	mg/kg	0.1	<0.1
		Beta BHC	mg/kg	0.1	<0.1
		Delta BHC	mg/kg	0.1	<0.1
		Heptachlor epoxide	mg/kg	0.1	<0.1
		Alpha Endosulfan	mg/kg	0.2	<0.2
		Gamma Chlordane	mg/kg	0.1	<0.1
		Alpha Chlordane	mg/kg	0.1	<0.1
		p,p'-DDE	mg/kg	0.1	<0.1
		Dieldrin	mg/kg	0.2	<0.2
		Endrin	mg/kg	0.2	<0.2
		Beta Endosulfan	mg/kg	0.2	<0.2
		p,p'-DDD	mg/kg	0.1	<0.1
		p,p'-DDT	mg/kg	0.1	<0.1
		Endosulfan sulphate	mg/kg	0.1	<0.1
		Endrin Aldehyde	mg/kg	0.1	<0.1
		Methoxychlor	mg/kg	0.1	<0.1
		Endrin Ketone	mg/kg	0.1	<0.1
		Isodrin	mg/kg	0.1	<0.1
		Mirex	mg/kg	0.1	<0.1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	88

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB217481.001		Dichlorvos	mg/kg	0.5	<0.5
		Dimethoate	mg/kg	0.5	<0.5
		Diazinon (Dimpylate)	mg/kg	0.5	<0.5
		Fenitrothion	mg/kg	0.2	<0.2
		Malathion	mg/kg	0.2	<0.2
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2
		Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2
		Bromophos Ethyl	mg/kg	0.2	<0.2
		Methidathion	mg/kg	0.5	<0.5
		Ethion	mg/kg	0.2	<0.2
		Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2
	Surrogates	2-fluorobiphenyl (Surrogate)	%	-	94
		d14-p-terphenyl (Surrogate)	%	-	92

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB217481.001		Naphthalene	mg/kg	0.1	<0.1
		2-methylnaphthalene	mg/kg	0.1	<0.1
		1-methylnaphthalene	mg/kg	0.1	<0.1
		Acenaphthylene	mg/kg	0.1	<0.1
		Acenaphthene	mg/kg	0.1	<0.1
		Fluorene	mg/kg	0.1	<0.1
		Phenanthrene	mg/kg	0.1	<0.1
		Anthracene	mg/kg	0.1	<0.1
		Fluoranthene	mg/kg	0.1	<0.1
		Pyrene	mg/kg	0.1	<0.1
		Benzo(a)anthracene	mg/kg	0.1	<0.1
		Chrysene	mg/kg	0.1	<0.1
		Benzo(a)pyrene	mg/kg	0.1	<0.1

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METHOD BLANKS

SE215773 R0

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued) — Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB217481.001		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1
		Dibenzo(ah)anthracene	mg/kg	0.1	<0.1
		Benzo(ghi)perylene	mg/kg	0.1	<0.1
		Total PAH (18)	mg/kg	0.8	<0.8
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	92
		2-fluorobiphenyl (Surrogate)	%	-	94
		d14-p-terphenyl (Surrogate)	%	-	92

PCBs in Soil — Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB217481.001		Arochlor 1016	mg/kg	0.2	<0.2
		Arochlor 1221	mg/kg	0.2	<0.2
		Arochlor 1232	mg/kg	0.2	<0.2
		Arochlor 1242	mg/kg	0.2	<0.2
		Arochlor 1248	mg/kg	0.2	<0.2
		Arochlor 1254	mg/kg	0.2	<0.2
		Arochlor 1260	mg/kg	0.2	<0.2
		Arochlor 1262	mg/kg	0.2	<0.2
		Arochlor 1268	mg/kg	0.2	<0.2
		Total PCBs (Arochlors)	mg/kg	1	<1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	88

Speciated Phenols in Soil — Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB217481.001		Phenol	mg/kg	0.5	<0.5
		2-methyl phenol (o-cresol)	mg/kg	0.5	<0.5
		3/4-methyl phenol (m/p-cresol)	mg/kg	1	<1
		2-chlorophenol	mg/kg	0.5	<0.5
		2,4-dimethylphenol	mg/kg	0.5	<0.5
		2,6-dichlorophenol	mg/kg	0.5	<0.5
		2,4-dichlorophenol	mg/kg	0.5	<0.5
		2,4,6-trichlorophenol	mg/kg	0.5	<0.5
		2-nitrophenol	mg/kg	0.5	<0.5
		4-nitrophenol	mg/kg	1	<1
		2,4,5-trichlorophenol	mg/kg	0.5	<0.5
		2,3,4,6/2,3,5,6-tetrachlorophenol	mg/kg	1	<1
		Pentachlorophenol	mg/kg	0.5	<0.5
		2,4-dinitrophenol	mg/kg	2	<2
		4-chloro-3-methylphenol	mg/kg	2	<2
	Surrogates	2,4,6-Tribromophenol (Surrogate)	%	-	89
		d5-phenol (Surrogate)	%	-	92

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES — Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result
LB217499.001	Arsenic, As	mg/kg	1	<1
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.5	<0.5
	Copper, Cu	mg/kg	0.5	<0.5
	Nickel, Ni	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Zinc, Zn	mg/kg	2	<2.0

TRH (Total Recoverable Hydrocarbons) in Soil — Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB217481.001	TRH C10-C14	mg/kg	20	<20
	TRH C15-C28	mg/kg	45	<45
	TRH C29-C36	mg/kg	45	<45
	TRH C37-C40	mg/kg	100	<100
	TRH C10-C36 Total	mg/kg	110	<110

VOC's in Soil — Method: ME-(AU)-[ENV]AN433

Sample Number	Parameter	Units	LOR

SGS

METHOD BLANKS

SE215773 R0

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

VOC's in Soil (continued) — Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB217480.001	Monocyclic Aromatic Hydrocarbons	Benzene	mg/kg	0.1	<0.1
		Toluene	mg/kg	0.1	<0.1
		Ethylbenzene	mg/kg	0.1	<0.1
		m/p-xylene	mg/kg	0.2	<0.2
		o-xylene	mg/kg	0.1	<0.1
	Polycyclic VOCs	Naphthalene	mg/kg	0.1	<0.1
	Surrogates	d4-1,2-dichloroethane (Surrogate)	%	-	109
		d8-toluene (Surrogate)	%	-	122
		Bromofluorobenzene (Surrogate)	%	-	108
	Totals	Total BTEX	mg/kg	0.6	<0.6

Volatile Petroleum Hydrocarbons in Soil — Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB217480.001		TRH C6-C9	mg/kg	20	<20
	Surrogates	d4-1,2-dichloroethane (Surrogate)	%	-	109

SGS

DUPLICATES

SE215773 R0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may give a different calculated RPD.

Mercury in Soil — Method: ME-(AU)-[ENV]AN312

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE215718A.011	LB217507.019		Mercury	mg/kg	0.05	0.0290127450	0.0306060606	198	0
SE215773.001	LB217507.014		Mercury	mg/kg	0.05	<0.05	<0.05	176	0

Moisture Content — Method: ME-(AU)-[ENV]AN002

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE215870.001	LB217482.011		% Moisture	%w/w	1	15.2466367713	4.839181286	37	3
SE215870.011	LB217482.022		% Moisture	%w/w	1	15.9183673469	5.290178571	36	4
SE215870.012	LB217482.024		% Moisture	%w/w	1	17.0626349892	6.472749540	36	4

OC Pesticides in Soil — Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE215870.005	LB217481.031		Hexachlorobenzene (HCB)	mg/kg	0.1	0	0	200	0
			Alpha BHC	mg/kg	0.1	0	0	200	0
			Lindane	mg/kg	0.1	0	0	200	0
			Heptachlor	mg/kg	0.1	0	0	200	0
			Aldrin	mg/kg	0.1	0	0	200	0
			Beta BHC	mg/kg	0.1	0	0	200	0
			Delta BHC	mg/kg	0.1	0	0	200	0
			Heptachlor epoxide	mg/kg	0.1	0	0	200	0
			o,p'-DDE	mg/kg	0.1	0	0	200	0
			Alpha Endosulfan	mg/kg	0.2	0	0	200	0
			Gamma Chlordane	mg/kg	0.1	0	0	200	0
			Alpha Chlordane	mg/kg	0.1	0	0	200	0
			trans-Nonachlor	mg/kg	0.1	0	0	200	0
			p,p'-DDE	mg/kg	0.1	0	0	200	0
			Dieldrin	mg/kg	0.2	0	0	200	0
			Endrin	mg/kg	0.2	0	0	200	0
			o,p'-DDD	mg/kg	0.1	0	0	200	0
			o,p'-DDT	mg/kg	0.1	0	0	200	0
			Beta Endosulfan	mg/kg	0.2	0	0	200	0
			p,p'-DDD	mg/kg	0.1	0	0	200	0
			p,p'-DDT	mg/kg	0.1	0.0239993128	0.0241044557	200	0
			Endosulfan sulphate	mg/kg	0.1	0	0	200	0
			Endrin Aldehyde	mg/kg	0.1	0	0	200	0
			Methoxychlor	mg/kg	0.1	0	0.0016084008	200	0
			Endrin Ketone	mg/kg	0.1	0	0	200	0
			Isodrin	mg/kg	0.1	0	0	200	0
			Mirex	mg/kg	0.1	0	0	200	0
			Total CLP OC Pesticides	mg/kg	1	0	0.0016084008	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.1338338972	0.1228423710	30	8
SE215870.009	LB217481.028		Hexachlorobenzene (HCB)	mg/kg	0.1	0	0	200	0
			Alpha BHC	mg/kg	0.1	0	0	200	0
			Lindane	mg/kg	0.1	0	0	200	0
			Heptachlor	mg/kg	0.1	0	0	200	0
			Aldrin	mg/kg	0.1	0	0	200	0
			Beta BHC	mg/kg	0.1	0	0	200	0
			Delta BHC	mg/kg	0.1	0	0	200	0
			Heptachlor epoxide	mg/kg	0.1	0	0	200	0
			o,p'-DDE	mg/kg	0.1	0	0	200	0
			Alpha Endosulfan	mg/kg	0.2	0	0	200	0
			Gamma Chlordane	mg/kg	0.1	0	0	200	0
			Alpha Chlordane	mg/kg	0.1	0	0	200	0
			trans-Nonachlor	mg/kg	0.1	0	0	200	0
			p,p'-DDE	mg/kg	0.1	0	0	200	0
			Dieldrin	mg/kg	0.2	0	0	200	0
			Endrin	mg/kg	0.2	0	0	200	0
			o,p'-DDD	mg/kg	0.1	0	0	200	0
			o,p'-DDT	mg/kg	0.1	0	0	200	0
			Beta Endosulfan	mg/kg	0.2	0	0	200	0
			p,p'-DDD	mg/kg	0.1	0	0	200	0

DUPLICATES

SE215773 R0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may give a different calculated RPD.

OC Pesticides in Soil (continued) — Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE215870.009	LB217481.028		p,p'-DDT	mg/kg	0.1	0	0.0141283408	200	0
			Endosulfan sulphate	mg/kg	0.1	0	0	200	0
			Endrin Aldehyde	mg/kg	0.1	0	0	200	0
			Methoxychlor	mg/kg	0.1	0.0011188278	0	200	0
			Endrin Ketone	mg/kg	0.1	0	0	200	0
			Isodrin	mg/kg	0.1	0	0	200	0
			Mirex	mg/kg	0.1	0	0	200	0
			Total CLP OC Pesticides	mg/kg	1	0.0011188278	0	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.1280141030	0.1272970181	30	1

OP Pesticides in Soil — Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE215870.006	LB217481.030		Dichlorvos	mg/kg	0.5	0	0	200	0
			Dimethoate	mg/kg	0.5	0.0008987850	0.0038701271	200	0
			Diazinon (Dimpylate)	mg/kg	0.5	0.0762789876	0	200	0
			Fenitrothion	mg/kg	0.2	0.0065010355	0	200	0
			Malathion	mg/kg	0.2	0	0	200	0
			Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	0	0	200	0
			Parathion-ethyl (Parathion)	mg/kg	0.2	0.0425072763	0	200	0
			Bromophos Ethyl	mg/kg	0.2	0	0	200	0
			Methidathion	mg/kg	0.5	0.0044812617	0	200	0
			Ethion	mg/kg	0.2	0.0151914937	0	200	0
			Azinphos-methyl (Guthion)	mg/kg	0.2	0	0	200	0
			Total OP Pesticides*	mg/kg	1.7	0	0	200	0
		Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4250796384	0.4332791757	30	2
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.4197983314	0.4284916685	30	2
SE215870.009	LB217481.028		Dichlorvos	mg/kg	0.5	0.0018753432	0	200	0
			Dimethoate	mg/kg	0.5	0	0	200	0
			Diazinon (Dimpylate)	mg/kg	0.5	0	0	200	0
			Fenitrothion	mg/kg	0.2	0.0038138172	0	200	0
			Malathion	mg/kg	0.2	0	0	200	0
			Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	0	0	200	0
			Parathion-ethyl (Parathion)	mg/kg	0.2	0	0.0078060569	200	0
			Bromophos Ethyl	mg/kg	0.2	0.0891655831	0	200	0
			Methidathion	mg/kg	0.5	0	0	200	0
			Ethion	mg/kg	0.2	0	0.0360758063	200	0
			Azinphos-methyl (Guthion)	mg/kg	0.2	0.0012775657	0	200	0
			Total OP Pesticides*	mg/kg	1.7	0	0	200	0
		Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4531698601	0.4398233860	30	3
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.4405639316	0.4284214815	30	3

PAH (Polynuclear Aromatic Hydrocarbons) in Soil — Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE215870.006	LB217481.030		Naphthalene	mg/kg	0.1	0	0.0198512377	200	0
			2-methylnaphthalene	mg/kg	0.1	0.0036538340	0.0111271261	200	0
			1-methylnaphthalene	mg/kg	0.1	0.0040552479	0.0108168183	200	0
			Acenaphthylene	mg/kg	0.1	0.0057997188	0.0141446806	200	0
			Acenaphthene	mg/kg	0.1	0.0052648260	0.0103611846	200	0
			Fluorene	mg/kg	0.1	0.0117582198	0.0232888238	200	0
			Phenanthrene	mg/kg	0.1	0.0833763754	0.1512372476	115	41
			Anthracene	mg/kg	0.1	0.0780309074	0.0471512201	190	0
			Fluoranthene	mg/kg	0.1	0.1788834229	0.3031657959	71	52
			Pyrene	mg/kg	0.1	0.1852358829	0.2942745303	72	45
			Benzo(a)anthracene	mg/kg	0.1	0.0522003509	0.0989660467	162	0
			Chrysene	mg/kg	0.1	0.0560277895	0.1043255066	155	4
			Benzo(b&j)fluoranthene	mg/kg	0.1	0.0675691434	0.1291174456	132	25
			Benzo(k)fluoranthene	mg/kg	0.1	0.0369291564	0.0618303938	200	0
			Benzo(a)pyrene	mg/kg	0.1	0.0762884694	0.1292373379	127	26
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	0.0463958068	0.0782285394	190	0
			Dibenzo(ah)anthracene	mg/kg	0.1	0.0069105191	0.0115023065	200	0
			Benzo(ghi)perylene	mg/kg	0.1	0.0446754855	0.0801877550	190	0
			Carcinogenic PAHs, BaP TEQ <LOR=0	mg/kg	0.2	0	0.1302805930	200	0

DUPLICATES

SE215773 R0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may give a different calculated RPD.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued) Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE215870.006	LB217481.030		Carcinogenic PAHs, BaP TEQ <LOR=LOR	mg/kg	0.3	0.242	0.2712805930	127	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	mg/kg	0.2	0.121	0.2007805930	134	0
			Total PAH (18)	mg/kg	0.8	0.3641193058	0.9822404174	149	20
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5309279001	0.5440434722	30	2
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4250796384	0.4332791757	30	2
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.4197983314	0.4284916685	30	2
SE215870.009	LB217481.028		Naphthalene	mg/kg	0.1	0.0118792420	0.0117404831	200	0
			2-methylnaphthalene	mg/kg	0.1	0.0091489480	0.0074071857	200	0
			1-methylnaphthalene	mg/kg	0.1	0.0117306181	0.0080987377	200	0
			Acenaphthylene	mg/kg	0.1	0.0127529629	0.0076158583	200	0
			Acenaphthene	mg/kg	0.1	0.0216163790	0.0117762063	200	0
			Fluorene	mg/kg	0.1	0.0439740857	0.0246019232	200	0
			Phenanthrene	mg/kg	0.1	0.3354471653	0.1655122640	70	68
			Anthracene	mg/kg	0.1	0.1073617689	0.0533286714	154	7
			Fluoranthene	mg/kg	0.1	0.7932743109	0.3747459094	47	72 ②
			Pyrene	mg/kg	0.1	0.7970016988	0.3783485697	47	71 ②
			Benzo(a)anthracene	mg/kg	0.1	0.2259816641	0.0971069308	92	77
			Chrysene	mg/kg	0.1	0.2753655399	0.1051513341	83	89 ②
			Benzo(b&j)fluoranthene	mg/kg	0.1	0.3123901593	0.1365200893	75	78 ②
			Benzo(k)fluoranthene	mg/kg	0.1	0.1284545810	0.0653318412	133	25
			Benzo(a)pyrene	mg/kg	0.1	0.2836355018	0.1383651410	77	68
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	0.1672157782	0.0784773652	111	50
			Dibenzo(ah)anthracene	mg/kg	0.1	0.0319652875	0.0119736711	200	0
			Benzo(ghi)perylene	mg/kg	0.1	0.1651300031	0.0755555065	113	40
			Carcinogenic PAHs, BaP TEQ <LOR=0	mg/kg	0.2	0.3704300311	0.1404166543	88	60
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	mg/kg	0.3	0.4704300311	0.2814166543	90	44
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	mg/kg	0.2	0.4204300311	0.2109166543	73	56
			Total PAH (18)	mg/kg	0.8	3.5811117279	1.1631232183	64	102 ②
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5730049475	0.5540397505	30	3
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4531698601	0.4398233860	30	3
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.4405639316	0.4284214815	30	3

PCBs in Soil Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE215870.005	LB217481.031		Arochlor 1016	mg/kg	0.2	0	0	200	0
			Arochlor 1221	mg/kg	0.2	0	0	200	0
			Arochlor 1232	mg/kg	0.2	0	0	200	0
			Arochlor 1242	mg/kg	0.2	0	0	200	0
			Arochlor 1248	mg/kg	0.2	0	0	200	0
			Arochlor 1254	mg/kg	0.2	0	0	200	0
			Arochlor 1260	mg/kg	0.2	0.0128232033	0	200	0
			Arochlor 1262	mg/kg	0.2	0	0	200	0
			Arochlor 1268	mg/kg	0.2	0	0	200	0
			Total PCBs (Arochlors)	mg/kg	1	0.0128232033	0	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.1336936972	0.1228423710	30	8
SE215870.009	LB217481.028		Arochlor 1016	mg/kg	0.2	0	0	200	0
			Arochlor 1221	mg/kg	0.2	0	0	200	0
			Arochlor 1232	mg/kg	0.2	0	0	200	0
			Arochlor 1242	mg/kg	0.2	0	0	200	0
			Arochlor 1248	mg/kg	0.2	0	0	200	0
			Arochlor 1254	mg/kg	0.2	0	0	200	0
			Arochlor 1260	mg/kg	0.2	0.0149096333	0.0234589868	200	0
			Arochlor 1262	mg/kg	0.2	0	0	200	0
			Arochlor 1268	mg/kg	0.2	0	0	200	0
			Total PCBs (Arochlors)	mg/kg	1	0.0149096333	0.0234589868	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.1280141030	0.1272970181	30	1

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate	Parameter	Units	LOR

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may give a different calculated RPD.

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES (continued) — Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE215718A.011	LB217499.019		Arsenic, As	mg/kg	1	0.8423739495	1.1276942148	132	12
			Cadmium, Cd	mg/kg	0.3	0.0008487394	0.0020867768	200	0
			Chromium, Cr	mg/kg	0.5	2.3577983193	2.4770041322	51	5
			Copper, Cu	mg/kg	0.5	8.0176176470	8.2043719008	36	2
			Nickel, Ni	mg/kg	0.5	0.8232773109	0.8839586776	89	7
			Lead, Pb	mg/kg	1	5.9899789915	6.1902148760	46	3
			Zinc, Zn	mg/kg	2	7.4014327731	7.6935289256	56	4
SE215773.001	LB217499.014		Arsenic, As	mg/kg	1	6	6	47	3
			Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	200	0
			Chromium, Cr	mg/kg	0.5	13	15	34	10
			Copper, Cu	mg/kg	0.5	18	18	33	1
			Nickel, Ni	mg/kg	0.5	7.5	7.5	37	1
			Lead, Pb	mg/kg	1	32	33	33	4
			Zinc, Zn	mg/kg	2	53	54	34	1

TRH (Total Recoverable Hydrocarbons) in Soil — Method: ME-(AU)-[ENV]AN403

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE215870.006	LB217481.030		TRH C10-C14	mg/kg	20	0	0	200	0
			TRH C15-C28	mg/kg	45	0	0	200	0
			TRH C29-C36	mg/kg	45	0	0	200	0
			TRH C37-C40	mg/kg	100	0	0	200	0
			TRH C10-C36 Total	mg/kg	110	0	0	200	0
			TRH >C10-C40 Total (F bands)	mg/kg	210	0	0	200	0
		TRH F Bands	TRH >C10-C16	mg/kg	25	0	0	200	0
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	0	0	200	0
			TRH >C16-C34 (F3)	mg/kg	90	0	0	200	0
			TRH >C34-C40 (F4)	mg/kg	120	0	0	200	0
SE215870.009	LB217481.028		TRH C10-C14	mg/kg	20	0	0	200	0
			TRH C15-C28	mg/kg	45	0	0	200	0
			TRH C29-C36	mg/kg	45	0	0	200	0
			TRH C37-C40	mg/kg	100	0	0	200	0
			TRH C10-C36 Total	mg/kg	110	0	0	200	0
			TRH >C10-C40 Total (F bands)	mg/kg	210	0	0	200	0
		TRH F Bands	TRH >C10-C16	mg/kg	25	0	0	200	0
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	0	0	200	0
			TRH >C16-C34 (F3)	mg/kg	90	0	0	200	0
			TRH >C34-C40 (F4)	mg/kg	120	0	0	200	0

VOC's in Soil — Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE215870.006	LB217480.014	Monocyclic	Benzene	mg/kg	0.1	0	0	200	0
		Aromatic	Toluene	mg/kg	0.1	0.0048865520	0.0041403984	200	0
			Ethylbenzene	mg/kg	0.1	0.0016204671	0.0016004093	200	0
			m/p-xylene	mg/kg	0.2	0.0033396216	0.0030971507	200	0
			o-xylene	mg/kg	0.1	0.0012444853	0.0009035786	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	0.0018228578	0.0020668224	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	10.12986773	8.3295910193	50	20
			d8-toluene (Surrogate)	mg/kg	-	11.10107511	9.1152969537	50	20
			Bromofluorobenzene (Surrogate)	mg/kg	-	8.1502964353	6.6569964138	50	20
		Totals	Total Xylenes	mg/kg	0.3	0.0045841070	0.0040007294	200	0
			Total BTEX	mg/kg	0.6	0	0	200	0
SE215870.010	LB217480.019	Monocyclic	Benzene	mg/kg	0.1	0	0	200	0
		Aromatic	Toluene	mg/kg	0.1	0.0040166662	0.0039552503	200	0
			Ethylbenzene	mg/kg	0.1	0.0014606214	0.0014335810	200	0
			m/p-xylene	mg/kg	0.2	0.0030212570	0.0029739394	200	0
			o-xylene	mg/kg	0.1	0.0009182805	0.0008509228	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	0.0020876802	0.0018212758	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	9.4033641222	9.3800307901	50	0
			d8-toluene (Surrogate)	mg/kg	-	10.166197285	10.309139149	50	1
			Bromofluorobenzene (Surrogate)	mg/kg	-	7.5929218752	7.6084561216	50	0
		Totals	Total Xylenes	mg/kg	0.3	0.0039395376	0.0038249222	200	0
			Total BTEX	mg/kg	0.6	0	0	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may give a different calculated RPD.

Volatile Petroleum Hydrocarbons in Soil — Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE215870.006	LB217480.014		TRH C6-C10	mg/kg	25	0	0	200	0
			TRH C6-C9	mg/kg	20	0	0	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	10.129887730	8.3295910193	30	20
			d8-toluene (Surrogate)	mg/kg	-	11.101075119	9.1152969537	30	20
			Bromofluorobenzene (Surrogate)	mg/kg	-	8.1502964353	6.6569964138	30	20
		VPH F Bands	Benzene (F0)	mg/kg	0.1	0	0	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	0	0	200	0
SE215870.010	LB217480.019		TRH C6-C10	mg/kg	25	0	0	200	0
			TRH C6-C9	mg/kg	20	0	0	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	9.4033641222	9.3800307901	30	0
			d8-toluene (Surrogate)	mg/kg	-	10.166197285	10.309139149	30	1
			Bromofluorobenzene (Surrogate)	mg/kg	-	7.5929218752	7.6084561216	30	0
		VPH F Bands	Benzene (F0)	mg/kg	0.1	0	0	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	0	0	200	0

D21/78776

SGS

LABORATORY CONTROL SAMPLES

SE215773 R0

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury in Soil — Method: ME-(AU)-[ENV]AN312

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB217507.002		Mercury	mg/kg	0.05	0.20	0.2	70 - 130	99

OC Pesticides in Soil — Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB217481.002		Heptachlor	mg/kg	0.1	0.1	0.2	60 - 140	70
		Aldrin	mg/kg	0.1	0.1	0.2	60 - 140	68
		Delta BHC	mg/kg	0.1	0.1	0.2	60 - 140	69
		Dieldrin	mg/kg	0.2	<0.2	0.2	60 - 140	73
		Endrin	mg/kg	0.2	<0.2	0.2	60 - 140	74
		p,p'-DDT	mg/kg	0.1	0.1	0.2	60 - 140	74
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.11	0.15	40 - 130	76

OP Pesticides in Soil — Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB217481.002		Dichlorvos	mg/kg	0.5	2.6	2	60 - 140	130
		Diazinon (Dimpylate)	mg/kg	0.5	2.0	2	60 - 140	98
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	1.8	2	60 - 140	91
		Ethion	mg/kg	0.2	1.8	2	60 - 140	91
	Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	92
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	86

PAH (Polynuclear Aromatic Hydrocarbons) in Soil — Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB217481.002		Naphthalene	mg/kg	0.1	3.8	4	60 - 140	94
		Acenaphthylene	mg/kg	0.1	3.8	4	60 - 140	96
		Acenaphthene	mg/kg	0.1	4.1	4	60 - 140	101
		Phenanthrene	mg/kg	0.1	3.8	4	60 - 140	95
		Anthracene	mg/kg	0.1	3.7	4	60 - 140	93
		Fluoranthene	mg/kg	0.1	3.7	4	60 - 140	92
		Pyrene	mg/kg	0.1	4.0	4	60 - 140	100
		Benzo(a)pyrene	mg/kg	0.1	4.4	4	60 - 140	110
	Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	90
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	92
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	86

PCBs in Soil — Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB217481.002		Arochlor 1260	mg/kg	0.2	0.5	0.4	60 - 140	132

Speciated Phenols in Soil — Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB217481.002		Phenol	mg/kg	0.5	0.9	1	70 - 130	92
		2,4-dichlorophenol	mg/kg	0.5	0.8	1	70 - 130	84
		2,4,6-trichlorophenol	mg/kg	0.5	0.8	1	70 - 130	84
		Pentachlorophenol	mg/kg	0.5	0.7	1	70 - 130	72
	Surrogates	2,4,6-Tribromophenol (Surrogate)	mg/kg	-	4.6	5	40 - 130	91
		d5-phenol (Surrogate)	mg/kg	-	1.8	2	40 - 130	92

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES — Method: ME-(AU)-[ENV]AN040/AN320

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB217499.002		Arsenic, As	mg/kg	1	330	318.22	80 - 120	105
		Cadmium, Cd	mg/kg	0.3	5.0	5.41	80 - 120	93
		Chromium, Cr	mg/kg	0.5	38	38.31	80 - 120	100
		Copper, Cu	mg/kg	0.5	300	290	80 - 120	105
		Nickel, Ni	mg/kg	0.5	190	187	80 - 120	99
		Lead, Pb	mg/kg	1	93	89.9	80 - 120	103
		Zinc, Zn	mg/kg	2	270	273	80 - 120	100

TRH (Total Recoverable Hydrocarbons) in Soil — Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

TRH (Total Recoverable Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN403

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB217481.002		TRH C10-C14	mg/kg	20	37	40	60 - 140	93
		TRH C15-C28	mg/kg	45	<45	40	60 - 140	85
		TRH C29-C36	mg/kg	45	<45	40	60 - 140	73
	TRH F Bands	TRH >C10-C16	mg/kg	25	36	40	60 - 140	90
		TRH >C16-C34 (F3)	mg/kg	90	<90	40	60 - 140	80
		TRH >C34-C40 (F4)	mg/kg	120	<120	20	60 - 140	75

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB217480.002	Monocyclic Aromatic	Benzene	mg/kg	0.1	4.1	5	60 - 140	82
		Toluene	mg/kg	0.1	4.2	5	60 - 140	83
		Ethylbenzene	mg/kg	0.1	4.0	5	60 - 140	80
		m/p-xylene	mg/kg	0.2	8.0	10	60 - 140	80
		o-xylene	mg/kg	0.1	4.0	5	60 - 140	81
	Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	10.4	10	70 - 130	104
		d8-toluene (Surrogate)	mg/kg	-	11.6	10	70 - 130	116
		Bromofluorobenzene (Surrogate)	mg/kg	-	9.1	10	70 - 130	91

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB217480.002		TRH C6-C10	mg/kg	25	81	92.5	60 - 140	87
		TRH C6-C9	mg/kg	20	71	80	60 - 140	88
	Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	10.4	10	70 - 130	104
		Bromofluorobenzene (Surrogate)	mg/kg	-	9.1	10	70 - 130	91
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	57	62.5	60 - 140	90

MATRIX SPIKES

SE215773 R0

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury in Soil — Method: ME-(AU)-[ENV]AN312

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE215752.001	LB217507.004		Mercury	mg/kg	0.05	0.18	<0.05	0.2	89

OC Pesticides in Soil — Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE215752.001	LB217481.004		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	-	-
			Alpha BHC	mg/kg	0.1	<0.1	<0.1	-	-
			Lindane	mg/kg	0.1	<0.1	<0.1	-	-
			Heptachlor	mg/kg	0.1	0.1	<0.1	0.2	68
			Aldrin	mg/kg	0.1	0.1	<0.1	0.2	84
			Beta BHC	mg/kg	0.1	<0.1	<0.1	-	-
			Delta BHC	mg/kg	0.1	0.1	<0.1	0.2	65
			Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	-	-
			o,p'-DDE	mg/kg	0.1	<0.1	<0.1	-	-
			Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	-	-
			Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	-	-
			Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	-	-
			trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	-	-
			p,p'-DDE	mg/kg	0.1	<0.1	<0.1	-	-
			Dieldrin	mg/kg	0.2	<0.2	<0.2	0.2	69
			Endrin	mg/kg	0.2	<0.2	<0.2	0.2	70
			o,p'-DDD	mg/kg	0.1	<0.1	<0.1	-	-
			o,p'-DDT	mg/kg	0.1	<0.1	<0.1	-	-
			Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	-	-
			p,p'-DDD	mg/kg	0.1	<0.1	<0.1	-	-
			p,p'-DDT	mg/kg	0.1	0.1	<0.1	0.2	62
			Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	-	-
			Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	-	-
			Methoxychlor	mg/kg	0.1	<0.1	<0.1	-	-
			Endrin Ketone	mg/kg	0.1	<0.1	<0.1	-	-
			Isodrin	mg/kg	0.1	<0.1	<0.1	-	-
			Mirex	mg/kg	0.1	<0.1	<0.1	-	-
			Total CLP OC Pesticides	mg/kg	1	<1	<1	-	-
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.11	0.12	-	77

OP Pesticides in Soil — Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE215752.001	LB217481.004		Dichlorvos	mg/kg	0.5	2.3	<0.5	2	115
			Dimethoate	mg/kg	0.5	<0.5	<0.5	-	-
			Diazinon (Dimpylate)	mg/kg	0.5	2.3	<0.5	2	116
			Fenitrothion	mg/kg	0.2	<0.2	<0.2	-	-
			Malathion	mg/kg	0.2	<0.2	<0.2	-	-
			Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	2.2	<0.2	2	112
			Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	-	-
			Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	-	-
			Methidathion	mg/kg	0.5	<0.5	<0.5	-	-
			Ethion	mg/kg	0.2	1.8	<0.2	2	90
			Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	-	-
			Total OP Pesticides*	mg/kg	1.7	8.7	<1.7	-	-
		Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.4	-	88
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.4	0.5	-	83

PAH (Polynuclear Aromatic Hydrocarbons) in Soil — Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE215752.001	LB217481.004		Naphthalene	mg/kg	0.1	4.4	<0.1	4	109
			2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
			1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
			Acenaphthylene	mg/kg	0.1	4.3	<0.1	4	108
			Acenaphthene	mg/kg	0.1	4.3	<0.1	4	106
			Fluorene	mg/kg	0.1	<0.1	<0.1	-	-
			Phenanthrene	mg/kg	0.1	4.3	<0.1	4	107

SGS

MATRIX SPIKES

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE215752.001	LB217481.004		Anthracene	mg/kg	0.1	4.2	<0.1	4	104
			Fluoranthene	mg/kg	0.1	4.2	<0.1	4	106
			Pyrene	mg/kg	0.1	4.2	<0.1	4	105
			Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	-	-
			Chrysene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(a)pyrene	mg/kg	0.1	4.2	<0.1	4	105
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	-	-
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	4.2	<0.2	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	4.4	<0.3	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	4.3	<0.2	-	-
			Total PAH (18)	mg/kg	0.8	34	<0.8	-	-
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.6	-	109
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.4	-	88
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.4	0.5	-	83

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE215752.001	LB217481.004		Arochlor 1016	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1221	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1232	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1242	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1248	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1254	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1260	mg/kg	0.2	0.5	<0.2	0.4	120
			Arochlor 1262	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1268	mg/kg	0.2	<0.2	<0.2	-	-
			Total PCBs (Arochlors)	mg/kg	1	<1	<1	-	-
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0	0	-	77

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE215752.001	LB217499.004		Arsenic, As	mg/kg	1	44	2	50	85
			Cadmium, Cd	mg/kg	0.3	43	<0.3	50	85
			Chromium, Cr	mg/kg	0.5	51	9.1	50	85
			Copper, Cu	mg/kg	0.5	45	2.7	50	85
			Nickel, Ni	mg/kg	0.5	50	14	50	71
			Lead, Pb	mg/kg	1	48	7	50	82
			Zinc, Zn	mg/kg	2	68	31	50	73

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE215752.001	LB217481.004		TRH C10-C14	mg/kg	20	39	<20	40	98
			TRH C15-C28	mg/kg	45	<45	<45	40	98
			TRH C29-C36	mg/kg	45	<45	<45	40	85
			TRH C37-C40	mg/kg	100	<100	<100	-	-
			TRH C10-C36 Total	mg/kg	110	<110	<110	-	-
			TRH >C10-C40 Total (F bands)	mg/kg	210	<210	<210	-	-
		TRH F Bands	TRH >C10-C16	mg/kg	25	39	<25	40	98
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	35	<25	-	-
			TRH >C16-C34 (F3)	mg/kg	90	<90	<90	40	95
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	-	-

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE215752.001	LB217480.004	Monocyclic Aromatic	Benzene	mg/kg	0.1	3.2	<0.1	5	64
			Toluene	mg/kg	0.1	3.3	<0.1	5	65
			Ethylbenzene	mg/kg	0.1	3.3	<0.1	5	66
			m/p-xylene	mg/kg	0.2	6.7	<0.2	10	67
			o-xylene	mg/kg	0.1	3.4	<0.1	5	67

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

VOC's in Soil (continued) — Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE215752.001	LB217480.004	Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	7.9	9.5	10	79
			d8-toluene (Surrogate)	mg/kg	-	8.5	9.2	10	85
			Bromofluorobenzene (Surrogate)	mg/kg	-	6.0	11.0	10	60 ①
		Totals	Total Xylenes	mg/kg	0.3	10	<0.3	-	-
			Total BTEX	mg/kg	0.6	20	<0.6	-	-

Volatile Petroleum Hydrocarbons in Soil — Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE215752.001	LB217480.004		TRH C6-C10	mg/kg	25	59	<25	92.5	64
			TRH C6-C9	mg/kg	20	53	<20	80	66
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	7.9	9.5	10	79
			d8-toluene (Surrogate)	mg/kg	-	8.5	9.2	10	85
			Bromofluorobenzene (Surrogate)	mg/kg	-	6.0	11.0	-	60
		VPH F Bands	Benzene (F0)	mg/kg	0.1	3.2	<0.1	-	-
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	39	<25	62.5	62

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here: https://www.sgs.com.au/~/media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

*	NATA accreditation does not cover the performance of this service.
**	Indicative data, theoretical holding time exceeded.
***	Indicates that both * and ** apply.
-	Sample not analysed for this analyte.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.

①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to relevant report comments for further information.

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F.14 - CHAIN OF CUSTODY DESPATCH SHEET

Project No:	99872.01	**Suburb:**	West Ryde	**To:**	Envirolab Services Pty Ltd
Project Name:	Marsden High School	**Order Number**			12 Ashley Street, Chatswood, NSW 2067
Project Manager:	Lisa Teng	**Sampler:**	TM	**Attn:**	Aileen Hie
Emails:	isa.Teng@douglaspartners.com.a			**Phone:**	
Date Required:	Standard ☐			**Email:**	Ahie@envirolab.com.au

Prior Storage: Fridge/freezer   Do samples contain 'potential' HBM? No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Sample ID	Depth Range	Lab ID	Date Sampled	Sample Type: S - soil W - water	Container Type: G - glass P - plastic	Analytes: COMBO 8A	COMBO 3A	COMBO 3	pH and CEC	hold	TRH BTEX	Combo 8			Notes/preservation
BH16	0-0.1	30	19/01/21	S	G	x									Relinquished by EIS sue Cmylom 22/1/21 a00 am
BH16	0.9-1.0	31	19/01/21	S	G					X					
BH17	0.4-0.5	32	19/01/21	S	G	X									
BH18	0-0.1	33	19/01/21	S	G		x								
BH19	0.4-0.5	34	18/01/21	S	G	X									Envirolab Services 12 Ashley St Chatswood NSW 2067 Ph: (02) 9910 6200
BH19	1.4-1.5	35	18/01/21	S	G										Job No: 260039
BH20	0-0.1	36	18/01/21	S	G	x									Date Received: 21/01/21
BH21	0-0.1	37	19/01/21	S	G	X									Time Received: 16:40
BH22	0.4-0.5	38	18/01/21	S	G		x								Received By:
BH23	0.4-0.5	39	19/01/21	S	G		x								Temp: Cool/Ambient Cooling: Ice/Icepack
BD1/20210118	-	40	18/01/21	S	G							x			Security: Intact/Broken/None
BD10/20210119	-	41	19/01/21	S	G			x							
BD2/20210118	-	42	18/01/21	S	G			x							
BD6/20210119	-		19/01/21	S	G							x			SEND AS INTERLAB TO SGS
Trip Spike		43	18-19/01/21	S	G						x				
PQL (S) mg/kg													ANZECC PQLs req'd for all water analytes		

SGS EHS Sydney COC
SE215773

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container: **Relinquished by:** **Transported to laboratory by:**

Send Results to: Douglas Partners Pty Ltd **Address** **Phone:** **Fax:**

Signed: **Received by:** Envirolab m **Date & Time:** 21/01/21 16:40

Received by: George Zhi 22/1/21 @ 3:35pm

SGS

SAMPLE RECEIPT ADVICE

SE215773

CLIENT DETAILS

Contact	Lisa Teng
Client	DOUGLAS PARTNERS PTY LTD
Address	96 Hermitage Road West Ryde NSW 2114
Telephone	02 9809 0666
Facsimile	02 9809 4095
Email	lisa.teng@douglaspartners.com.au
Project	**99872.01 Marsden High School**
Order Number	(Not specified)
Samples	1

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Fri 22/1/2021
Report Due	Mon 1/2/2021
SGS Reference	**SE215773**

SUBMISSION DETAILS

This is to confirm that 1 sample was received on Friday 22/1/2021. Results are expected to be ready by COB Monday 1/2/2021. Please quote SGS reference SE215773 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	Client	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	1 Soil
Date documentation received	22/1/2021	Type of documentation received	COC
Number of eskies/boxes received		Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	17°C
Sufficient sample for analysis	Yes	Turnaround time requested	Standard

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

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SGS

SAMPLE RECEIPT ADVICE

SE215773

CLIENT DETAILS

Client DOUGLAS PARTNERS PTY LTD

Project 99872.01 Marsden High School

SUMMARY OF ANALYSIS

No.	Sample ID	OC Pesticides in Soil	OP Pesticides in Soil	PAH (Polynuclear Aromatic Hydrocarbons) in Soil	PCBs in Soil	Speciated Phenols in Soil	TRH (Total Recoverable Hydrocarbons) in Soil	VOC's in Soil	Volatile Petroleum Hydrocarbons in Soil
001	BD6/20210119	29	14	26	11	18	10	11	7

CONTINUED OVERLEAF

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details.
Testing as per this table shall commence immediately unless the client intervenes with a correction .

SGS

SAMPLE RECEIPT ADVICE

SE215773

CLIENT DETAILS

Client: DOUGLAS PARTNERS PTY LTD

Project: 99872.01 Marsden High School

SUMMARY OF ANALYSIS

No.	Sample ID	Mercury in Soil	Moisture Content	Total Recoverable Elements in Soil/Waste
001	BD6/20210119	1	1	7

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details.
Testing as per this table shall commence immediately unless the client intervenes with a correction .

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Report on
Preliminary Site (Contamination) Investigation

Marsden High School Repurposed to Netball Facility
Marsden High School, Ryde

Prepared for
School Infrastructure New South Wales (SINSW)

Project 99872.01
December 2020

Integrated Practical Solutions

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Document History

Document details

Project No.	99872.01	Document No.	R.001.Rev0
Document title	Report on Preliminary Site (Contamination) Investigation Marsden High School Repurposed to Netball Facility		
Site address	Marsden High School, Ryde		
Report prepared for	School Infrastructure New South Wales (SINSW)		
File name	99872.01.R.001.Rev0		

Document status and review

Status	Prepared by	Reviewed by	Date issued
Revision 0	Jack Hinchliffe	Paul Gorman	16 December 2020

Distribution of copies

Status	Electronic	Paper	Issued to
Revision 0	1	-	Roman Pilch, School Infrastructure New South Wales (SINSW)

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

	Signature	Date
Author		16 December 2020
Reviewer	P. Gorman	16 December 2020

bsi. ISO 9001 Quality Management
FS 604853

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Executive Summary

This Preliminary Site (Contamination) Investigation (PSI) has been undertaken for Marsden High School (the site), located at 22a Winbourne Street, West Ryde. It is understood that the school will be relocated to a nearby campus as part of wider education upgrades in the Ryde Local Government area. The existing school grounds are proposed to be developed to a new netball facility once the school has relocated. Specific details of the development have not been confirmed at this early stage.

The objective of the PSI is to assess the potential for contamination at the site based on past and present land uses and to inform and refine a proposed intrusive investigation and / or management with regard to the proposed development. It is understood that the report will be used to support the initial master planning phase and concept / schematic design process of the project.

The PSI comprised a desktop study and search of the relevant site history documentation including a review of the title deeds, historical aerial photography, previous investigation reports and search of the public registers and planning records.

The site history information suggests that the site has been owned by the NSW Government and used as a school since at least the 1960s. Information on historical aerial photographs suggest that the site has continued to be developed since the 1960's into the school as it is currently. Prior to becoming a school, the site appeared to have been vacant since at least the 1930s and it is unknown what the site may have been used for prior to this, but aerial imagery indicates the site may have been used for agricultural purposes.

Based on the outcomes of this PSI it is considered that the risk of significant or widespread contamination at the site is low to moderate, given the risk of asbestos on the ground or in the fill, other potential contaminants in the fill and some possible low level application of herbicides and pesticides at the site.

In order to achieve an outcome of stating that the site is suitable or can be made suitable for the proposed development (as required under SEPP55), it is recommended that an intrusive investigation is undertaken as proposed herein. It is recommended that the intrusive works include a soil and groundwater assessment and depending on the proposed development design, a preliminary waste classification. Given the intrusive investigation is proposed to be undertaken prior to demolition of the buildings on site, a limited sampling program is recommended with additional sampling following demolition to assess the areas within the footprints of the buildings. An updated hazardous material building survey is also recommended for the site prior to renovation or demolition works.

This document should be read in its entirety for any future planning purposes.

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Appendix A: Notes About this Report
Drawing 1
Appendix B: Asbestos Register (Prepared by Greencap, 13-AUG-2014)
Appendix C: Site History Information
Appendix D: Historical Aerials
Appendix E: Site Photographs

Report on Preliminary Site (Contamination) Investigation (Contamination)
Marsden High School Repurposed to Netball Facility
Marsden High School, Ryde

1. Introduction

Douglas Partners Pty Ltd (DP) has been engaged by School Infrastructure New South Wales (SINSW) to complete this Preliminary Site (Contamination) Investigation (Contamination) (PSI) undertaken for a proposed redevelopment of Marsden High School (the site) into a netball facility. The site is shown on Drawing 1, Appendix A.

The investigation was undertaken in accordance with DP's proposal SYD201127 dated 16 October 2020.

It is understood that the school will be relocated to a nearby campus as part of wider education upgrades in the Ryde Local Government area. The existing school grounds are proposed to be developed to a new netball facility once the school has relocated. Specific details of the development have not been confirmed at this early stage

The objective of the PSI is to assess the potential for contamination at the site based on past and present land uses and to inform and refine a proposed intrusive investigation and / or management with regard to the proposed development. It is understood that the report will be used to support the initial master planning phase and concept / schematic design process of the project.

This report must be read in conjunction with all appendices including the notes provided in Appendix A.

The PSI was undertaken concurrently with a desktop geotechnical investigation[1] which is reported under a separate cover.

The following key guidelines were consulted in the preparation of this report:

- NEPC National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM] (NEPC, 2013);
- NSW EPA Guidelines for Consultants Reporting on Contaminated Land (NSW EPA, 2020); and
- NSW DUAP/EPA. (1998). Managing Land Contamination, Planning Guidelines, SEPP 55 - Remediation of Land. NSW Department of Urban Affairs and Planning / Environment Protection Authority (SEPP55).

[1] Douglas Partners Pty Ltd, *'Report on Geotechnical Assessment, Marsden High School Repurposed to Netball Facility, Marsden High School, Ryde*, dated November 2020, reference: 99872.00.R.001 (DP, 2020);

2. Scope of Works

The scope of works conducted for the investigation comprised the following:

- Review of the following site/history information:
  - Section 10.7 (2&5) Planning Certificates;
  - Asbestos register (Prepared by Greencap, 13 August 2014); and
  - SafeWork NSW records on dangerous goods.
- Review of the following site / history information records, obtained by DP:
  - Historical aerial photographs;
  - Historical title deeds;
  - NSW EPA databases held under the CLM and POEO Acts for the site and adjoining properties;
  - Registered groundwater bores;
  - Regional geological, soil and hydrogeological mapping; and
  - Acid sulphate soil and salinity risk maps.
- A site walkover to determine current and (if possible) recent land use and assess the potential for contaminating activities;
- Development of a preliminary conceptual site model (CSM) outlining potential contamination sources, transport pathways and receptors; and
- Preparation of this report detailing the methodology and results of the investigation with reference to NSW EPA approved guidelines and provides recommendations to assist future stages of the design and delivery of the project.

3. Site Information

Site Address	Marsden High School, Ryde
Legal Description	Lot 1, Deposited Plan 220808
Area	Approximately 5.5 ha
Zoning	Zone SP2 Infrastructure
Local Council Area	Ryde City Council
Current Use	High School
Surrounding Uses	North - Residential East - Residential and Public Park South - Ermington Public School West - Residential

Figure 1: Site Location

4. Environmental Setting

Regional Topography	The areas surrounding site generally slope sharply in north-east and south-east directions towards Archers Creek which runs along the eastern side of the site.
Site Topography	The overall site slopes down from the north western corner to the south east towards Archer Creek. The surface levels across the site fall from about RL 42 m relative to Australian Height Datum (AHD) near the north western corner to about RL 30 m, AHD on the south eastern corner.
Soil Landscape	Reference to Sydney 1:100,000 Soils Landscape Sheet indicates that the site is within Glenorie soil landscape which typically comprises undulating to rolling low hills on Wianamatta Group shales.

Geology	Reference to Sydney 1:100,000 Geology Sheet indicates that the site is underlain by Wianamatta Group Ashfield Shale; black to dark-grey shale and laminate sedimentary rock the from Triassic age.
Acid Sulfate Soils	Reference to the 1:25 000 Acid Sulphate Soils (ASS) Risk map indicates that the site is in an area of no known occurrence of acid sulphate soils.
Surface Water	Archers Creek is present along the eastern portion of the site and flows south-east downgradient, surface water is expected to infiltrate into exposed soils, sheet east into Archers Creek and stormwater drains at Brush Road.
Groundwater	No registered groundwater bores are located within 1 km of the site. No free groundwater was observed during previous investigations at the site (refer Section 6.

Further detail on the environmental setting is provided in DP (2020).

5. Site History Information

5.1 Title Deeds

A historical title deeds search was used to obtain ownership and occupancy information including company names and the occupations of individuals. The title information can assist in the identification of previous land uses by the company names or the site owners and can, therefore, assist in establishing whether there were potentially contaminating activities occurring at the site. A summary of the title deeds and possible land uses (with reference to the aerial photographs and other historical searches) is presented in Table 1.

Table 1: Historical Title Deeds

Date of Acquisition and Term Held	Registered Proprietor(s) & Occupations	Inferred Land Use
Lot 1 in DP220808		
As regards the parts numbered (1) on the attached Cadastral Records Enquiry Report		
03.04.1913 (1913 to 1945)	John Barlow (Cane Grower)	Vacant/ Agricultural
01.05.1945 (1945 to 1948)	Ewald Wezgal (Wharf Labourer)	Vacant/ Agricultural
29.07.1948 (1948 to 1958)	Housing Commission of New South Wales	Vacant/ Agricultural
30.06.1958	Her Most Gracious Queen Elizabeth the Second (For the purposes of the Public Instruction Act)	School
30.06.1958	# Minister of Public Instruction	School

Date of Acquisition and Term Held	Registered Proprietor(s) & Occupations	Inferred Land Use
(1958 to date)	Now # Minister for Education	
As regards the parts numbered (2) on the attached Cadastral Records Enquiry Report		
17.07.1895 (1895 to 1920)	Adam Spies (Fruitgrower)	Vacant/ Agricultural
04.03.1920 (1920 to 1947)	Michael Spies (Plumber) Franz Spies (Hairdresser) (Transmission Application not investigated)	Vacant/ Agricultural
10.05.1947 (1947 to 1948)	Franz Spies (Hairdresser)	Vacant/ Agricultural
29.07.1948 (1948 to 1958)	Housing Commission of New South Wales	School
30.06.1958 (1958 to date)	# Minister of Public Instruction Now # Minister for Education	School
As regards the parts numbered (3) on the attached Cadastral Records Enquiry Report		
31.08.1965 (1965 to	# Minister of Public Instruction Now # Minister for Education	School

5.2 Historical Aerial Photography

Several historical aerial photographs were obtained from public databases. Extracts of the aerial photographs are included in Appendix D. A summary of key features observed for the site and surrounding land is presented in Table 2.

Table 2: Summary of Historical Aerial Photographs

Year	Site	Surrounding Land Use
1951	The entirety of the site is occupied by agricultural farmland, small buildings and sheds occupy the areas to the north-east and southern portions of site. Archer Creek appears to bisect the site flowing north-west to south-east.	The surrounding lands are occupied by low-density residential dwellings and agricultural farmland. Both Winbourne Street and Brush Road are sealed roads that become unsealed private roads leading to large agricultural properties north of site.

Year	Site	Surrounding Land Use
1961	The entirety of the site has been cleared and the school has been constructed. School buildings occupy the north-west corner of the site. The remaining area of the site is cleared and assumed to be the playing fields. Archer Creek still bisects the site partially through piping that has been installed at the south-eastern corner of site. No other significant changes compared to the 1951 aerial photograph.	The southern extent of the aerial, displaying the area south of site is incomplete. Ermington Public School has been constructed along the southern border of site. There has been a large increase in low density residential housing replacing the previous agricultural lands. No other significant changes to surrounding areas compared to the 1951 aerial photograph.
1971	The School buildings have been extended in the northern portion of site. Archer Creek has potentially been filled and no longer flows through site, although may be piped beneath the site. No other significant changes compared to the 1961 aerial photograph.	The areas surrounding site is now dominated by low density residential housing. No other significant changes to surrounding areas compared to the 1961 aerial photograph.
1978	No significant changes compared to the 1971 aerial photograph.	No significant changes to surrounding areas compared to the 1971 aerial photograph.
1986	The School buildings have been extended in the northern portion of site. No other significant changes compared to the 1978 aerial photograph.	No significant changes to surrounding areas compared to the 1978 aerial photograph.
1991	No significant changes compared to the 1986 aerial photograph.	No significant changes to surrounding areas compared to the 1986 aerial photograph.
2005	A school building at the south-western corner of the site has been extended east. No other significant changes compared to the 1991 aerial photograph.	No significant changes to surrounding areas compared to the 1991 aerial photograph.
2011	A school building that appears to be connected to Ermington Public School has been constructed and is within the south western boundary of site. No other significant changes compared to the 2011 aerial photograph.	No significant changes to surrounding areas compared to the 2005 aerial photograph.
2020	No significant changes compared to the 2011 aerial photograph.	No significant changes to surrounding areas compared to the 2011 aerial photograph.

5.3 Public Registers and Planning Records

EPA Notices	Three contaminated sites notified to the EPA were within a 1 km buffer to the site: • A biopharmaceutical company Pfizer Australia listed as a Chemical Industry [532 m south-west of the site]; • Blue Star Ermington Service Station [577 m south-west of the site]; and • Consumer goods manufacturing Reckitt Benckiser listed as a Chemical Industry [870 m south-west of the site]. All sites were listed as not required to be regulated by the EPA. Accessed 17/11/2020.
EPA Licences	Two formerly licensed activities were identified within a 1 km buffer to the site (Pfizer Australia and Reckitt Benckiser respectively). These activities were licensed as 'chemical activities' and located from 530 m to 870 m south-east of the site. Accessed 17/11/2020.
SafeWork NSW	A search of the SafeWork NSW records of Schedule 11 Hazardous Chemicals on Premises was undertaken on 10 November 2020. No records were located for the site. The letter summarising the results of the search is appended in Appendix C.
Planning Certificate(s)	Section 10.7 Planning Certificates provided by Ryde City Council revealed that council did not identify the site as contaminated, being contaminated, having been remediated or being remediated. The planning certificates are appended in Appendix C.

5.4 Asbestos Register

The Asbestos Register for the site obtained from the NSW Department of Education outlines the results of an asbestos survey last reviewed by Greencap in 2020. The register indicates that asbestos is present in various forms in many of the buildings on the site.

The register also noted that '*No previous investigations have been recorded against the school. However, asbestos containing materials maybe present in grounds from time to time and caution must be exercised prior to any grounds disturbance.*' A copy of the register is provided in Appendix B.

5.5 Site History Integrity Assessment

The information used to establish the history of the site was sourced from reputable and reliable reference documents, many of which were official records held by Government departments / agencies. The databases maintained by various Government agencies potentially can contain high quality information, but some of these do not contain any data at all.

In particular, aerial photographs provide high quality information that is generally independent of memory or documentation. They are only available at intervals of several years, so some gaps exist in the information from this source. The observed site features are open to different interpretations and can be affected by the time of day and / or year at which they were taken, as well as specific events, such as flooding. Care has been taken to consider different possible interpretations of aerial photographs and to consider them in conjunction with other lines of evidence.

5.6 Summary of Site History

The site history information suggests that the site has been owned by the NSW Government and used as a school since at least 1961. Information on historical aerial photographs suggest that the site has continued to be developed since the 1960's into the school as it is currently. Prior to becoming a school, the site appeared to have been utilised for agricultural purposes at least the 1950s and it is unknown what the site may have been used for prior to this.

6. Previous Investigations

DP has carried out previous geotechnical and contamination investigations at Ermington Public School, which is located immediately adjacent to the southern boundary of Marsden High School, for the then proposed communal hall/toilets and covered outdoor learning area (COLA), as part of the Building the Education Revolution (BER) program. Part of the new hall is located within the current site boundary (south-west corner of the site), as shown on Drawing 1, Appendix A.

The previous investigation generally encountered:

- **FILL:** Silty sand fill to depths of between 0.15 m and 0.4 m and some locally placed gravelly clay fill and sand and sandstone cobbles to 0.8 m depth; overlying
- **RESIDUAL CLAY/SHALY CLAY:** Stiff, very stiff and hard clay and slightly silty clay with a trace of ironstone gravel and rootlets to depths of between 1.0 m and 2.1 m; overlying
- **SHALE:** Extremely weathered shale becoming very low to low strength shale below depths of between 0.8 m and 2.1 m, with practical auger refusal at depths of between 1.4 m and 2.2 m. Low strength shale was interpreted in one of the boreholes below 1.0 m depth, with auger refusal encountered on low to medium strength shale at 1.5 m. A 50 mm thick high-strength ironstone band was encountered at 1.7 m depth in another borehole.

No free groundwater was observed during the field work from previous investigations. It should be noted that groundwater levels are transient and that fluctuations may occur in response to climatic and seasonal conditions.

Laboratory testing on selected samples from the previous investigation was measured against site assessment criteria for health-based investigation levels 'HIL A' which includes residential with garden/accessible soil, day care centres, preschools and primary schools. The laboratory results for the analysed soil samples revealed that all analyte concentrations were within the adopted site assessment criteria. The filing of the site was also considered to be assigned a preliminary waste classification of General Solid Waste. The report considered the nominated site to be environmentally suitable for the proposed development of the current school hall.

7. Site Walkover

7.1 Observations

A site walkover was undertaken by an environmental scientist on 19 November 2020. The general site topography was consistent with that described in Section 4. The site layout appears to have remained unchanged from the 2020 aerial photograph (Drawing 1, Appendix A). The following key site features pertinent to the PSI were observed (refer to photographs in Appendix E and site plan in Appendix A):

- Evidence of potential fill given the numerous retaining walls across the school;
- Mulch applied across the school grounds and sports field, acting to help attenuate surface water flooding / erosion of the school oval;
- General waste storage was located in council provided waste bins;
- The north western buildings were utilised for the school office, library, and classrooms. The area was mostly covered with asphaltic concrete, which appeared to have multiple areas which have been patched;
- A school assembly area (COLA) and sports courts were located in the centre of the school buildings in the north-west, the sport courts consisted of a sealed asphaltic concrete, uncovered area in good condition;
- A school canteen was present as part of north-west buildings and opened to the cola. The canteen was closed at the time and no evidence of a grease trap was identified;
- The bathrooms were located at the eastern end of the COLA, with sewer pits visible both south-east and north-east of the building;
- A small storage alcove in the eastern most building in the north west and a large shipping container were used for storage of groundskeeping equipment and chemicals;
- Multiple raised garden beds were also present on the eastern edge of the north-west buildings;
- Archers Creek was present in the north east in a well vegetated area with a series of concrete steps that cut through the vegetated area and Archer Creek for access to the eastern edge of the site;
- An unsealed carpark was utilised by the teaching staff was present at both the north-western corner and eastern edge of the site;
- The south eastern area of the school was mostly occupied by the sports field, consisting of patches of exposed bare ground, likely to be fill although no significant anthropogenic materials were visible and maintained grassland;
- A small and covered basketball / netball court was present at the south-western corner of the site and backed onto the sports field. The court consisted of a sealed asphaltic concrete covered by a plastic lining; and
- The school hall backed on to the adjacent basketball / netball court at the western boundary of site. The building was in relatively good condition.

8. Preliminary Conceptual Site Model

A Conceptual Site Model (CSM) is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM provides the framework for identifying how the site became contaminated and how potential receptors may be exposed to contamination either in the present or the future i.e., it enables an assessment of the potential source - pathway - receptor linkages (complete pathways).

Potential Sources and Areas of Environmental Concern

Based on the current investigation, the following potential sources of contamination and associated contaminants of potential concern (COPC) have been identified.

- S1: Fill: Associated with levelling and forming the site;
  - COPC include metals, total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene, xylene (BTEX), polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), organochlorine pesticides (OCP), organophosphorus pesticides (OPP), phenols and asbestos.
- S2: Previous and current general site maintenance and previous agricultural activities (including low level application of pesticides, fertilisers and herbicides);
  - COPC include OPPs, OCPs, metals and herbicides.
- S3: Former buildings and renovations of current buildings on-site;
  - COPC include asbestos, synthetic mineral fibres (SMF), lead (in paint) and PCB.
- S4: Unsealed carparks on-site;
  - COPC include metals (lead), TRH, BTEX and PAHs.

Potential Receptors

The following potential human receptors have been identified:

- R1: Current users [secondary school];
- R2: Construction and maintenance workers;
- R3: End users [public (open space)]; and
- R4: Adjacent site users [primary school and residential].

The following potential environmental receptors have been identified:

- R5: Surface water [Archer Creek];
- R6: Groundwater; and
- R7: Terrestrial ecology.

Potential Pathways

The following potential pathways have been identified:

- P1: Ingestion and dermal contact;

- P2: Inhalation of dust and/or vapours;
- P3: Surface water run-off;
- P4: Lateral migration of groundwater providing base flow to water bodies (Archer Creek);
- P5: Leaching of contaminants and vertical migration into groundwater; and,
- P6: Contact with terrestrial ecology.

Summary of Potentially Complete Exposure Pathways

A 'source - pathway - receptor' approach has been used to assess the potential risks of harm being caused to human or environmental receptors from contamination sources on or in the vicinity of the site, via exposure pathways (potential complete pathways). The possible pathways between the above sources (S1 to S4) and receptors (R1 to R7) are provided in below Table 6.

Table 6: Summary of Potentially Complete Exposure Pathways

Source and COPC	Transport Pathway	Receptor	Risk Management Action
S1: Fill COPC: Metals, TRH, BTEX, PAH, OPP, OCP, PCB and asbestos. S2: Previous and current general site maintenance and agricultural use COPC: OPPs, OCPs, metals and herbicides. S4: Unsealed carparks COPC: metals, TRH, BTEX and PAHs.	P1: Ingestion and dermal contact P2: Inhalation of dust and/or vapours	R1: Current users [secondary school] R2: Construction and maintenance workers R3: End users [public (open space)] R4: Adjacent site users [primary school and residential]	An intrusive investigation is recommended to assess possible contamination including testing of the soil and groundwater. This can be undertaken in a staged manner whereby the soil results may inform the need for a groundwater assessment.
	P3: Surface water run-off P4: Lateral migration of groundwater providing base flow to water bodies	R5: Surface water [Archer Creek]	
	P5: Leaching of contaminants and vertical migration into groundwater	R6: Groundwater	
	P6: Contact with terrestrial ecology	R7: Terrestrial ecology	
S3: Former buildings and renovations of current buildings on site	P1: Ingestion and dermal contact P2: Inhalation of dust and/or vapours	R1: Current users [secondary school] R2: Construction and maintenance workers	To complement the asbestos register previously generated, a hazardous building

Source and COPC	Transport Pathway	Receptor	Risk Management Action
COPC: Asbestos, SMF, lead (in paint) and PCB		R3: End users [public (open space)] R4: Adjacent site users [primary school and residential]	materials survey is recommended to update the current register and identify any SMF, lead paint and PCB in the buildings.
	P5: Leaching of contaminants and vertical migration into groundwater	R6: Groundwater	As mentioned above, an intrusive investigation is recommended to assess the potential impact on the soil and, if impacted, asses the risk to groundwater.

9. Conclusions and Recommendations

The objective of the PSI is to assess the potential for contamination at the site based on past and present land uses and to inform and refine a proposed intrusive investigation and/or management with regard to the proposed development. It is understood that the report will be used to support the initial master planning phase and concept / schematic design process of the project.

Based on the outcomes of this PSI it is considered that the risk of significant or widespread contamination at the site is low to moderate, given the risk of asbestos on the ground or in the fill, other potential contaminants in the fill and some possible low level application of herbicides and pesticides around the site.

In order to achieve an outcome of stating that the site is suitable or can be made suitable for the proposed development (as required under SEPP55), it is recommended that an intrusive investigation is undertaken, including:

- An assessment of the contaminant risk in the soil and groundwater relative to the proposed land use. Given an intrusive investigation is proposed to be undertaken prior to demolition of the buildings on site, a limited sampling program is recommended with additional sampling following demolition to assess the areas within the footprints of the buildings; and
- A preliminary waste classification (depending on whether the proposed development design involves any excavation and spoil removal from site).

Additionally, as the buildings on the site are considered likely to contain hazardous building materials given their age, an updated hazardous material building survey and subsequent appropriate removal or management of any identified hazardous materials (such as asbestos, lead paint, SMF and PCBs) in accordance with relevant legislation and guidelines should be undertaken prior to renovation or demolition works.

10. References

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013);
- NSW EPA *Guidelines for Consultants Reporting on Contaminated Land* (NSW EPA, 2020); and
- NSW DUAP/EPA. (1998). *Managing Land Contamination, Planning Guidelines, SEPP 55 - Remediation of Land.* NSW Department of Urban Affairs and Planning / Environment Protection Authority (SEPP55).

11. Limitations

Douglas Partners (DP) has prepared this report for this project at Marsden High School, West Ryde in accordance with DP's proposal SYD201127.P.001.Rev0 dated 16 October 2020 and acceptance received from SINSW01425/20 dated 20 October 2020. This report is provided for the exclusive use of School Infrastructure NSW for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk. This design process requires risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of DP. DP may be able, however, to assist the client in carrying out a risk assessment of potential hazards contained in the Comments section of this report, as an extension to the current scope of works, if so requested, and provided that suitable additional information is made available to DP. Any such risk assessment would, however, be necessarily restricted to the (environmental) components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

Douglas Partners Pty Ltd

Appendix A

Notes About this Report

Drawing 1

About this Report

Introduction
These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright
This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs
The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater
Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports
The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

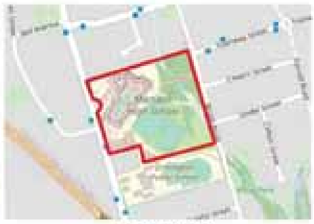
Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

D21/78776



LOCALITY MAP

Notes:
1. Basemap from metromap.com (dated 29/08/2020).
2. Boundary is approximate only.

Legend

Site Boundary

0 25 50 75 100 m

Douglas Partners Geotechnics / Environment / Groundwater	CLIENT: School Infrastructure New South Wales (SINSW)		TITLE: **Site Location Plan**	PROJECT No: 99872.01
	OFFICE: Sydney	DRAWN BY: JH	**Marsden High School Repurposed to Netball Facility**	DRAWING No: 1
	SCALE: 1:1450 at A3	DATE: 17.11.2020	**Marsden High School, Ryde**	REVISION: 0

Appendix B

Asbestos Register (Prepared by Greencap, 13-AUG-2014)

D21/78776

Asbestos Register

(Hazardous Materials and Risk Assessment)

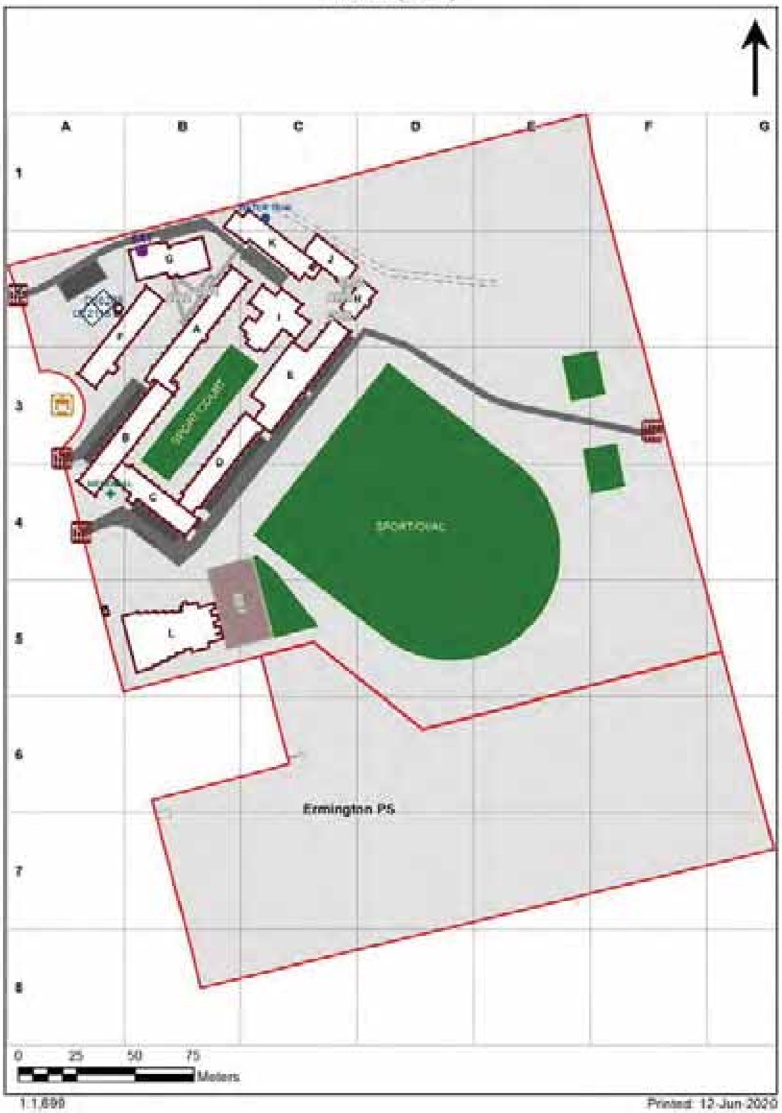
NSW Government | Education School Infrastructure

School:	**Marsden High School (8225)**
Region:	**Northern Sydney AMU**
State Electorate:	**Ryde**
Local Government Area:	**Ryde**

Last Reviewed By:	Greencap 13-AUG-2014
Last Revised By:	Greencap 25-JUL-2020

Historical Fibro In Grounds Investigations/Events	**No**
No previous investigations have been recorded against the school. However, asbestos containing materials maybe present in grounds from time to time and caution must be exercised prior to any grounds disturbance.	

8225 - Marsden High School
Site Plan (10751)



1:1,699 Printed: 12-Jun-2020

Preface to Asbestos Register

Limitations

Asbestos Registers established (first surveyed 2007/08) and maintained for the Department of Education (DoE) are limited in extent, in that:

1. All inspections and surveys of materials and finishes in DoE facilities are non-disturbance, with
2. Samples undertaken by hygienist to determine whether a sample is an Asbestos Containing Material (ACM),
3. The hygienist may apply a single sample to like materials within a space and adjoining spaces, but not normally between buildings,
4. Successive inspections have reduced any inconclusive records such as 'assumed asbestos' in difficult to access areas, by undertaking additional sampling with lifting devices.
5. In compliance with WHS Act 2011 and WHS Regulations 2017, additional inspections have been undertaken in ceiling spaces and sub-floor areas where access is possible.
   - Where the ground floor is slab on ground, no inspection is made beneath the slab.
   - Where fibro fragments (ACM taken for sampling) are located in ceiling spaces or sub floor voids air monitoring is normally undertaken at time of sampling, and clearance undertaken as soon as practicable.
6. No attempt has been made to identify any ACM that is hidden from view or encapsulated within
   - Any wall cavity
   - Sub floor area, particularly formwork for slabs in/on ground,
   - Services (that may use ACM) such as: pipe lagging, asbestos cement pipes, flues.
7. All known ACM in Grounds (Fibro in Grounds) is made available in associated site specific asbestos management plans in DoE electronic files. Notwithstanding information provided, ACM may be present in grounds from time to time and caution must be exercised prior to any grounds disturbance.

Use of the Asbestos Register

Prior to any disturbance works being undertaken in a building to which this asbestos register applies it will be necessary to confirm the extent of any ACM by a disturbance investigation:

- If the building was built prior to 2003
- If any ACM has been identified in the Asbestos Register for the building.

Update of Asbestos Registers

Asbestos Register Data is updated regularly by the DoE Hygienist Panel via the Online Asbestos Register Tool (Managed by Business Systems, School Infrastructure NSW). Internal users can view the latest edition of the Asbestos Register in the AMS.

Please note: The Department's external website may not contain the latest revision of the Asbestos Register.

Notes 1: Vermiculite

- During 2018/19, all vermiculite occurrences in DoE schools identified in 2007/08, were 'composite tested' in accordance with a safe work NSW agreed procedure. This required multiple testing of all vermiculite occurrences.
- During the period 2007/08 to 2018/19, some vermiculite has been over sheeted and a warning is indicated for schools where this has happened.

Note 2: DoE website link for information is here:

https://www.schoolinfrastructure.nsw.gov.au/about-us/workingwithus/schools-asbestos-register.html
https://education.nsw.gov.au/about-us/strategies-and-reports/our-reports-and-reviews/schools-asbestos-register

Note 3: Material Condition Assessment

The material condition assessment descriptors from Section 3 of the Asbestos Management Plan (AMP) is extracted below. Please read the AMP in its entirety for further information.

3.3.2.1 Material condition assessment

The OART records the material condition of identified ACM in the following format:

Rating	Description
Good condition (1)	For non-friable asbestos that is sealed and has no visible damage. This primarily related to asbestos cement (AC) sheet and vinyl tiles
Minimal damage (2)	For non-friable asbestos that has a very small amount of damage, eg hairline cracks.
Some damage / unsealed (3)	For non-friable asbestos with significant breakage or several small areas where material has been damaged, revealing loose asbestos fibres. Non-friable asbestos that is unsealed.
Poor condition (4)	For non-friable asbestos that has extensive damage. Visible asbestos debris
Friable asbestos (5)	Any occurrence of friable asbestos

Product	Material Description	Extent	Location	Material Condition	Risk Status	Remediation Priority	Result
B00A - Technological & Applied Studies/Science Learning - 1959 - Concrete Framed							
Exterior							
Eaves Linings	Flat AC Sheeting	6.00m2	North facing, South facing	Good Condition (1)	Low (1)	Low Priority (2-3)	Assumed Asbestos
Gable Verge Lining	Flat AC Sheeting	20.00m2	North facing, South facing	Good Condition (1)	Low (1)	Low Priority (2-3)	Assumed Asbestos
Ceiling Voids	No Asbestos Found						
Underfloor Voids	No Asbestos Found						
Interior							
B00A - R0001 - Food Technology L.S. - 64.14 m2							
No Asbestos							
B00A - R0010 - Staff Study - 25.07 m2							
No Asbestos							
B00A - R0011 - Main Switchroom - 6.44 m2							
No Asbestos							
B00A - R0012 - Shower - 6.42 m2							
No Asbestos							
B00A - R0013 - Laboratory L.S. - 88.48 m2							
No Asbestos							
B00A - R0014 - Preparation - Science - 27.42 m2							
Plant / Equipment - Fume Cupboard	Fibre Cement Pipe	1.00	Above ceiling	Good Condition (1)	Low (1)	Low Priority (2-3)	
B00A - R0016 - Food Technology L.S. - 38.61 m2							
No Asbestos							
B00A - R0017 - Food Technology L.S. - 91.3 m2							
No Asbestos							
B00A - R0018 - Laundry - 8.52 m2							
No Asbestos							
B00A - R0019 - Preparation - Materials - 16.74 m2							
No Asbestos							
B00A - R0020 - General Storeroom - 4.17 m2							
No Asbestos							
B00A - R0021 - Movement - 143.63 m2							
No Asbestos							
B00A - R0022 - Stairs - 1.56 m2							
No Asbestos							
B00A - R0023 - External Movement - 7.32 m2							
Ceiling Structures/Linings	Flat AC Sheeting	8m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R0024 - External Movement - 2.59 m2							
No Asbestos							
B00A - R1001 - Materials Technology L.S. - 65.15 m2							
Floor Coverings Res/Textile	Vinyl Tiles	66.00m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1002 - General Storeroom - 12.57 m2							
Floor Coverings Res/Textile	Vinyl Tiles	13.00m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)

B00A - R1003 - Resources Store - 6.07 m2							
Floor Coverings Res/Textile	Vinyl Tiles	6.00m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1004 - Computer Learning Space - 65.26 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	66.00m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1005 - Resources Store - 6.07 m2							
Floor Coverings Res/Textile	Vinyl Tiles	7.00m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1006 - Computer Learning Space - 65.33 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	66m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1007 - Practice/Seminar - 19.12 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	19.00m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1008 - Cleaning Store - Distributed - 2.96 m2							
Floor Coverings Res/Textile	Vinyl Tiles	4.00m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
Electrical - Mounting Board	Resinous Board	1.00	Concealed in cabinet	Good Condition (1)	Low (1)	Low Priority (2-3)	Assumed Asbestos
B00A - R1009 - Resources Store - 2.91 m2							
Floor Coverings Res/Textile	Vinyl Tiles	4m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1010 - General Learning Space - 64.74 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	65.00m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1011 - Performance Workshop - 65.1 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	66.00m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1012 - Staff Study - 3.21 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	4.00m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1014 - Stairs - 15.55 m2							
No Asbestos							
B00A - R1015 - External Movement - 17.39 m2							
Ceiling Structures/Linings	Flat AC Sheeting	2.00m2	West	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00A - R1016 - Movement - 94.33 m2							
B00A - R1017 - Movement - 21.87 m2							
Floor Coverings Res/Textile	Vinyl Tiles	22.00m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00B - General Learning/Music/Science Learning - 1959 - Concrete Framed							
Exterior							
External Wall Structure - Awnings	Flat AC Sheeting						

Eaves Linings	Flat AC Sheeting	6.00m2	North facing, South facing	Good Condition (1)	Low (1)	Low Priority (2-3)	Assumed Asbestos
Gable Verge Lining	Flat AC Sheeting	20.00m2	North facing, South facing	Good Condition (1)	Low (1)	Low Priority (2-3)	Assumed Asbestos
Underfloor Voids	No Asbestos Found						
Ceiling Voids	No Asbestos Found						
Interior							
B00B - R0001 - Leading Teacher - 18.55 m2							
No Asbestos							
B00B - R0002 - Music Store - 2.94 m2							
No Asbestos							
B00B - R0003 - Laboratory L.S. - 87.18 m2							
No Asbestos							
B00B - R0004 - Apparatus Storage - 16.78 m2							
No Asbestos							
B00B - R0005 - Laboratory L.S. - 87.18 m2							
No Asbestos							
B00B - R0008 - Office/Store - 42.76 m2							
No Asbestos							
B00B - R0013 - Preparation - Science - 38.76 m2							
No Asbestos							
B00B - R0014 - Music Learning Space - 80.86 m2							
No Asbestos							
B00B - R0015 - Handwashing Facilities - .55 m2							
No Asbestos							
B00B - R0016 - Music Store - 12.4 m2							
No Asbestos							
B00B - R0017 - Movement - 2.96 m2							
No Asbestos							
B00B - R0018 - Handwashing Facilities - 1.06 m2							
No Asbestos							
B00B - R0019 - Movement - 88.3 m2							
No Asbestos							
B00B - R1002 - Resources Store - 9.72 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	10m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00B - R1003 - Staff Study - 21.79 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	22m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00B - R1004 - General Learning Space - 52.15 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	52m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00B - R1005 - General Learning Space - 51.86 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	52m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00B - R1006 - General Learning Space - 52.01 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	52m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00B - R1007 - General Learning Space - 52.01 m2							

Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	52m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00B - R1008 - General Learning Space - 51.86 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	52m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00B - R1010 - Resources Store - 6.02 m2							
Floor Coverings Res/Textile	Vinyl Tiles	7m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00B - R1011 - Resources Store - 6.14 m2							
No Asbestos							
B00B - R1012 - Movement - 87.42 m2							
Floor Coverings Res/Textile	Vinyl Tiles	90.00m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00B - R1013 - Movement - 3.82 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	4.00m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00B - R1014 - Tea Room - 2.22 m2							
No Asbestos							
B00B - R1015 - Movement - 2.91 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	3m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00B - R1016 - General Learning Space - 82.21 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	83m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)

B00C - Administration/General Learning - 1959 - Concrete Framed

Exterior							
Eaves Linings	Flat AC Sheeting	6m2	North facing, South facing	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos) , Amosite (brown asbestos)
Gable Verge Lining	Flat AC Sheeting	20m2	North facing, South facing	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos) , Amosite (brown asbestos)
Ceiling Voids	No Asbestos Found						
Underfloor Voids	No Asbestos Found						
Interior							
B00C - R0002 - Resources Store - 10.76 m2							
No Asbestos							
B00C - R0003 - Secure Storeroom - 7.18 m2							
Floor Coverings Res/Textile	Compressed AC Sheet	8m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00C - R0004 - Deputy Principal Office - 14.89 m2							
No Asbestos							
B00C - R0006 - Deputy Principal Office - 14.85 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	15m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00C - R0007 - Administration - Clerical - 5.58 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	6m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00C - R0008 - Administration - Clerical - 11.64 m2							

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Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	12m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00C - R0009 - Principal Office - 16.73 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	17m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00C - R0010 - Staff - Toilet - 3.45 m2							
Wall Linings Internal	Flat AC Sheeting						
B00C - R0012 - Distribution Board Cupboard - .67 m2							**Note: No inspection of live electrical installation**
No Asbestos							
B00C - R0016 - Clinic - 8.09 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	9m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00C - R0018 - Uniform Shop - 10.33 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	11m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00C - R0019 - Printing/Photocopying - 16.56 m2							
No Asbestos							
B00C - R0021 - Public Reception - 33.99 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	34m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00C - R0023 - Administration - Clerical - 34.5 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	35.00m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00C - R0024 - Ancillary Staff - 14.88 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	15m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00C - R0025 - Staff Kitchen - 3.48 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	4m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00C - R0026 - General Storeroom - 6.14 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	7m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00C - R0027 - Toilet - Lobby - 2.94 m2							
No Asbestos							
B00C - R0028 - Staff - Toilet - 5.06 m2							
No Asbestos							
B00C - R0029 - Toilet - Lobby - 2.25 m2							
No Asbestos							
B00C - R0030 - Staff - Toilet - 12.11 m2							
No Asbestos							
B00C - R0031 - Movement - 43.73 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	44m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00C - R0032 - Toilets-Unisex - 8.4 m2							
No Asbestos							
B00C - R0033 - Handwashing Facilities - 1.12 m2							
No Asbestos							
B00C - R0034 - Stairs - 7.23 m2							

No Asbestos							
B00C - R0035 - Computer Learning Space - 42.38 m2							
No Asbestos							
B00C - R0036 - External Movement - 13.47 m2							
Ceiling Structures/Linings	Flat AC Sheeting						
B00C - R1001 - General Learning Space - 65.68 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	67m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00C - R1003 - Resources Store - 4.03 m2							
Floor Coverings Res/Textile	Vinyl Tiles	5m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00C - R1004 - Resources Store - 8.25 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	9m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00C - R1005 - General Learning Space - 52.08 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	53m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00C - R1006 - General Learning Space - 51.86 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	53m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00C - R1007 - Resources Store - 2.91 m2							
Floor Coverings Res/Textile	Vinyl Tiles	4m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00C - R1008 - Cleaning Store - Distributed - 2.94 m2							
Floor Coverings Res/Textile	Vinyl Tiles	3m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00C - R1009 - Interview/Office - Type 1 - 19.09 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	20m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00C - R1010 - Distribution Board Cupboard - .54 m2					**Note: No inspection of live electrical installation**		
No Asbestos							
B00C - R1012 - Staff Study - 23.12 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	24m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00C - R1013 - Tea Room - 2.34 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	3.00m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00C - R1014 - Movement - 77.03 m2							
Floor Coverings Res/Textile	Vinyl Tiles	77.00m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00C - R1015 - Stairs - 15.98 m2							
No Asbestos							
B00D - General Learning - 1959 - Concrete Framed							
Exterior							
Eaves Linings	Flat AC Sheeting	10m2	North facing, South facing	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos) , Amosite (brown asbestos)

Gable Verge Lining	Flat AC Sheeting	20m2	North facing, South facing	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos) , Amosite (brown asbestos)
Ceiling Voids	No Asbestos Found						
Underfloor Voids	No Asbestos Found						
Interior							
B00D - R0002 - Resources Store - 2.96 m2							
No Asbestos							
B00D - R0004 - General Learning Space - 65.13 m2							
No Asbestos							
B00D - R0009 - Distribution Board Cupboard - .79 m2					**Note: No inspection of live electrical installation**		
No Asbestos							
B00D - R0010 - Toilets-Disabled - 9.26 m2							
No Asbestos							
B00D - R0011 - Cleaning Store - Distributed - 4.04 m2							
No Asbestos							
B00D - R0012 - Movement - 130.62 m2							
No Asbestos							
B00D - R0014 - General Learning Space - 51.36 m2							
No Asbestos							
B00D - R0015 - Handwashing Facilities - .49 m2							
No Asbestos							
B00D - R0016 - Staff Study - 25.61 m2							
No Asbestos							
B00D - R0017 - Staff Study - 22.56 m2							
No Asbestos							
B00D - R0018 - Tea Room - 2.67 m2							
No Asbestos							
B00D - R0019 - Staff Study - 49.87 m2							
No Asbestos							
B00D - R0020 - Tea Room - 15.41 m2							
Floor Coverings Res/Textile	Vinyl Tiles	16.00m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00D - R0021 - Interview/Office - Type 1 - 17.09 m2							
No Asbestos							
B00D - R0022 - Tea Room - 1.65 m2							
No Asbestos							
B00D - R0023 - Stairs - 7.69 m2							
Floor Coverings Res/Textile	Vinyl Tiles	8m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00D - R0024 - Other-Vacant - 1.03 m2							
No Asbestos							
B00D - R0025 - External Movement - 3.48 m2							
No Asbestos							
B00D - R1001 - Resources Store - 8.5 m2							
No Asbestos							
B00D - R1002 - General Learning Space - 65.87 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	66m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00D - R1003 - General Learning Space - 65.44 m2							

Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	66m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00D - R1004 - General Learning Space - 65.15 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	66m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00D - R1005 - General Learning Space - 65.66 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	66m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00D - R1006 - Cleaning Store - Distributed - 2.4 m2							
Floor Coverings Res/Textile	Vinyl Tiles	3m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00D - R1007 - Distribution Board Cupboard - .63 m2					**Note: No inspection of live electrical installation**		
No Asbestos							
B00D - R1008 - Movement - 103.62 m2							
Floor Coverings Res/Textile	Vinyl Tiles	107.00m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00D - R1009 - Stairs - 16.12 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	17.00m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00E - General Learning - 1959 - Concrete Framed							
Exterior							
Gable Verge Lining	Flat AC Sheeting	20m2	North facing, South facing	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos) , Amosite (brown asbestos)
Underfloor Voids	No Asbestos Found						
Ceiling Voids	No Asbestos Found						
Eaves Linings	Flat AC Sheeting	6m2	North facing, South facing	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos) , Amosite (brown asbestos)
Interior							
B00E - R0002 - Interview/Office - Type 1 - 9.82 m2							
No Asbestos							
B00E - R0003 - Resources Store - 8.94 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	9m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00E - R0007 - Staff - Toilet - 4.09 m2							
Ceiling Structures/Linings	Flat AC Sheeting	4m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos) , Amosite (brown asbestos)
B00E - R0008 - Distribution Board Cupboard - .62 m2					**Note: No inspection of live electrical installation**		
No Asbestos							
B00E - R0009 - Careers Advisers Office - 24.46 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	25m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00E - R0010 - General Learning Space - 38.84 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	39m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00E - R0011 - General Learning Space - 38.86 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	39m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)

B00E - R0012 - General Learning Space - 51.35 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	52m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00E - R0013 - Movement - 74.77 m2							
No Asbestos							
B00E - R0014 - Covered Outdoor Space - 216.85 m2							
No Asbestos							
B00E - R0015 - Staff Study - 65.07 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	66m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00E - R0016 - Commonroom - 139.93 m2							
No Asbestos							
B00E - R0017 - Staff Kitchen - 16.53 m2							
No Asbestos							
B00E - R0018 - Stairs - 5.67 m2							
Floor Coverings Res/Textile	Vinyl Tiles	6m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00E - R0019 - External Movement - 1.77 m2							
No Asbestos							
B00E - R1001 - General Learning Space - 52.51 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	53m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00E - R1002 - General Learning Space - 51.86 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	52m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00E - R1003 - Resources Store - 6.05 m2							
No Asbestos							
B00E - R1004 - General Learning Space - 65.13 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	66m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00E - R1005 - Resources Store - 6.06 m2							
No Asbestos							
B00E - R1006 - Resources Store - 2.96 m2							
Floor Coverings Res/Textile	Vinyl Tiles	4m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00E - R1007 - Interview/Office - Type 1 - 19.05 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	20m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00E - R1008 - Distribution Board Cupboard - .63 m2					**Note: No inspection of live electrical installation**		
No Asbestos							
B00E - R1009 - General Learning Space - 51.93 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	52m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00E - R1010 - General Learning Space - 51.86 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	52m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00E - R1011 - General Learning Space - 52.01 m2							

Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	52m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00E - R1012 - Movement - 101.85 m2							
Floor Coverings Res/Textile	Vinyl Tiles	104m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00E - R1013 - Stairs - 17.68 m2							
Floor Coverings Res/Textile	Vinyl Tiles	18m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00E - R1014 - Other-Vacant - 1.09 m2							
No Asbestos							
B00F - Technological & Applied Studies - 1959 - Concrete Framed							
Exterior							
Eaves Linings	Flat AC Sheeting	6m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
Gable Verge Lining	Flat AC Sheeting	20m2	North facing, South facing	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
Underfloor Voids	No Asbestos Found						
Ceiling Voids	No Asbestos Found						
Interior							
B00F - R0001 - Staff - Toilet - 6.75 m2							
No Asbestos							
B00F - R0002 - Staff Study - 18.88 m2							
No Asbestos							
B00F - R0003 - Resources Store - 16.76 m2							
No Asbestos							
B00F - R0006 - Class Tools Storage - 16.94 m2							
No Asbestos							
B00F - R0007 - Movement - 3.87 m2							
No Asbestos							
B00F - R0010 - Resources Store - 10.55 m2							
No Asbestos							
B00F - R0011 - Design L.S. - 71.76 m2							
No Asbestos							
B00F - R0012 - Resources Store - 10.41 m2							
No Asbestos							
B00F - R0013 - Movement - 6.07 m2							
Wall Linings Internal	Flat AC Sheeting						
B00F - R0015 - Metal Technology L.S. - 72.2 m2							
No Asbestos							
B00F - R0016 - Handwashing Facilities - .42 m2							
No Asbestos							
B00F - R0017 - Metal Technology Bay - 16.56 m2							
No Asbestos							
B00F - R0018 - Welding Area - 4.25 m2							
No Asbestos							
B00F - R0019 - Wood Technology L.S. - 75.65 m2							
No Asbestos							
B00F - R0020 - Handwashing Facilities - .29 m2							
No Asbestos							

B00F - R0021 - Wood Technology L.S. - 75.76 m2							
No Asbestos							
B00F - R0022 - Handwashing Facilities - .34 m2							
No Asbestos							
B00F - R0023 - Movement - 7.99 m2							
No Asbestos							
B00F - R0024 - Handwashing Facilities - .71 m2							
No Asbestos							
B00F - R0025 - External Movement - 9.67 m2							
Ceiling Structures/Linings	Flat AC Sheeting	10.00m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	

B00G - Library - 1984 - Brick/Veneer

Exterior		
Wall Cladding	Compressed AC Sheet	
Eaves Linings	Flat AC Sheeting	
Ceiling Voids	No Asbestos Found	
Underfloor Voids - Slab on Ground	No Asbestos Found	
Interior		
B00G - M0001 - Senior Study - 114.55 m2		
No Asbestos		
B00G - M0002 - Stairs - 3.09 m2		
No Asbestos		
B00G - R0001 - Main Area - 195.9 m2		
No Asbestos		
B00G - R0002 - Main Entry - 61.03 m2		
No Asbestos		
B00G - R0005 - Staff - Toilet - 3.26 m2		
No Asbestos		
B00G - R0006 - Cleaning Store - Distributed - 2.12 m2		
No Asbestos		
B00G - R0007 - Audio Visual Workroom - 36.94 m2		
No Asbestos		
B00G - R0009 - Movement - 22.63 m2		
No Asbestos		
B00G - R0010 - Main Switchroom - 2.02 m2		
Wall Linings Internal	Flat AC Sheeting	
Ceiling Structures/Linings	Flat AC Sheeting	
B00G - R0011 - Lift - 1.43 m2		
No Asbestos		
B00G - R0012 - Study Space - 39.83 m2		
No Asbestos		
B00G - R0013 - Library Administration - 41.2 m2		
No Asbestos		
B00G - R0014 - Tea Room - 4.94 m2		
No Asbestos		
B00G - R0015 - Stairs - .34 m2		
No Asbestos		
B00G - R0016 - External Movement - 7.83 m2		

Ceiling Structures/Linings	Flat AC Sheeting						

B00H - Staff/Storage - 1959 - Brick/Block

Exterior							
Ceiling Voids	No Asbestos Found						
Underfloor Voids	No Asbestos Found						
Interior							
B00H - R0001 - Apparatus Storage - 27.1 m2							
Floor Coverings Res/Textile	Vinyl Tiles						
Ceiling Structures/Linings	Vermiculite - Composite Sample - (10 - 40 m2) - (X3)						
B00H - R0002 - General Storeroom - 9.56 m2							
No Asbestos							
B00H - R0003 - Distribution Board Cupboard - .4 m2							**Note: No inspection of live electrical installation**
No Asbestos							
B00H - R0004 - General Storeroom - 11.57 m2							
Floor Coverings Res/Textile	Vinyl Tiles						
Ceiling Structures/Linings	Vermiculite - Composite Sample - (10 - 40 m2) - (X3)						
B00H - R0005 - General Assistants - 16.85 m2							
Floor Coverings Res/Textile	Vinyl Tiles	18m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
Ceiling Structures/Linings	Vermiculite - Composite Sample - (10 - 40 m2) - (X3)						
B00H - R0006 - External Movement - 19.17 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (10 - 40 m2) - (X3)						
B00H - R0007 - Cleaning Supplies Store - 10.37 m2							
No Asbestos							
B00H - R0008 - External Stairs - 3.04 m2							
No Asbestos							
B00H - R1003 - Staff - Toilet - 4.24 m2							
No Asbestos							
B00H - R1004 - Distribution Board Cupboard - .32 m2							**Note: No inspection of live electrical installation**
No Asbestos							
B00H - R1005 - Resources Store - 32.54 m2							
Floor Coverings Res/Textile	Vinyl Tiles						
Ceiling Structures/Linings	Vermiculite - Composite Sample - (10 - 40 m2) - (X3)						
B00H - R1006 - External Movement - 32.59 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (10 - 40 m2) - (X3)						
B00H - R1007 - Staff Study - 27.02 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (10 - 40 m2) - (X3)						
B00H - R1008 - External Stairs - 4.82 m2							
No Asbestos							
B00H - R2002 - Staff - Toilet - 4.26 m2							
Ceiling Structures/Linings	Flat AC Sheeting	5m2	All surfaces	Friable Asbestos (5)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00H - R2003 - Distribution Board Cupboard - .38 m2							**Note: No inspection of live electrical installation**

Ceiling Structures/Linings	Flat AC Sheeting	1m2	All surfaces	Friable Asbestos (5)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00H - R2004 - Resources Store - 11.68 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (10 - 40 m2) - (X3)						
Floor Coverings Res/Textile	Vinyl Tiles						
B00H - R2005 - Staff Study - 27.53 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (10 - 40 m2) - (X3)						
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	28m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00H - R2006 - External Movement - 24.07 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (10 - 40 m2) - (X3)						
B00H - R2007 - External Stairs - 5.07 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (< 10 m2) - (X2)						
B00H - R2008 - Staff Study - 25.43 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	26m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
Ceiling Structures/Linings	Vermiculite - Composite Sample - (10 - 40 m2) - (X3)						
B00H - R2009 - Tea Room - 1.57 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	2.00m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
Ceiling Structures/Linings	Vermiculite - Composite Sample - (< 10 m2) - (X2)						
B00H - R9001 - Machine Storage - 27.91 m2							
No Asbestos							
B00I - Pupil Facilities - 1959 - Concrete Framed							
Exterior							
Eaves Linings	Flat AC Sheeting	50m2	North facing, South facing, East facing, West facing	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos) , Amosite (brown asbestos)
Ceiling Voids - Raked Ceiling	No Asbestos Found						
Underfloor Voids - Slab on Ground	No Asbestos Found						
Interior							
B00I - R0001 - Student Canteen - 35.26 m2							
Ceiling Structures/Linings	Flat AC Sheeting	35m2	All surfaces	Friable Asbestos (5)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos) , Amosite (brown asbestos)
Wall Linings Internal	Flat AC Sheeting	20m2	South facing, Upper portion	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos) , Amosite (brown asbestos)
Electrical - Backing Board	Resinous Board	1	West	Good Condition (1)	Low (1)	Low Priority (2-3)	Assumed Asbestos
B00I - R0002 - General Storeroom - 3.2 m2							
Ceiling Structures/Linings	Flat AC Sheeting	4m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos) , Amosite (brown asbestos)
B00I - R0004 - Covered Area - 206.2 m2							

Wall Linings Internal	Flat AC Sheeting	60m2	North facing, South facing, Upper portion	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos) , Amosite (brown asbestos)
Ceiling Structures/Linings	Flat AC Sheeting	212m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos) , Amosite (brown asbestos)
B00I - R0005 - General Storeroom - 20.44 m2							
Ceiling Structures/Linings	Flat AC Sheeting	20m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos) , Amosite (brown asbestos)
Wall Linings Internal	Flat AC Sheeting	12m2	North facing, East facing, West facing, Upper portion, Variable positions	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos) , Amosite (brown asbestos)
B00I - R0007 - Toilets-Girls - 73.75 m2							
Ceiling Structures/Linings	Flat AC Sheeting	60m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos) , Amosite (brown asbestos)
B00I - R0008 - Access Student Shower/Toilet/Change - 10.66 m2							
No Asbestos							
B00I - R0009 - External Movement - 8.65 m2							
No Asbestos							
B00I - R0010 - Toilets-Boys - 64.07 m2							
No Asbestos							
B00I - R0011 - Cleaning Store - Distributed - 9.13 m2							
No Asbestos							
B00I - R0012 - General Storeroom - 2.94 m2							
Ceiling Structures/Linings	Flat AC Sheeting	3m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos) , Amosite (brown asbestos)
B00I - R0013 - Staff - Toilet - 1.29 m2							
Ceiling Structures/Linings	Flat AC Sheeting	2m2	Throughout	Friable Asbestos (5)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos) , Amosite (brown asbestos)
B00J - Art/Science Learning - 1971 - Brick/Block							
Exterior							
Ceiling Voids	No Asbestos Found						
Underfloor Voids	No Asbestos Found						
Interior							
B00J - R0001 - Laboratory L.S. - 93.77 m2							
Floor Coverings Res/Textile	Vinyl Tiles	95m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
Ceiling Structures/Linings	Vermiculite - Composite Sample - (70 - 120 m2) - (X8)						
B00J - R0002 - Preparation - Science - 29.23 m2							
Floor Coverings Res/Textile	Vinyl Tiles	1m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
Floor Coverings Res/Textile	Vinyl Tiles	1m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos) , Amosite (brown asbestos)
Plant / Equipment - Fume Cupboard	Flat AC Sheeting	1	Upper portion	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
Plant / Equipment - Fume Cupboard	Flat AC Sheeting	1	Upper portion	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos) , Amosite (brown asbestos)

Ceiling Structures/Linings	Vermiculite - Composite Sample - (10 - 40 m2) - (X3)						
Plant / Equipment - Flue	Fibre Cement Pipe	4	East	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos) , Amosite (brown asbestos)
B00J - R0003 - Apparatus Storage - 9.58 m2							
Floor Coverings Res/Textile	Vinyl Tiles	10m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
Ceiling Structures/Linings	Vermiculite - Composite Sample - (< 10 m2) - (X2)						
B00J - R0004 - Resources Store - 26.47 m2							
Floor Coverings Res/Textile	Vinyl Tiles	28m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
Ceiling Structures/Linings	Vermiculite - Composite Sample - (10 - 40 m2) - (X3)						
B00J - R0005 - Distribution Board Cupboard - .36 m2					**Note: No inspection of live electrical installation**		
Electrical - Mounting Board	Resinous Board	1	Concealed in cabinet	Good Condition (1)	Low (1)	Low Priority (2-3)	Assumed Asbestos
B00J - R0006 - External Movement - 40.68 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (40 - 70 m2) - (X5)						
B00J - R1001 - Art Learning Space - 79.93 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (70 - 120 m2) - (X8)						
B00J - R1002 - Dark Room - 26.47 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (10 - 40 m2) - (X3)						
B00J - R1003 - Multi Media Studio - 26.07 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (10 - 40 m2) - (X3)						
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	27m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00J - R1005 - Cleaning Store - Distributed - 1.52 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (< 10 m2) - (X2)						
Floor Coverings Res/Textile	Vinyl Tiles	2m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00J - R1006 - Distribution Board Cupboard - .54 m2					**Note: No inspection of live electrical installation**		
Electrical - Mounting Board	Resinous Board	1	Concealed in cabinet	Good Condition (1)	Low (1)	Low Priority (2-3)	Assumed Asbestos
B00J - R1007 - External Movement - 40.44 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (40 - 70 m2) - (X5)						
B00J - R1008 - Staff Study - 21.95 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (10 - 40 m2) - (X3)						
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	22m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00J - R1009 - Tea Room - 2.33 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (< 10 m2) - (X2)						

Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	3m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00J - R2001 - Art Learning Space - 59.29 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (40 - 70 m2) - (X5)						
B00J - R2002 - Kiln Space - 22.66 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (10 - 40 m2) - (X3)						
B00J - R2003 - Class Tools Storage - 11.26 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (10 - 40 m2) - (X3)						
Floor Coverings Res/Textile	Vinyl Tiles						
B00J - R2004 - Art Learning Space - 52.94 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (40 - 70 m2) - (X5)						
B00J - R2005 - Resources Store - 11.13 m2							
Floor Coverings Res/Textile	Vinyl Tiles						
Ceiling Structures/Linings	Vermiculite - Composite Sample - (10 - 40 m2) - (X3)						
B00J - R2006 - Cleaning Store - Distributed - 1.76 m2							
Floor Coverings Res/Textile	Vinyl Tiles	2m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
Ceiling Structures/Linings	Flat AC Sheeting	2m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00J - R2007 - Distribution Board Cupboard - .55 m2					**Note: No inspection of live electrical installation**		
Ceiling Structures/Linings	Flat AC Sheeting	1m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
Electrical - Mounting Board	Resinous Board	1	Concealed in cabinet	Good Condition (1)	Low (1)	Low Priority (2-3)	Assumed Asbestos
B00J - R2008 - External Movement - 40.44 m2							
No Asbestos							
B00K - General Learning/Science Learning - 1959 - Brick/Block							
Exterior							
Ceiling Voids	No Asbestos Found						
Underfloor Voids - Slab on Ground	No Asbestos Found						
Interior							
B00K - R0001 - Laboratory L.S. - 92.6 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (70 - 120 m2) - (X8)	93.00m2	Behind new Plaster ceiling	Good Condition (1)	Low (1)	Low Priority (2-3)	Assumed Asbestos
B00K - R0004 - Laboratory L.S. - 93.38 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (70 - 120 m2) - (X8)	94.00m2	Above new plaster ceiling	Good Condition (1)	Low (1)	Low Priority (2-3)	Assumed Asbestos
B00K - R0005 - Resources Store - 5.34 m2							
No Asbestos							
B00K - R0007 - Distribution Board Cupboard - .5 m2					**Note: No inspection of live electrical installation**		
Electrical - Backing Board	Resinous Board	1	South	Good Condition (1)	Low (1)	Low Priority (2-3)	Assumed Asbestos
B00K - R0008 - Cleaning Store - Distributed - 6.99 m2							

No Asbestos							
B00K - R0009 - Cleaning Store - Distributed - 4.15 m2							
No Asbestos							
B00K - R0010 - External Movement - 85.65 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (70 - 120 m2) - (X8)						
B00K - R0011 - Movement - 11.31 m2							
No Asbestos							
B00K - R0012 - Lift - 2.07 m2							
No Asbestos							
B00K - R0013 - Movement - 2.88 m2							
No Asbestos							
B00K - R0014 - External Stairs - 4.01 m2							
No Asbestos							
B00K - R0015 - Preparation - Science - 30.13 m2							
Floor Coverings Res/Textile	Vinyl Tiles	31.00m2	Throughout	Minimal Damage (2)	Low (1)	Low Priority (2-3)	
Ceiling Structures/Linings	Vermiculite - Composite Sample - (10 - 40 m2) - (X3)						
B00K - R0016 - Chemical Store - 8.47 m2							
Floor Coverings Res/Textile	Vinyl Tiles	9.00m2	Throughout	Minimal Damage (2)	Low (1)	Low Priority (2-3)	
B00K - R0017 - External Stairs - 2.56 m2							
No Asbestos							
B00K - R0018 - Toilets-Boys - 28.19 m2							
Partition Walls (Cubicles)	Compressed AC Sheet	10m2	Variable positions	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
Ceiling Structures/Linings	Vermiculite - Composite Sample - (10 - 40 m2) - (X3)						
B00K - R0019 - Plant - .2 m2							
No Asbestos							
B00K - R1001 - General Learning Space - 52.21 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (40 - 70 m2) - (X5)						
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	53m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00K - R1002 - General Learning Space - 52.95 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (40 - 70 m2) - (X5)						
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	54m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00K - R1003 - General Learning Space - 52.94 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (40 - 70 m2) - (X5)						
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	54m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00K - R1004 - Resources Store - 5.23 m2							
Floor Coverings Res/Textile	Vinyl Tiles						
Ceiling Structures/Linings	Vermiculite - Composite Sample - (< 10 m2) - (X2)						

B00K - R1005 - Cleaning Store - Distributed - 1.64 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (< 10 m2) - (X2)						
Floor Coverings Res/Textile	Vinyl Tiles	2m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00K - R1006 - General Learning Space - 53.24 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (40 - 70 m2) - (X5)						
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	54m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00K - R1007 - Resources Store - 5.37 m2							
Floor Coverings Res/Textile	Vinyl Tiles						
Ceiling Structures/Linings	Vermiculite - Composite Sample - (< 10 m2) - (X2)						
B00K - R1009 - Distribution Board Cupboard - .44 m2					**Note: No inspection of live electrical installation**		
Electrical - Mounting Board	Resinous Board	1	South	Good Condition (1)	Low (1)	Low Priority (2-3)	Assumed Asbestos
B00K - R1010 - Resources Store - 6.99 m2							
No Asbestos							
B00K - R1011 - External Movement - 80.85 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (70 - 120 m2) - (X8)						
B00K - R1012 - Movement - 11.31 m2							
No Asbestos							
B00K - R1014 - Movement - 2.88 m2							
No Asbestos							
B00K - R1015 - External Stairs - 17.41 m2							
No Asbestos							
B00K - R1016 - External Stairs - 5.55 m2							
No Asbestos							
B00K - R1017 - Toilets-Girls - 29.07 m2							
Partition Walls (Cubicles)	Compressed AC Sheet	12m2	Variable positions	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
Ceiling Structures/Linings	Vermiculite - Composite Sample - (10 - 40 m2) - (X3)						
B00K - R1018 - Plant - .21 m2							
Ceiling Structures/Linings	Compressed AC Sheet	1m2	East facing	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00K - R2001 - General Learning Space - 52.36 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (40 - 70 m2) - (X5)						
Floor Coverings Res/Textile	Vinyl Tiles						
B00K - R2002 - General Learning Space - 52.87 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (40 - 70 m2) - (X5)						
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)						
B00K - R2003 - General Learning Space - 52.87 m2							
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)	53m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)

Ceiling Structures/Linings	Vermiculite - Composite Sample - (40 - 70 m2) - (X5)						
B00K - R2004 - Resources Store - 5.22 m2							
Floor Coverings Res/Textile	Vinyl Tiles						
Ceiling Structures/Linings	Vermiculite - Composite Sample - (< 10 m2) - (X2)						
B00K - R2005 - Cleaning Store - Distributed - 1.64 m2							
Floor Coverings Res/Textile	Vinyl Tiles	2m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
Ceiling Structures/Linings	Flat AC Sheeting	2m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00K - R2006 - Computer Learning Space - 53.38 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (40 - 70 m2) - (X5)						
Floor Coverings Res/Textile	Vinyl Tiles (Under Floor Covering/Carpet)						
B00K - R2007 - Resources Store - 5.29 m2							
Floor Coverings Res/Textile	Vinyl Tiles						
Ceiling Structures/Linings	Vermiculite - Composite Sample - (< 10 m2) - (X2)						
B00K - R2009 - Distribution Board Cupboard - .44 m2					**Note: No inspection of live electrical installation**		
Ceiling Structures/Linings	Flat AC Sheeting	1m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
Electrical - Mounting Board	Resinous Board	1	Concealed in cabinet	Good Condition (1)	Low (1)	Low Priority (2-3)	Assumed Asbestos
B00K - R2010 - Resources Store - 6.99 m2							
No Asbestos							
B00K - R2011 - External Movement - 80.42 m2							
No Asbestos							
B00K - R2012 - Movement - 11.31 m2							
No Asbestos							
B00K - R2014 - Movement - 2.88 m2							
No Asbestos							
B00K - R2015 - External Stairs - 17.41 m2							
No Asbestos							
B00K - R2016 - Staff Study - 26.76 m2							
No Asbestos							
B00K - R2017 - Tea Room - 2.63 m2							
No Asbestos							
B00K - R2018 - External Stairs - 6.11 m2							
No Asbestos							
B00K - R9001 - General Storeroom - 15.55 m2							
No Asbestos							
B00L - Multi Purpose Facilities - 1971 - Brick/Block							
Exterior							
External Wall Structure - Awnings	Flat AC Sheeting						
Eaves Linings	Flat AC Sheeting	5m2	East facing	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)

Ceiling Voids	No Asbestos Found						
Underfloor Voids	Flat AC Sheeting	4	Variable positions	Minimal Damage (2)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
Interior							
B00L - M0001 - General Storeroom - 19.03 m2							
No Asbestos							
B00L - M0002 - General Storeroom - 18.77 m2							
No Asbestos							
B00L - M0003 - Movement - 164.58 m2							
No Asbestos							
B00L - M0004 - Stairs - 2.89 m2							
No Asbestos							
B00L - M0005 - Stairs - 2.89 m2							
No Asbestos							
B00L - M0006 - Movement - 17.93 m2							
No Asbestos							
B00L - R0001 - Sport Equipment Store - 18.81 m2							
Door - Insulation	Encapsulated Asbestos material within unit						
B00L - R0002 - Stage - 109.45 m2							
No Asbestos							
B00L - R0003 - Performance Store - 18.53 m2							
Door - Insulation	Encapsulated Asbestos material within unit						
B00L - R0004 - Multi-Purpose Space - 332.29 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (40 - 70 m2) - (X5)						
B00L - R0006 - Staff Kitchen - 11.84 m2							
Ceiling Structures/Linings	Flat AC Sheeting	13m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00L - R0007 - Movement - 19.32 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (10 - 40 m2) - (X3)						
B00L - R0008 - Distribution Board Cupboard - .48 m2							**Note: No inspection of live electrical installation**
Door - Insulation	Encapsulated Asbestos material within unit						
B00L - R0009 - Chair Store - 11.7 m2							
Ceiling Structures/Linings	Flat AC Sheeting	12m2	All surfaces	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00L - R0012 - Stairs - 8.63 m2							
No Asbestos							
B00L - R0013 - Stairs - 8.48 m2							
No Asbestos							
B00L - R0014 - Stairs - 9.78 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (< 10 m2) - (X2)						
B00L - R0015 - Plant - .43 m2							
Door - Insulation	Encapsulated Asbestos material within unit						
B00L - R0016 - Toilet - Lobby - 1.2 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (< 10 m2) - (X2)						
B00L - R0017 - Toilets-Girls - 9.65 m2							

Ceiling Structures/Linings	Flat AC Sheeting	10m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00L - R0018 - Toilet - Lobby - 1.22 m2							
Ceiling Structures/Linings	Flat AC Sheeting	2m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00L - R0019 - Toilets-Boys - 9.54 m2							
Ceiling Structures/Linings	Flat AC Sheeting	10m2	Throughout	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos)
B00L - R0020 - Stairs - 5.11 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (< 10 m2) - (X2)						
B00L - R0021 - External Movement - 86.99 m2							
Ceiling Structures/Linings	Vermiculite - Composite Sample - (70 - 120 m2) - (X8)						
B00L - R9002 - Cleaning Store - Distributed - 9.74 m2							
Plant / Equipment - Boiler	Fibre Cement Pipe	6	South	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos) , Amosite (brown asbestos)
B00L - R9003 - Change - 44.18 m2							
No Asbestos							
B00L - R9006 - Change - 38.79 m2							
No Asbestos							
B00L - R9008 - Cleaning Store - Distributed - 1.11 m2							
No Asbestos							
B00L - R9009 - Sport Equipment Store - 9.74 m2							
Plant / Equipment - Boiler	Fibre Cement Pipe	6	North	Good Condition (1)	Low (1)	Low Priority (2-3)	Chrysotile (white asbestos) , Amosite (brown asbestos)
B00L - R9012 - Sport Equipment Store - 11.77 m2							
Floor Coverings Res/Textile	Vinyl Tiles						
B00L - R9013 - Movement - 9.04 m2							
No Asbestos							
B00L - R9014 - Stairs - .79 m2							
No Asbestos							
B00L - R9015 - Toilet - Lobby - 2.48 m2							
No Asbestos							
B00L - R9016 - Toilets-Boys - 13.92 m2							
No Asbestos							
B00L - R9017 - Toilet - Lobby - 2.66 m2							
No Asbestos							
B00L - R9018 - Sport Equipment Store - 13.5 m2							
No Asbestos							
B00L - R9019 - Sport Equipment Store - 1.6 m2							
No Asbestos							
B00L - R9020 - Movement - 9.12 m2							
No Asbestos							
B00L - R9021 - Stairs - 1.07 m2							
No Asbestos							
B00L - R9022 - Toilet - Lobby - 2.59 m2							
No Asbestos							
B00L - R9023 - Toilets-Girls - 15.12 m2							

Partition Walls (Cubicles)	Compressed AC Sheet	
B00L - R9024 - Toilet - Lobby - 2.59 m2		
No Asbestos		
B00L - R9025 - External Movement - 6.27 m2		
No Asbestos		
B00L - R9026 - External Movement - 6.53 m2		
No Asbestos		
B00L - R9027 - External Movement - 5.71 m2		
No Asbestos		
B00L - R9028 - External Movement - 6.17 m2		
No Asbestos		
B00L - R9029 - External Movement - 2.93 m2		
No Asbestos		
B00L - R9030 - Sport Equipment Store - 124.53 m2		
No Asbestos		
B00L - R9031 - Archive Store - 55.5 m2		
No Asbestos		
B00L - R9032 - General Storeroom - 212.24 m2		
No Asbestos		
B00M - Building Services - 2004 - Brick/Block		
Exterior		
No Asbestos		
Interior		
B00M - R0001 - Dust Extraction Space - 7.44 m2		
No Asbestos		
B00Z - Building Services - 1998 - Concrete		
Exterior		
No Asbestos		
Interior		
B00Z - R0001 - Plant - 6.57 m2		
No Asbestos		

Demountables

OS 600 12115 - Learning Unit - Small - Placement Date : 14-AUG-2017

Note: This refurbished demountable may have asbestos present in remnant mastic in window frames.

No Asbestos Found

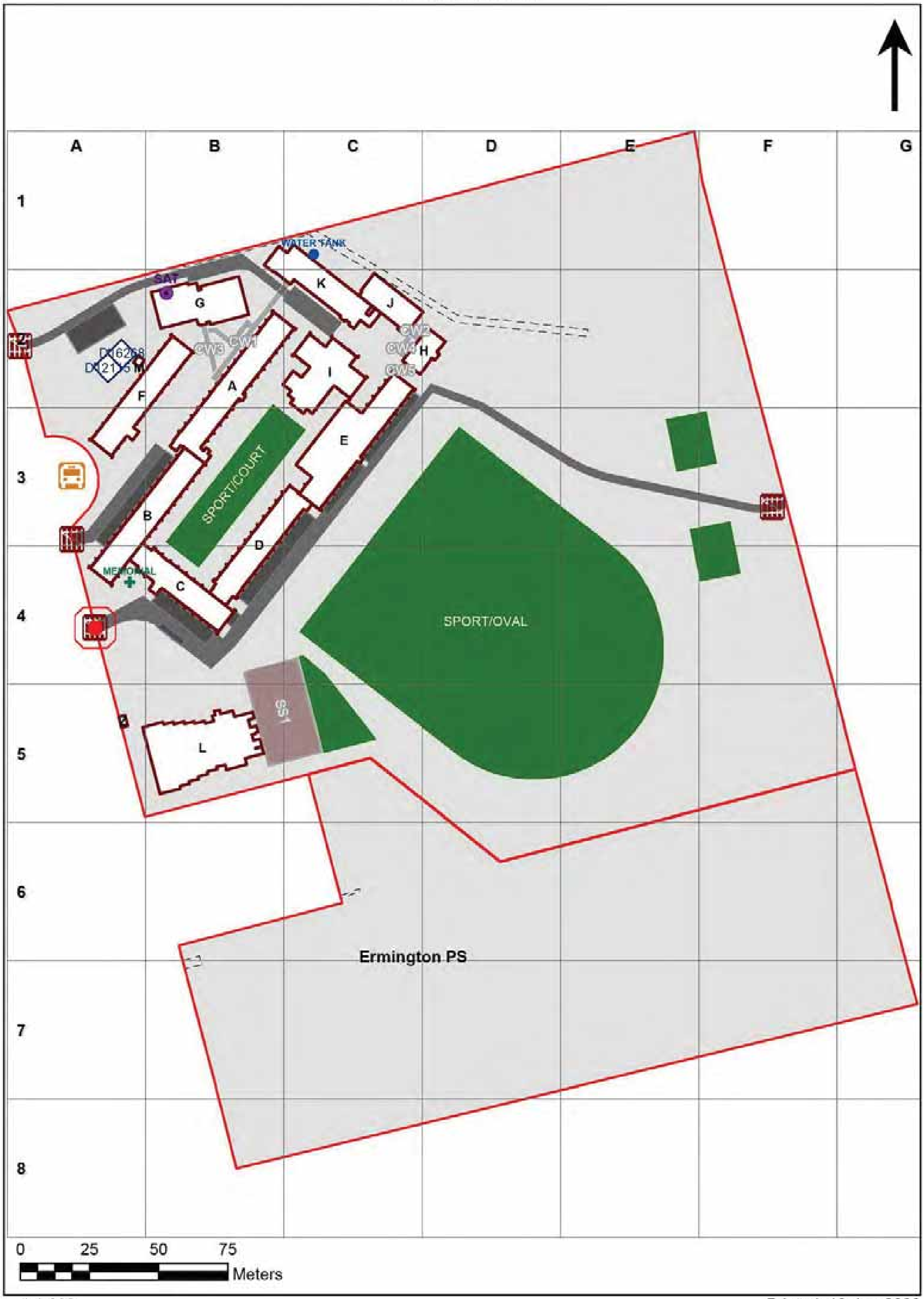
OS 600 16268 - Learning Unit - Small - Placement Date : 14-AUG-2017

No Asbestos Found

D21/78776

8225 - Marsden High School

Site Plan (10751)



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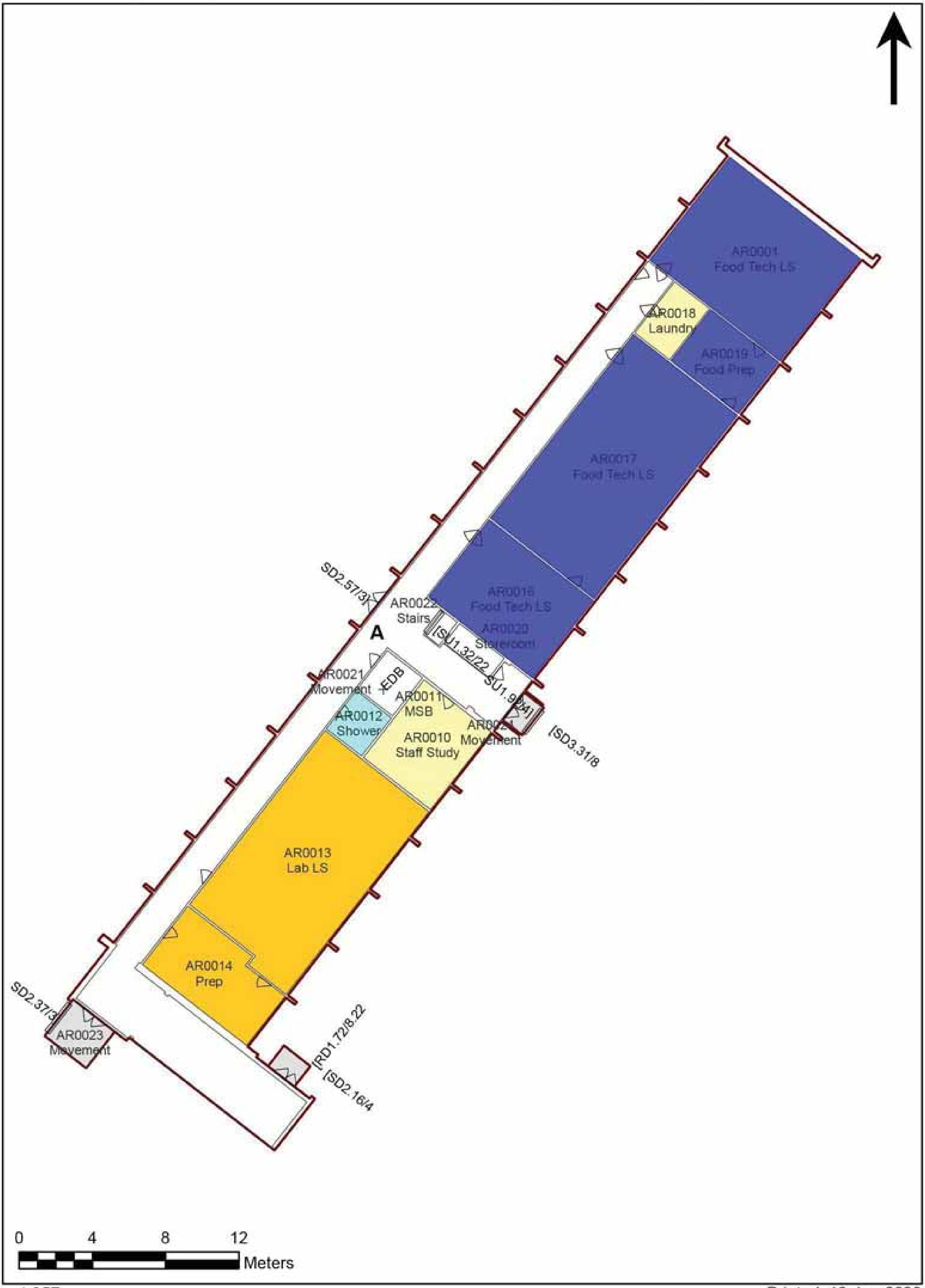
Printed: 12-Jun-2020

D21/78776

8225 - Marsden High School

Technological & Applied Studies/Science Learning (B00A) - Ground Floor (Room Function)



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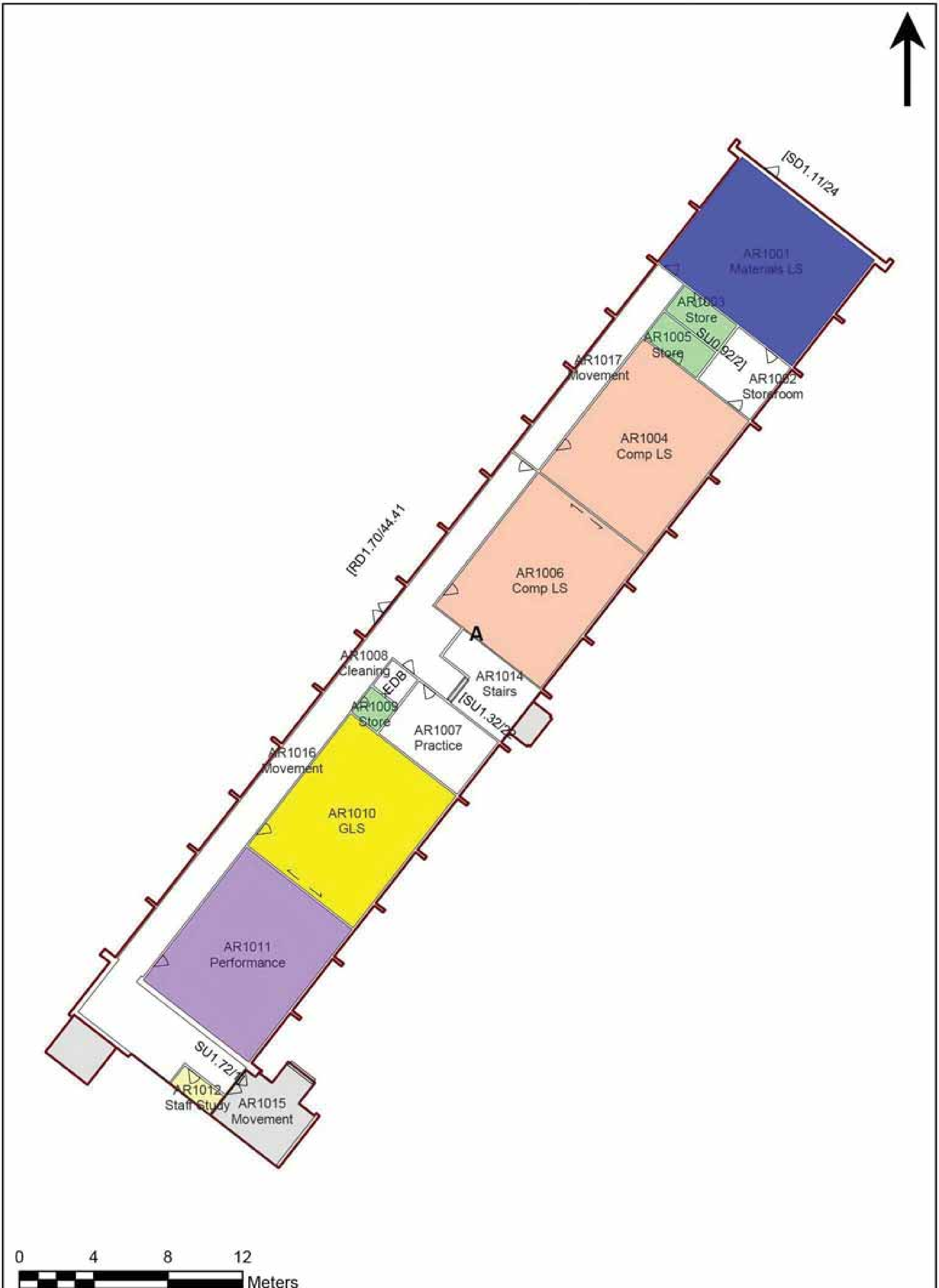
Printed: 12-Jun-2020

D21/78776

8225 - Marsden High School

Technological & Applied Studies/Science Learning (B00A) - 1st Floor (Room Function)



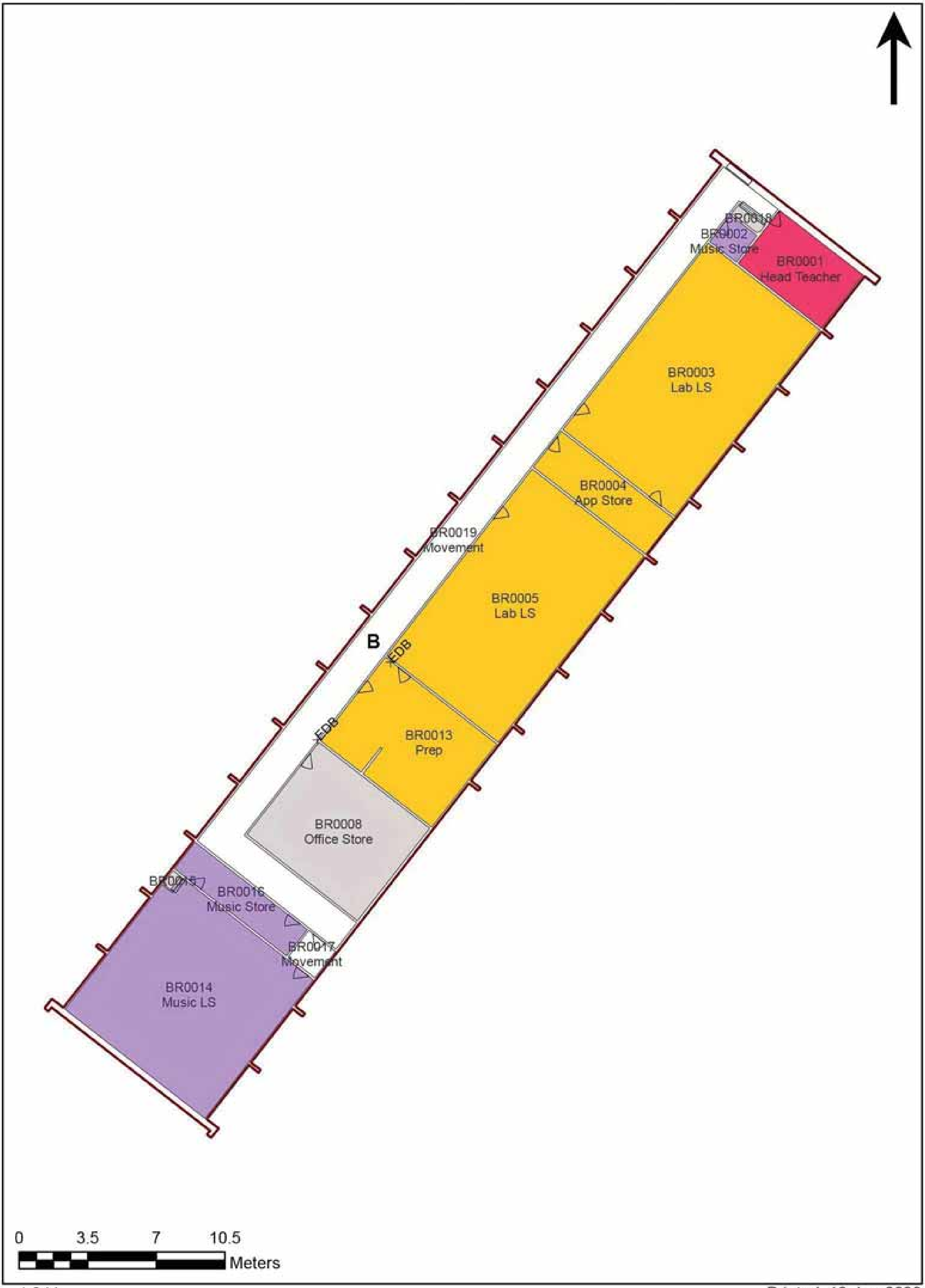
1:257

Printed: 12-Jun-2020

D21/78776

8225 - Marsden High School

General Learning/Music/Science Learning (B00B) - Ground Floor (Room Function)



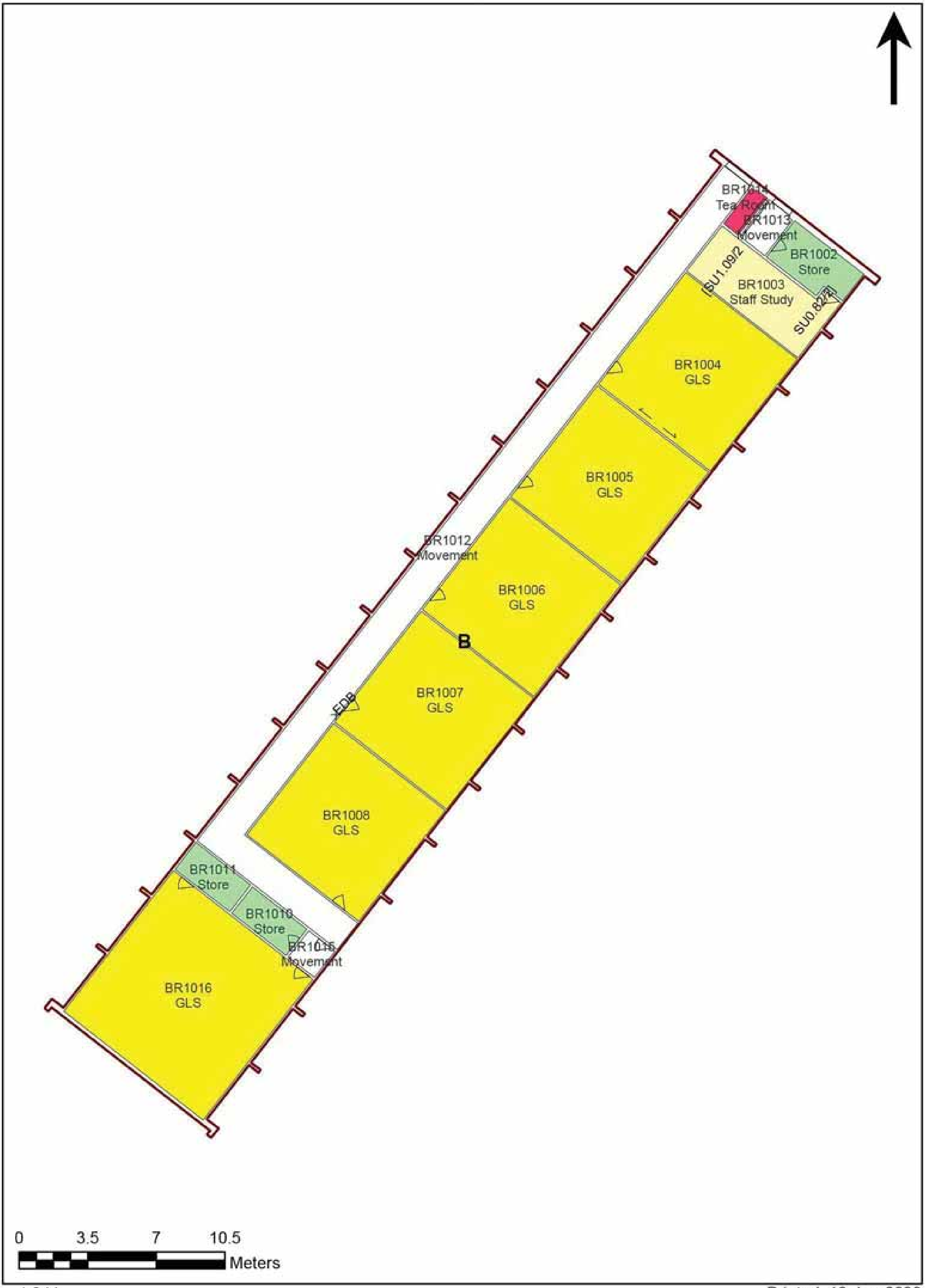
1:241

Printed: 12-Jun-2020

D21/78776

8225 - Marsden High School

General Learning/Music/Science Learning (B00B) - 1st Floor (Room Function)



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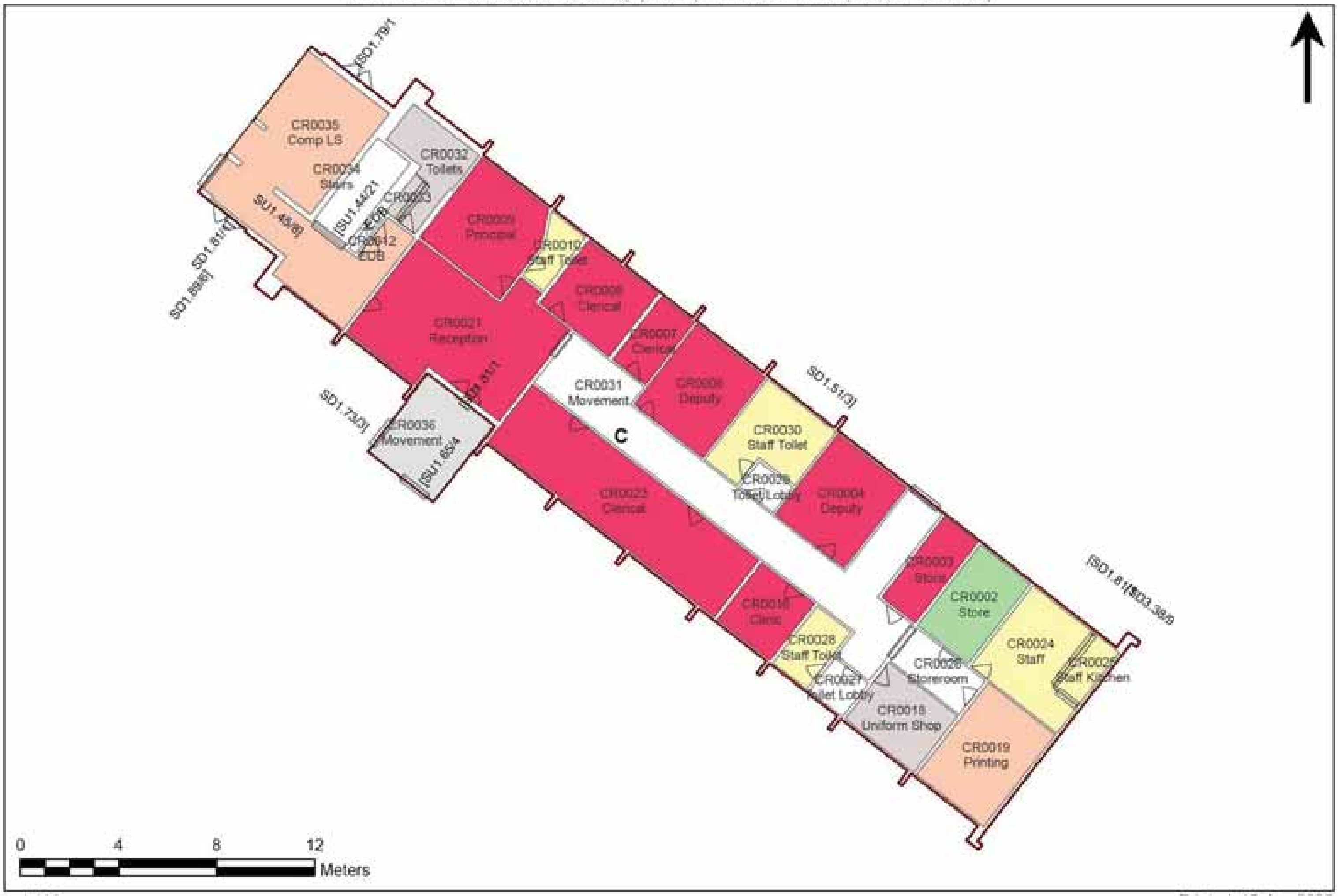
Printed: 12-Jun-2020

D21/78776

8225 - Marsden High School

Administration/General Learning (B00C) - Ground Floor (Room Function)



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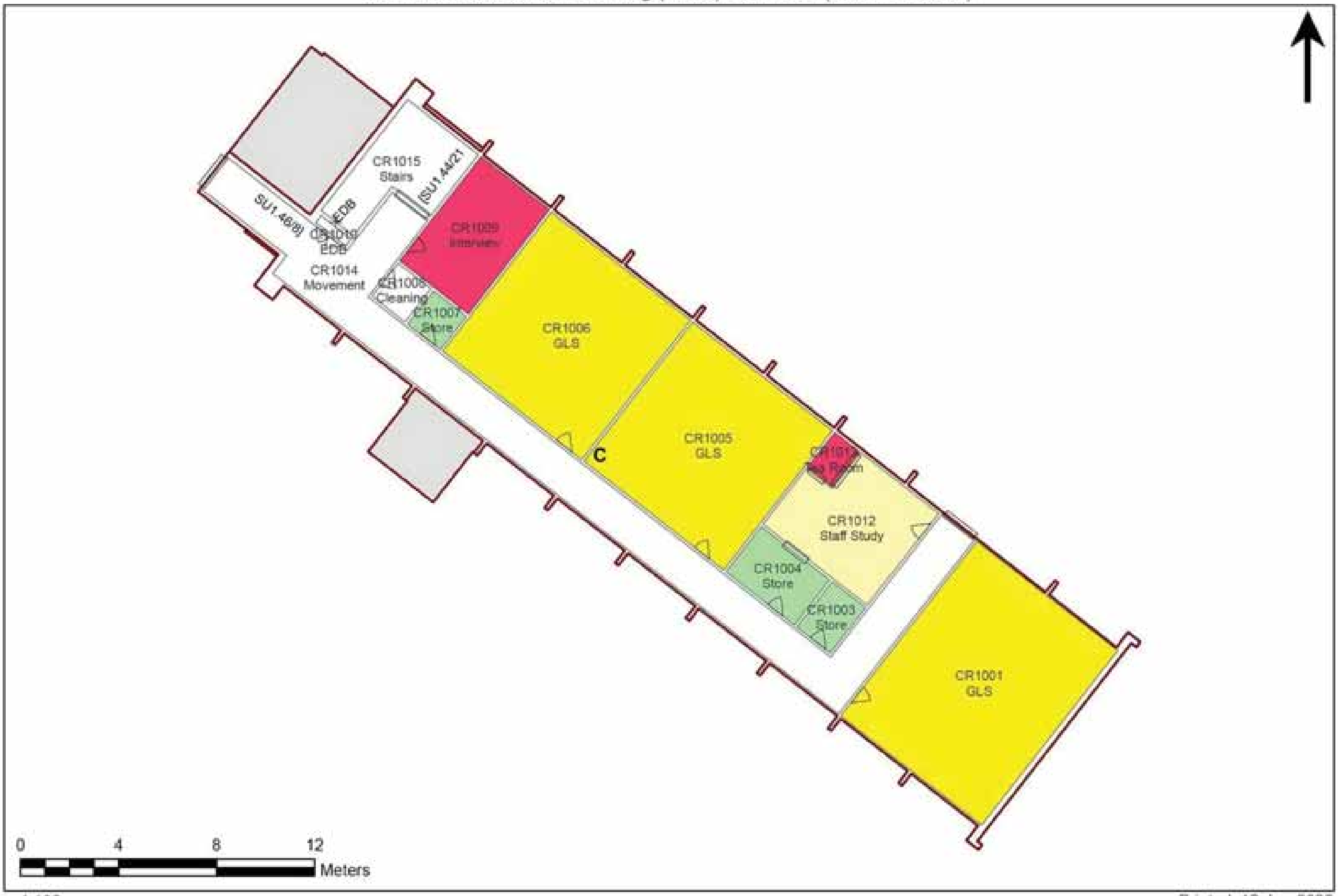
Printed: 12-Jun-2020

D21/78776

8225 - Marsden High School

Administration/General Learning (B00C) - 1st Floor (Room Function)

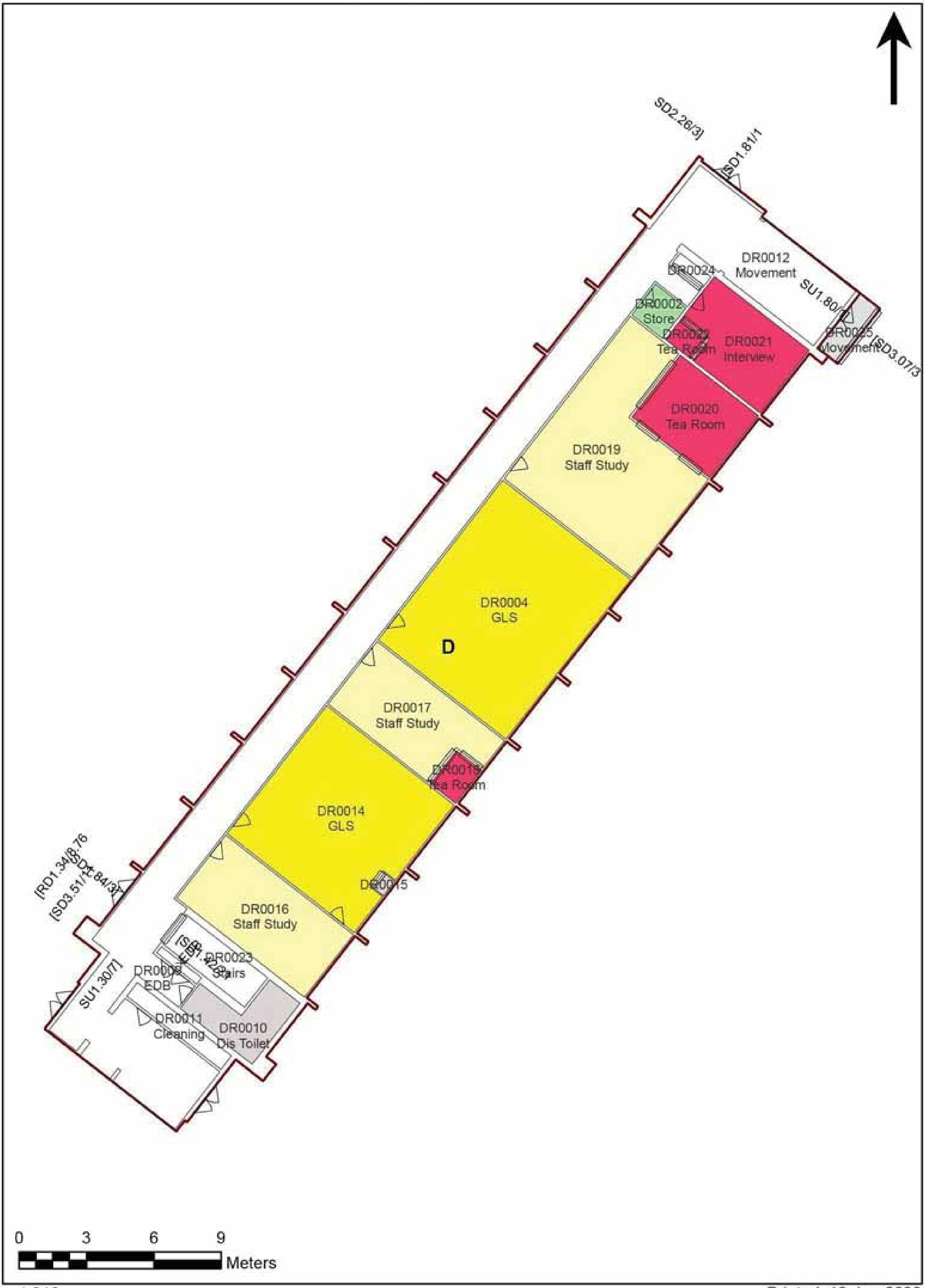


1:192

Printed: 12-Jun-2020

8225 - Marsden High School

General Learning (B00D) - Ground Floor (Room Function)



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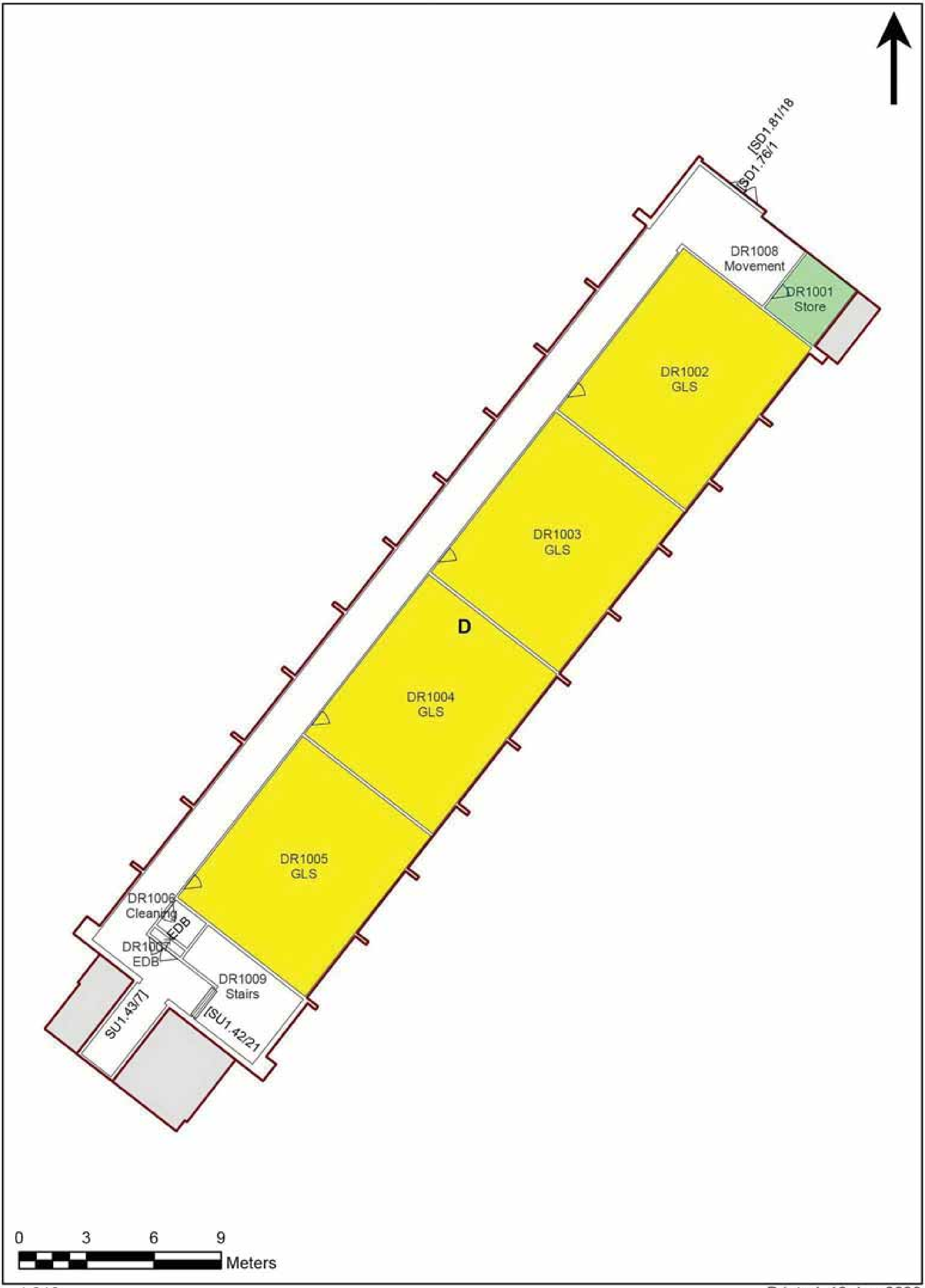
Printed: 12-Jun-2020

8225 - Marsden High School

General Learning (B00D) - 1st Floor (Room Function)



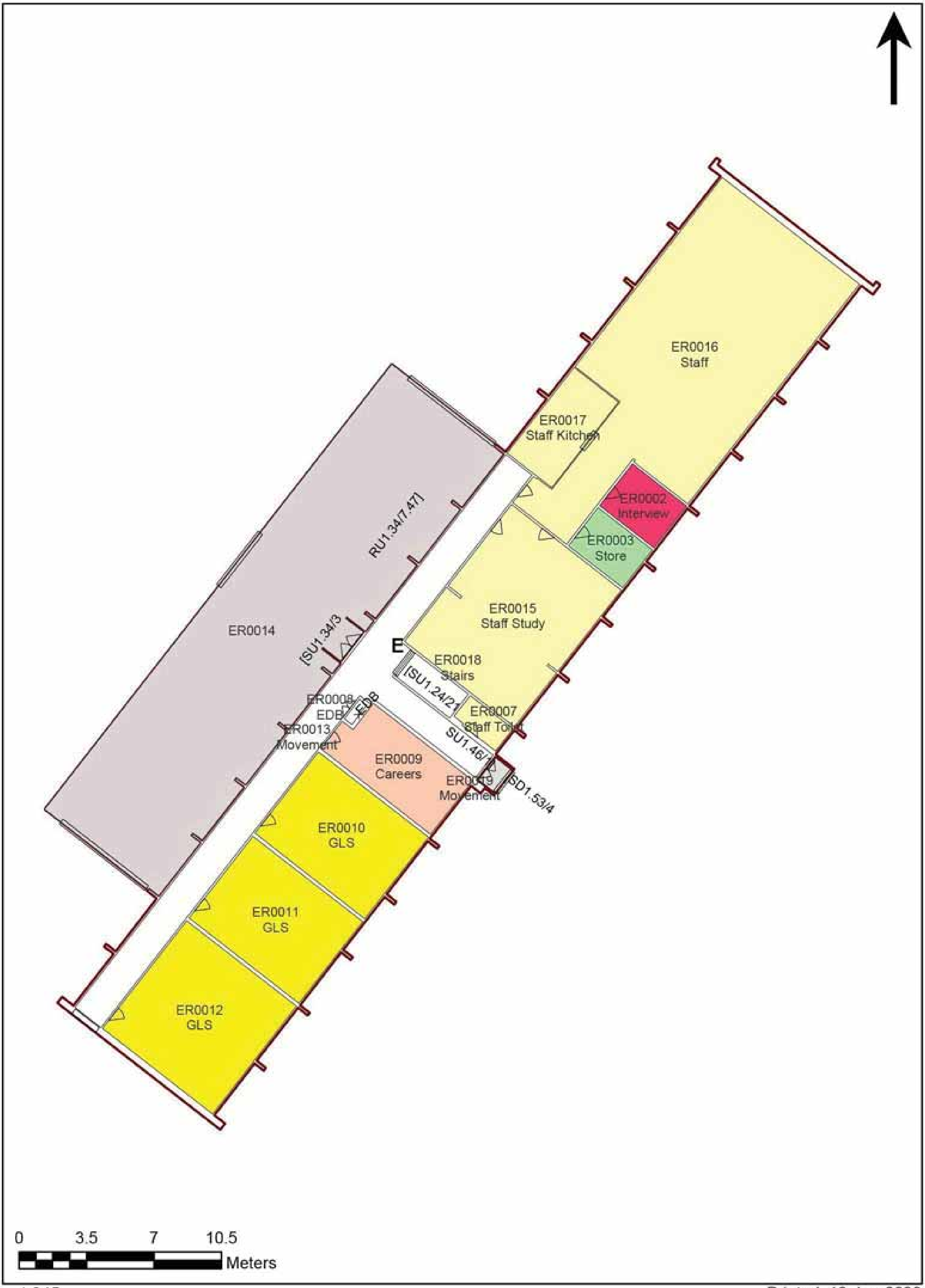
1:210

Printed: 12-Jun-2020

D21/78776

8225 - Marsden High School

General Learning (B00E) - Ground Floor (Room Function)



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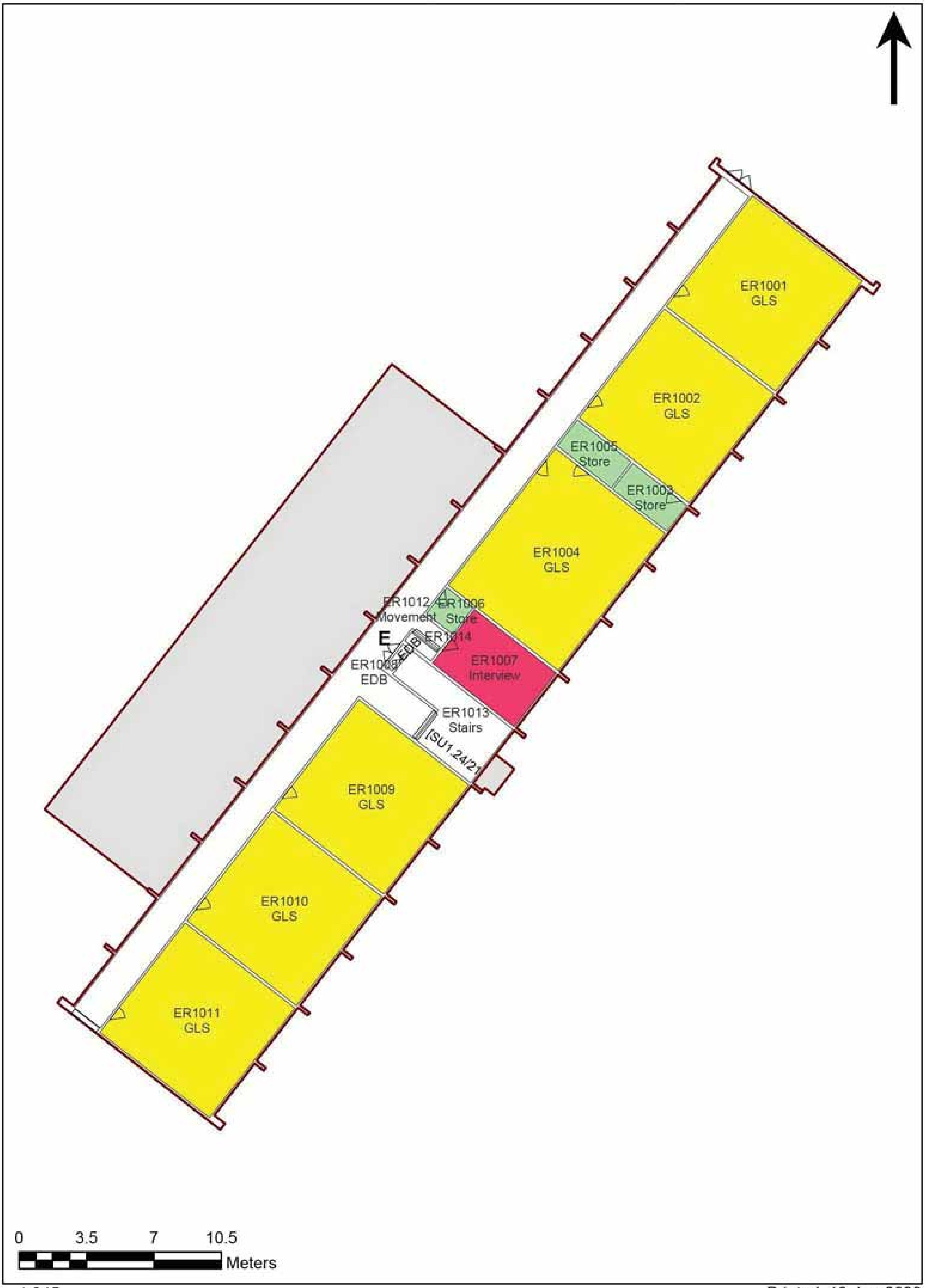
Printed: 12-Jun-2020

D21/78776

8225 - Marsden High School

General Learning (B00E) - 1st Floor (Room Function)



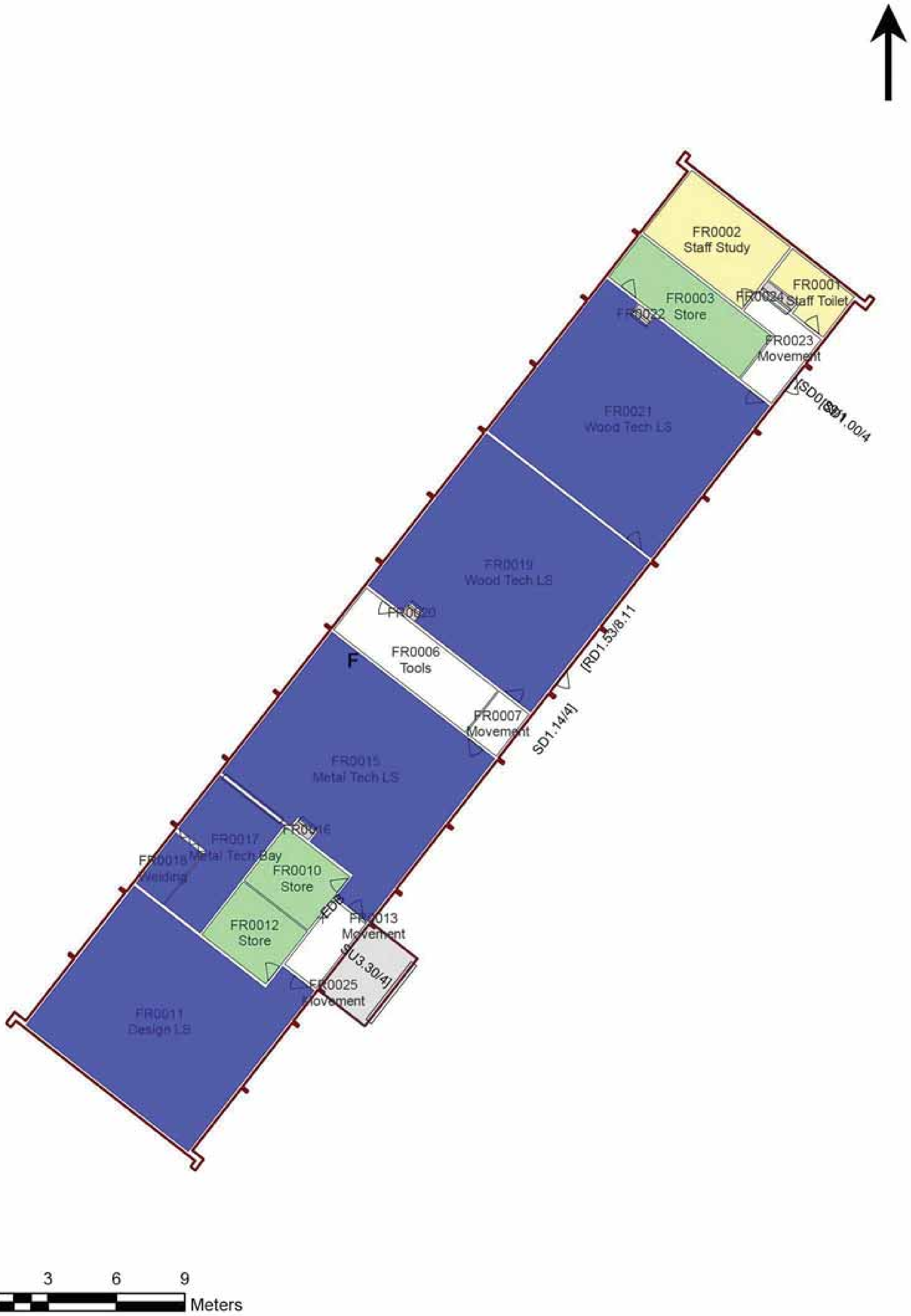
1:245

Printed: 12-Jun-2020

D21/78776

8225 - Marsden High School

Technological & Applied Studies (B00F) - Ground Floor (Room Function)



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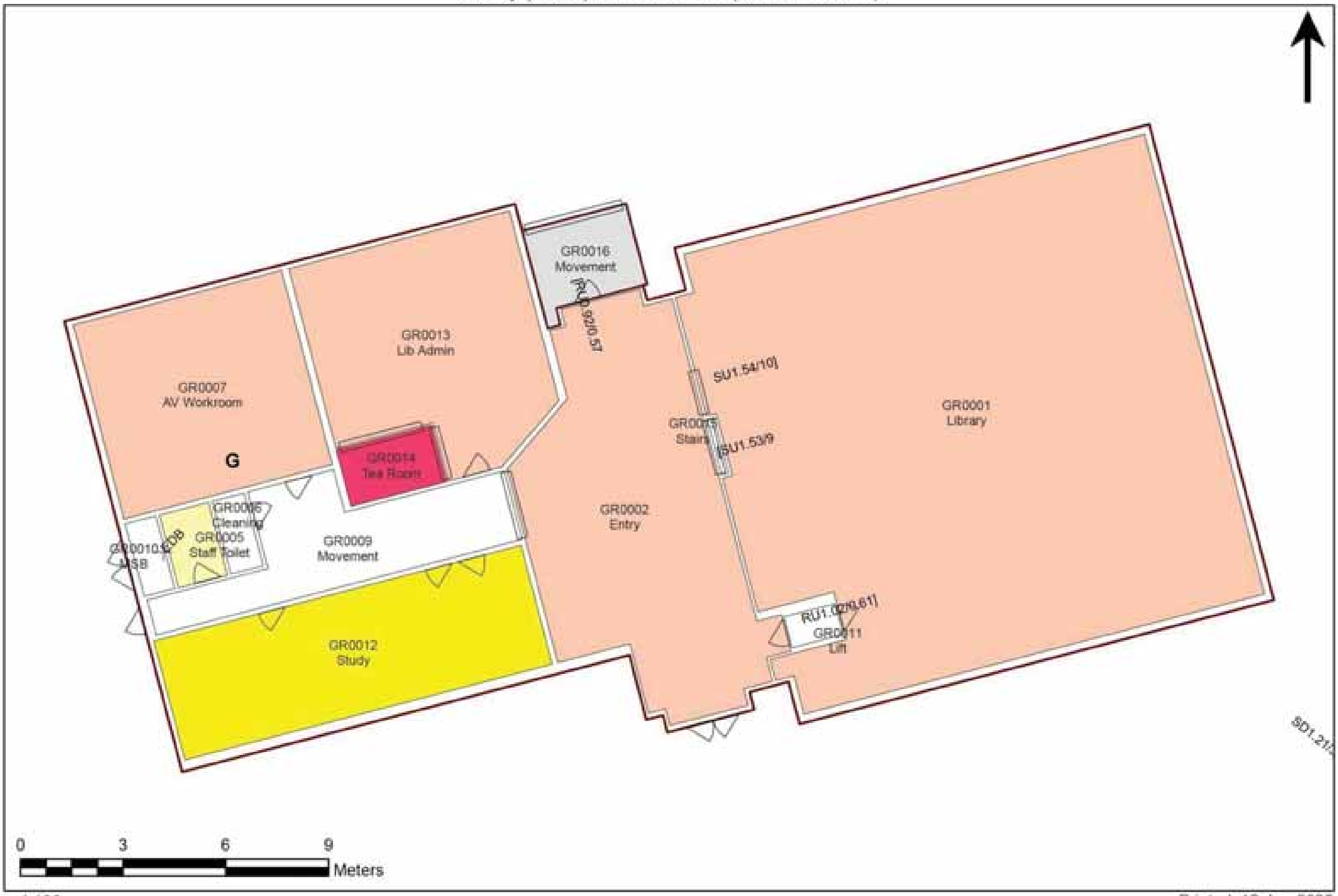
Printed: 12-Jun-2020

D21/78776

8225 - Marsden High School

Library (B00G) - Ground Floor (Room Function)



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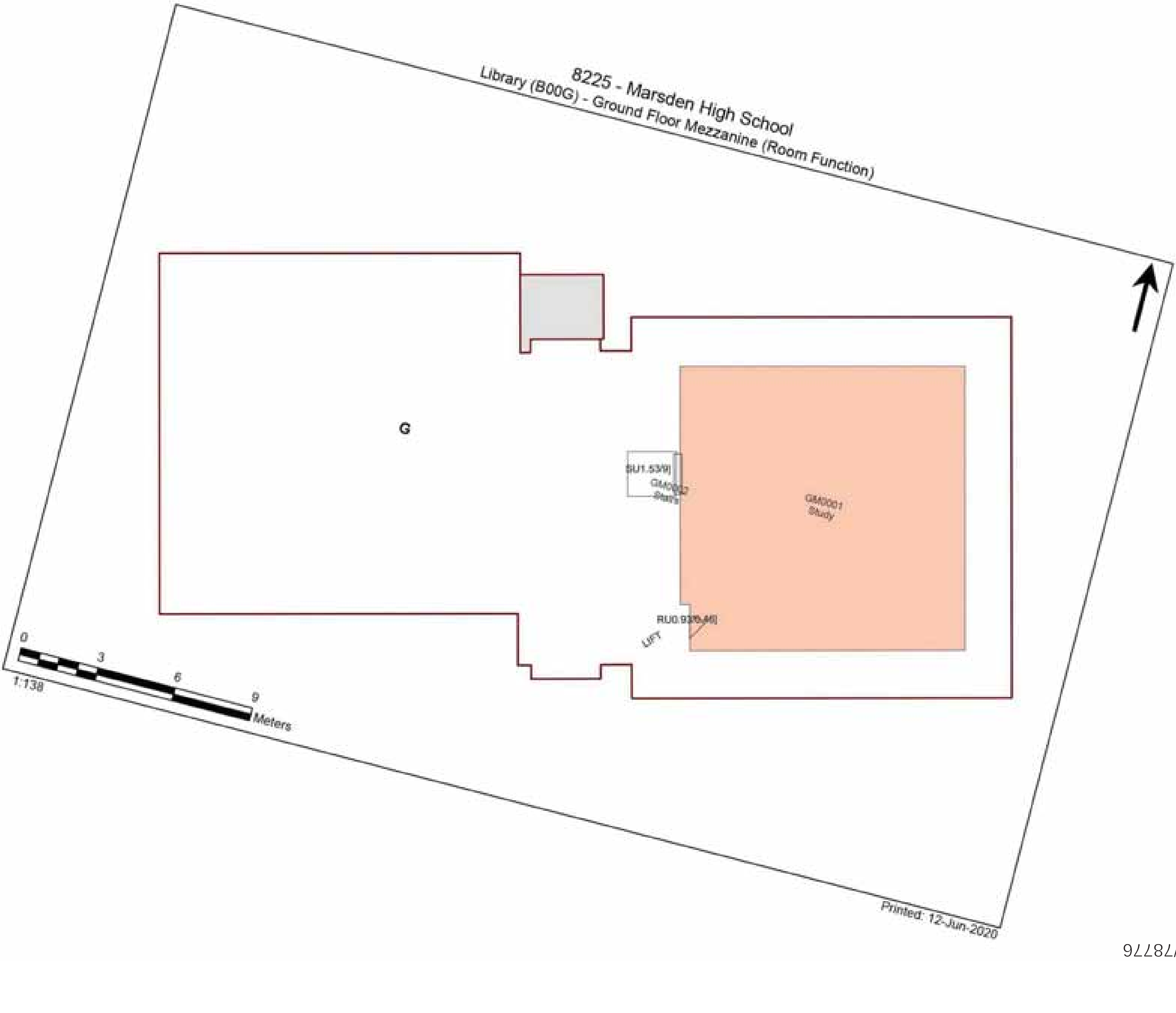
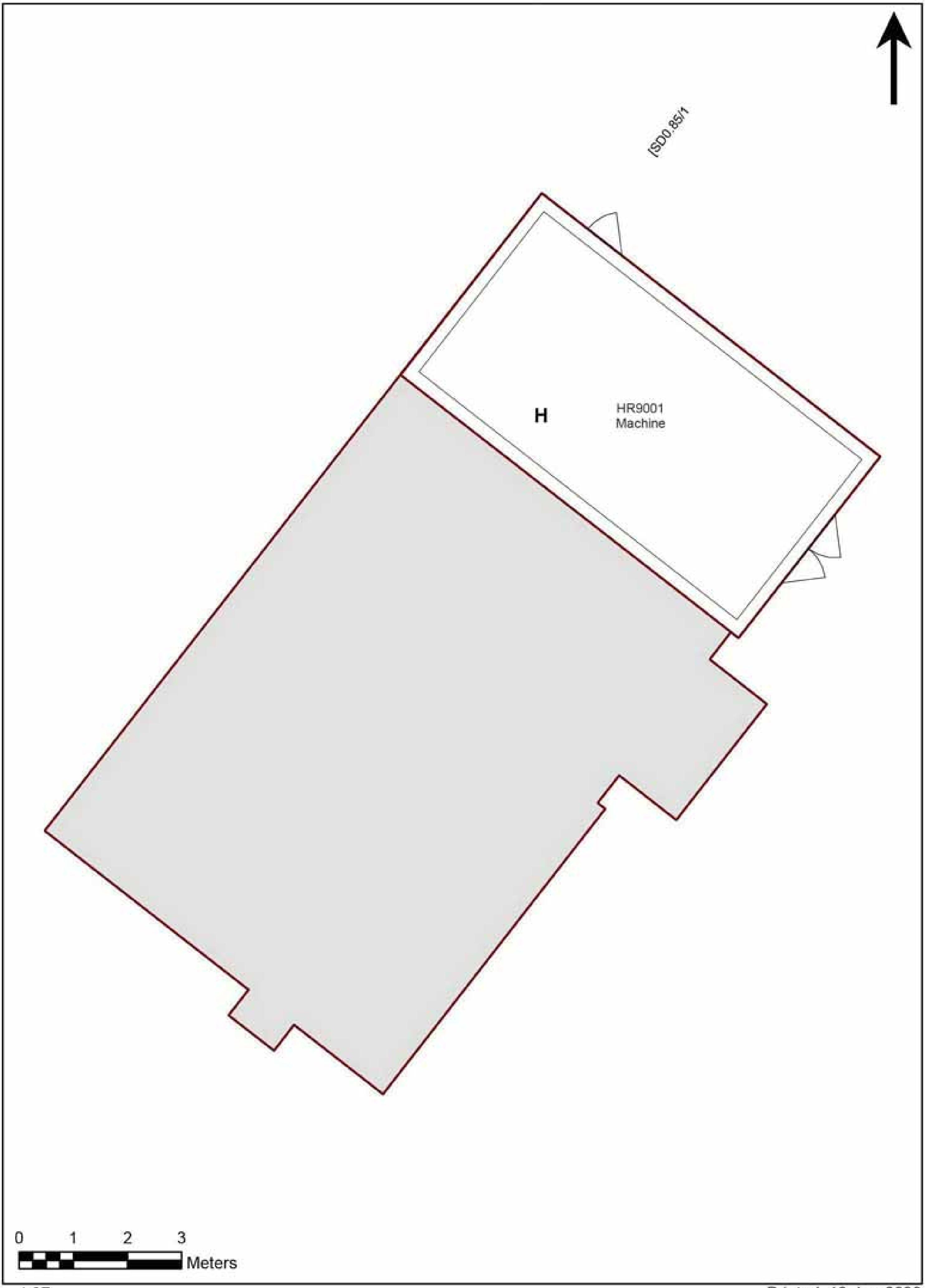
Printed: 12-Jun-2020


8225 - Marsden High School
Library (B00G) - Ground Floor Mezzanine (Room Function)
G
SU1.53[9]
GM0002
Stairs
GM0001
Study
RU0.93[0.46]
LIFT
0
3
6
9
1:138
Meters
Printed: 12-Jun-2020

D21/78776

8225 - Marsden High School

Staff/Storage (B00H) - Basement 1 (Room Function)



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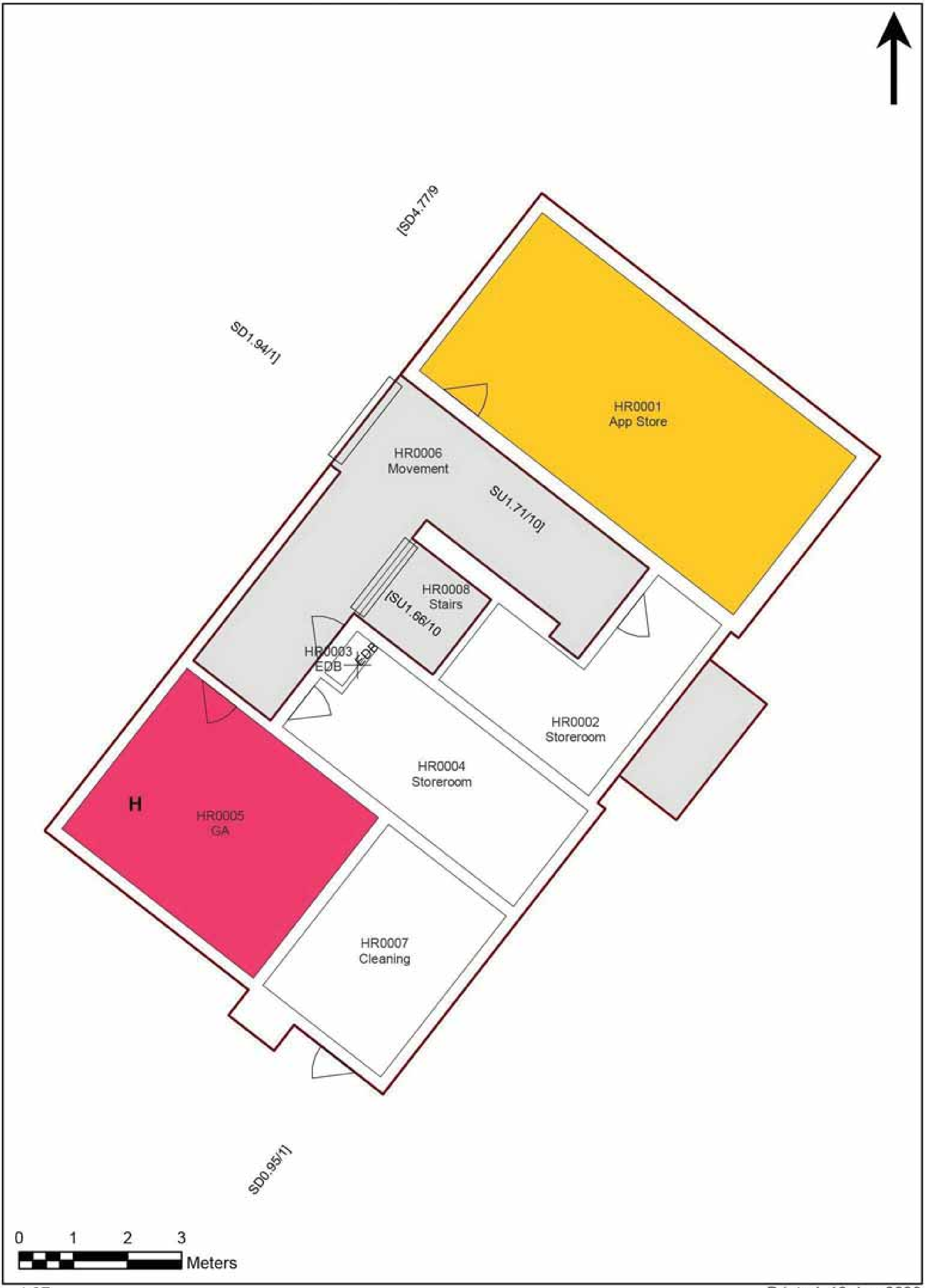
Printed: 12-Jun-2020

D21/78776

8225 - Marsden High School

Staff/Storage (B00H) - Ground Floor (Room Function)



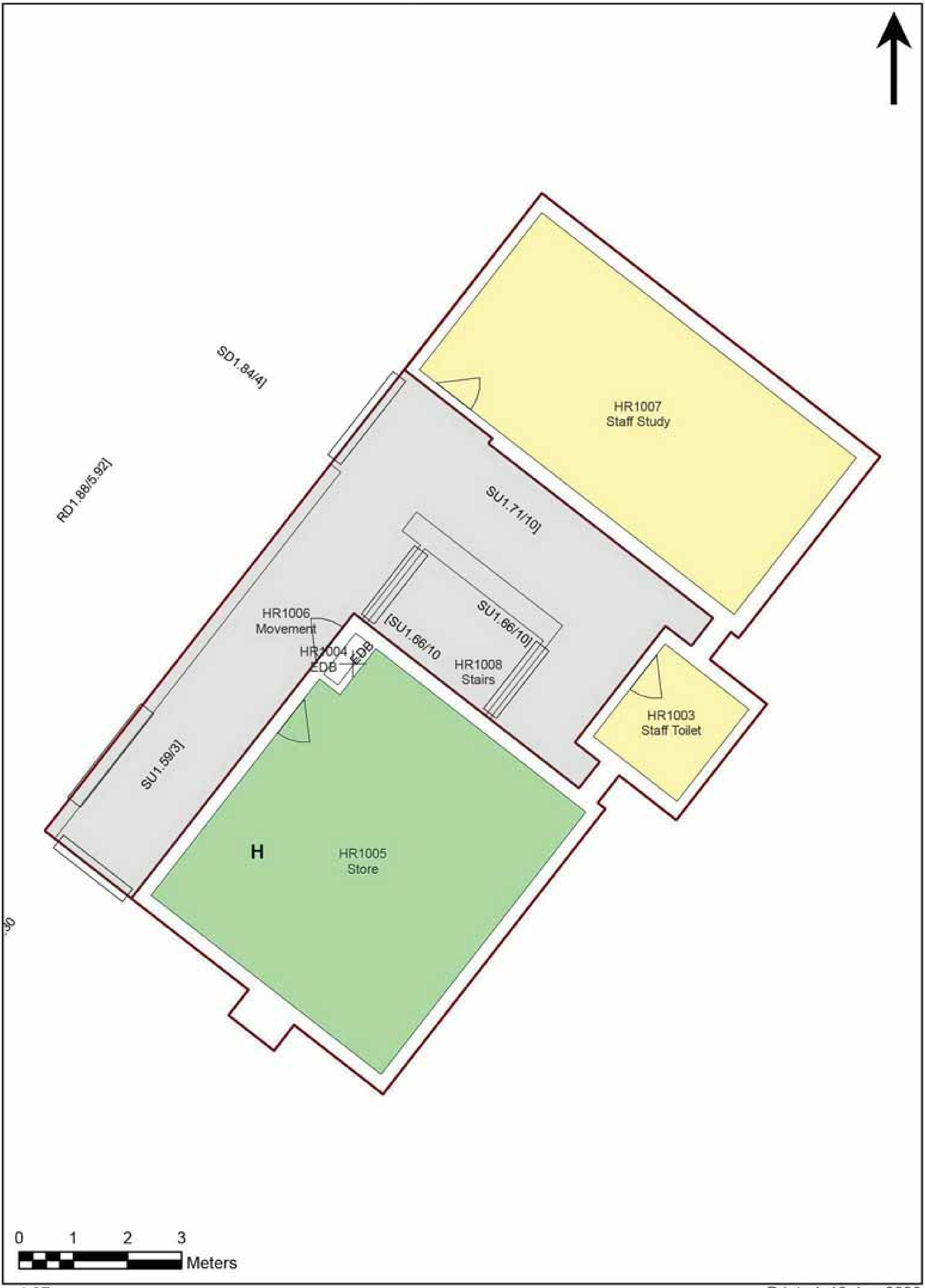
1:87

Printed: 12-Jun-2020

D21/78776

8225 - Marsden High School

Staff/Storage (B00H) - 1st Floor (Room Function)



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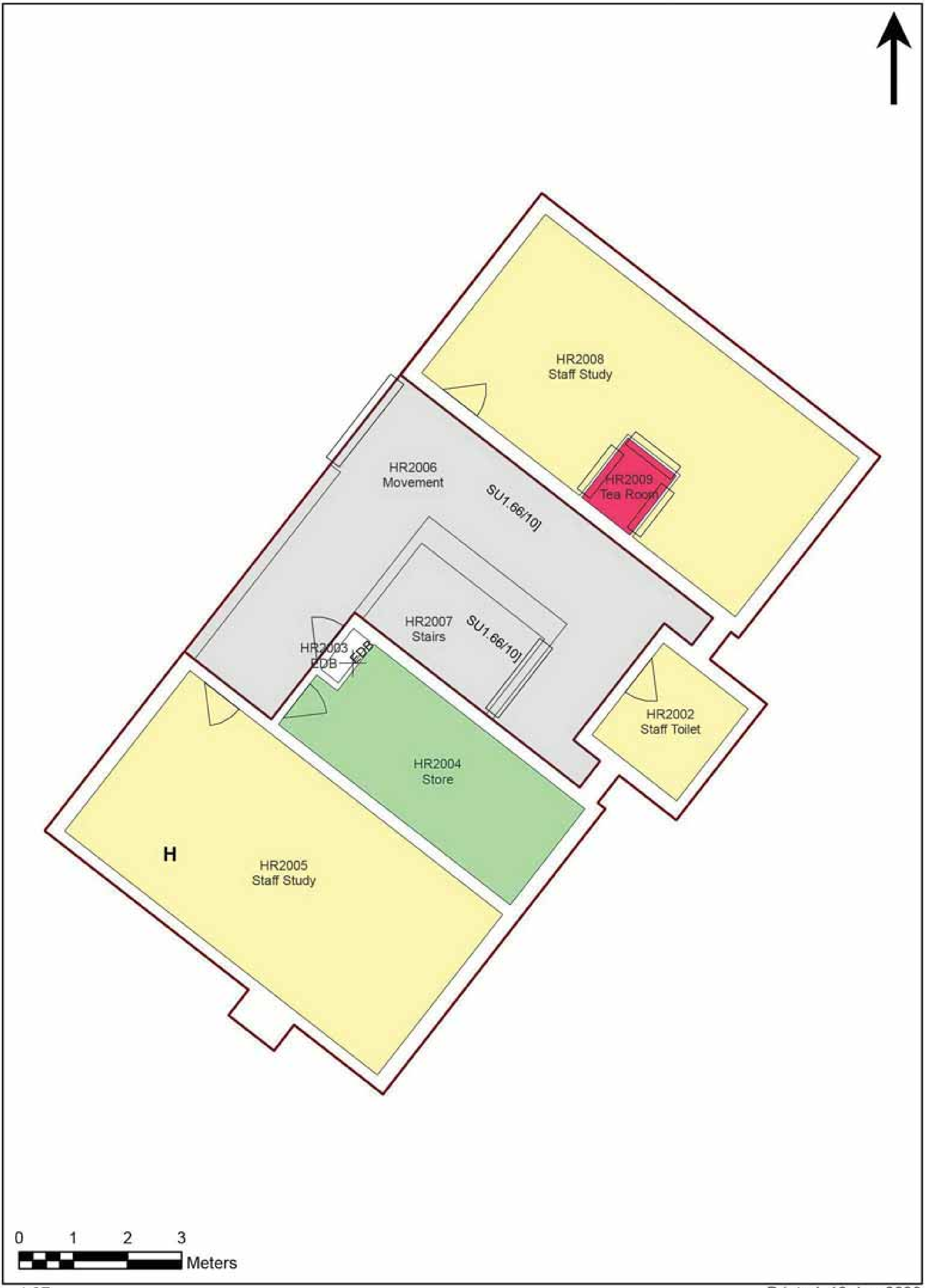
Printed: 12-Jun-2020

D21/78776

8225 - Marsden High School

Staff/Storage (B00H) - 2nd Floor (Room Function)



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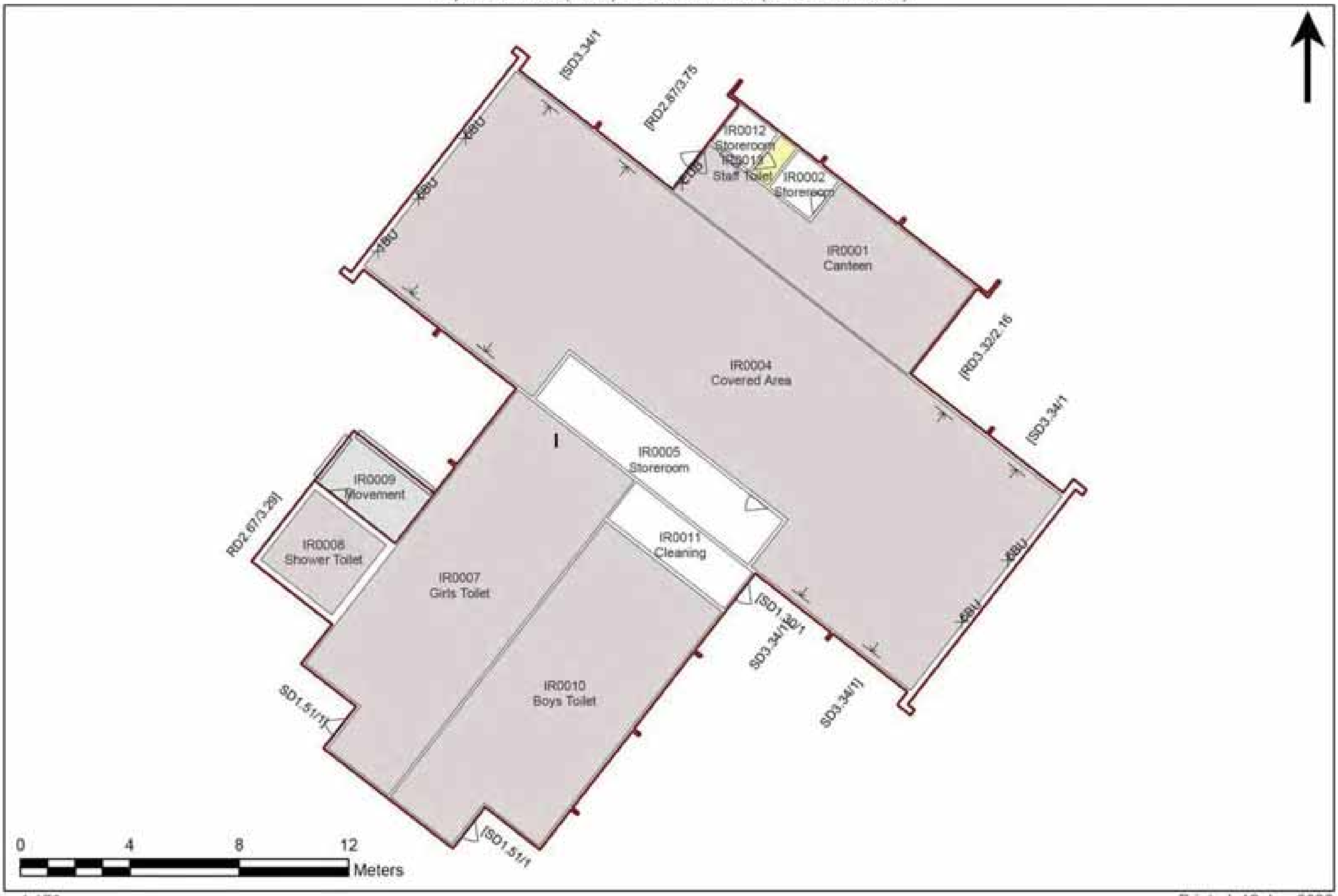
Printed: 12-Jun-2020

D21/78776

8225 - Marsden High School

Pupil Facilities (B00I) - Ground Floor (Room Function)



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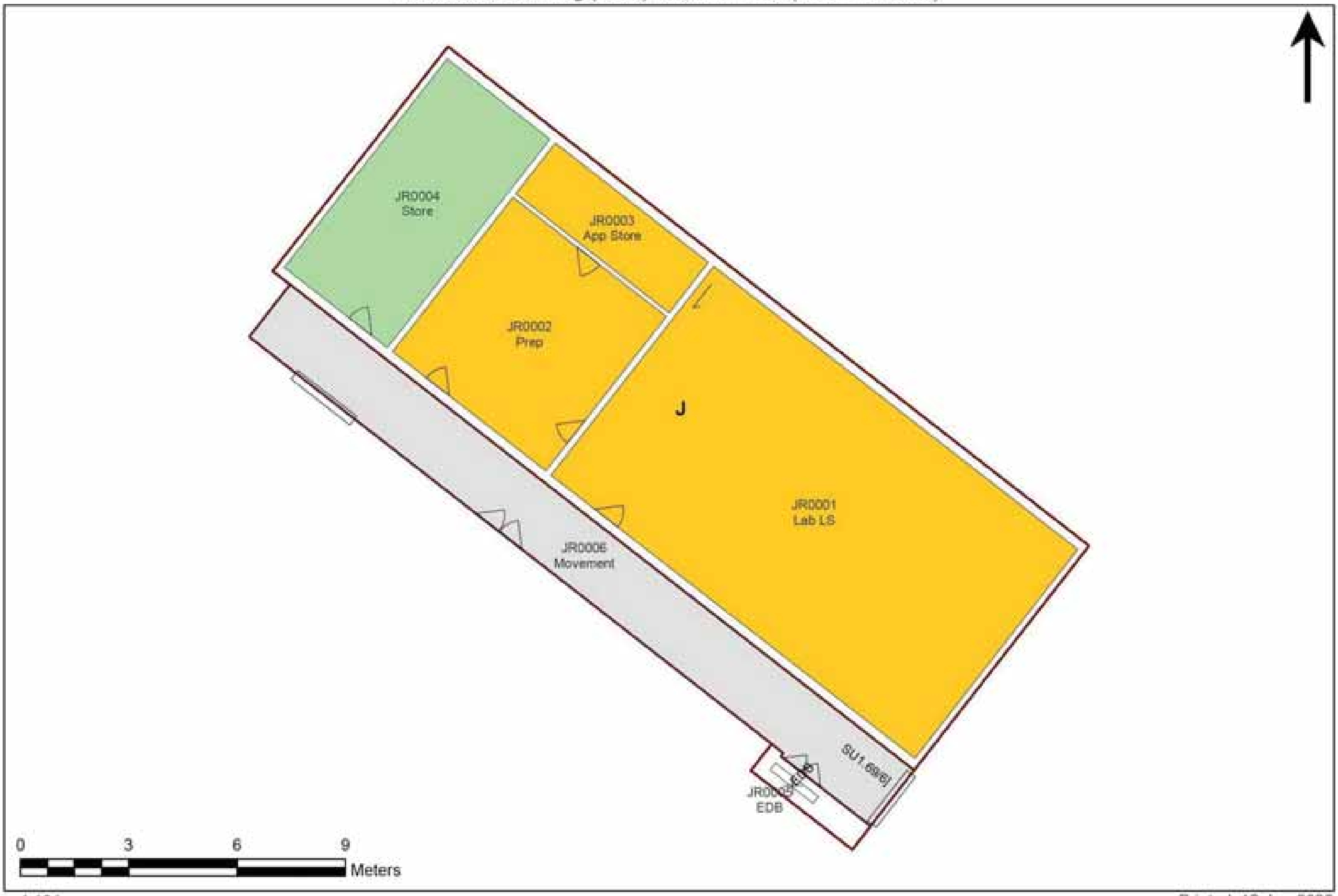
Printed: 12-Jun-2020

D21/78776

8225 - Marsden High School

Art/Science Learning (B00J) - Ground Floor (Room Function)



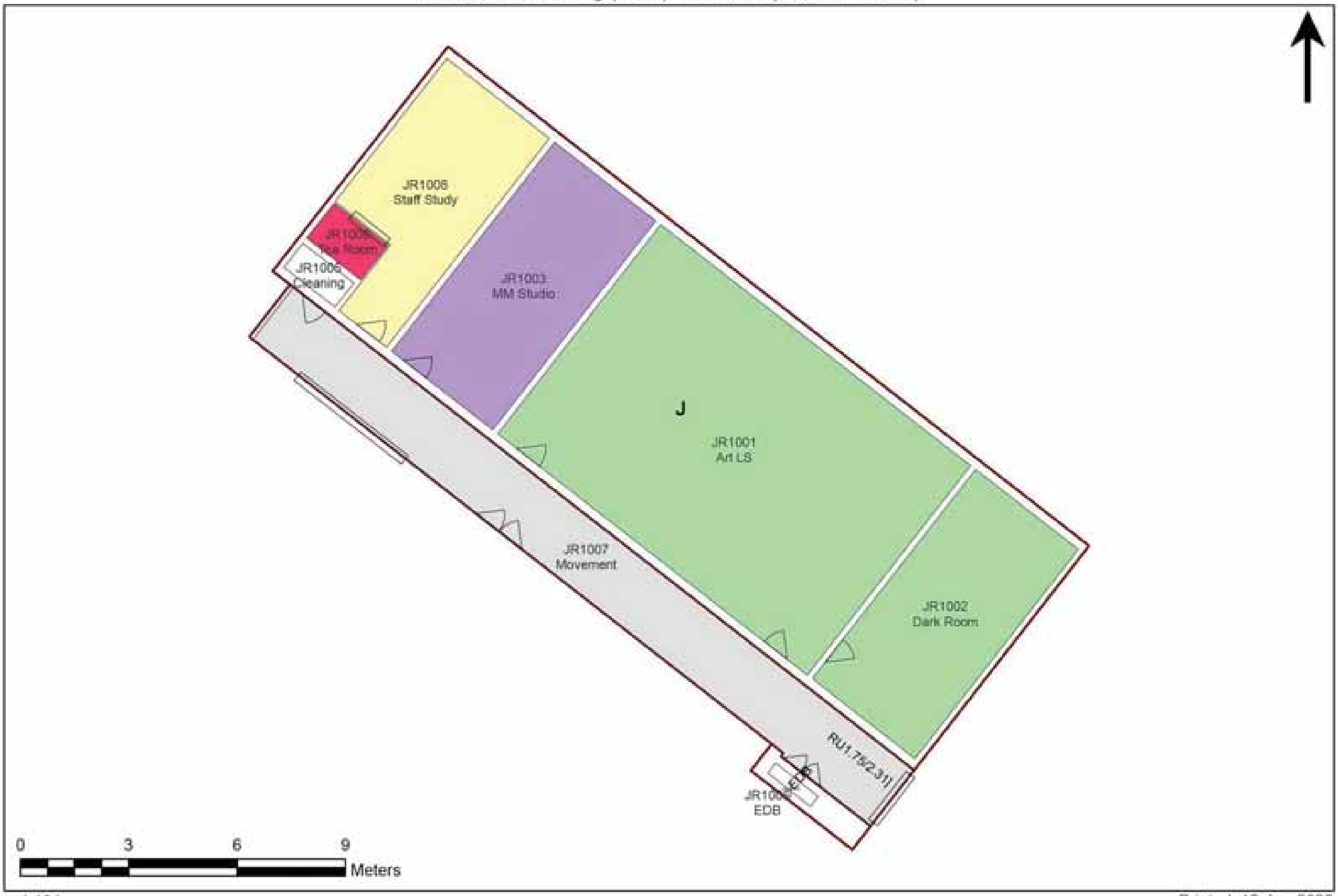
1:131

Printed: 12-Jun-2020

D21/78776

8225 - Marsden High School

Art/Science Learning (B00J) - 1st Floor (Room Function)



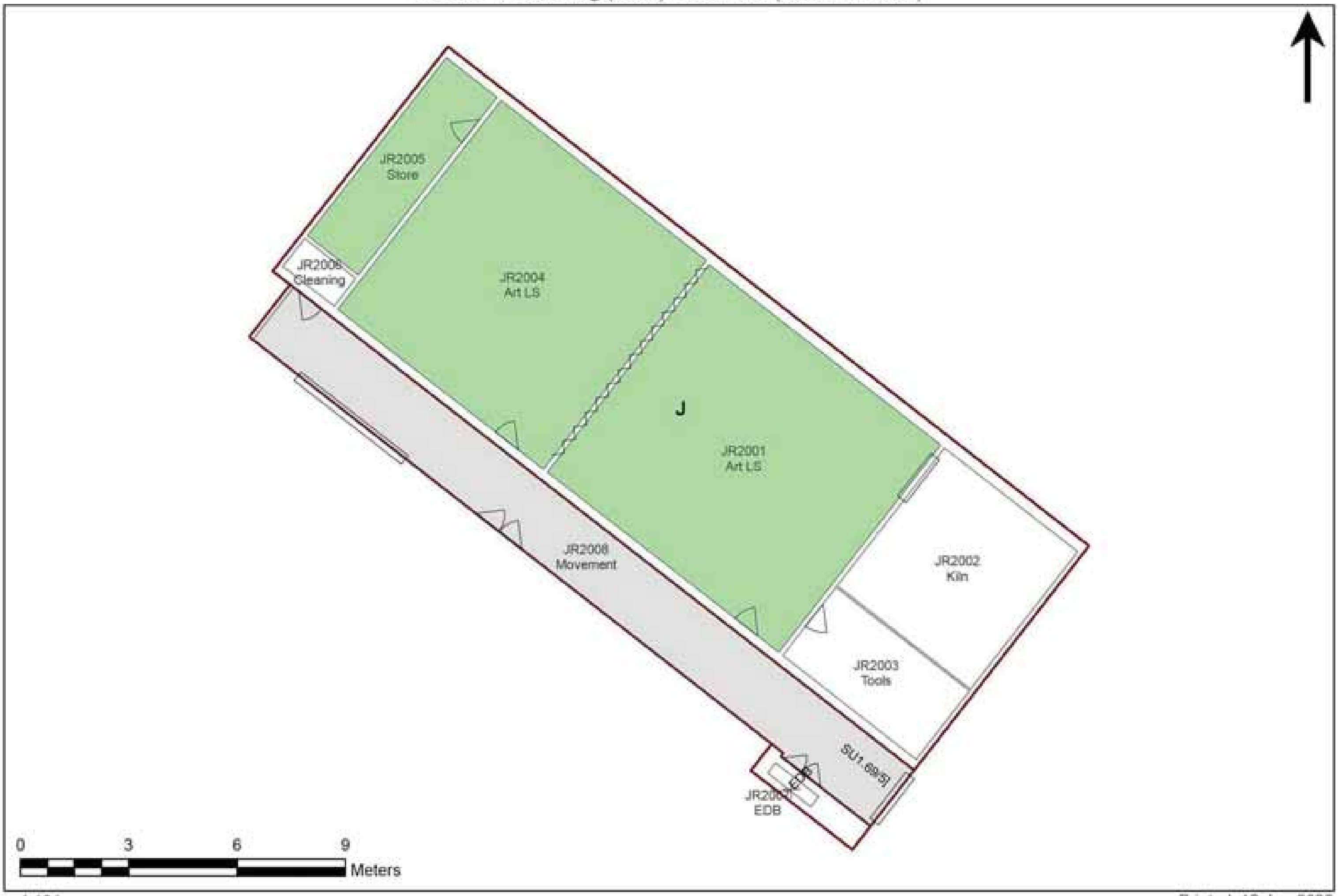
1:131

Printed: 12-Jun-2020

D21/78776

8225 - Marsden High School

Art/Science Learning (B00J) - 2nd Floor (Room Function)



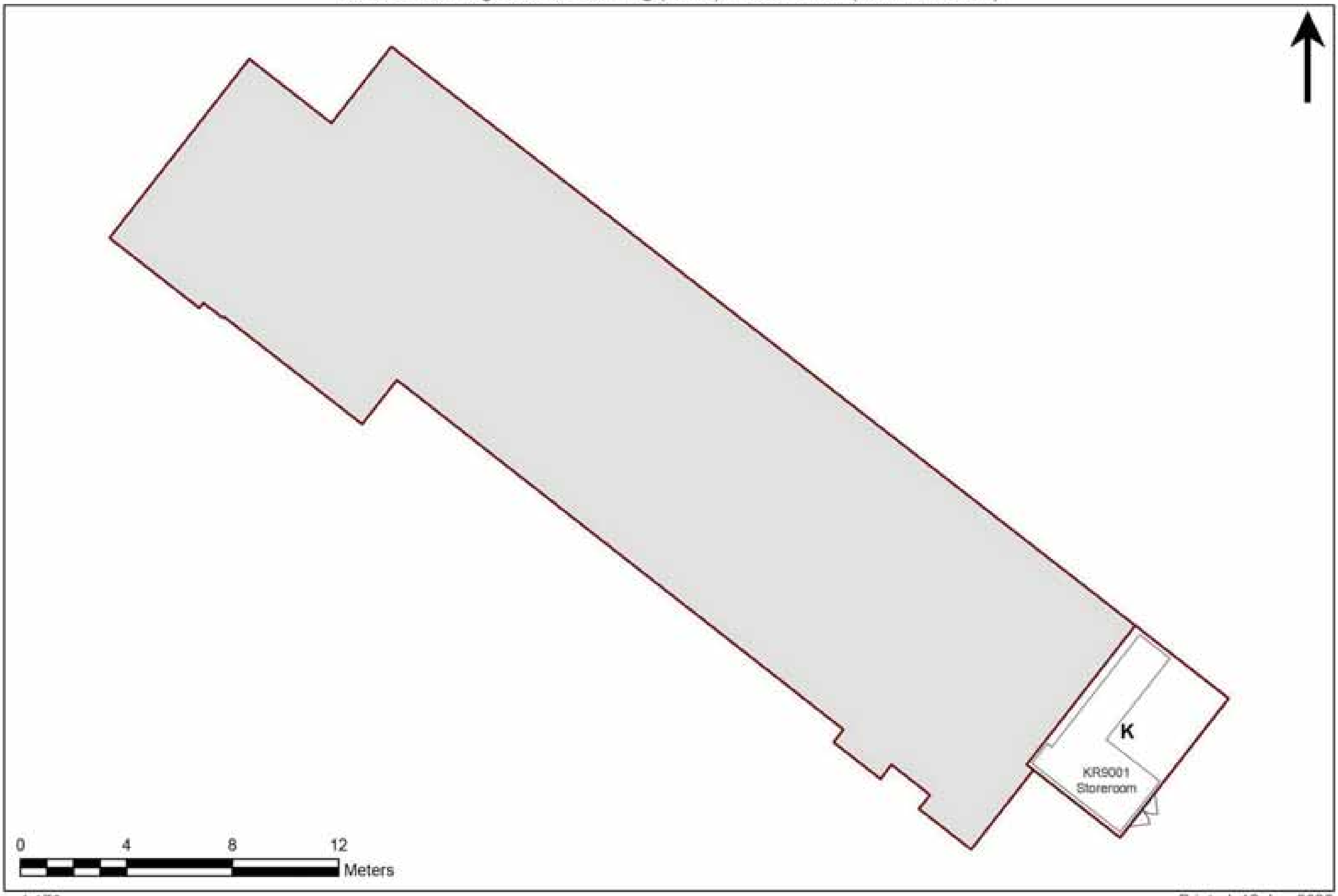
1:131

Printed: 12-Jun-2020

D21/78776

8225 - Marsden High School

General Learning/Science Learning (B00K) - Basement 1 (Room Function)



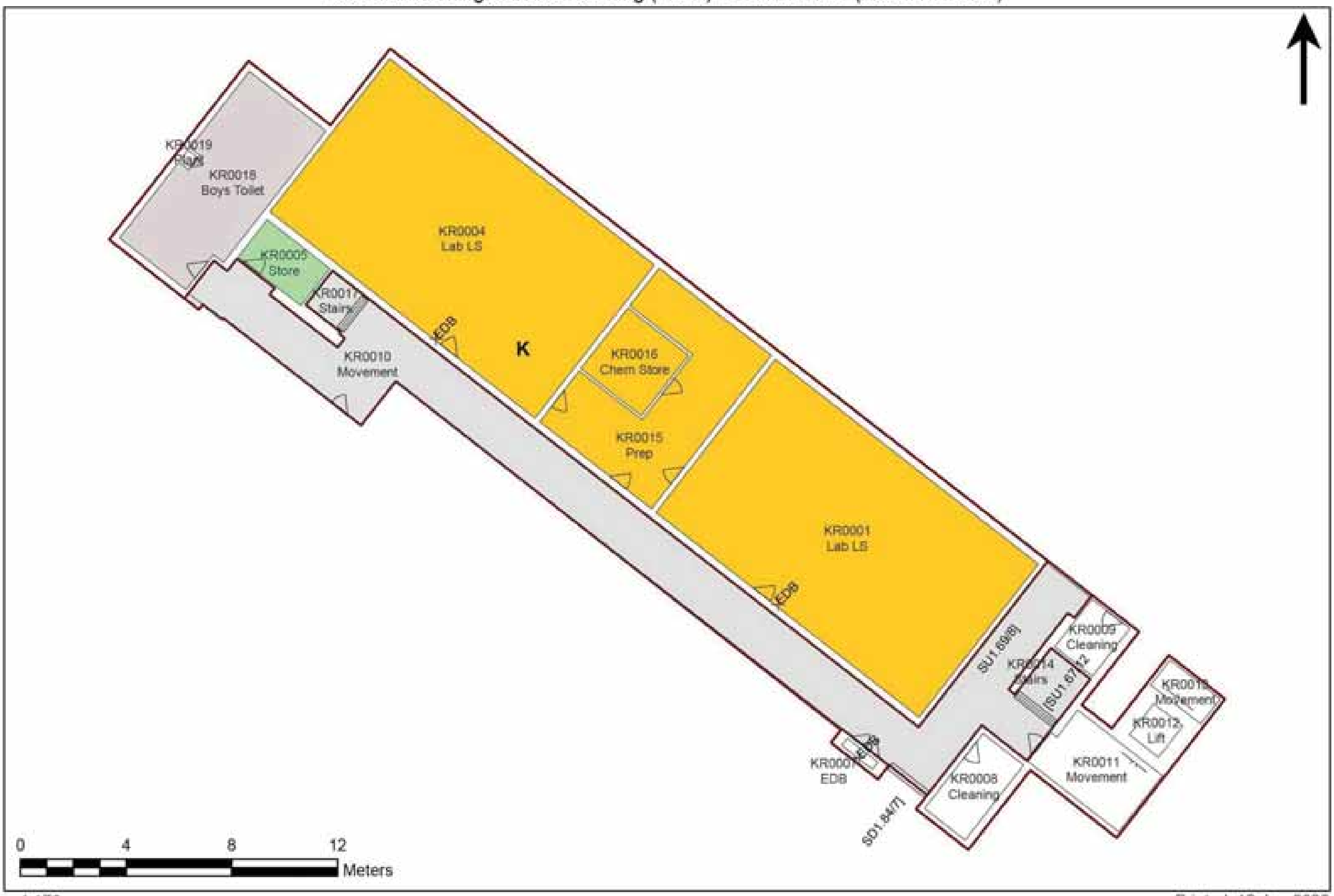
1:178

Printed: 12-Jun-2020

D21/78776

8225 - Marsden High School

General Learning/Science Learning (B00K) - Ground Floor (Room Function)



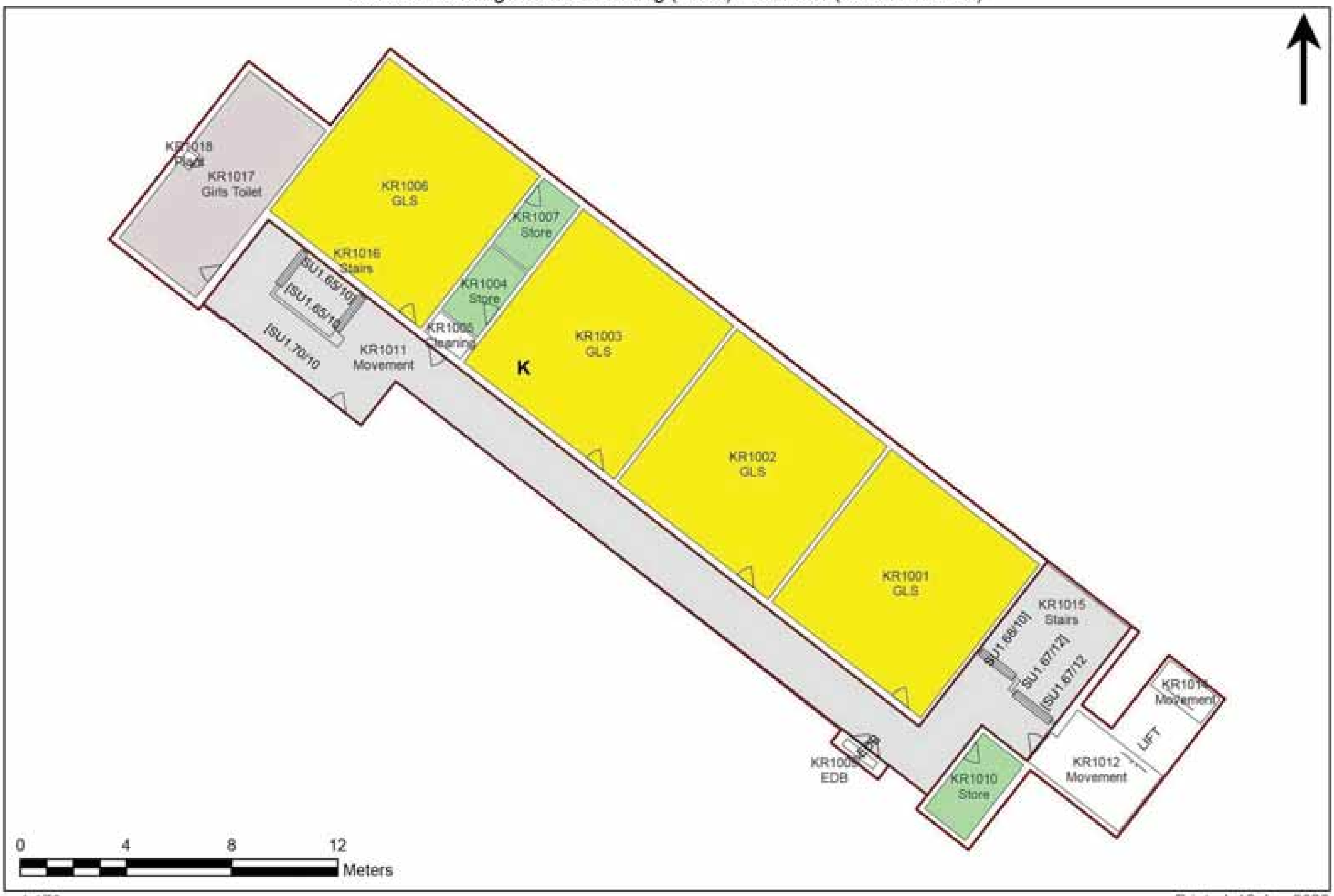
1:178

Printed: 12-Jun-2020

D21/78776

8225 - Marsden High School

General Learning/Science Learning (B00K) - 1st Floor (Room Function)



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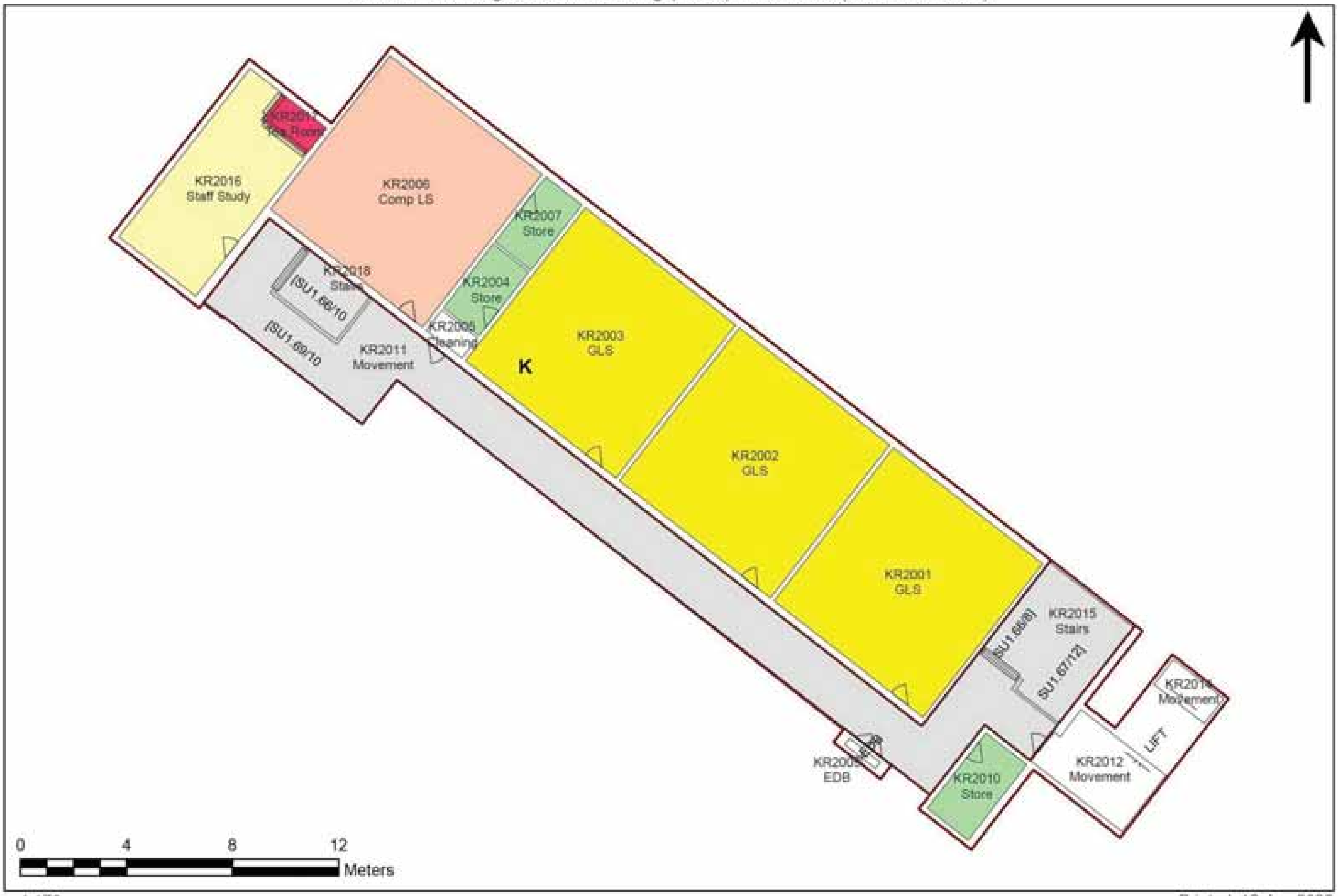
Printed: 12-Jun-2020

D21/78776

8225 - Marsden High School

General Learning/Science Learning (B00K) - 2nd Floor (Room Function)



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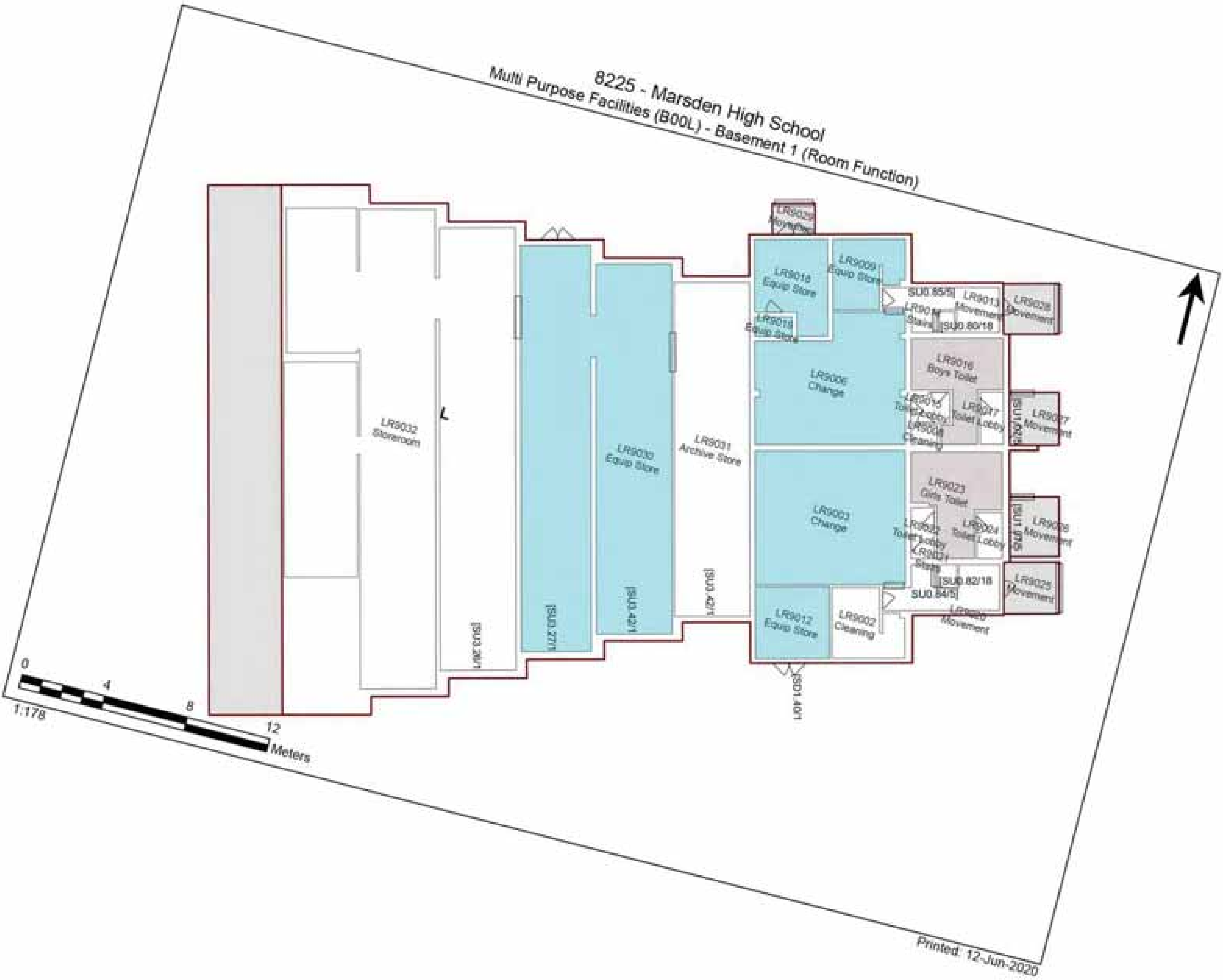
Printed: 12-Jun-2020

D21/78776

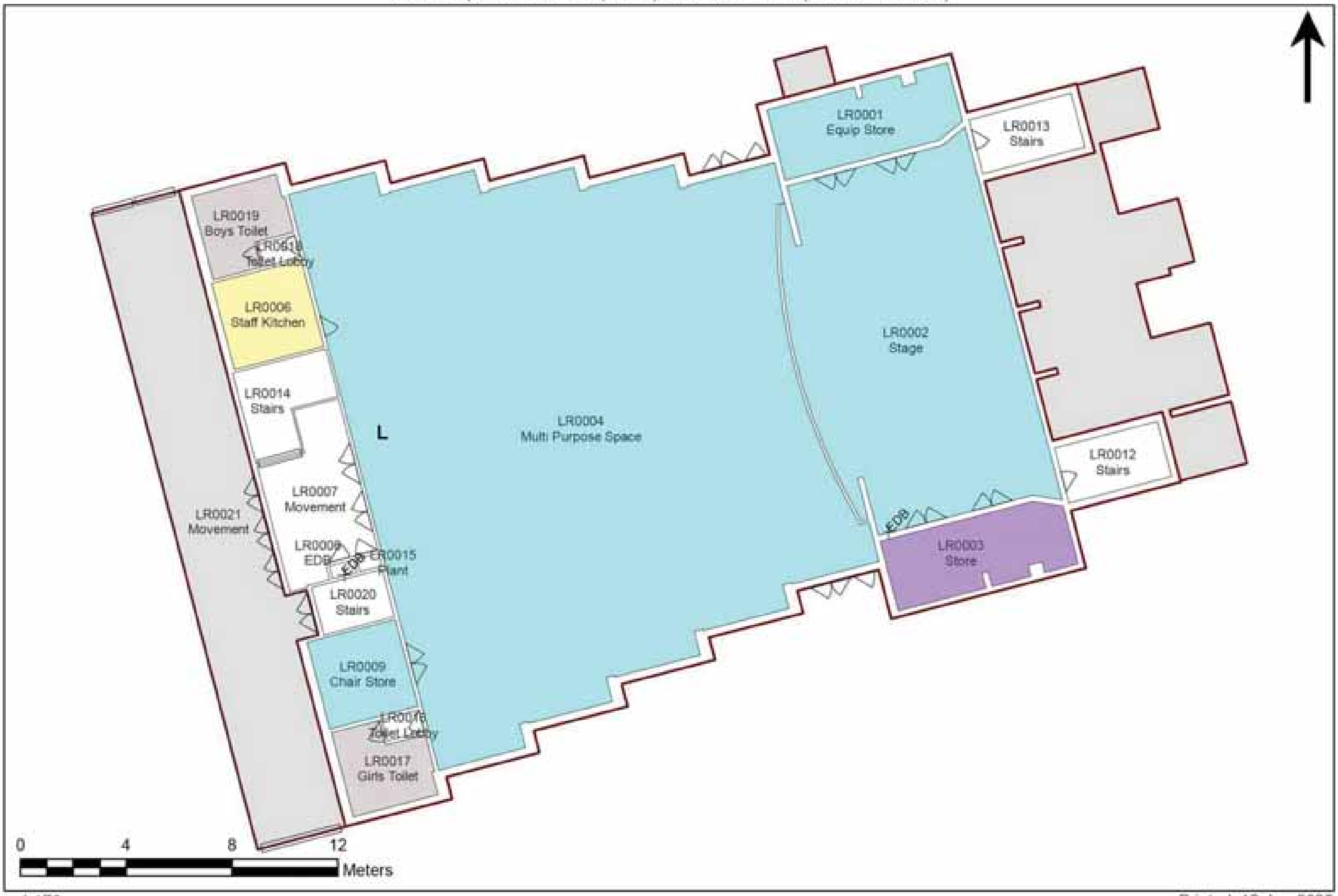


8225 - Marsden High School
Multi Purpose Facilities (B00L) - Basement 1 (Room Function)
LR9032
Storeroom
LR9030
Equip Store
LR9031
Archive Store
LR9018
Equip Store
LR9009
Equip Store
LR9019
Equip Store
LR9006
Change
LR9003
Change
LR9016
Boys Toilet
LR9023
Girls Toilet
LR9012
Equip Store
LR9002
Cleaning
LR9028
Movement
LR9027
Movement
LR9026
Movement
LR9025
Movement
LR9013
Movement
LR9020
Movement
SU0.85/5
SU0.80/18
SU0.82/18
SU0.84/5
[SU3.27/1
[SU3.42/1
[SU3.42/1
[SU3.28/1
SD1.40/1
0
4
8
12
1:178
Meters
Printed: 12-Jun-2020

D21/78776

8225 - Marsden High School

Multi Purpose Facilities (B00L) - Ground Floor (Room Function)



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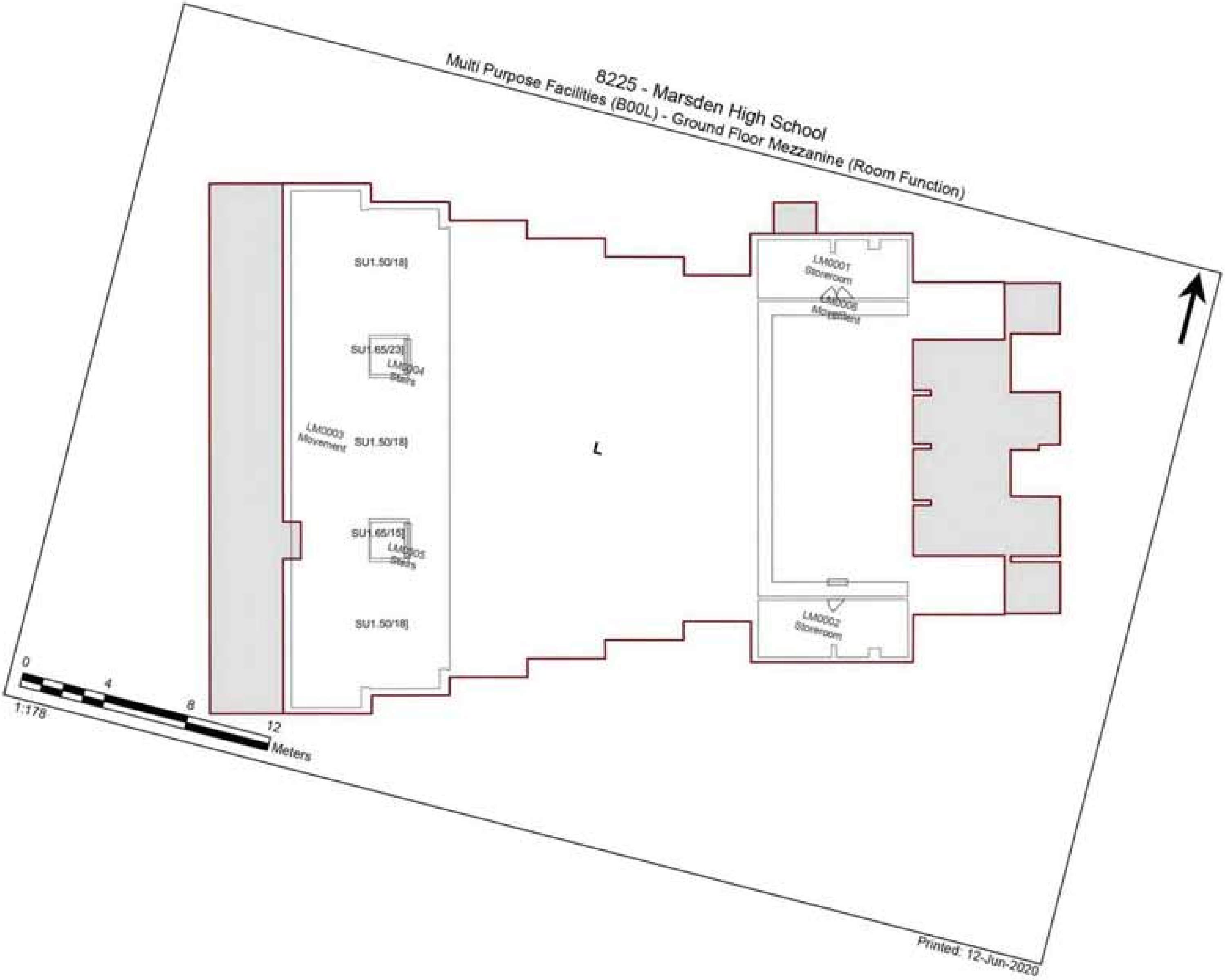
Printed: 12-Jun-2020

D21/78776

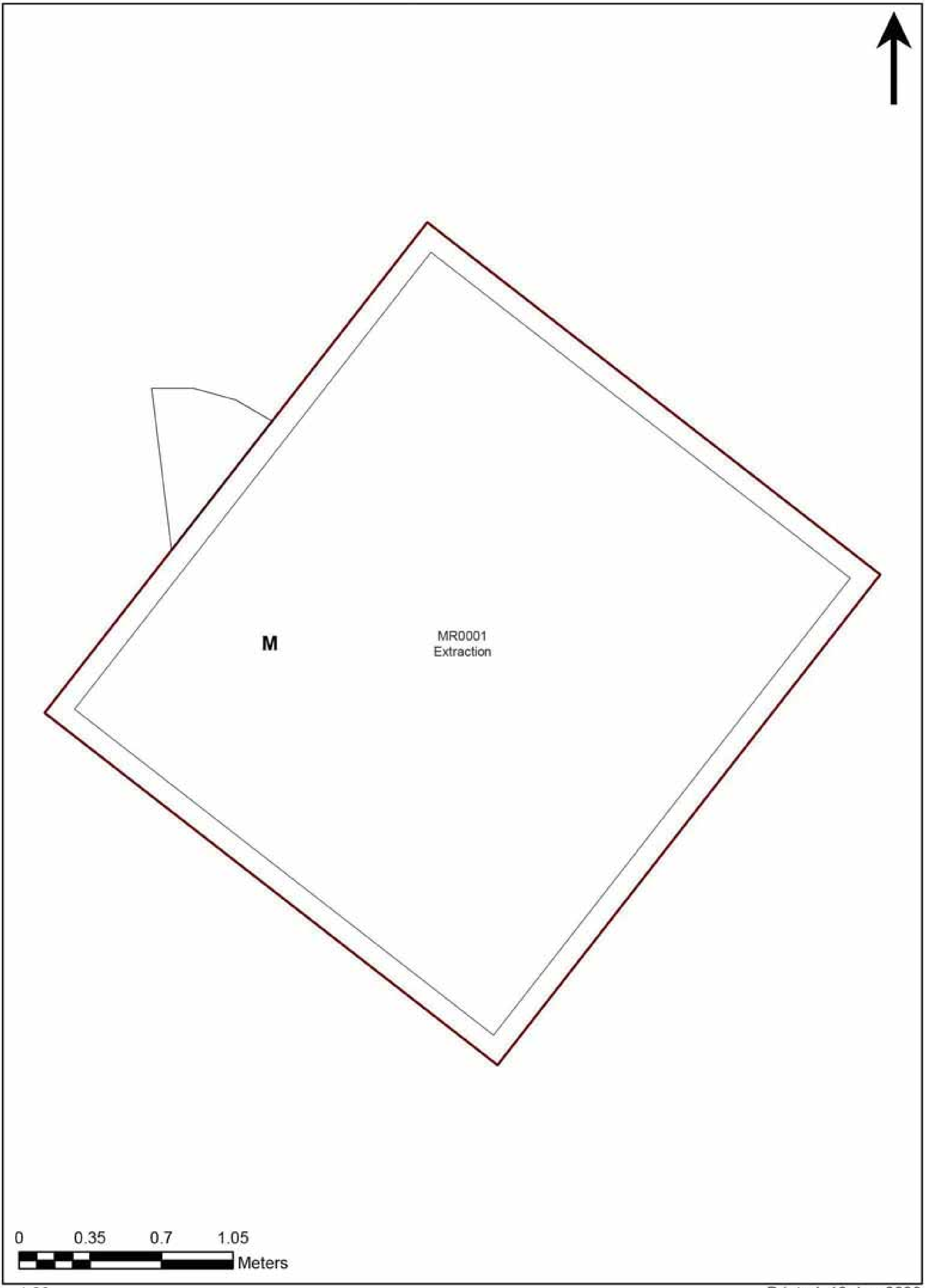


8225 - Marsden High School
Multi Purpose Facilities (B00L) - Ground Floor Mezzanine (Room Function)
SU1.50/18]
SU1.65/23]
LM0004
Stairs
LM0003
Movement
SU1.50/18]
L
SU1.65/15]
LM0005
Stairs
SU1.50/18]
LM0001
Storeroom
LM0006
Movement
LM0002
Storeroom
0
4
8
12
1:178
Meters
Printed: 12-Jun-2020

D21/78776

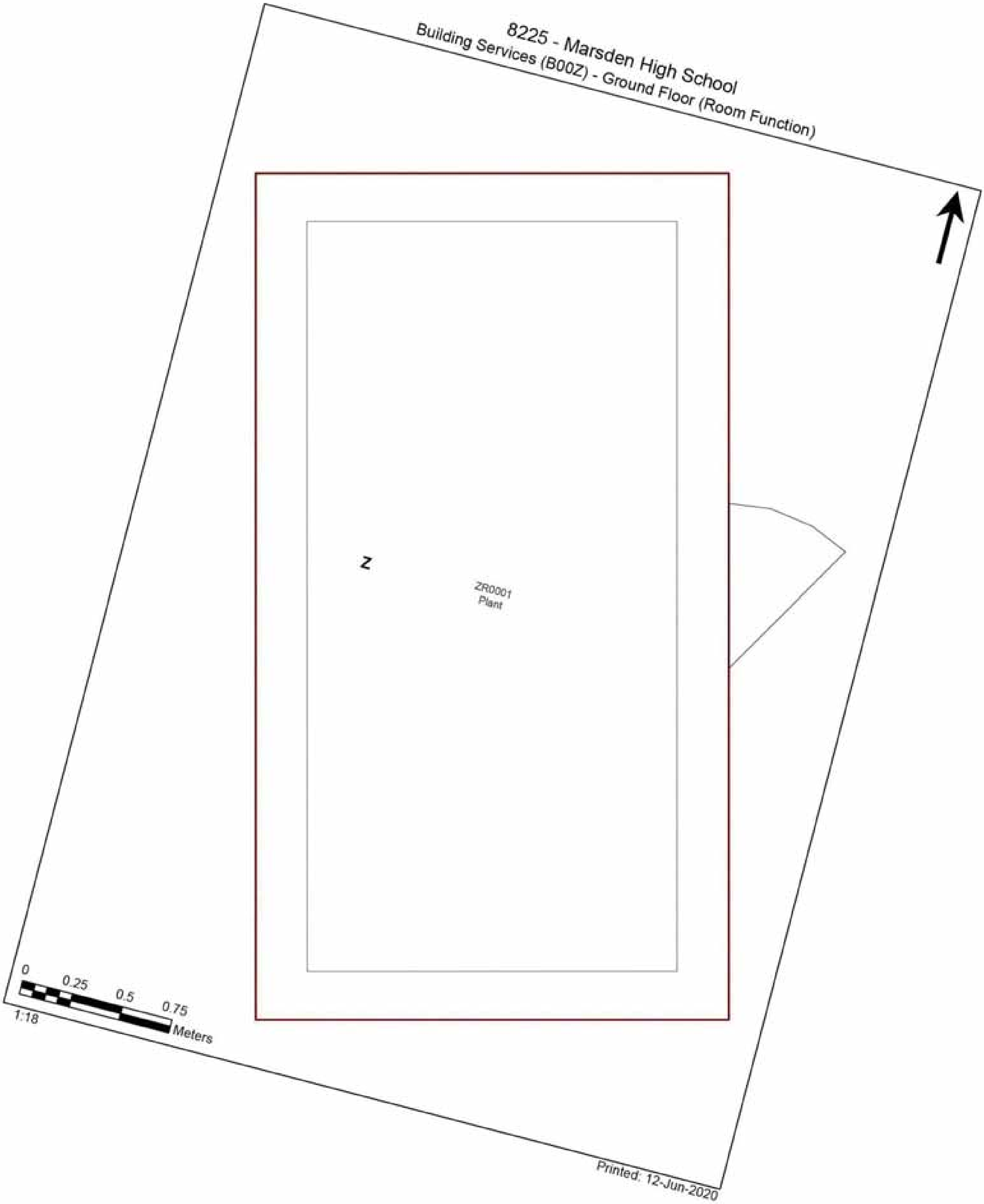
8225 - Marsden High School

Building Services (B00M) - Ground Floor (Room Function)



Printed: 12-Jun-2020

D21/78776


8225 - Marsden High School
Building Services (B00Z) - Ground Floor (Room Function)
Z
ZR0001
Plant
0
0.25
0.5
0.75
1:18
Meters
Printed: 12-Jun-2020

Appendix C

Site History Information

SafeWork NSW

Locked Bag 2906, Lisarow NSW 2252
Customer Experience 13 10 50
ABN 81 913 830 179 | www.safework.nsw.gov.au

Our Ref: D20/231547

11 December 2020

Ms Lisa Teng
Douglas Partners Pty Ltd
Lisa.teng@douglaspartners.com.au

Dear Ms Teng

RE SITE: 22a Winbourne St, West Ryde NSW 2114

I refer to your site search request received by SafeWork NSW on 10 November 2020 requesting information on Storage of Hazardous Chemicals for the above site.

A search of the records held by SafeWork NSW has not located any records pertaining to the above-mentioned premises.

For further information or if you have any questions, please call us on 13 10 50 or email licensing@safework.nsw.gov.au

Yours sincerely

Gabriela Draper

Licensing Representative
Licensing and Funds, Better Regulation
SafeWork NSW

City of Ryde

Lifestyle and opportunity @ your doorstep

Customer Service Centre
1 Pope Street, Ryde NSW 2112
(Within Top Ryde City shopping centre)
Phone (02) 9952 8222
Fax (02) 9952 8070
Email cityofryde@ryde.nsw.gov.au
Post Locked Bag 2069, North Ryde NSW 1670
ABN 81 621 292 610
www.ryde.nsw.gov.au

Dfp Planning Pty Ltd
11 Dartford Road
THORNLEIGH NSW 2120

Issue Date:	11 November 2020
Certificate No:	PLN2020/4226
Your Ref:	21295A SE

PLANNING CERTIFICATE SECTION 10.7

NSW Environmental Planning and Assessment Act 1979 ('Act')

Property Address: 22 Winbourne St WEST RYDE NSW 2114
Legal Description: Lot 1 DP 220808
Property Reference: 531720
Land Reference: 37017

INFORMATION PROVIDED PURSANT TO SECTION 10.7(2) OF THE ACT AND SCHEDULE 4 OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT REGUALTION 2000

1. NAMES OF RELEVANT ENVIRONMENTAL PLANNING INSTRUMENTS AND DEVELOPMENT CONTROL PLANS

a) LOCAL ENVIRONMENTAL PLAN AND DEEMED ENVIRONMENTAL PLANNING INSTRUMENTS
Ryde Local Environment Plan 2014

b) PROPOSED LOCAL ENVIRONMENTAL PLANS that are or have been the subject of community consultation or public exhibition under the Act.
Nil

c) DEVELOPMENT CONTROL PLANS
City of Ryde Development Control Plan 2014

d) STATE ENVIRONMENTAL PLANNING POLICIES AND INSTRUMENTS
The Minister for Planning has notified Council that the following State Environmental Planning Policies and Proposed State Environmental Plans apply to the land and should be specified in this certificate:

State Environmental Planning Policies
State Environmental Planning Policy No 1-Development Standards
State Environmental Planning Policy No 19 - Bushland in Urban Areas.
State Environmental Planning Policy No 21 - Caravan Parks.
State Environmental Planning Policy No 33 - Hazardous and Offensive Development.
State Environmental Planning Policy No 50 - Canal Estate Development.
State Environmental Planning Policy No 55 - Remediation of Land.

State Environmental Planning Policy No 64 - Advertising and Signage.
State Environmental Planning Policy No 65 - Design Quality of Residential Apartment Development.
State Environmental Planning Policy No 70-Affordable Housing (Revised Schemes)
State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004
State Environmental Planning Policy (Exempt and Complying Development Codes) 2008
State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004
State Environmental Planning Policy (Infrastructure) 2007
State Environmental Planning Policy (State Significant Precincts) 2005
State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007
State Environmental Planning Policy (State and Regional Development) 2011
State Environmental Planning Policy (Miscellaneous Consent Provisions) 2007
State Environmental Planning Policy (Education Establishments and Child Care Facilities) 2017
State Environmental Planning Policy (Affordable Rental Housing) 2009
State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017
State Environmental Planning Policy (Concurrences) 2018
State Environmental Planning Policy (Primary Production and Rural Development) 2019.

Deemed State Environmental Planning Policies

Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005

Proposed State Environmental Planning Policies

State Environmental Planning Policy (Environment)

Note: Specific constraints and zoning of the land may affect the applicability of certain provisions within the Policies listed above.

2. ZONING AND LAND USE UNDER RELEVANT LOCAL ENVIRONMENTAL PLANS

(a) ZONING and ZONING TABLE

Ryde Local Environmental Plan 2014 - Zone SP2 Infrastructure - Educational Establishment

1 Objectives of zone

- To provide for infrastructure and related uses.
- To prevent development that is not compatible with or that may detract from the provision of infrastructure.
- To ensure the orderly development of land so as to minimise any adverse effect of development on other land uses.

2 Permitted without consent

Nil

3 Permitted with consent

Aquaculture; Roads; The purpose shown on the Land Zoning Map, including any development that is ordinarily incidental or ancillary to development for that purpose

4 Prohibited

Any development not specified in item 2 or 3

(b) DEVELOPMENT STANDARDS FOR THE ERECTION OF A DWELLING HOUSE

No development standards under the Local Environment Plan apply to the land that fix minimum land dimension for the erection of a dwelling house on the land.

(c) CRITICAL HABITAT / AREA OF OUTSTANDING BIODIVERSITY VALUE
No. The land does not include or comprise critical habitat under Local Environmental Plan.

(d) CONSERVATION AREA (however described)
No. The land has not been identified as being within a heritage conservation area under the Local Environment Plan.

(e) ITEMS OF ENVIRONMENTAL HERITAGE (however described)
No. An item of environmental heritage is not situated on the land under the Local Environmental Plan.

2A. ZONING AND LAND USE UNDER STATE ENVIRONMENTAL PLANNING POLICY (SYDNEY REGION GROWTH CENTRES) 2006

This land **is not** within any zone under:

a) Part 3 of the *State Environmental Planning Policy (Sydney Region Growth Centres) 2006* (the 2006 SEPP); or
b) a Precinct Plan (within the meaning of the 2006 SEPP); or
c) a proposed Precinct Plan (within the meaning of the 2006 SEPP) that is or has been the subject of community consultation or on public exhibition.

OTHER PRESCRIBED INFORMATION

3. COMPLYING DEVELOPMENT
Whether or not the land is land on which complying development may be carried out under each of the codes for complying development because of provisions of clauses 1.17A(1)(c) to (e), (2), (3), and (4), 1.18(1)(c3) and 1.19 of the State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Housing Code, Inland Code, Low Rise Housing Diversity Code and Rural Housing Code
Complying Development under the Housing Code, Inland Code, Low Rise Housing Diversity Code and Rural Housing Code may be carried out on this land.

Housing Alterations Code and General Development Code
Complying development under the Housing Alterations Code and General Development Code may be carried out on the land.

Commercial and Industrial (New Buildings and Additions) Code
Complying development under the Commercial and Industrial (New Building and Additions) Code may be carried out on the land.

Greenfield Housing Code
No, the Greenfield Housing Code **does not** apply to land within the Ryde Local Government Area.

Note: It is necessary for the zoning, size of land and other criteria such as risk level of flood prone and bushfire prone land to be in accordance with that specified in State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 for certain types of development to occur under the Policy.

4, 4A (Repealed)

4B Annual charges under Local Government Act 1993 for coastal protection services that relate to existing coastal protection works
Whether the owner (or any previous owner) of the land has consented in writing to the land being subject to annual charges under section 496B of the *Local Government Act 1993* for coastal protection services that relate to existing coastal protection works (within the meaning of section 553B of that Act).

NO

Note. "Existing coastal protection works" are works to reduce the impact of coastal hazards on land (such as seawalls, revetments, groynes and beach nourishment) that existed before the commencement of section 553B of the Local Government Act 1993.

5. MINE SUBSIDENCE
Whether or not the land is proclaimed to be a mine subsidence district within the meaning of the Coal Mine Subsidence Compensation Act 2017.

No. The land has not been proclaimed to be a mine subsidence district.

6. ROAD WIDENING AND ROAD REALIGNMENT
Whether or not the land is affected by any road widening or road realignment.

The land is not affected by any road widening or road realignment under:
(a)Division 2 of Part 3 of the Roads Act 1993, or
(b) any environmental planning instrument, or
(c) any resolution of Council.

7. COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS
Whether or not the land is affected by a policy adopted by the council, or adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council, that restricts the development of the land because of the likelihood of:

(i) landslip - NO.
(ii) bush fire - NO.
(iii) tidal inundation - NO.
(iv) subsidence - NO.
(v) acid sulphate soil - NO.
(vi) any other risk (other than flooding) - NO.

Note: The fact that land has not been identified as being affected by a policy to restrict development because of the risks referred to does not mean that the risk is non-existent.

7A. FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION
(1) Whether or not development on that land or part of the land for the purposes of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings (not including development for the purposes of group homes or seniors) living is subject to flood related development controls - YES

(2) Whether or not development on that land or part of the land for any other purpose is subject to flood related development controls - YES

(3) Words and expressions in this clause have the same meanings as in the Standard Instrument.

8. LAND RESERVED FOR ACQUISITION

Whether or not any environmental planning instrument or proposed environmental planning instrument referred to in Clause 1 makes provision in relation to the acquisition of the land by a public authority, as referred to in Section 3.15 of the Act.

No Environmental Planning Instrument applying to the land provides for the acquisition of the land by a public authority as referred to in Section 3.15 of the Act.

9. CONTRIBUTIONS PLAN

The name of each contributions plan applying to the land:

- City of Ryde Section 7.11 Development Contributions Plan 2020.
- City of Ryde Fixed Rate Levy (Section 7.12) Development Contributions Plan 2020.

9A. BIODIVERSITY CERTIFIED LAND

This land is not biodiversity certified land Under Part 8 of the Biodiversity Conservation Act 2016.

Note: Biodiversity certified land includes land certified under Part 7AA of the Threatened Species Conservation Act 1995 that is taken to be certified under Part 8 of the Biodiversity Conservation Act 2016.

10. BIODIVERSITY STEWARDSHIP SITES

The land is not the subject of a biodiversity stewardship agreement under Part 5 of the Biodiversity Conservation Act 2016.

Note: Biodiversity stewardship agreements include biobanking agreements under Part 7A of the Threatened Species Conservation Act 1995 that are taken to be biodiversity stewardship agreements under Part 5 of the Biodiversity Conservation Act 2016.

10A. NATIVE VEGETATION CLEARING SET ASIDES

Council has not been notified that the land contains a set aside area under section 60ZC of the *Local Land Services Act 2013* by Local Land Services.

11. BUSH FIRE PRONE LAND

The land described in this certificate is not bush fire prone land (as defined in the Act)

12. PROPERTY VEGETATION PLANS

The land is not subject to a property vegetation plan under the Native Vegetation Act 2003.

13. ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

There has not been an order made under the Trees (Disputes between Neighbours) Act 2006 to carry out work in relation to a tree on the land.

14. DIRECTIONS UNDER PART 3A (REPEALED)

There is no direction in force under section 75P (2)(c1) of the Environmental Planning and Assessment Act 1979.

15. SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING

a) There is no current site compatibility certificate (seniors housing), of which the Council is aware, in respect of proposed development on the land.

b) There are no terms of a kind referred to in clause 18(2) of State Environment Planning Policy (Housing for Seniors or People with a Disability) 2004 that have been imposed as a condition of consent to a development application since 11 October 2007 in respect of proposed development on the land.

16. SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE, SCHOOLS OR TAFE ESTABLISHMENTS
There is no valid site compatibility certificate (infrastructure) or site compatibility certificate (schools or TAFE establishments), of which the Council is aware, in respect of proposed development on the land.

17. SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING
There is no current site compatibility certificate (affordable rental housing) that Council is aware of, in respect of proposed development on the land.

There are no terms of a kind referred to in clause 17(1) or 37(1) of State Environmental Planning Policy (Affordable Rental Housing) 2009 that have been imposed as a condition of consent to a development application in respect of the land.

18. PAPER SUBDIVISION INFORMATION
(1) The name of any development plan adopted by a relevant authority that applies to the land or that is proposed to be subject to a consent ballot. NIL
(2) The date of any subdivision order that applies to the land. NIL
(3) Words and expressions used in this clause have the same meaning as they have in Part 16C of Environmental Planning and Assessment Regulation 2000.
Note: *City of Ryde does not hold any paper subdivision within the meaning of this clause.*

19. SITE VERIFICATION CERTIFICATES
There is no current site verification certificate of which the Council is aware in respect of the land.

20. LOOSE-FILL ASBESTOS INSULATION
The land does NOT include any residential premises (within the meaning of Division 1A of Part 8 of the Home Building Act 1989) that are listed on the register that is required to be maintained under that Division.

21. AFFECTED BUILDING NOTICES AND BUILDING PRODUCT RECTIFICATION ORDERS

(1) Whether or not there is any affected building notice of which the council is aware that is in force in respect of the land.

No

(2) (a) Whether or not there is any building product rectification order of which the council is aware that is in force in respect of the land and has not been fully complied with,

No

and
(b) Whether or not there is any notice of intention to make a building product rectification order of which the council is aware that has been given in respect of the land and is outstanding.

No

(3) In this clause:
Affected building notice has the same meaning as in Part 4 of the Building Products (Safety) Act 2017.

Building product rectification order has the same meaning as in the Building Products (Safety) Act 2017.

***Note**. The following matters are prescribed by section 59 (2) of the Contaminated Land Management Act 1997 as additional matters to be specified in a planning certificate:*

(a) The land to which this certificate relates IS NOT significantly contaminated land.
(b) The land to which this certificate relates IS NOT subject to a management order.
(c) The land to which this certificate relates IS NOT the subject of an approved voluntary management proposal.
(d) The land to which this certificate relates IS NOT subject to an ongoing maintenance order.
(e) The land to which this certificate relates IS NOT subject of a site audit statement.

ADDITIONAL INFORMATION UNDER SECTION 10.7(5) OF THE ACT

Environmental planning instruments or development control plans may place restrictions on matters such as:

i) the purpose for which buildings, works or land may be erected, carried out or used;
ii) the extent of development permitted;
iii) minimum site requirements; and/or
iv) the means of vehicular access to the land.

The instruments and the plans should be examined in relation to the specific restrictions which may apply to any development which may be proposed.

Registers of Consents may be examined at Council's Customer Service Centre for particulars relating to development consents which may have been issued for the use or development of the land.

Enquiries regarding areas reserved for Classified Road and Regional Open Space should be directed to the Roads and Maritime Services and Departments of Planning and Environment respectively.

The information provided concerning the Coastal Protection Act, 1979 is only to the extent that the Council has been notified by the Office of Environment and Heritage.

Council has adopted by resolution a policy concerning the management of contaminated land. This policy applies to all land in the City of Ryde and will restrict development of the land if the circumstances set out in the policy prevail. Copies of the policy are available on Council's Website at www.ryde.nsw.gov.au.

FURTHER ADDITIONAL INFORMATION UNDER SECTION 10.7(5) OF THE ACT

Heritage
The property is within 100 metres of a heritage item as listed in Schedule 5 of Ryde Local Environmental Plan 2014. Your attention is drawn to Clause 5.10(5) which addresses the need to assess the impact of proposed development on properties in the vicinity of a heritage item on the heritage significance, visual curtilage and setting of the heritage item itself.
Bushland

The following reports indicate the subject property may contain endangered bushland:

•OEH (2016) The Native Vegetation of the Sydney Metropolitan Area. Volume 1: Technical Report. Version 3.0. Office of Environment and Heritage Sydney.

•OEH (2016) The Native Vegetation of the Sydney Metropolitan Area. Volume 2: Vegetation Community Profiles. Version 3.0. NSW Office of Environment and Heritage, Sydney.

The reports and the associated maps are available for inspection at Council's Customer Service Centre. For any proposed development of the land the existing endangered bushland must be retained and all proposed development must take into account any aspects that may adversely affect the sustainability of the subject bushland.

Under the Biodiversity Conservation Act 2016 (NSW) Blue Gum High Forest is listed as a critically endangered ecological community and Sydney Turpentine - Ironbark Forest is listed as endangered ecological community.

Council records show that your property may contain a Blue Gum High Forest community. Any action or activity that is proposed on this land that is likely to significantly affect threatened species, ecological communities or their habitats, must be subject to a threatened species test of significance. The test of significance is set out in s.7.3 of the Biodiversity Conservation Act 2016 (NSW) and is applied under the Environmental Planning and Assessment Act 1979 (NSW). If the activity is likely to have a significant impact the proponent must either apply the Biodiversity Offsets Scheme or prepare a species impact statement (SIS).

The environmental impact of activities that will not have a significant impact on threatened species will continue to be assessed under s.5.5 of the Environmental Planning and Assessment Act 1979 (NSW).

Note: The information in this certificate is current as of the date of the certificate.

Liz Coad
Director City Planning and Environment

City of Ryde

Lifestyle and opportunity @ your doorstep

Customer Service Centre
1 Pope Street, Ryde NSW 2112
(Within Top Ryde City shopping centre)
Phone (02) 9952 8222
Fax (02) 9952 8070
Email cityofryde@ryde.nsw.gov.au
Post Locked Bag 2069, North Ryde NSW 1670
ABN 81 621 292 610
www.ryde.nsw.gov.au

Dfp Planning Pty Ltd
11 Dartford Road
THORNLEIGH NSW 2120

Issue Date:	13 November 2020
Certificate No:	PLN2020/4227
Your Ref:	21295A SE

PLANNING CERTIFICATE SECTION 10.7

NSW Environmental Planning and Assessment Act 1979 ('Act')

Property Address: 22 Winbourne St WEST RYDE NSW 2114
Legal Description: Lot C DP 23326
Property Reference: 531720
Land Reference: 33314

INFORMATION PROVIDED PURSANT TO SECTION 10.7(2) OF THE ACT AND SCHEDULE 4 OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT REGUALTION 2000

1. NAMES OF RELEVANT ENVIRONMENTAL PLANNING INSTRUMENTS AND DEVELOPMENT CONTROL PLANS

a) LOCAL ENVIRONMENTAL PLAN AND DEEMED ENVIRONMENTAL PLANNING INSTRUMENTS
Ryde Local Environment Plan 2014

b) PROPOSED LOCAL ENVIRONMENTAL PLANS that are or have been the subject of community consultation or public exhibition under the Act.
Nil

c) DEVELOPMENT CONTROL PLANS
City of Ryde Development Control Plan 2014

d) STATE ENVIRONMENTAL PLANNING POLICIES AND INSTRUMENTS
The Minister for Planning has notified Council that the following State Environmental Planning Policies and Proposed State Environmental Plans apply to the land and should be specified in this certificate:

State Environmental Planning Policies
State Environmental Planning Policy No 1-Development Standards
State Environmental Planning Policy No 19 - Bushland in Urban Areas.
State Environmental Planning Policy No 21 - Caravan Parks.
State Environmental Planning Policy No 33 - Hazardous and Offensive Development.
State Environmental Planning Policy No 50 - Canal Estate Development.
State Environmental Planning Policy No 55 - Remediation of Land.

State Environmental Planning Policy No 64 - Advertising and Signage.
State Environmental Planning Policy No 65 - Design Quality of Residential Apartment Development.
State Environmental Planning Policy No 70-Affordable Housing (Revised Schemes)
State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004
State Environmental Planning Policy (Exempt and Complying Development Codes) 2008
State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004
State Environmental Planning Policy (Infrastructure) 2007
State Environmental Planning Policy (State Significant Precincts) 2005
State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007
State Environmental Planning Policy (State and Regional Development) 2011
State Environmental Planning Policy (Miscellaneous Consent Provisions) 2007
State Environmental Planning Policy (Education Establishments and Child Care Facilities) 2017
State Environmental Planning Policy (Affordable Rental Housing) 2009
State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017
State Environmental Planning Policy (Concurrences) 2018
State Environmental Planning Policy (Primary Production and Rural Development) 2019.
Deemed State Environmental Planning Policies
Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005

Proposed State Environmental Planning Policies
State Environmental Planning Policy (Environment)
Note: Specific constraints and zoning of the land may affect the applicability of certain provisions within the Policies listed above.

2. ZONING AND LAND USE UNDER RELEVANT LOCAL ENVIRONMENTAL PLANS

(a) ZONING and ZONING TABLE
Ryde Local Environmental Plan 2014 - Zone SP2 Infrastructure - Educational Establishment

1 Objectives of zone
- To provide for infrastructure and related uses.
- To prevent development that is not compatible with or that may detract from the provision of infrastructure.
- To ensure the orderly development of land so as to minimise any adverse effect of development on other land uses.

2 Permitted without consent
Nil

3 Permitted with consent
Aquaculture; Roads; The purpose shown on the Land Zoning Map, including any development that is ordinarily incidental or ancillary to development for that purpose

4 Prohibited
Any development not specified in item 2 or 3

(b) DEVELOPMENT STANDARDS FOR THE ERECTION OF A DWELLING HOUSE
No development standards under the Local Environment Plan apply to the land that fix minimum land dimension for the erection of a dwelling house on the land.

(c) CRITICAL HABITAT / AREA OF OUTSTANDING BIODIVERSITY VALUE
No. The land does not include or comprise critical habitat under Local Environmental Plan.

(d) CONSERVATION AREA (however described)
No. The land has not been identified as being within a heritage conservation area under the Local Environment Plan.

(e) ITEMS OF ENVIRONMENTAL HERITAGE (however described)
No. An item of environmental heritage is not situated on the land under the Local Environmental Plan.

2A. ZONING AND LAND USE UNDER STATE ENVIRONMENTAL PLANNING POLICY (SYDNEY REGION GROWTH CENTRES) 2006

This land **is not** within any zone under:

a) Part 3 of the *State Environmental Planning Policy (Sydney Region Growth Centres) 2006* (the 2006 SEPP); or
b) a Precinct Plan (within the meaning of the 2006 SEPP); or
c) a proposed Precinct Plan (within the meaning of the 2006 SEPP) that is or has been the subject of community consultation or on public exhibition.

OTHER PRESCRIBED INFORMATION

3. COMPLYING DEVELOPMENT
Whether or not the land is land on which complying development may be carried out under each of the codes for complying development because of provisions of clauses 1.17A(1)(c) to (e), (2), (3), and (4), 1.18(1)(c3) and 1.19 of the State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Housing Code, Inland Code, Low Rise Housing Diversity Code and Rural Housing Code
Complying Development under the Housing Code, Inland Code, Low Rise Housing Diversity Code and Rural Housing Code may be carried out on this land.

Housing Alterations Code and General Development Code
Complying development under the Housing Alterations Code and General Development Code may be carried out on the land.

Commercial and Industrial (New Buildings and Additions) Code
Complying development under the Commercial and Industrial (New Building and Additions) Code may be carried out on the land.

Greenfield Housing Code
No, the Greenfield Housing Code **does not** apply to land within the Ryde Local Government Area.

Note: It is necessary for the zoning, size of land and other criteria such as risk level of flood prone and bushfire prone land to be in accordance with that specified in State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 for certain types of development to occur under the Policy.

4, 4A (Repealed)

4B Annual charges under Local Government Act 1993 for coastal protection services that relate to existing coastal protection works
Whether the owner (or any previous owner) of the land has consented in writing to the land being subject to annual charges under section 496B of the *Local Government Act 1993* for coastal protection services that relate to existing coastal protection works (within the meaning of section 553B of that Act).

NO

Note. "Existing coastal protection works" are works to reduce the impact of coastal hazards on land (such as seawalls, revetments, groynes and beach nourishment) that existed before the commencement of section 553B of the Local Government Act 1993.

5. MINE SUBSIDENCE
Whether or not the land is proclaimed to be a mine subsidence district within the meaning of the Coal Mine Subsidence Compensation Act 2017.

No. The land has not been proclaimed to be a mine subsidence district.

6. ROAD WIDENING AND ROAD REALIGNMENT
Whether or not the land is affected by any road widening or road realignment.

The land is not affected by any road widening or road realignment under:
(a)Division 2 of Part 3 of the Roads Act 1993, or
(b) any environmental planning instrument, or
(c) any resolution of Council.

7. COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS
Whether or not the land is affected by a policy adopted by the council, or adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council, that restricts the development of the land because of the likelihood of:

(i) landslip - NO.
(ii) bush fire - NO.
(iii) tidal inundation - NO.
(iv) subsidence - NO.
(v) acid sulphate soil - NO.
(vi) any other risk (other than flooding) - NO.

Note: The fact that land has not been identified as being affected by a policy to restrict development because of the risks referred to does not mean that the risk is non-existent.

7A. FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION
(1) Whether or not development on that land or part of the land for the purposes of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings (not including development for the purposes of group homes or seniors) living is subject to flood related development controls - YES

(2) Whether or not development on that land or part of the land for any other purpose is subject to flood related development controls - YES

(3) Words and expressions in this clause have the same meanings as in the Standard Instrument.

8. LAND RESERVED FOR ACQUISITION
Whether or not any environmental planning instrument or proposed environmental planning instrument referred to in Clause 1 makes provision in relation to the acquisition of the land by a public authority, as referred to in Section 3.15 of the Act.

No Environmental Planning Instrument applying to the land provides for the acquisition of the land by a public authority as referred to in Section 3.15 of the Act.

9. CONTRIBUTIONS PLAN
The name of each contributions plan applying to the land:

- City of Ryde Section 7.11 Development Contributions Plan 2020.
- City of Ryde Fixed Rate Levy (Section 7.12) Development Contributions Plan 2020.

9A. BIODIVERSITY CERTIFIED LAND
This land is not biodiversity certified land Under Part 8 of the Biodiversity Conservation Act 2016.

Note: Biodiversity certified land includes land certified under Part 7AA of the Threatened Species Conservation Act 1995 that is taken to be certified under Part 8 of the Biodiversity Conservation Act 2016.

10. BIODIVERSITY STEWARDSHIP SITES
The land is not the subject of a biodiversity stewardship agreement under Part 5 of the Biodiversity Conservation Act 2016.

Note: Biodiversity stewardship agreements include biobanking agreements under Part 7A of the Threatened Species Conservation Act 1995 that are taken to be biodiversity stewardship agreements under Part 5 of the Biodiversity Conservation Act 2016.

10A. NATIVE VEGETATION CLEARING SET ASIDES
Council has not been notified that the land contains a set aside area under section 60ZC of the *Local Land Services Act 2013* by Local Land Services.

11. BUSH FIRE PRONE LAND
The land described in this certificate is not bush fire prone land (as defined in the Act)

12. PROPERTY VEGETATION PLANS
The land is not subject to a property vegetation plan under the Native Vegetation Act 2003.

13. ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006
There has not been an order made under the Trees (Disputes between Neighbours) Act 2006 to carry out work in relation to a tree on the land.

14. DIRECTIONS UNDER PART 3A (REPEALED)
There is no direction in force under section 75P (2)(c1) of the Environmental Planning and Assessment Act 1979.

15. SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING
a) There is no current site compatibility certificate (seniors housing), of which the Council is aware, in respect of proposed development on the land.

b) There are no terms of a kind referred to in clause 18(2) of State Environment Planning Policy (Housing for Seniors or People with a Disability) 2004 that have been imposed as a condition of consent to a development application since 11 October 2007 in respect of proposed development on the land.

16. SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE, SCHOOLS OR TAFE ESTABLISHMENTS
There is no valid site compatibility certificate (infrastructure) or site compatibility certificate (schools or TAFE establishments), of which the Council is aware, in respect of proposed development on the land.

17. SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING
There is no current site compatibility certificate (affordable rental housing) that Council is aware of, in respect of proposed development on the land.

There are no terms of a kind referred to in clause 17(1) or 37(1) of State Environmental Planning Policy (Affordable Rental Housing) 2009 that have been imposed as a condition of consent to a development application in respect of the land.

18. PAPER SUBDIVISION INFORMATION
(1) The name of any development plan adopted by a relevant authority that applies to the land or that is proposed to be subject to a consent ballot. NIL
(2) The date of any subdivision order that applies to the land. NIL
(3) Words and expressions used in this clause have the same meaning as they have in Part 16C of Environmental Planning and Assessment Regulation 2000.
***Note**: City of Ryde does not hold any paper subdivision within the meaning of this clause.*

19. SITE VERIFICATION CERTIFICATES
There is no current site verification certificate of which the Council is aware in respect of the land.

20. LOOSE-FILL ASBESTOS INSULATION
The land does NOT include any residential premises (within the meaning of Division 1A of Part 8 of the Home Building Act 1989) that are listed on the register that is required to be maintained under that Division.

21. AFFECTED BUILDING NOTICES AND BUILDING PRODUCT RECTIFICATION ORDERS

(1) Whether or not there is any affected building notice of which the council is aware that is in force in respect of the land.

No

(2) (a) Whether or not there is any building product rectification order of which the council is aware that is in force in respect of the land and has not been fully complied with,

No

and
(b) Whether or not there is any notice of intention to make a building product rectification order of which the council is aware that has been given in respect of the land and is outstanding.

No

(3) In this clause:
Affected building notice has the same meaning as in Part 4 of the Building Products (Safety) Act 2017.

Building product rectification order has the same meaning as in the Building Products (Safety) Act 2017.

***Note**. The following matters are prescribed by section 59 (2) of the Contaminated Land Management Act 1997 as additional matters to be specified in a planning certificate:*

(a) The land to which this certificate relates IS NOT significantly contaminated land.
(b) The land to which this certificate relates IS NOT subject to a management order.
(c) The land to which this certificate relates IS NOT the subject of an approved voluntary management proposal.
(d) The land to which this certificate relates IS NOT subject to an ongoing maintenance order.
(e) The land to which this certificate relates IS NOT subject of a site audit statement.

ADDITIONAL INFORMATION UNDER SECTION 10.7(5) OF THE ACT

Environmental planning instruments or development control plans may place restrictions on matters such as:

i) the purpose for which buildings, works or land may be erected, carried out or used;
ii) the extent of development permitted;
iii) minimum site requirements; and/or
iv) the means of vehicular access to the land.

The instruments and the plans should be examined in relation to the specific restrictions which may apply to any development which may be proposed.

Registers of Consents may be examined at Council's Customer Service Centre for particulars relating to development consents which may have been issued for the use or development of the land.

Enquiries regarding areas reserved for Classified Road and Regional Open Space should be directed to the Roads and Maritime Services and Departments of Planning and Environment respectively.

The information provided concerning the Coastal Protection Act, 1979 is only to the extent that the Council has been notified by the Office of Environment and Heritage.

Council has adopted by resolution a policy concerning the management of contaminated land. This policy applies to all land in the City of Ryde and will restrict development of the land if the circumstances set out in the policy prevail. Copies of the policy are available on Council's Website at www.ryde.nsw.gov.au.

FURTHER ADDITIONAL INFORMATION UNDER SECTION 10.7(5) OF THE ACT

Heritage
The property is within 100 metres of a heritage item as listed in Schedule 5 of Ryde Local Environmental Plan 2014. Your attention is drawn to Clause 5.10(5) which addresses the need to assess the impact of proposed development on properties in the vicinity of a heritage item on the heritage significance, visual curtilage and setting of the heritage item itself.

Note: The information in this certificate is current as of the date of the certificate.

Liz Coad
Director City Planning and Environment

City of Ryde

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Customer Service Centre
1 Pope Street, Ryde NSW 2112
(Within Top Ryde City shopping centre)
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Fax (02) 9952 8070
Email cityofryde@ryde.nsw.gov.au
Post Locked Bag 2069, North Ryde NSW 1670
ABN 81 621 292 610
www.ryde.nsw.gov.au

Dfp Planning Pty Ltd
11 Dartford Road
THORNLEIGH NSW 2120

Issue Date:	13 November 2020
Certificate No:	PLN2020/4228
Your Ref:	21295A SE

PLANNING CERTIFICATE SECTION 10.7

NSW Environmental Planning and Assessment Act 1979 ('Act')

Property Address: 22 Winbourne St WEST RYDE NSW 2114
Legal Description: Lot D DP 23326
Property Reference: 531720
Land Reference: 41839

INFORMATION PROVIDED PURSANT TO SECTION 10.7(2) OF THE ACT AND SCHEDULE 4 OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT REGUALTION 2000

1. NAMES OF RELEVANT ENVIRONMENTAL PLANNING INSTRUMENTS AND DEVELOPMENT CONTROL PLANS

a) LOCAL ENVIRONMENTAL PLAN AND DEEMED ENVIRONMENTAL PLANNING INSTRUMENTS
Ryde Local Environment Plan 2014

b) PROPOSED LOCAL ENVIRONMENTAL PLANS that are or have been the subject of community consultation or public exhibition under the Act.
Nil

c) DEVELOPMENT CONTROL PLANS
City of Ryde Development Control Plan 2014

d) STATE ENVIRONMENTAL PLANNING POLICIES AND INSTRUMENTS
The Minister for Planning has notified Council that the following State Environmental Planning Policies and Proposed State Environmental Plans apply to the land and should be specified in this certificate:

State Environmental Planning Policies
State Environmental Planning Policy No 1-Development Standards
State Environmental Planning Policy No 19 - Bushland in Urban Areas.
State Environmental Planning Policy No 21 - Caravan Parks.
State Environmental Planning Policy No 33 - Hazardous and Offensive Development.
State Environmental Planning Policy No 50 - Canal Estate Development.
State Environmental Planning Policy No 55 - Remediation of Land.

State Environmental Planning Policy No 64 - Advertising and Signage.
State Environmental Planning Policy No 65 - Design Quality of Residential Apartment Development.
State Environmental Planning Policy No 70-Affordable Housing (Revised Schemes)
State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004
State Environmental Planning Policy (Exempt and Complying Development Codes) 2008
State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004
State Environmental Planning Policy (Infrastructure) 2007
State Environmental Planning Policy (State Significant Precincts) 2005
State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007
State Environmental Planning Policy (State and Regional Development) 2011
State Environmental Planning Policy (Miscellaneous Consent Provisions) 2007
State Environmental Planning Policy (Education Establishments and Child Care Facilities) 2017
State Environmental Planning Policy (Affordable Rental Housing) 2009
State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017
State Environmental Planning Policy (Concurrences) 2018
State Environmental Planning Policy (Primary Production and Rural Development) 2019.

Deemed State Environmental Planning Policies

Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005

Proposed State Environmental Planning Policies

State Environmental Planning Policy (Environment)

Note: Specific constraints and zoning of the land may affect the applicability of certain provisions within the Policies listed above.

2. ZONING AND LAND USE UNDER RELEVANT LOCAL ENVIRONMENTAL PLANS

(a) ZONING and ZONING TABLE

Ryde Local Environmental Plan 2014 - Zone SP2 Infrastructure - Educational Establishment

1 Objectives of zone

- To provide for infrastructure and related uses.
- To prevent development that is not compatible with or that may detract from the provision of infrastructure.
- To ensure the orderly development of land so as to minimise any adverse effect of development on other land uses.

2 Permitted without consent

Nil

3 Permitted with consent

Aquaculture; Roads; The purpose shown on the Land Zoning Map, including any development that is ordinarily incidental or ancillary to development for that purpose

4 Prohibited

Any development not specified in item 2 or 3

(b) DEVELOPMENT STANDARDS FOR THE ERECTION OF A DWELLING HOUSE

No development standards under the Local Environment Plan apply to the land that fix minimum land dimension for the erection of a dwelling house on the land.

(c) CRITICAL HABITAT / AREA OF OUTSTANDING BIODIVERSITY VALUE
No. The land does not include or comprise critical habitat under Local Environmental Plan.

(d) CONSERVATION AREA (however described)
No. The land has not been identified as being within a heritage conservation area under the Local Environment Plan.

(e) ITEMS OF ENVIRONMENTAL HERITAGE (however described)
No. An item of environmental heritage is not situated on the land under the Local Environmental Plan.

2A. ZONING AND LAND USE UNDER STATE ENVIRONMENTAL PLANNING POLICY (SYDNEY REGION GROWTH CENTRES) 2006

This land **is not** within any zone under:

a) Part 3 of the *State Environmental Planning Policy (Sydney Region Growth Centres) 2006* (the 2006 SEPP); or
b) a Precinct Plan (within the meaning of the 2006 SEPP); or
c) a proposed Precinct Plan (within the meaning of the 2006 SEPP) that is or has been the subject of community consultation or on public exhibition.

OTHER PRESCRIBED INFORMATION

3. COMPLYING DEVELOPMENT
Whether or not the land is land on which complying development may be carried out under each of the codes for complying development because of provisions of clauses 1.17A(1)(c) to (e), (2), (3), and (4), 1.18(1)(c3) and 1.19 of the State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Housing Code, Inland Code, Low Rise Housing Diversity Code and Rural Housing Code
Complying Development under the Housing Code, Inland Code, Low Rise Housing Diversity Code and Rural Housing Code may be carried out on this land.

Housing Alterations Code and General Development Code
Complying development under the Housing Alterations Code and General Development Code may be carried out on the land.

Commercial and Industrial (New Buildings and Additions) Code
Complying development under the Commercial and Industrial (New Building and Additions) Code may be carried out on the land.

Greenfield Housing Code
No, the Greenfield Housing Code **does not** apply to land within the Ryde Local Government Area.

Note: It is necessary for the zoning, size of land and other criteria such as risk level of flood prone and bushfire prone land to be in accordance with that specified in State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 for certain types of development to occur under the Policy.

4, 4A (Repealed)

4B Annual charges under Local Government Act 1993 for coastal protection services that relate to existing coastal protection works
Whether the owner (or any previous owner) of the land has consented in writing to the land being subject to annual charges under section 496B of the *Local Government Act 1993* for coastal protection services that relate to existing coastal protection works (within the meaning of section 553B of that Act).

NO

Note. "Existing coastal protection works" are works to reduce the impact of coastal hazards on land (such as seawalls, revetments, groynes and beach nourishment) that existed before the commencement of section 553B of the Local Government Act 1993.

5. MINE SUBSIDENCE
Whether or not the land is proclaimed to be a mine subsidence district within the meaning of the Coal Mine Subsidence Compensation Act 2017.

No. The land has not been proclaimed to be a mine subsidence district.

6. ROAD WIDENING AND ROAD REALIGNMENT
Whether or not the land is affected by any road widening or road realignment.

The land is not affected by any road widening or road realignment under:
(a)Division 2 of Part 3 of the Roads Act 1993, or
(b) any environmental planning instrument, or
(c) any resolution of Council.

7. COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS
Whether or not the land is affected by a policy adopted by the council, or adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council, that restricts the development of the land because of the likelihood of:

(i) landslip - NO.
(ii) bush fire - NO.
(iii) tidal inundation - NO.
(iv) subsidence - NO.
(v) acid sulphate soil - NO.
(vi) any other risk (other than flooding) - NO.

Note: The fact that land has not been identified as being affected by a policy to restrict development because of the risks referred to does not mean that the risk is non-existent.

7A. FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION
(1) Whether or not development on that land or part of the land for the purposes of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings (not including development for the purposes of group homes or seniors housing) is subject to flood related development controls. -- NO
(2) Whether or not development on that land or part of the land for any other purpose is subject to flood related development controls. -- NO
(3) Words and expressions in this clause have the same meanings as in the Standard Instrument.

8. LAND RESERVED FOR ACQUISITION

Whether or not any environmental planning instrument or proposed environmental planning instrument referred to in Clause 1 makes provision in relation to the acquisition of the land by a public authority, as referred to in Section 3.15 of the Act.

No Environmental Planning Instrument applying to the land provides for the acquisition of the land by a public authority as referred to in Section 3.15 of the Act.

9. CONTRIBUTIONS PLAN
The name of each contributions plan applying to the land:

- City of Ryde Section 7.11 Development Contributions Plan 2020.
- City of Ryde Fixed Rate Levy (Section 7.12) Development Contributions Plan 2020.

9A. BIODIVERSITY CERTIFIED LAND
This land is not biodiversity certified land Under Part 8 of the Biodiversity Conservation Act 2016.

Note: Biodiversity certified land includes land certified under Part 7AA of the Threatened Species Conservation Act 1995 that is taken to be certified under Part 8 of the Biodiversity Conservation Act 2016.

10. BIODIVERSITY STEWARDSHIP SITES
The land is not the subject of a biodiversity stewardship agreement under Part 5 of the Biodiversity Conservation Act 2016.

Note: Biodiversity stewardship agreements include biobanking agreements under Part 7A of the Threatened Species Conservation Act 1995 that are taken to be biodiversity stewardship agreements under Part 5 of the Biodiversity Conservation Act 2016.

10A. NATIVE VEGETATION CLEARING SET ASIDES
Council has not been notified that the land contains a set aside area under section 60ZC of the *Local Land Services Act 2013* by Local Land Services.

11. BUSH FIRE PRONE LAND
The land described in this certificate is not bush fire prone land (as defined in the Act)

12. PROPERTY VEGETATION PLANS
The land is not subject to a property vegetation plan under the Native Vegetation Act 2003.

13. ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006
There has not been an order made under the Trees (Disputes between Neighbours) Act 2006 to carry out work in relation to a tree on the land.

14. DIRECTIONS UNDER PART 3A (REPEALED)
There is no direction in force under section 75P (2)(c1) of the Environmental Planning and Assessment Act 1979.

15. SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING
a) There is no current site compatibility certificate (seniors housing), of which the Council is aware, in respect of proposed development on the land.
b) There are no terms of a kind referred to in clause 18(2) of State Environment Planning Policy (Housing for Seniors or People with a Disability) 2004 that have been imposed as a condition of consent to a development application since 11 October 2007 in respect of proposed development on the land.

16. SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE, SCHOOLS OR TAFE ESTABLISHMENTS
There is no valid site compatibility certificate (infrastructure) or site compatibility certificate (schools or TAFE establishments), of which the Council is aware, in respect of proposed development on the land.

17. SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING
There is no current site compatibility certificate (affordable rental housing) that Council is aware of, in respect of proposed development on the land.

There are no terms of a kind referred to in clause 17(1) or 37(1) of State Environmental Planning Policy (Affordable Rental Housing) 2009 that have been imposed as a condition of consent to a development application in respect of the land.

18. PAPER SUBDIVISION INFORMATION
(1) The name of any development plan adopted by a relevant authority that applies to the land or that is proposed to be subject to a consent ballot. NIL
(2) The date of any subdivision order that applies to the land. NIL
(3) Words and expressions used in this clause have the same meaning as they have in Part 16C of Environmental Planning and Assessment Regulation 2000.
***Note**: City of Ryde does not hold any paper subdivision within the meaning of this clause.*

19. SITE VERIFICATION CERTIFICATES
There is no current site verification certificate of which the Council is aware in respect of the land.

20. LOOSE-FILL ASBESTOS INSULATION
The land does NOT include any residential premises (within the meaning of Division 1A of Part 8 of the Home Building Act 1989) that are listed on the register that is required to be maintained under that Division.

21. AFFECTED BUILDING NOTICES AND BUILDING PRODUCT RECTIFICATION ORDERS

(1) Whether or not there is any affected building notice of which the council is aware that is in force in respect of the land.

No

(2) (a) Whether or not there is any building product rectification order of which the council is aware that is in force in respect of the land and has not been fully complied with,

No

and
(b) Whether or not there is any notice of intention to make a building product rectification order of which the council is aware that has been given in respect of the land and is outstanding.

No

(3) In this clause:
Affected building notice has the same meaning as in Part 4 of the Building Products (Safety) Act 2017.

Building product rectification order has the same meaning as in the Building Products (Safety) Act 2017.

***Note**. The following matters are prescribed by section 59 (2) of the Contaminated Land Management Act 1997 as additional matters to be specified in a planning certificate:*

(a) The land to which this certificate relates IS NOT significantly contaminated land.
(b) The land to which this certificate relates IS NOT subject to a management order.
(c) The land to which this certificate relates IS NOT the subject of an approved voluntary management proposal.
(d) The land to which this certificate relates IS NOT subject to an ongoing maintenance order.
(e) The land to which this certificate relates IS NOT subject of a site audit statement.

ADDITIONAL INFORMATION UNDER SECTION 10.7(5) OF THE ACT

Environmental planning instruments or development control plans may place restrictions on matters such as:

i) the purpose for which buildings, works or land may be erected, carried out or used;
ii) the extent of development permitted;
iii) minimum site requirements; and/or
iv) the means of vehicular access to the land.

The instruments and the plans should be examined in relation to the specific restrictions which may apply to any development which may be proposed.

Registers of Consents may be examined at Council's Customer Service Centre for particulars relating to development consents which may have been issued for the use or development of the land.

Enquiries regarding areas reserved for Classified Road and Regional Open Space should be directed to the Roads and Maritime Services and Departments of Planning and Environment respectively.

The information provided concerning the Coastal Protection Act, 1979 is only to the extent that the Council has been notified by the Office of Environment and Heritage.

Council has adopted by resolution a policy concerning the management of contaminated land. This policy applies to all land in the City of Ryde and will restrict development of the land if the circumstances set out in the policy prevail. Copies of the policy are available on Council's Website at www.ryde.nsw.gov.au.

FURTHER ADDITIONAL INFORMATION UNDER SECTION 10.7(5) OF THE ACT

Heritage
The property is within 100 metres of a heritage item as listed in Schedule 5 of Ryde Local Environmental Plan 2014. Your attention is drawn to Clause 5.10(5) which addresses the need to assess the impact of proposed development on properties in the vicinity of a heritage item on the heritage significance, visual curtilage and setting of the heritage item itself.

Note: The information in this certificate is current as of the date of the certificate.

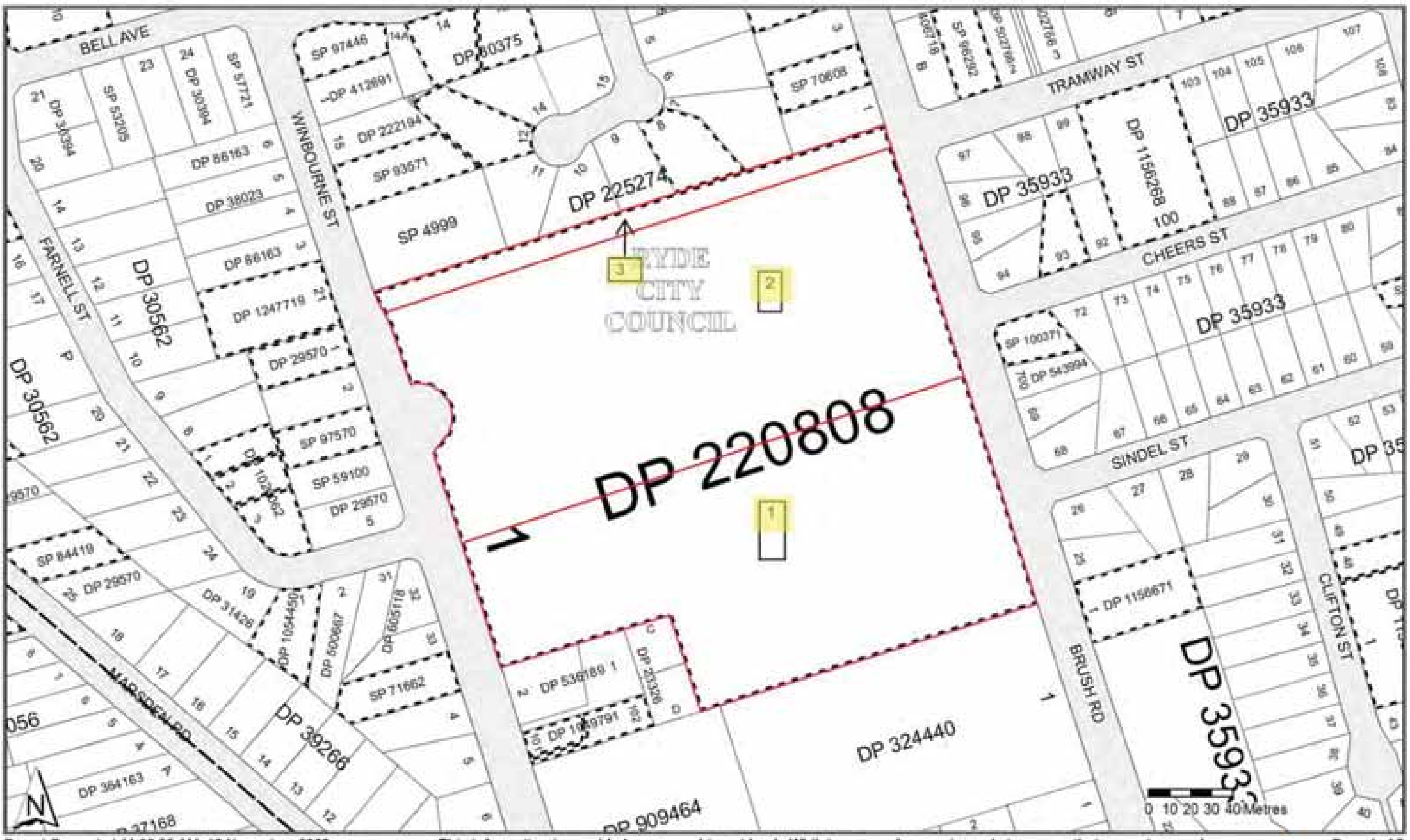
Liz Coad
Director City Planning and Environment

D21/78776

Cadastral Records Enquiry Report : Lot 1 DP 220808

Ref : marsden high school

Locality : WEST RYDE
LGA : RYDE
Parish : HUNTERS HILL
County : CUMBERLAND



Report Generated 11:36:55 AM, 19 November, 2020

This information is provided as a searching aid only.Whilst every endeavour is made to ensure that current map, plan and titling information is accurately reflected, the Registrar General cannot guarantee the information provided. For ALL ACTIVITY PRIOR TO SEPTEMBER 2002 you must refer to the RGs Charting and Reference Maps

D21/78776

Marsden High School

(1) AE—

M990620 06

THIS FORM MAY BE USED WHERE NEW RESTRICTIVE COVENANTS ARE IMPOSED OR EASEMENTS CREATED OR WHERE THE SIMPLE TRANSFER FORM IS UNSUITABLE.

R.P. 13A. No.

FEES:— £ s. d.
Lodgment
Endorsement
Certificate

£12.00.
24.00.

REGISTRAR-GENERAL NEW SOUTH WALES

New South Wales

MEMORANDUM OF TRANSFER

(REAL PROPERTY ACT, 1900.)

(Trusts must not be disclosed in the transfer.)

Typing or handwriting in this instrument should not extend into any margin. Handwriting should be clear and legible and in permanent black non-copying ink.

I, THE HONOURABLE ~~CHARLES CUTLER~~ ERIC ARCHIBALD WILLIS the Minister for Education of the State of New South Wales (herein called "the Transferor") (which expression shall where the context admits include his successors in office)

TG

~~(herein called transferor)~~

a If a less estate, strike out "in fee simple" and interline the required alteration.

being registered as the proprietor of an estate in fee simple[a] in the land hereinafter described, subject, however, to such encumbrances, liens and interests as are notified hereunder, in consideration of ONE DOLLAR (£ $1.00) (the receipt whereof is hereby acknowledged) paid to him by THE COUNCIL OF THE MUNICIPALITY OF RYDE

do hereby transfer/to and grant

b Show in BLOCK LETTERS the full name, postal address and description of the persons taking, and if more than one, whether they hold as joint tenants or tenants in common.

THE COUNCIL OF THE MUNICIPALITY OF RYDE (herein called transferee)

c The description may refer to parcels shown in Town or Parish Maps issued by the Department of Lands or shown in plans filed in the Office of the Registrar-General. If part only of the land comprised in a Certificate or Certificates of Title is to be transferred add "and being Lot sec D.P. " or "being the land shown in the plan annexed hereto" or "being the residue of the land in certificate (or grant) registered Vol. Fol. ".

Where the consent of the Local Council to a subdivision is required the certificate and plan mentioned in the Local Government Act, 1919, should accompany the transfer.

Out of /ALL such his Estate and Interest in ALL THE land mentioned in the schedule following:—

County.	Parish.	Reference to Title. Whole or Part.	Vol.	Fol.	Description of Land (if part only).
CUMBERLAND	HUNTERS HILL	PART	10128	1	Being that part of Lot 1 Deposited Plan No. 220808 as is shown on the plan hereto annexed and marked "A" and shown as "Proposed Drainage Easement 8 feet wide" (hereinafter called or included in the expression "the servient tenement").

~~And the transferee covenant(s) with the transferor~~‡

an easement to drain water within the meaning of Section 88A of the Conveyancing Act, 1919 as amended in the servient tenement PROVIDED THAT Part III of Schedule IVA of that Act shall for the purposes of this easement be read and construed -

(a) as if after the words "the servient tenement" where first and secondly appearing there were inserted the words "but beneath the surface thereof"

(b) as if the words "or upon the surface of" were omitted

(c) as if at the end of that part there were added the following words:-

PROVIDED HOWEVER and the Transferee doth hereby covenant with the Transferor that the Transferee will at all times at its own expense keep the said line of pipes in a good and efficient state of repair AND SHALL at the option of the Transferor make good or bear the reasonable costs incurred by the Transferor or by any lessee tenant or licensee of the Transferor in making good any works or property of the Transferor or any property of any such lessee tenant or licensee that may be interfered with in the execution of any works by the Transferee PROVIDED ALWAYS that before doing any act or thing in the exercise of any rights powers or authorities hereby granted and during the progress thereof the Transferee shall do everything reasonably necessary to obviate risk or injury and/or damage to persons and property being in upon or in the vicinity of the servient tenement or any adjoining land of Her Majesty the Queen and or the Transferor PROVIDED FURTHER and the Transferee doth hereby covenant with the Transferor to indemnify and keep indemnified Her Majesty the Queen Her Heirs and Successors and the Transferor and his successors in office against all claims for injury loss or damage suffered by any person or body lawfully using or being upon the servient tenement or any adjoining land of Her Majesty or the Transferor arising out of the exercise by the Transferee of any right hereby conferred and against all liability for costs charges and expenses incurred by Her Majesty Her Heirs and Successors or by the Transferor and his successors in office in respect of the claim of any such person or body.

‡ Strike out if unnecessary, or suitably adjust,
(i) if any easements are to be created or any exceptions to be made; or
(ii) if the statutory covenants implied by the Act are intended to be varied or modified.

Covenants should comply with the provisions of Section 88 of the Conveyancing Act, 1919-1964.

ENCUMBRANCES, &c., REFERRED TO.*

Excepting thereout all mines and deposits specified in Section 141 of the Public Works Act, ~~1912~~ 1912 as regards part of the land above described.

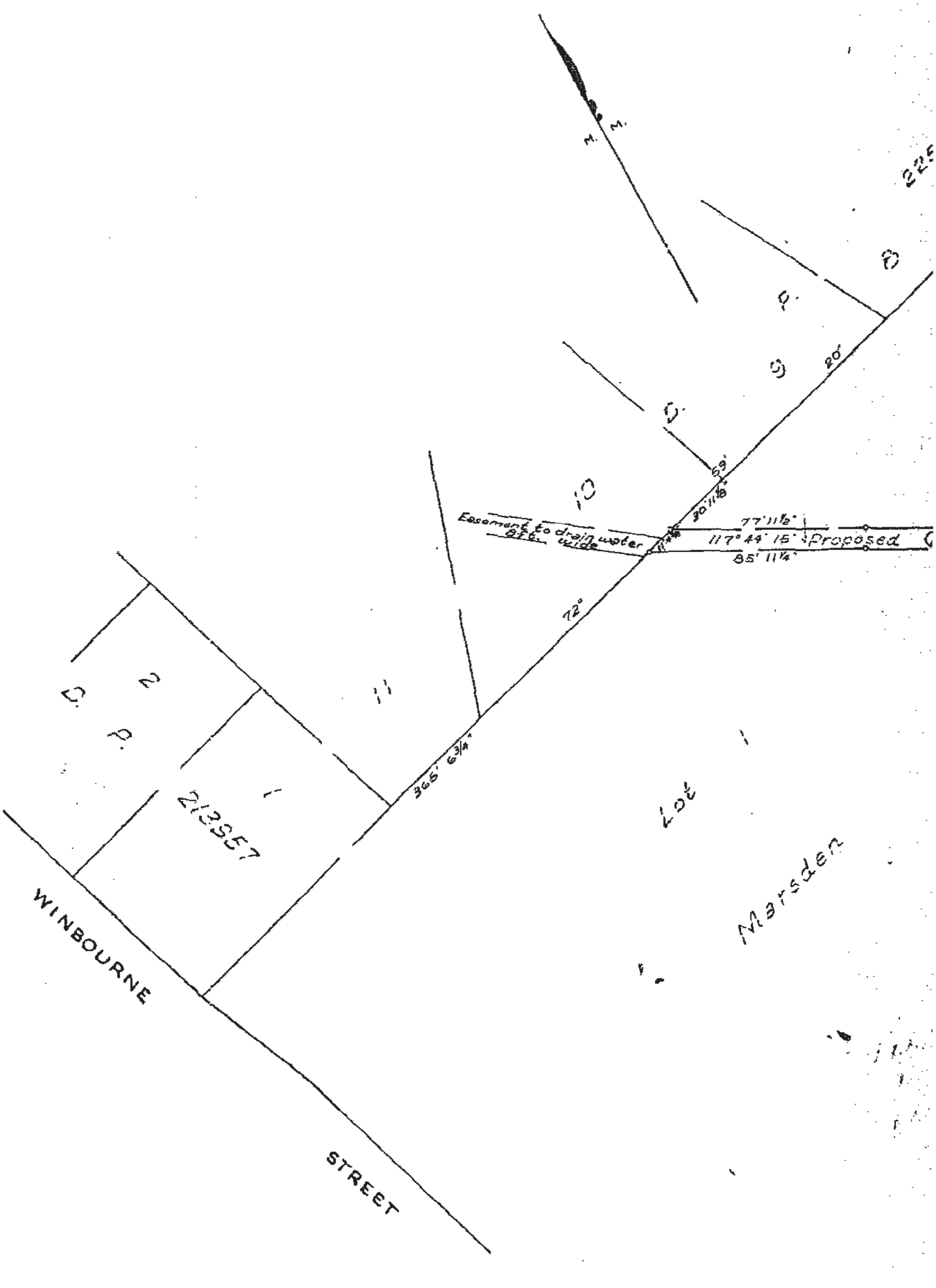
* A very short note will suffice.

K 1165—2

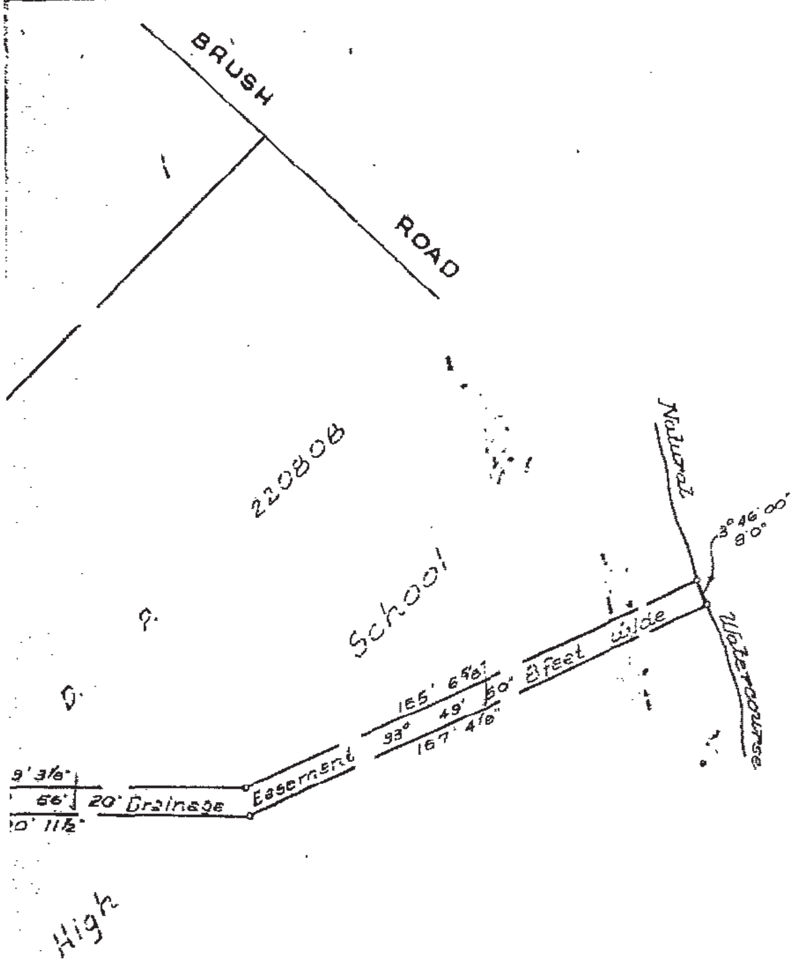
Plan Form 2—This form must NOT be used where it is intended to dedicate public roads or public reserves or create drainage reserve

WARNING. Plan Drawing only to appear in this space.

S.B. 24882 R.



WARNING. Plan Drawing only to appear in th ments, or restrictions as to user.—See Form 8. WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION.



M 990620

Registered:
C.A.:
Title System:
Purpose:
Ref. Map:
Last Plan

OFFICE USE ONLY.

PLAN OF PROPOSED EASEMENT 8 FEET WIDE FOR DRAINAGE WITHIN LOT 1, D.P. 220808

Scale: 40 FEET to an inch

Mun./Shire
City: Ryde
Locality: Ermington
Parish: Hunters Hill
County: Cumberland

~~I, ...~~
~~of ...~~
~~a surveyor registered under the Surveyors Act, 1929, as amended, hereby certify that the survey represented in this plan is accurate and has been made * (1) by me (2) under my immediate supervision in accordance with the Survey Practice Regulations, 1933, and was completed on † ...~~

Signature ... 7.1.71

Surveyor registered under Surveyors Act, 1929, as amended.
Datum Line of Azimuth.

S.B. 24882 R

LODGE WITH LEASING 19.1.72

● Proposed Easement for Drainage 8 feet wide

This is the plan marked "A" referred to in the Memorandum of Transfer and Grant from the Minister for Education to the Council of the Municipality of Ryde.

Dated the 24 day of March 1972

Mayor

Minister for Education

A.G. Sindel
Town Clerk

Council Clerk's Certificate.

I hereby certify that—

(a) the requirements of the Local Government Act, 1919 (other than the requirements for the registration of plans), and

*(b) the requirements of section 348 of the Metropolitan Water, Sewerage, and Drainage Act, 1924, as amended,

have been complied with by the applicant in relation to the proposed ...

...(Insert "new road" or "subdivision") set out hereon.

Subdivision No. ...

Date ...

(Signature) ...
Council Clerk.

* NOTE.—This part of certificate to be deleted where the application is only for the opening of a new road or where the land to be subdivided is wholly outside the area of operations of the Metropolitan Water Sewerage and Drainage Board.

* Strike out either (1) or (2).

† Insert date of survey.

SURVEYORS REFERENCE

Transferor or Transferee signs by a mark, the attestation must state "that the instrument was read over and explained to him, and that he appeared fully to understand the same."

/ Execution in New South Wales may be proved if this instrument is signed or acknowledged before the Registrar-General, or Deputy Registrar-General, or a Notary Public, a J.P., or Commissioner for Affidavits, to whom the Transferor is known, otherwise the attesting witness should appear before one of the above functionaries who having received an affirmative answer to each of the questions set out in Sec. 108 (1) (5) of the Real Property Act should sign the certificate at the foot of this page.

Execution may be proved where the parties are resident:—

(a) in any part of the British dominions outside the State of New South Wales by signing or acknowledging before the Registrar-General or Recorder of Titles of such Possession, or before any Judge, Notary Public, Justice of the Peace for New South Wales, or Commissioner for taking affidavits for New South Wales, or Mayor or Chief Officer of any municipal or local government corporation of such part, or Justice of the Peace for such part, or the Governor, Government Resident, or Chief Secretary of such part or such other person as the Chief Justice of New South Wales may appoint.

(b) in the United Kingdom by signing or acknowledging before the Mayor or Chief Officer of any corporation or a Notary Public.

(c) in any foreign place by signing or acknowledging before (i) a British Consular Officer (which includes a British Ambassador, Envoy, Minister, Chargé d'Affaires, Secretary of Embassy or Legation, Consul-General, Acting Consul-General, Consul, Acting Consul, Vice-Consul, Acting Vice-Consul, Pro-Consul, Consular Agent and Acting Consular Agent). (ii) an Australian Consular Officer (which includes an Ambassador, High Commissioner, Minister, Head of Mission, Commissioner, Chargé d'Affaires, Counsellor or Secretary at an Embassy, High Commissioner's Office or Legation, Consul-General, Consul, Vice-Consul, Trade Commissioner and Consular Agent), who should affix his seal of office, or the attesting witness may make a declaration of the due execution thereof before one of such persons (who should sign and affix his seal to such declaration), or such other person as the said Chief Justice may appoint.

Signed at Ryde said the 2nd day of March 1972.

Signed in my presence by the ~~transferor~~ ~~THE HONOURABLE CHARLES BENJAMIN CUTLER as such Minister for Education as aforesaid who is personally known to me:~~ ~~WHO IS PERSONALLY KNOWN TO ME~~
THE HONOURABLE ERIC ARCHIBALD WILLIS as such Minister for Education as aforesaid who is personally known to me:

[signature] J.P.

[signature]
Transferor.*

Accepted, and the Council hereby certifies this Instrument to be correct for the purposes of the Real Property Act.

THE COMMON SEAL of THE COUNCIL ~~Signed in my presence by the transferee~~ OF THE MUNICIPALITY OF RYDE ~~WHO IS PERSONALLY KNOWN TO ME~~ was hereto affixed in pursuance of a ~~Resolution carried at a~~ duly convened meeting of the Council held on the 2nd day of March 1965.

† ~~Accepted, and I hereby certify this Transfer to be correct for the purposes of the Real Property Act.~~

[signature] Mayor
[signature]
Town Clerk ~~Transferee(s).~~

MEMORANDUM AS TO NON-REVOCATION OF POWER OF ATTORNEY.

(To be signed at the time of executing the within instrument.)

Memorandum where by the undersigned states that he has no notice of the revocation of the Power of Attorney registered No. Miscellaneous Register under the authority of which he has just executed the within transfer.

Signed at the day of 19 .

Signed in the presence of—

‡ Strike out unnecessary words. Add any other matter necessary to show that the power is effective

CERTIFICATE OF J.P., &c., TAKING DECLARATION OF ATTESTING WITNESS.‡

‡ To be signed by Registrar-General, Deputy Registrar-General, a Notary Public, J.P., Commissioner for Affidavits, or other functionary before whom the attesting witness appears. Not required if the instrument itself be signed or acknowledged before one of those parties.

Appeared before me at , the day of , one thousand nine hundred and the attesting witness to this instrument and declared that he personally knew the person signing the same, and whose signature thereto he has attested; and that the name purporting to be such signature of the said is own handwriting, and that he was of sound mind and freely and voluntarily signed the same.

* If signed by virtue of any power of attorney, the original power must be registered in the Miscellaneous Register, and produced with each dealing, and the memorandum of non-revocation on back of form signed by the attorney before a witness.

† N.B.—Section 117 requires that the above Certificate be signed by each Transferee or his Solicitor or Conveyancer, and renders any person falsely or negligently certifying liable to a penalty of £50; also to damages recoverable by parties injured. Acceptance by the Solicitor or Conveyancer (who must sign his own name, and not that of his firm) is permitted only when the signature of the Transferee cannot be obtained without difficulty, and when the instrument does not impose a liability on the party taking under it. When the instrument contains some special covenant by the Transferee or is subject to a mortgage, encumbrance or lease, the Transferee must accept personally.

No alterations should be made by erasure. The words rejected should be scored through with the pen, and those substituted written over them, the alteration being verified by signature or initials in the margin, or noticed in the attestation.

K 1165—2

S. $60.

M990620

No.

LODGED BY Hill Thomson
58 Pitt St

FEES.

The Fees, which are payable on lodgment, are as follows:—

(a) £2 where the memorandum of transfer is accompanied by the relevant Certificates of Title or Crown Grants, otherwise £2 5s. 0d. Where such instrument is to be endorsed on more than one folium of the register, an additional charge of 5s. is made for every Certificate of Title or Crown Grant after the first.

(b) A supplementary charge of 10s. is made in each of the following—
(i) where a restrictive covenant is imposed; or
(ii) a new easement is created; or
(iii) a partial discharge of mortgage is endorsed on the transfer.

(c) Where a new Certificate of Title must issue the scale charges are—
(i) £2 for every Certificate of Title not exceeding 15 folios and without diagram;
(ii) £2 10s. 0d. for every Certificate of Title not exceeding 15 folios with one simple diagram;
(iii) as approved where more than one simple diagram, or an extensive diagram will appear.
Where the engrossing exceeds 15 folios, an amount of 5s. per folium, extra fee is payable.

DOCUMENTS LODGED HEREWITH.

To be filled in by person lodging dealing.

1. C/T 11/2/72
2. Plan
3. [illegible]
4. [illegible]
5.
6.

Received Docs. Nos.
Receiving Clerk.

PARTIAL DISCHARGE OF MORTGAGE.[1]
(*N.B.—Before execution read marginal note.*)

I, *mortgagee under Mortgage No.* *release and discharge the land comprised in the within transfer from such mortgage and all claims thereunder but without prejudice to my rights and remedies as regards the balance of the land comprised in such mortgage.*

Dated at this day of 19 .

Signed in my presence by

D

M.P.D.

who is personally known to me.

Mortgagee.

[1] This discharge is appropriate to a transfer of part of the land in the Mortgage. The mortgagee should execute a formal discharge where the land transferred is the whole of or the residue of the land in the Certificate of Title or Crown Grant or is the whole of the land in the mortgage.

INDEXED	MEMORANDUM OF TRANSFER and Grant of Easement for Drainage
Checked by	Particulars entered in Register Book, Volume Folio
Passed (in S.D.B.) by [signature] 7/12/72	the 4th day of December 1972 at minutes past o'clock in the noon.
Signed by [signature]	[signature] Registrar-General.

PROGRESS RECORD.

	Initials.	Date.
Sent to Survey Branch		
Received from Records		
Draft written ...		
Draft examined ...		
Diagram prepared ...		
Diagram examined ...		
Draft forwarded ...		
Supt. of Engrossors		
Cancellation Clerk ...		
VOL.	FOL.	

LEAVE THESE SPACES FOR DEPARTMENTAL USE.

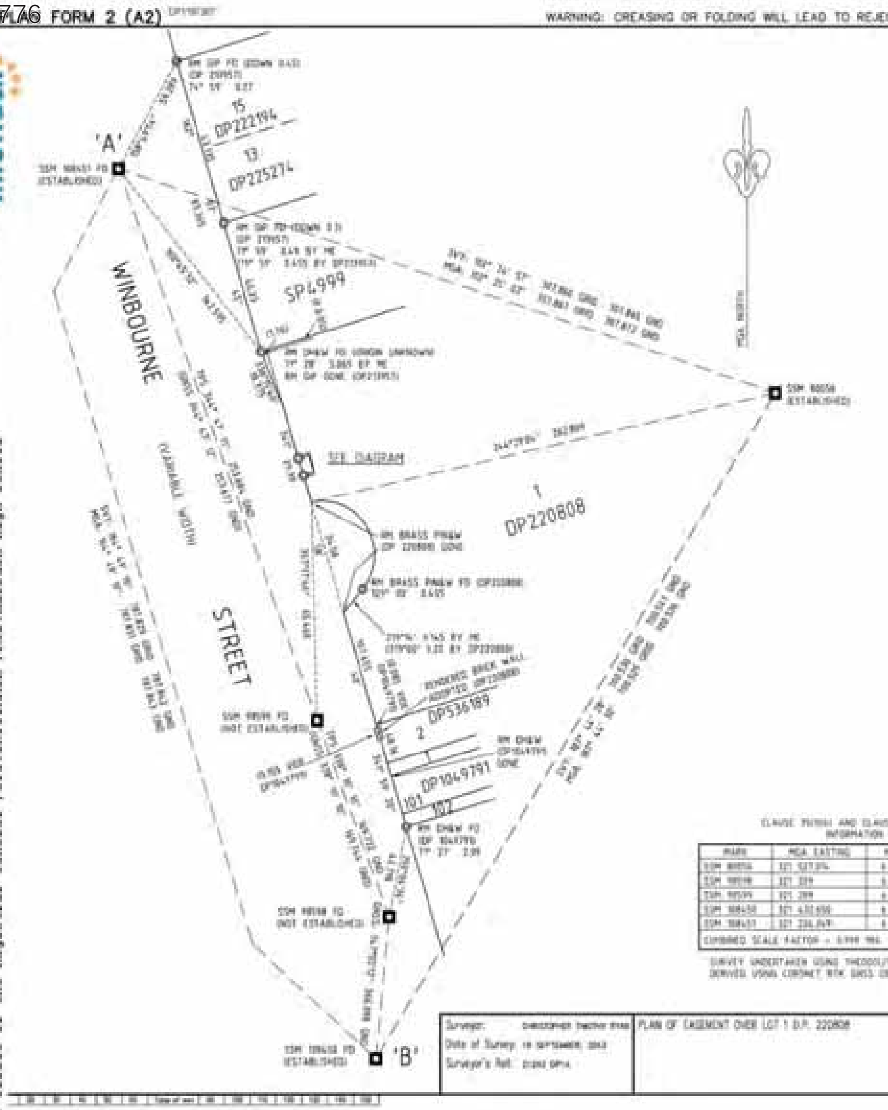
K 1165—2

D21/78776

PLAN FORM 2 (A2)

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

ePlan Sheet 1 of 1 sheets



CLAUSE 35(1)(b) AND CLAUSE 6(12) SURVEYING & SPATIAL INFORMATION REGULATION 2012

MARK	MGA EASTING	MGA NORTHING	ZONE	CLASS	ORDER
SSM 80056	321 527.074	6 258 104.772	56	C	4
SSM 98598	321 359	6 257 895	56	U	U
SSM 98599	321 289	6 257 930	56	U	U
SSM 108450	321 432.650	6 257 632.632	56	A	1
SSM 108451	321 226.049	6 258 173.972	56	B	2
COMBINED SCALE FACTOR = 0.999 986 SOURCE: SCIMS 25.05.2015					

SURVEY UNDERTAKEN USING THEODOLITE TRAVERSE WITH MGA ORIENTATION DERIVED USING CORSNET RTK GNSS OBSERVATIONS

CLAUSE 6(12) SURVEYING & SPATIAL INFORMATION REGULATION 2012

OCCUPIED MARK	OBSERVED MGA EASTING	OBSERVED MGA NORTHING	ZONE
SSM 80056	321 526.996	6 258 104.798	56
SSM 98598	321 354.024	6 257 770.634	56
SSM 98599	321 293.903	6 257 928.095	56
SSM 108450	321 432.618	6 257 612.650	56
SSM 108451	321 226.336	6 258 172.988	56
COMBINED SCALE FACTOR = 0.999 986 SOURCE: RTK GNSS OBSERVATIONS			

Surveyor: CHRISTOPHER TIMOTHY RYAN Date of Survey: 19 SEPTEMBER 2013 Surveyor's Ref: 21202 DP14	PLAN OF EASEMENT OVER LOT 1 D.P. 220808	LGA: RYDE Locality: WEST RYDE Subdivision No: ——— Lengths are in metres. Reduction Ratio 1:500	Registered 1.9.2014	DP1197387

D21/78776

PLAN FORM 6 (2013) WARNING: Creasing or folding will lead to rejection ePlan

DEPOSITED PLAN ADMINISTRATION SHEET

Sheet 1 of 2 sheet(s)

Office Use Only

Registered: 1.9.2014

Title System: TORRENS

Purpose: EASEMENT

Office Use Only

DP1197387

PLAN OF EASEMENT OVER LOT 1 DP220808

LGA: RYDE

Locality: WEST RYDE

Parish: HUNTERS HILL

County: CUMBERLAND

Crown Lands NSW/Western Lands Office Approval

I, ... (Authorised Officer) in approving this plan certify that all necessary approvals in regard to the allocation of the land shown herein have been given.

Signature: ....

Date: ....

File Number: ....

Office: ....

Subdivision Certificate

I, ...

*Authorised Person/*General Manager/*Accredited Certifier, certify that the provisions of s.109J of the *Environmental Planning and Assessment Act 1979* have been satisfied in relation to the proposed subdivision, new road or reserve set out herein.

Signature: ....

Accreditation number: ....

Consent Authority: ....

Date of endorsement: ....

Subdivision Certificate number: ....

File number: ....

*Strike through if inapplicable.

Survey Certificate

I, CHRISTOPHER TIMOTHY RYAN ....

of AAM Suite 2, 33 Waterloo Rd, Macquarie Park, NSW, 21113 ....

a surveyor registered under the *Surveying and Spatial Information Act 2002*, certify that:

*(a) The land shown in the plan was surveyed in accordance with the *Surveying and Spatial Information Regulation 2012*, is accurate and the survey was completed on 18 September 2013 ....

~~*(b) The part of the land shown in the plan (*being/*excluding ^ ....) was surveyed in accordance with the *Surveying and Spatial Information Regulation 2012*, is accurate and the survey was completed on, ... the part not surveyed was compiled in accordance with that Regulation.~~

~~*(c) The land shown in this plan was compiled in accordance with the *Surveying and Spatial Information Regulation 2012*.~~

Signature: ....Dated: 26 Sep, 2013

Surveyor ID: 1946 ....

Datum Line: 'A' – 'B' ....

Type: *Urban/~~*Rural~~

The terrain is *Level-Undulating / ~~*Steep-Mountainous~~.

*Strike through if inapplicable.

^Specify the land actually surveyed or specify any land shown in the plan that is not the subject of the survey.

Statements of intention to dedicate public roads create public reserves and drainage reserves, acquire/resume land.

Plans used in the preparation of survey/compilation.

- SP4999
- DP30375
- DP213957
- DP220808
- DP222194
- DP225274
- DP412691
- DP536189
- DP1049791
- DP1118996

If space is insufficient continue on PLAN FORM 6A

Signatures, Seals and Section 88B Statements should appear on PLAN FORM 6A

Surveyor's Reference: 21292

PLAN FORM 6A (2012) WARNING: Creasing or folding will lead to rejection ePlan

DEPOSITED PLAN ADMINISTRATION SHEET

Sheet 2 of 2 sheet(s)

Office Use Only

Registered: 1.9.2014

Office Use Only

DP1197387

PLAN OF EASEMENT OVER LOT 1 DP220808

This sheet is for the provision of the following information as required:

- A schedule of lots and addresses - See 60(c) *SSI Regulation 2012*
- Statements of intention to create and release affecting interests in accordance with section 88B *Conveyancing Act 1919*
- Signatures and seals- see 195D *Conveyancing Act 1919*
- Any information which cannot fit in the appropriate panel of sheet 1 of the administration sheets.

Subdivision Certificate number: ....

Date of Endorsement: ....

Lot	Street Number	Street Name	Street Type	Locality
1	22	Winbourne	Street	West Ryde

PURSUANT TO SECTION 88B , CONVEYANCING ACT, 1919, IT IS INTENDED TO CREATE:-

1. EASEMENT FOR ELECTRICITY AND OTHER PURPOSES 3.31 WIDE

SIGNED SEALED AND DELIVERED
for and on behalf of Ausgrid
by TREVOR MARK ARMSTRONG
its duly constituted Attorney pursuant
to Power of Attorney registered
Book 4641 No. 639

Attorney

K. Rayner
Witness

Signed by me ANTHONY PERRAU as delegate
of the Minister for Education pursuant
to Section 125 of the Education Act 1990
and I hereby certify that I have no notice
of the revocation of such delegation

If space is insufficient use additional annexure sheet

Surveyor's Reference: 21292

R.P. 13. No. [illegible] 1958

FEES:— £ s. d.
Lodgment
Endorsement
Certificate

REGISTRAR-GENERAL NEW SOUTH WALES

New South Wales

MEMORANDUM OF TRANSFER

(REAL PROPERTY ACT, 1900.)

(Trusts must not be disclosed in the transfer.)

Typing or handwriting in this instrument should not extend into any margin. Handwriting should be clear and legible and in permanent black non-copying ink.

a If a less estate, strike out "in fee simple" and interline the required alteration.

b Full postal address of transferee must be shown.

c If to two or more, state whether "as joint tenants" or "as tenants in common".

d If all the references cannot be conveniently inserted, a form of annexure (obtainable at L.T.O.) may be added. Any annexure must be signed by the parties and their signatures witnessed.

e If part only of the land comprised in a Certificate or Certificates of Title is to be transferred add "and being lot sec. D.P." or "being the land shown in the plan annexed hereto," or "being the residue of the land in certificate (or grant) registered Vol. Fol." Where the consent of the local council is required to a subdivision the certificate and plan mentioned in the L.G. Act, 1919, should accompany the transfer.

f Strike out if unnecessary, or suitably adjust
(i) if any easements are to be created or any exceptions to be made,
(ii) if the statutory covenants implied by the Act are intended to be varied or modified.
Covenants should comply with the provisions of Section 88 of the Conveyancing Act, 1919-1953.

g A very short note will suffice.

h Execution in New South Wales may be proved if this instrument is signed or acknowledged before the Registrar-General, or Deputy Registrar-General, or a Notary Public, a J.P., or Commissioner for Affidavits, to whom the Transferor is known, otherwise the attesting witness should appear before one of the above functionaries who having questioned the witness should sign the certificate on the back of this form. As to instruments executed elsewhere, see back of form.

i Repeat attestation if necessary.

If the Transferor or Transferee signs by a mark, the attestation must state "that the instrument was read over and explained to him, and that he appeared fully to understand the same."

THIS SPACE TO BE LEFT FREE FROM NOTATION. NOT TO BE ALTERED BY ERASURE—See Foot Note.

I, EWALD WEZGAL of Woollahra in the State of New South Wales Wharf Labourer presently of Quaker's Hill (herein called transferor) being registered as the proprietor of an estate in *fee simple*ᵃ in the land hereinafter described, subject, however, to such encumbrances, liens and interests as are notified hereunder, in consideration of Six thousand pounds (£6,000.) (the receipt whereof is hereby acknowledged) paid to me by THE HONOURABLE ROBERT JAMES HEFFRON the Minister for Education of the State of New South Wales for and on behalf of HER MOST GRACIOUS MAJESTY QUEEN ELIZABETH II Do hereby transfer to HER MOST GRACIOUS MAJESTY THE QUEEN for the purposes of the Public Instruction Act of 1880 (herein called transferee) do hereby transfer to the said transferee

ALL such my Estate and Interest in ALL THE land mentioned in the schedule following:—

County.	Parish.	Reference to Title (d) Whole or Part.	Vol.	Fol.	Description of Land (if part only). (e)
CUMBERLAND	HUNTERS HILL	whole	5516	5	

~~And the transferee covenants with the transferor~~ᶠ

ENCUMBRANCES, &c., REFERRED TO.ᵍ

The reservations contained in the original Crown Grant.

Signed at Sydney the thirtieth day of June 1958.

ʰSigned in my presence by the transferor WHO IS PERSONALLY KNOWN TO ME

[signature]

ⁱSigned

Solicitor
Sydney

E. Wezgal
Transferor.*

Signed in my presence by the transferee for Edward Patrick McRae by Attorney
WHO IS PERSONALLY KNOWN TO ME

[signature]
State Crown Solicitor.

† Accepted, and I hereby certify this Transfer to be correct for the purposes of the Real Property Act.

State Crown Solicitor

[signature]
Transferee(s).

* If signed by virtue of any power of attorney, the original power must be registered in the Miscellaneous Register, and produced with each dealing, and the memorandum of non-revocation on back of form signed by the attorney before a witness.

† N.B.—Section 117 requires that the above Certificate be signed by each Transferee or his Solicitor or Conveyancer, and renders any person falsely or negligently certifying liable to a penalty of £50; also to damages recoverable by parties injured. Acceptance by the Solicitor or Conveyancer (who must sign his own name, and not that of his firm) is permitted only when the signature of the Transferee cannot be obtained without difficulty, and when the instrument does not impose a liability on the party taking under it. When the instrument contains some special covenant by the Transferee or is subject to a mortgage, encumbrance or lease, the Transferee must accept personally.

No alterations should be made by erasure. The words rejected should be scored through with the pen, and those substituted written over them, the alteration being verified by signature or initials in the margin, or noticed in the attestation.

58 437—W K 1165 A. H. PETTIFER, GOVERNMENT PRINTER.

D21/78776

G 990325

No.

LODGED BY State Crown Solicitor.

CONSENT OF MORTGAGEE.[j]

(N.B.—Before execution read marginal note.)

I,

mortgagee under Mortgage No.

release and discharge the land comprised in the within transfer from such mortgage and all claims thereunder but without prejudice to my rights and remedies as regards the balance of the land comprised in such mortgage.

j This consent is appropriate to a transfer of part of the land in the Mortgage. The mortgagee should execute a formal discharge where the land transferred is the whole of or the residue of the land in the Certificate of Title or Crown Grant or is the whole of the land in the mortgage.

Dated at this day of 19 .

Signed in my presence by

who is personally known to me.

Mortgagee.

MEMORANDUM AS TO NON-REVOCATION OF POWER OF ATTORNEY.

(To be signed at the time of executing the within instrument.)

Memorandum whereby the undersigned states that he has no notice of the revocation of the Power of Attorney registered No. Miscellaneous Register under the authority of which he has just executed the within transfer.[k]

Signed at the day of 19 .

Signed in the presence of—

k Strike out unnecessary words. Add any other matter necessary to show that the power is effective.

CERTIFICATE OF J.P., &c., TAKING DECLARATION OF ATTESTING WITNESS.[l]

Appeared before me at , the day of , one thousand nine hundred and the attesting witness to this instrument and declared that he personally knew the person signing the same, and whose signature thereto he has attested; and that the name purporting to be such signature of the said is own handwriting, and that he was of sound mind and freely and voluntarily signed the same.

l To be signed by Registrar-General, Deputy Registrar-General, a Notary Public, J.P., Commissioner for Affidavits, or other functionary before whom the attesting witness appears. Not required if the instrument itself be signed or acknowledged before one of these parties.

LEAVE THESE SPACES FOR DEPARTMENTAL USE.

INDEXED

MEMORANDUM OF TRANSFER

Checked by

Particulars entered in Register Book, Volume 5516 Folio 5

Passed (in S.D.B.) by

the 18th day of August 1958 at

minutes past 12 o'clock in the noon.

Signed by

Registrar-General.

DOCUMENTS LODGED HEREWITH.

To be filled in by person lodging dealing.

1. 4.
2. 5.
3. 6.

Received Docs. Nos.

Receiving Clerk.

PROGRESS RECORD.

	Initials.	Date.
Sent to Survey Branch		
Received from Records		
Draft written ...		
Draft examined ...		
Diagram prepared		
Diagram examined ...		
Draft forwarded ...		
Supt. of Engrossers ...		
Cancellation Clerk ...		
Vol.	Fol.	

K 1165 St 437—W

EXECUTION OUTSIDE NEW SOUTH WALES.

Execution may be proved where the parties are resident:—

(a) *in any part of the British dominions outside the State of New South Wales* by signing or acknowledging before the Registrar-General or Recorder of Titles of such Possession, or before any Judge, Notary Public, Justice of the Peace for New South Wales, or Commissioner for taking affidavits for New South Wales, or Mayor or Chief Officer of any municipal or local government corporation of such part, or Justice of the Peace for such part, or the Governor, Government Resident, or Chief Secretary of such part or such other person as the Chief Justice of New South Wales may appoint.

(b) *in the United Kingdom* by signing or acknowledging before the Mayor or Chief Officer of any corporation or a Notary Public.

(c) *in any foreign place* by signing or acknowledging before (i) a British Consular Officer (which includes a British Ambassador, Envoy, Minister, Chargé d'Affaires, Secretary of Embassy or Legation, Consul-General, Acting Consul-General, Consul, Acting Consul, Vice-Consul, Acting Vice-Consul, Pro-Consul, Consular Agent and Acting Consular Agent). (ii) an Australian Consular Officer (which includes an Ambassador, High Commissioner, Minister, Head of Mission, Commissioner, Chargé d'Affaires, Counsellor or Secretary at an Embassy, High Commissioner's Office or Legation, Consul-General, Consul, Vice-Consul, Trade Commissioner and Consular Agent), who should affix his seal of office, or the attesting witness may make a declaration of the due execution thereof before one of such persons (who should sign and affix his seal to such declaration), or such other person as the said Chief Justice may appoint.

The fees are:—Upon lodgment (a) £1-10-0, if accompanied by the relevant title or evidence of production thereof, (b) £1-15-0 otherwise. This fee includes endorsement on the first Certificate. In addition the following fees are payable:—(a) 5/- for each additional Certificate included in the Transfer, (b) £2 for each new Certificate of Title issued, (c) 10/- where the Transfer contains covenant purporting to affect the user of any land, (d) 10/- where the Transfer is expressed to be made together with an easement or expressed to reserve an easement or in any way creates an easement, (e) 10/- where partial discharge of a mortgage is endorsed on the Transfer, (f) 2/6 for each additional folio where the Certificate exceeds fifteen folios, (g) as approved, in cases involving more than one simple diagram or any diagram other than a simple diagram.

Tenants in common must receive separate Certificates.

If part only of the land is transferred a new Certificate must issue for that part, and the old Certificate will be retained in the Office. A new Certificate may be taken out for the residue if desired.

10128001

[redacted]FICATE OF TITLE
[redacted]RTY ACT, 1900, as amended.

NEW SOUTH WALES

Application No. 5249 cnd 194

Prior Titles Volume 564 Folios 193
Volume 1168 Folio 199
Volume 5916 Folio 5

DIEU ET MON DROIT

Vol. 10128 Fol. 1

ID

(Page 1) Vol. 10128 Fol. 1

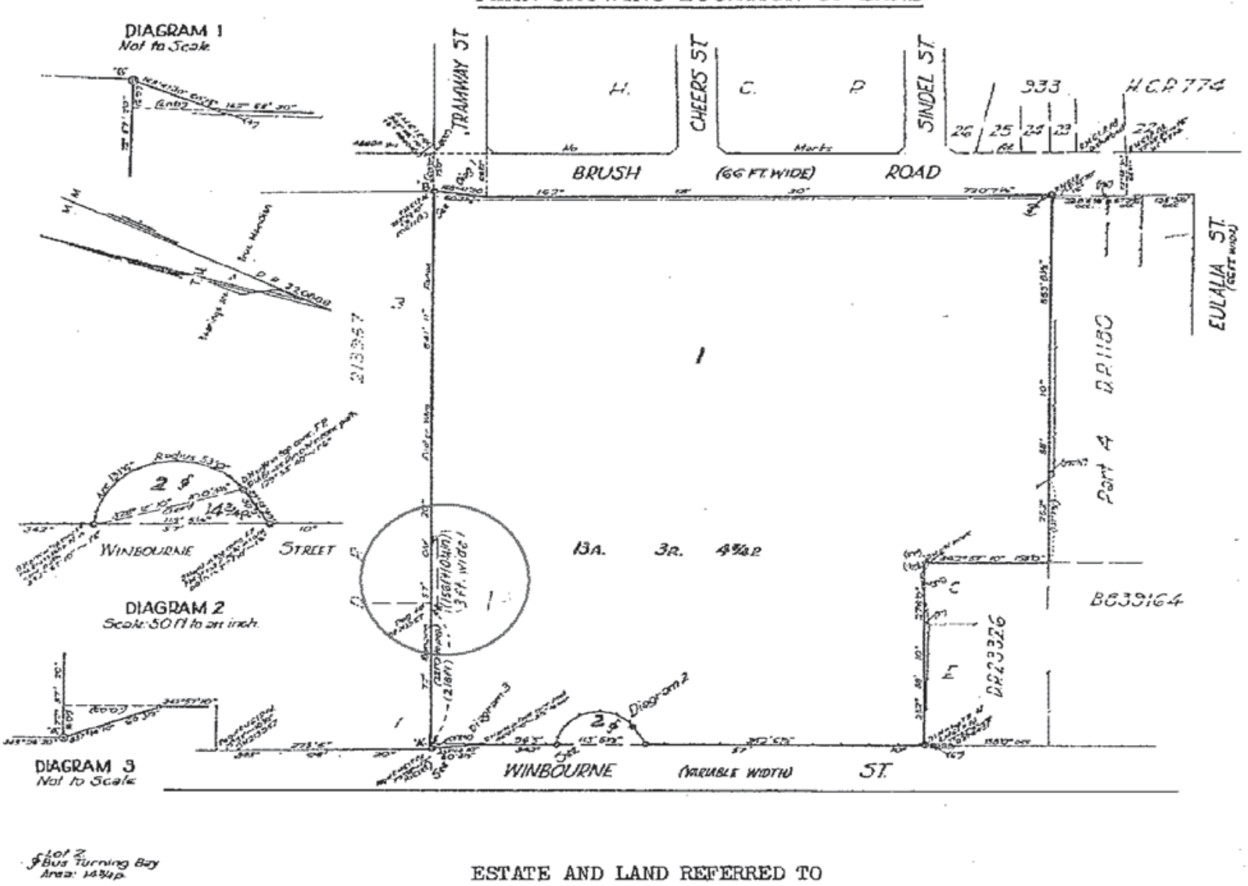
I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

Witness J. Charles

Registrar General.

REGISTRAR GENERAL NEW SOUTH WALES

PLAN SHOWING LOCATION OF LAND



ESTATE AND LAND REFERRED TO

Estate in Fee Simple in Lot 1 in Deposited Plan 220808 in the Municipality of Ryde Parish of Hunters Hill and County of Cumberland being part of Portion 61 granted to Samuel Wheeler on 20-2-1794 and part of Portion 58 granted to Patrick Campbell on 3-12-1794 Excepting thereout all mines and deposits specified in Section 141 Public Works Act 1912 as regards the part of the land above described formerly comprised in Certificates of Title Volume 564 Folios 193, 194 and Volume 1168 Folio 199.

FIRST SCHEDULE (continued overleaf)

[illegible] as to the part of the land above described formerly comprised in Certificates of Title Volume 564 Folios 193 and 194 and Volume 1168 Folio 199 and HER MAJESTY QUEEN ELIZABETH THE SECOND as to the part formerly comprised in Certificate of Title Volume 5916 Folio 5,

Registrar General

SECOND SCHEDULE (continued overleaf)

GCY 1. Reservations and conditions, if any, contained in the Crown Grants above referred to.

2. ~~Caveat No. A545589 by the Registrar General as regards thepart of the land above described formerly comprised in Certificate of Title Volume 1168 Folio 199 Entered 29-3-1920.~~ Cancelled 5-9-1966

Registrar General

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED.

PERSONS ARE CAUTIONED AGAINST ALTERING OR ADDING TO THIS CERTIFICATE OR ANY NOTIFICATION HEREON

WARNING: THIS DOCUMENT MUST NOT BE REMOVED FROM THE LAND TITLES OFFICE.

D21/78776

Vol. 10128 Fol. 1

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	ENTERED	Signature of Registrar General

25-6-71 CT (amended)

M347799- [illegible]

M990[illegible] T45

SECOND SCHEDULE (continued)

INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	PARTICULARS	ENTERED	Signature of Registrar General	CANCELLATION
EW Transfer	M347799	3.2.1971	Easement to Drain Water created by Transfer M347799 affecting the part of the land within described shown as "3 ft. wide" in the Plan hereon. [illegible] M347799	1.3.1972	[signature]	
ED Transfer	[illegible]	[illegible]	Easement for Drainage [illegible] said instrument) affecting the part of the land within described [illegible] easement [illegible] plan lodged with Transfer [illegible]	[illegible]	[signature]	

(Page 2 of 2 pages)

FORM No. 62

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

D21/78776

Historical Title

LAND REGISTRY SERVICES

InfoTrack

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
19/11/2020 10:51AM

FOLIO: 1/220808

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 10128 FOL 1

Recorded	Number	Type of Instrument	C.T. Issue
5/6/1987		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
1/6/1988		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
22/2/1994	U47154	APPLICATION	EDITION 1
1/9/2014	DP1197387	DEPOSITED PLAN	EDITION 2

*** END OF SEARCH ***

marsden high school PRINTED ON 19/11/2020

D21/78776

LAND REGISTRY SERVICES **Title Search** InfoTrack

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 1/220808

SEARCH DATE	TIME	EDITION NO	DATE
19/11/2020	10:52 AM	2	1/9/2014

LAND

LOT 1 IN DEPOSITED PLAN 220808
AT RYDE
LOCAL GOVERNMENT AREA RYDE
PARISH OF HUNTERS HILL COUNTY OF CUMBERLAND
TITLE DIAGRAM DP220808

FIRST SCHEDULE

MINISTER FOR EDUCATION (AP U47154)

SECOND SCHEDULE (5 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 LAND EXCLUDES MINERALS (S.141 PUBLIC WORKS ACT, 1912) AS REGARDS PART FORMERLY IN VOL 564 FOL 193, 194 & VOL 1168 FOL 199
3 M347799 EASEMENT TO DRAIN WATER AFFECTING THE PART OF THE LAND WITHIN DESCRIBED SHOWN AS "3 FT WIDE" IN THE PLAN WITH M347799
4 M990620 EASEMENT FOR DRAINAGE AFFECTING THAT PART OF THE LAND SHOWN AS PROPOSED DRAINAGE EASEMENT 8 FEET WIDE IN PLAN WITH M990620
5 DP1197387 EASEMENT FOR ELECTRICITY AND OTHER PURPOSES 3.31 METRE(S) WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN DP1197387

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

marsden high school PRINTED ON 19/11/2020

* Any entries preceded by an asterisk do not appear on the current edition of the Certificate of Title. Warning: the information appearing under notations has not been formally recorded in the Register. InfoTrack an approved NSW Information Broker hereby certifies that the information contained in this document has been provided electronically by the Registrar General in accordance with Section 96B(2) of the Real Property Act 1900.

Received: 19/11/2020 10:52:06

D21/78776

Appendix D

Historical Aerials

D21/78776

LOCALITY MAP

Notes:
1. Basemap from NSW Spatial Services (dated 1951).

Legend

Site Boundary

0 50 100 150 m

Douglas Partners Geotechnics / Environment / Groundwater	CLIENT: School Infrastructure New South Wales (SINSW)		TITLE: **1951 Historical Aerial Imagery**		PROJECT No: 99872.01
	OFFICE: Sydney	DRAWN BY: JH	**Marsden High School Repurposed to Netball Facility**	N	DRAWING No: A
	SCALE: 1:3500 at A3	DATE: 17.11.2020	**Marsden High School, Ryde**		REVISION: 0

D21/78776

LOCALITY MAP

Notes:
1. Basemap from NSW Spatial Services (dated 1961).

Legend

Site Boundary

0 50 100 150 m

Douglas Partners Geotechnics / Environment / Groundwater	CLIENT: School Infrastructure New South Wales (SINSW)		TITLE: **1961 Historical Aerial Imagery**	PROJECT No: 99872.01
	OFFICE: Sydney	DRAWN BY: JH	**Marsden High School Repurposed to Netball Facility**	DRAWING No: 8
	SCALE: 1:3500 at A3	DATE: 17.11.2020	**Marsden High School, Ryde**	REVISION: 0

D21/78776

LOCALITY MAP

Notes:
1. Basemap from NSW Spatial Services (dated 1971).

Legend

Site Boundary

0 50 100 150 m

Douglas Partners Geotechnics / Environment / Groundwater	CLIENT: School Infrastructure New South Wales (SINSW)		TITLE: **1971 Historical Aerial Imagery**	PROJECT No: 99872.01
	OFFICE: Sydney	DRAWN BY: JH	**Marsden High School Repurposed to Netball Facility**	DRAWING No: C
	SCALE: 1:3500 at A3	DATE: 17.11.2020	**Marsden High School, Ryde**	REVISION: 0

D21/78776

LOCALITY MAP

Notes:
1. Basemap from NSW Spatial Services (dated 1978).

Legend

Site Boundary

0 50 100 150 m

Douglas Partners
Geotechnics | Environment | Groundwater

CLIENT: School Infrastructure New South Wales (SINSW)		TITLE:	**1978 Historical Aerial Imagery**
OFFICE: Sydney	DRAWN BY: JH		**Marsden High School Repurposed to Netball Facility**
SCALE: 1:3500 at A3	DATE: 17.11.2020		**Marsden High School, Ryde**

PROJECT No:	99872.01
DRAWING No:	D
REVISION:	0

D21/78776

LOCALITY MAP

Notes:
1. Basemap from NSW Spatial Services (dated 1986).

Legend

Site Boundary

0 50 100 150 m

Douglas Partners *Geotechnics / Environment / Groundwater*	CLIENT: School Infrastructure New South Wales (SINSW)		TITLE: **1986 Historical Aerial Imagery**	PROJECT No: 99872.01
	OFFICE: Sydney	DRAWN BY: JH	**Marsden High School Repurposed to Netball Facility**	DRAWING No: E
	SCALE: 1:3500 at A3	DATE: 17.11.2020	**Marsden High School, Ryde**	REVISION: 0

D21/78776

LOCALITY MAP

Notes:
1. Basemap from NSW Spatial Services (dated 1991).

Legend

Site Boundary

0 50 100 150 m

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	School Infrastructure New South Wales (SINSW)		
OFFICE:	Sydney	DRAWN BY:	JH
SCALE:	1:3500 at A3	DATE:	17.11.2020

TITLE: **1991 Historical Aerial Imagery**
Marsden High School Repurposed to Netball Facility
Marsden High School, Ryde

N

PROJECT No:	99872.01
DRAWING No:	F
REVISION:	0

D21/78776

Notes:
1. Basemap from NSW Spatial Services (dated 2005).

Legend

Site Boundary

0 50 100 150 m

Douglas Partners Geotechnics / Environment / Groundwater	CLIENT: School Infrastructure New South Wales (SINSW)		TITLE: 2005 Historical Aerial Imagery	N	PROJECT No: 99872.01
	OFFICE: Sydney	DRAWN BY: JH	Marsden High School Repurposed to Netball Facility		DRAWING No: G
	SCALE: 1:3500 at A3	DATE: 17.11.2020	Marsden High School, Ryde		REVISION: 0

D21/78776

LOCALITY MAP

Notes:
1. Basemap from NSW Spatial Services (dated 2011).

Legend

Site Boundary

0 50 100 150 m

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: School Infrastructure New South Wales (SINSW)		TITLE: 2011 Historical Aerial Imagery	PROJECT No: 99872.01
OFFICE: Sydney	DRAWN BY: JH	Marsden High School Repurposed to Netball Facility	DRAWING No: H
SCALE: 1:3500 at A3	DATE: 17.11.2020	Marsden High School, Ryde	REVISION: 0

D21/78776

Appendix E

Site Photographs

Photo 1: Entrance to school buildings, facing north

Photo 2: School building that back onto playing fields, north

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs**		PROJECT:	99872.01
	Marsden High School Repurposed to Netball Facility		PLATE No:	1
	Marsden High School, Ryde		REV:	0
	CLIENT	School Infrastructure New South Wales (SINSW)	DATE	03/12/2020

Photo 3: Paved COLA and sports courtyard, facing north-east

Photo 4: Paints stored beneath the stairs of one of the school buildings in the north of site

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs**		PROJECT:	99872.01
	Marsden High School Repurposed to Netball Facility		PLATE No:	2
	Marsden High School, Ryde		REV:	0
	CLIENT	School Infrastructure New South Wales (SINSW)	DATE	03/12/2020

Photo 5: Unsealed staff carpark at the north-western corner of site, facing west

Photo 6: Paved hardstand leading to school garden and groundskeeping equipment

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs**		PROJECT:	99872.01
	Marsden High School Repurposed to Netball Facility		PLATE No:	3
	Marsden High School, Ryde		REV:	0
	CLIENT	School Infrastructure New South Wales (SINSW)	DATE	03/12/2020

Photo 7: Waste bins stored on the site, facing south-east

Photo 8: Bare patch of exposed fill soils similarly observed across the site

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs**		PROJECT:	99872.01
	Marsden High School Repurposed to Netball Facility		PLATE No:	4
	Marsden High School, Ryde		REV:	0
	CLIENT	School Infrastructure New South Wales (SINSW)	DATE	03/12/2020

Photo 9: Raised garden beds east of the school buildings, facing north

Photo 10: - Bushland that occupies the north-east of site, facing north

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs**		PROJECT:	99872.01
	Marsden High School Repurposed to Netball Facility		PLATE No:	5
	Marsden High School, Ryde		REV:	0
	CLIENT	School Infrastructure New South Wales (SINSW)	DATE	03/12/2020

Photo 11: - Archers Creek present in the bushland occupying the north-east of site

Photo 12: - Aged asphalt observed around footpath that bisects the bushland

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs**		PROJECT:	99872.01
	Marsden High School Repurposed to Netball Facility		PLATE No:	6
	Marsden High School, Ryde		REV:	0
	CLIENT	School Infrastructure New South Wales (SINSW)	DATE	03/12/2020

Photo 13: - Concrete steps that connect the school buildings to the east of site through the bushland, facing

Photo 14: - Unsealed carpark in the east of site, facing west

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs		PROJECT:	99872.01
	Marsden High School Repurposed to Netball Facility		PLATE No:	7
	Marsden High School, Ryde		REV:	0
	CLIENT	School Infrastructure New South Wales (SINSW)	DATE	03/12/2020

Photo 15: - Playing field occupying south-east of site, facing south

Photo 16: - Playing fields on suspected fill that occupies the majority of the site, facing north

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs**		PROJECT:	99872.01
	Marsden High School Repurposed to Netball Facility		PLATE No:	8
	Marsden High School, Ryde		REV:	0
	CLIENT	School Infrastructure New South Wales (SINSW)	DATE	03/12/2020

Photo 17: - Cracked concrete pavement similarly observed across the site

Photo 18: - Loosley sealed pavement within groundskeeping storage alcove with lawnmowers

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs**		PROJECT:	99872.01
	Marsden High School Repurposed to Netball Facility		PLATE No:	9
	Marsden High School, Ryde		REV:	0
	CLIENT	School Infrastructure New South Wales (SINSW)	DATE	03/12/2020

Photo 19: - Bunded storage of fuel and pesticides in groundskeeping alcove

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs**	PROJECT:	99872.01
	Marsden High School Repurposed to Netball Facility	PLATE No:	10
	Marsden High School, Ryde	REV:	0
	CLIENT: School Infrastructure New South Wales (SINSW)	DATE	03/12/2020

D21/78776

SINSW

22 WINBOURNE STREET

SITE INFRASTRUCTURE ASSESSMENT

JANUARY 2021

CONFIDENTIAL

Question today
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22 WINBOURNE STREET
SITE INFRASTRUCTURE ASSESSMENT

SINSW

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REV	DATE	DETAILS
A	22/01/2021	Preliminary Issue for information
B	27/01/2021	Preliminary Issue for inclusion within Masterplan report
C	08/04/2021	Updated to compressed version
D	12/05/2021	Site boundaries updated

	NAME	DATE	SIGNATURE
Prepared by:	Neil Langford	12/05/2021	NL
Reviewed by:	Sandeep Kodoth	12/05/2021	SK
Approved by:	Neil Langford	12/05/2021	

D21/78776

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1 INTRODUCTION

1.1 GENERAL

The objective of this report is to provide information on the existing site infrastructure at 22 Winbourne street and provide an overview of infrastructure requirements for planning to support proposal for future new development

This site infrastructure assessment report provides an overview of the electricity, communications, potable water, sewerage and gas infrastructure for the existing **22 Winbourne Street .**

All existing structures and services within the site are proposed to be decommissioned, demolished and removed with all new services required for future development to be sought under separate planning pathway.

1.2 SITE LOCALITY MAP

1.3 SOURCES OF INFORMATION

This report considers information obtained from:

1 Dial Before You Dig (**DBYD**) responses from affected utilities

2 Statement of Available Pressure and Flow, Lodged to Sydney Water – 27th of January 2021.

3 Ausgrid preliminary enquiry Assessment

4 City of Ryde Council guidelines

- City of Ryde Development Control Plan 2014 including 2017 adopted amendments
- Ryde Local Environmental Plan 2014

5 Relevant Australian Standards, primarily AS/NZS 3000, AS/NZS 3500, AS 5601, AS.2419 and AS.2118

6 NCC 2019 Deemed to Satisfy (DtS) requirements.

1.4 ADDITIONAL SITE CONDITIONS AFFECTING DESIGN

The site is understood to fall within a bushfire area buffer zone and shall be protected with appropriate measures as required by the development consent conditions and as prescribed by the specialist bushfire consultant engaged by SINSW. The following diagram indicates the extent of the Ryde bushfire zoning available from City of Ryde Council's online mapping portal.

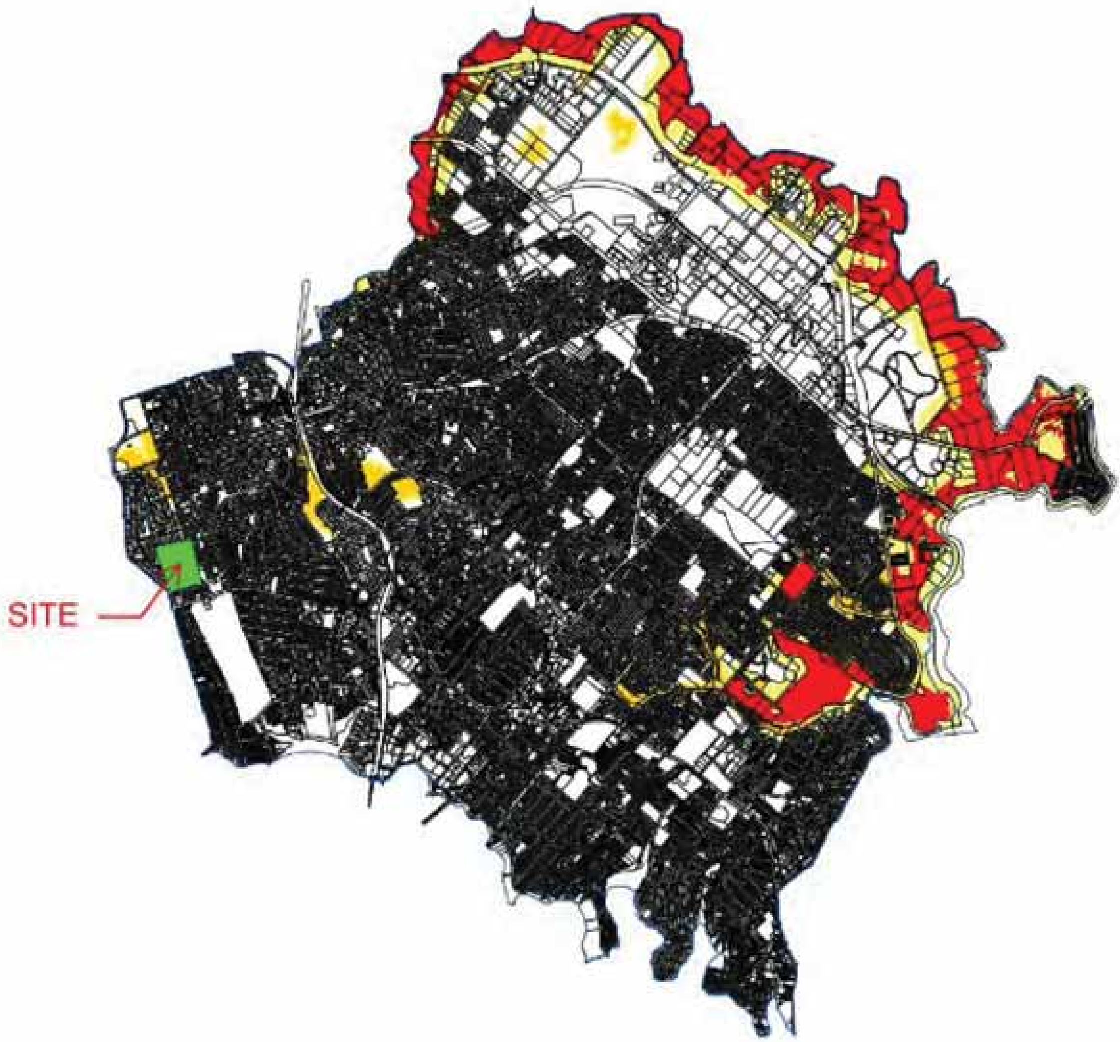

Figure 1 –Bushfire zoning extract from online mapping

1.5 ASSUMPTIONS

WSP have made the following assumptions in preparing this report:

1 The assessments contained herein is based upon the sources of information listed in **Section 1.2.** Should additional site utility infrastructure information be made available beyond the course of our scope, WSP reserve the right to review and amend our assessment outcomes accordingly.

2 Our assessments of fixed fire protection equipment requirements are based upon the following assumptions:

- Site fire hydrant demand of two (2) hydrants operating simultaneously @ 20L/s
- Should the design requirements of the project exceed this assumption, the contractor shall lodge pressure and flow enquiries to validate the final design outcome as necessary.
- The pressure and flow statement is valid only for **12 months** from date of issue.

3 A site Feasibility Study (pre-DA Section 73) should be undertaken for site specific Authority advice regarding their assets should be undertaken to validate WSP's preliminary advice. The turnaround time on a feasibility study by Sydney Water is approximately two (2) months.

4 Coordination between any new incoming utilities to service the site has not been reviewed.

2 ELECTRICAL

2.1 EXISTING INFRASTRUCTURE

Figure 2 - Ausgrid Extract with Substation Asset.

2.2 POWER INFRASTRUCTURE ASSESSMENT

2.2.1 EXISTING POWER SUPPLY ARRANGEMENT

The power supply to the current site is serviced from Ausgrid substation S3276 located in Winbourne street. The substation is a shared substation providing power to the school and other customers in the area.

From the substation power is serviced to the main switchboard located near the library via a private pillar. The current service size is estimated to be 500 A from the site investigation and available documentation.

3 COMMUNICATIONS

3.1 NBN INFRASTRUCTURE

Figure 4: NBN Dial Before You Dig Plan Showing Network assets

3.2 COMMUNICATIONS INFRASTRUCTURE ASSESSMENT

3.2.1 TELSTRA

Telstra has underground telecommunication assets located surrounding the site. There is an online process for registering your development with Telstra. The developer must apply to Telstra for the delivery of telecommunications services to the site at: http://www.telstra.com.au/smart-community/developers/

3.2.2 NATIONAL BROADBAND NETWORK (NBN)

NBNCo dial before you dig mapping and site investigations confirm NBN service is currently available to the site. The rollout map indicates there is currently an active NBNCo service connection within the existing layback connected to G Block.

The architecture and communications planning of the building shall accommodate an FTD and an NTD within a dedicated communications room.

4 WATER AND SEWER

4.1 SYDNEY WATER INFRASTRUCTURE

Figure 5: Sydney Water Dial Before You Dig Plan Showing Sewer and Water Networks within vicinity of redevelopment site

4.2 WATER INFRASTRUCTURE ASSESSMENT

The site is unencumbered of utility water mains and the site appears to be suitably serviced in its existing form. The existing Sydney Water' water mains infrastructure consists of water mains routed the entire length of the site in both Winbourne and Brush Streets.

1 The site has access to two Sydney Water assets:

- Winbourne Street – 100mm water service
- Brush Street – 100mm water service

2 The existing water mains routes appear clear of and may not impacted by future developments

3 The site is proposed to utilise two (2) water connections consisting of separate domestic and fire hydrant supplies.

4 The architecture and plumbing design shall accommodate individual water metering for each stratum zone should the redevelopment be split into separate managed portions.

5 The Central Western boundary of the site adjacent to existing turning apron is the proposed position of site water meters and required fire hydrant booster assembly per Australian standards, design guidelines and site architectural master planning options.

6 The proposed location exceeds a 10m setback from the building to house the booster assembly in this location in accordance with NCC 2019 Deemed to Satisfy (**DtS**) requirements.

Figure 6: Mains locations of water pressure and flow test

A "Statement of Available Flows" enquiry to determine the 95% fire flows and pressures Shall be submitted to Sydney Water and an extract of their assessment is as follows:

EXPECTED WATER MAIN PRESSURES AT CONNECTION POINT

Normal Supply Conditions	
Maximum Pressure Minimum Pressure	57 metre head 42 metre head

WITH PROPERTY FIRE PREVENTION SYSTEM DEMANDS	Flow l/s	Pressure head m
Fire Hose Reel Installations (Two hose reels simultaneously)	0.66	42
Fire Hydrant / Sprinkler Installations (Pressure expected to be maintained for 95% of the time)	5 10 14	39 28 11
Fire Installations based on peak demand (Pressure expected to be maintained with flows combined with peak demand in the water main) Maximum Permissible Flow	5 10 14	37 26 7

Figure 7: Sydney Water pressure and flow assessment extract

The water mains flow and pressure to service the development as advised by the pressure and flow statement obtained via Sydney Water are included in **APPENDIX A** indicate:

7 Fixed on-site fire hydrant protection system pumps and tanks are required for any the multi-story development

- This assessment is based on assumed height of 12m with maximum allowable system losses of 150kPa as per AS.2419 requirements to achieve minimum unassisted supply of 10L/s (each) @ 250kPa supply at the most disadvantaged outlet(s)
- This assessment is based upon the aggregate demand of hydrants required simultaneously as per AS.2419 and requirements.

8 Based upon the pressure and flow statement indicating the mains have insufficient flows available to supply the fire protection systems simultaneously, on-site dedicated fire protection storage tanks are required and will be designed to accommodate allowable inflows at the rate specified by the statement.

9 The site is advised as being situated within a bushfire danger zone, fire protection systems shall also provide for active bushfire protection measures in accordance with Development Consent and specialist consultant conditions.

The overall capacity of the water network must be assessed by Sydney Water via a ***Section 73*** application by the Part 4 consultant following submission of the development application (**DA**) process to the satisfaction of issue of a compliance certificate in accordance with Chapter 6 Part 2 Division 5 of the Water Management Act relating to the provision of services to the property.

4.3 SEWER INFRASTRUCTURE ASSESSMENT

The site is encumbered of utility sewer mains traversing the eastern and southern boundaries and the site appears to be suitably serviced by the existing Sydney Water sewer mains infrastructure with an existing sewer junction connection located in the south-eastern corner being the low point of the site.

- The Site is encumbered by the following assets:
  - Eastern boundary – 225mm VC sewer main falling towards the south along the watercourse alignment
  - Southern Boundary – 225mm VC sewer main falling from west to east along the existing embankment.
- The South-Eastern corner of the site would be the proposed position of connection.

Figure 8: Sydney Water Sewer map extract

The alignment of the existing sewer main may be any new development and may require a structural engineer to provide a building over sewer asset structural outcome to ensure no load is imposed on Sydney Waters' assets, this will be included within the Section 73 Notice of Requirements.

The existing alignment of the private site sewer traverses the site diagonally from NorthWest F Block picking up all other buildings as it passed complete with sewer man-holes and connects to the existing junction at the south eastern corner of the site at the toe of the adjacent property embankment and is to be accurately identified via survey through the Part 2 concept design process. Where existing sewer access chambers fall under the proposed external courts, they shall be locally adjusted and covered with discreet flush covers formed into the new courts slabs.

The overall capacity of the sewer network must be assessed by Sydney Water via a ***Section 73*** application by the contractor following submission of the development application (**DA**) process to the satisfaction of issue of a compliance certificate in accordance with Chapter 6 Part 2 Division 5 of the Water Management Act relating to the provision of services to the property.

5 NATURAL GAS

5.1 JEMENA GAS INFRASTRUCTURE

Figure 9: Jemena Dial Before You Dig Plan Showing Natural Gas Networks

5.2 GAS INFRASTRUCTURE ASSESSMENT

The site is currently in proximity of the following Jemena natural gas mains:

- 210kPa DN75 Nylon main along Winbourne Street currently serving the site;
- 210kPa DN32 Nylon main along Brush Street;
- 1050kPa DN350 Steel main along Brush Street; (Jemena do not permit connections to these mains)

Schools Infrastructure directive is to avoid use of gas where possible, in conjunction with Green star requirements the existing gas connection shall be decommissioned.

An "application to disconnect" shall be submitted to Jemena by the licensed plumber during construction.

The existing gas mains are confirmed to supply gas to the site in the South western corner of the site.

END OF REPORT

D21/78776

SCT Consulting

MARSDEN HIGH SCHOOL RECREATIONAL FACILITY PLANNING PROPOSAL

Traffic and Transport Impact Assessment

25 MARCH 2021

D21/78776

Quality Assurance

Project:	Marsden High School Recreational Facility Planning Proposal		
Project Number:	SCT_00219		
Client:	Department of Education c/o School Infrastructure NSW	**ABN:**	40 300 173 822
Prepared by:	SCT Consulting PTY. LTD. (SCT Consulting)	**ABN:**	53 612 624 058

Quality Information	
Document name:	Marsden High School Recreational Facility Planning Proposal
Prepared:	Adam Smith, Consultant
Reviewed:	Jonathan Busch, Associate Director
Authorised:	Andy Yung, Director

Revision	Revision Date	Details
1.0	16 March 2021	Draft report
1.1	23 March 2021	Updated draft report
2.0	25 March 2021	Final report

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Executive Summary

Purpose of this report

A Traffic and Transport Impact Assessment has been undertaken to support the Department of Education c/o School Infrastructure NSW in a planning proposal seeking rezoning of the site.

The proposal

The planning proposal seeks to rezone the existing Marsden High School site from SP2 Educational Establishment to RE1 Public Recreation. The rezoning will accommodate a future recreation use for 32 outdoor netball courts, a four-court indoor facility with associated support spaces, and at grade car parking at the site. The proposed recreational facilities are part of wider plans by Greater Sydney Commission to relocate the 28 outdoor courts existing netball facility at Meadowbank Park. The proposed recreational facilities at the study site will be by the Eastwood Ryde Netball Association (ERNA).

Future planning context

The rezoning of the site supports the high population and economic growth in the City of Ryde Local Government Area (LGA) that is placing pressure on sporting facilities, which have insufficient space for expansion. This recreational facility supports delivery of the Meadowbank Education and Employment Precinct (Greater Sydney Commission), which is relocating Marsden High School into the education and employment precinct by 2022.

Future transport initiatives are aimed at connecting people to jobs, goods, and services in our cities and regions. These investments will increase the permeability of public transport networks throughout suburbs, which benefit both students and school employees through improved accessibility and service. Provision for pedestrian and cyclist activity and efficient interchanging contributes to a safe and comfortable active transport environment. This in turn promotes sustainable mode share.

The North District Plan indicates major transport, health, and education investments are underway, with a focus on well-connected walkable places that build on local strengths to deliver quality public places. This will encourage both school employees and students to shift to public transport or active transport due to improved accessibility around the site.

As part of the proposed City of Ryde Bike Network, Winbourne Street located along the western perimeter of the school is set to become a 'Regional Route'. These routes operate as the 'main roads' of the cycle network providing the greatest connectivity and separation from vehicle traffic. The site's proximity to the boundary of the City of Parramatta means the delivery of the Parramatta Cycling Network will also key supporting cycling to the site.

Existing conditions

The data derived from the 2018/2019 Household Travel Survey showed the Ryde- Hunters Hills SA3 (which the site is located within) is consistent with the Greater Sydney average for most travel modes and purposes of trips. One key difference is the area has a higher bus mode share (10% compared to 5%) which will partially be due to the frequency and speeds of bus services along Victoria Road between Sydney CBD and Parramatta.

The study area is located within walking distance of several bus stops on Winbourne Street (300 m) and Victoria Road (1,200 m). These bus stops located along Winbourne Street are served by routes connecting to Macquarie shops, Auburn and Eastwood. The stops along Victoria Road connect to Sydney CBD, Parramatta, and West Ryde. Services along Winbourne Street are about two every hour whereas along Victoria Road buses depart every 10-15 minutes.

There is no dedicated cycling infrastructure in the vicinity of the site. Pedestrian footpaths are provided on at least one side of the street for the majority of the network within 1,200m of the proposed recreational facility.

The main roads in the vicinity of the development include Victoria Road, Marsden Road, Winbourne Street, Brush Road, and Tramway Street.

Transport assessment

The proposed recreational facility is estimated to generate 132 fewer vehicle trips over an average week compared to the existing Marsden High School.

The relocation of the 28 outdoor courts at Meadowbank Park to the proposed recreational facility means most of the vehicle trips (78%) attributed to the study site are not additional but redistributed from elsewhere in the LGA. The remaining 22% of the forecasted vehicle trips are due to the eight additional netball courts which are planned for the study site. The additional courts are required to population increase within the area.

Victoria Road, within a 1,200m walk of the site, is a high frequency bus corridor linking Sydney CBD, Ryde, and Parramatta. This could act as a viable alternative to the car for members located in proximity to the corridor and reduce pressure caused by high car use on the network. Initiatives, such as an on-demand shuttle bus from designated stops, could further increase the attractiveness of non-car travel modes.

The active transport network around the planning proposal allows for walking and cycling to the nearby residential areas, public parks, and bus stops located along Victoria Road. Initiatives included in this report have the potential to enhance walking and cycling in the area.

Conclusion

The planning proposal is positively aligned with the City of Ryde's ambition to address pressure on sporting facilities within the LGA as well as allow for the creation of new school spaces as part of the Meadowbank Employment and Education Precinct.

The proposed facility will result in a different weekly traffic profile to the existing school site, and a reduction in vehicle trips overall. The proposed recreational facility is located closer to public transport and residential areas than the existing Meadowbank Park netball facility potentially resulting in less car dependency within the LGA.

Capital and operational expenditure proposals have been made in this report to enhance the attractiveness of walking, cycling, and public transport to the site. Nevertheless, the road network is expected to will have sufficient capacity in its existing form to accommodate the vehicle trips from the proposed recreational facility.

1.0 Introduction

1.1 Background

SCT Consulting has been commissioned by School Infrastructure NSW (SINSW) on behalf of the Department of Education (DOE) to prepare a Traffic and Transport Impact Assessment to support a Planning Proposal to amend the 'land use zone' Development Standard in Ryde City Local Environmental Plan 2014 from SP2 Educational Establishment to RE1 Public Recreation. The site will include an indoor facility comprising of four courts, 32 outdoor courts, and provision of on-site car parking. The subject site is bounded by Winbourne Street to the west, and Brush Road to the east, Ermington Public School to the south, and residential properties to the north as shown in **Figure 1-1**.

Figure 1-1 Study area

The intended future use of the recreational facility is for netball courts. The proposed future facility will consist of 32 outdoor hard courts and four indoor courts. The indoor recreational facility will have an approximate floor plan of 4,000m^2 and seating for 100 spectators. Most of the activity will take place on Saturday between 8am–5pm, and one weeknight between 6-10pm.

The proposal is part of wider development plans across the City of Ryde to redesign Meadowbank Park and Memorial Park and deliver new residential and educational premises. The redesign results in the removal of the exiting 28 court netball facility.

1.2 Purpose and scope of the report

The purpose of this Traffic and Transport Impact Assessment is to support the planning proposal for a recreational facility at the existing Marsden High School site. The report will:

- Inform future planning controls to ensure a coordinated and efficient approach to land use planning, environmental management, and transport infrastructure
- Ascertain the cumulative and regional traffic and transport impacts associated with future land-based demands associated with the rezoning
- Maximise efficiency and safety of the existing / proposed transport systems in proximity to the subject site.

The scope of this traffic and transport impact assessment is to:

- Review of relevant background documents and information including relevant state, regional and local planning policies, transport planning documents and parking Development Control Plan (DCP) and standards
- Update the desktop review of existing traffic and transport conditions including Census, Journey-to-work data, travel mode, and existing network descriptions and performance
- Collection and analysis of peak time weekday traffic volumes at Brush Road and Winbourne Street
- Determine the difference in trip generation between the proposed development and the existing school site
- Identify public and active transport measures and sustainable travel initiatives for the development.

1.3 Report structure

This report has been structured into the following sections:

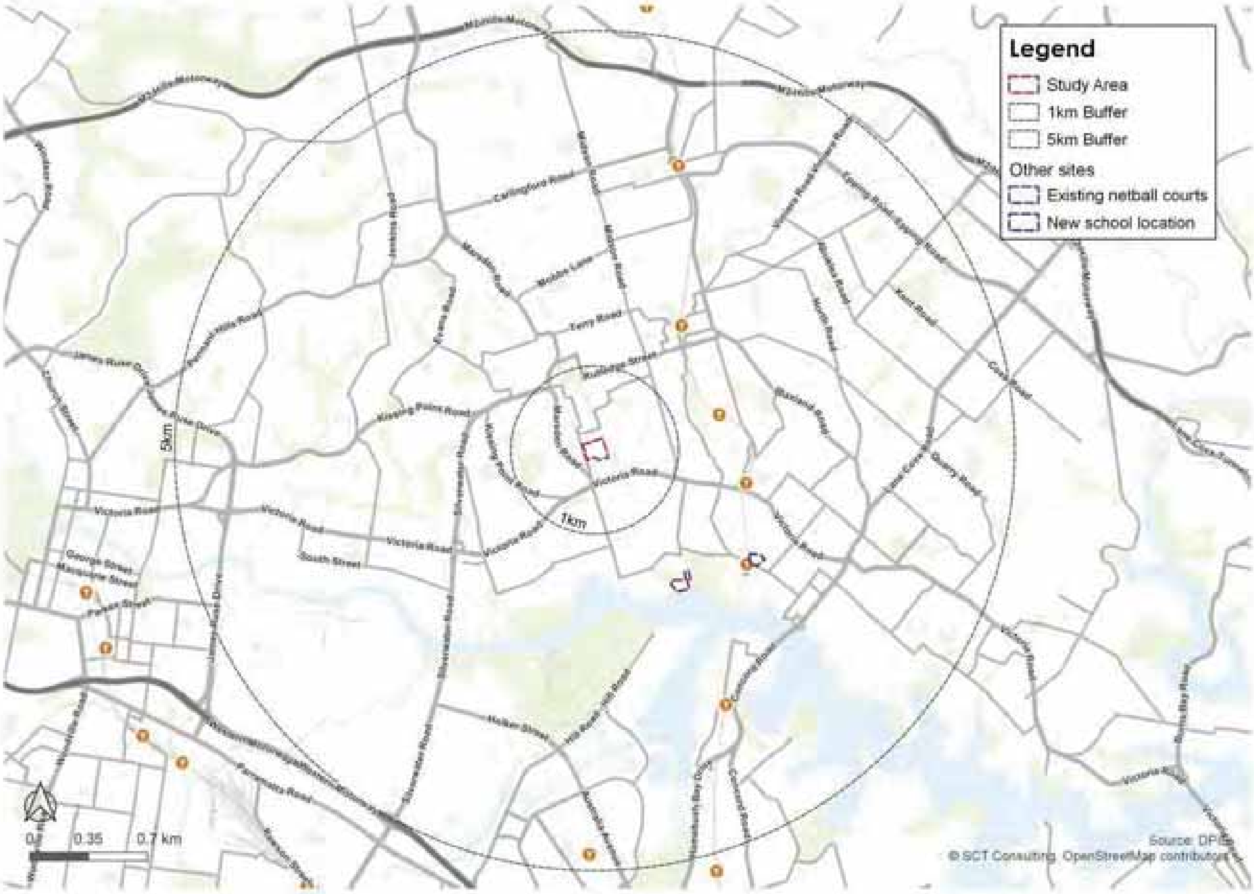
- **Section 2** reviews the relevant strategic planning and transport planning context
- **Section 3** describes the existing transport conditions in and around the site for all modes of transport
- **Section 4** describes the proposed development including development yield and proposed transport network
- **Section 5** discusses the traffic and transport appraisal which covers the assumed transport impacts and the mitigation measures
- **Section 6** presents the conclusions of the assessment

2.0 Strategic Context

2.1 Site context

The proposed recreational facility will be located at the existing Marsden High School site, 22 Winbourne Street, West Ryde. The site is situated between Winbourne Street to the west and Brush Road to the east. The site's regional context is shown in **Figure 2-1**.

Figure 2-1 Site context



The site is currently zoned as SP2 Educational Establishment. The planning proposal aims to amend the 'land use zone' Development Standard in Ryde City Local Environmental Plan 2014 to RE1 Public Recreation. The proposed recreational facility will primarily accommodate the 28 relocated netball courts from the existing facility at Meadowbank Park.

Concept Plans for the proposed recreational facility will see the overall frequency of netball courts increase by eight. The netball courts at Meadowbank Park are to be replaced by multi-purpose sports fields and a community lawn according to the *Meadowbank-Park and Memorial Park Draft-Masterplan (2018)*.

Ermington Public School (SP2 Educational Establishment) is located immediately south of the site. Low density residential properties surround the site to the north, east and west (R2 Low Density Residential). Maze Park (RE1 Public Recreation) is located south east of the site. There are two locally heritage listed items within vicinity of the site, being the former School residence/ 1988 Ermington School Building and Maze Park.

As part of the Meadowbank Education and Employment Precinct plans new residential, education, and employments premises will be situated in proximity to the Meadowbank Station. High residential development is also planned for Melrose park, south of Victoria Road.

2.2 Future Transport 2056

The Future Transport Strategy 2056 (NSW Government, 2018) is an update of NSW's Long-Term Transport Master Plan. It is a vision for how transport can support growth and the economy of New South Wales over the next 40 years. The strategy is underpinned by the Regional Services and Infrastructure Plan (NSW Government, 2018) and the Greater Sydney Services and Infrastructure Plan (NSW Government, 2018), as well as several supporting plans including Road Safety and Tourism (NSW Government, 2018).

The Future Transport Strategy 2056 sets the long-term vision for mobility and transport provision in NSW, explaining how the customer experience of transport will change and what this means for NSW. The Future Transport Strategy 2056 identifies Sydney as a growing global metropolis with benefits distributed more evenly across the city. It sets out a vision for a metropolis of three cities, with the vision helping to guide many of the planning, investment, and customer outcomes. Some of the key transport outcomes include faster, more convenient, and more reliable travel times to major centres, as shown in **Figure 2-2**.

Figure 2-2 A future metropolis of three cities

Source: The NSW Government Future Transport 2056 Strategy, 2018

Existing and potential transit connections, together with new technology and innovation, will make the network surrounding the site more responsive to demand and better able to manage congestion in the future. For the three cities identified, more specific outcomes listed as part of the Strategy which will benefit the site's transport context will include:

- A 30-minute access for customers to their nearest Centre by public transport 7-days a week
- Fast and convenient interchanging with walking times no longer than 5 minutes between services
- Walking or cycling as the most convenient option for short trips around centres and local areas, supported by a safe road environment and attractive paths
- Fully accessible transport for all customers.

Moving people from private vehicles to more sustainable transport modes will reduce congestion and the transport sector's emissions intensity, improve air quality, and support better health and wellbeing. Well-planned centres and cities will enable a shift from private cars to public transport and walking and cycling. In Sydney, the key to this will be the delivery of three 30-minute cities, supported by reliable 'turn up and go' mass transit services.

Figure 2-3 shows some of the proposed public transport improvements between Sydney CBD and Greater Parramatta. The blue line labelled 11 is for the Victoria Road Public Transport Improvements program. The program involves improving bus connectivity, speed, and frequency along Victoria Road between Sydney CBD and Parramatta CBD. This could further increase the attractiveness of bus travel within this part of Greater Sydney providing a feasible alternative to the car.

Figure 2-3 Victoria Road Public Transport updates

Source: NSW Government Future Transport 2056 Strategy, 2018

The implication for the proposed future netball facility: Future transport initiatives are aimed at connecting people to jobs, goods, and services in our cities and regions through increased permeability of public transport networks. A high-frequency bus transit corridor in proximity to the site means ERNA located across Ryde and Parramatta will have access to a viable alternative to the car. This can create cost benefits both for the netball members themselves and for the site itself due to reduced demand for parking and associated traffic congestion.

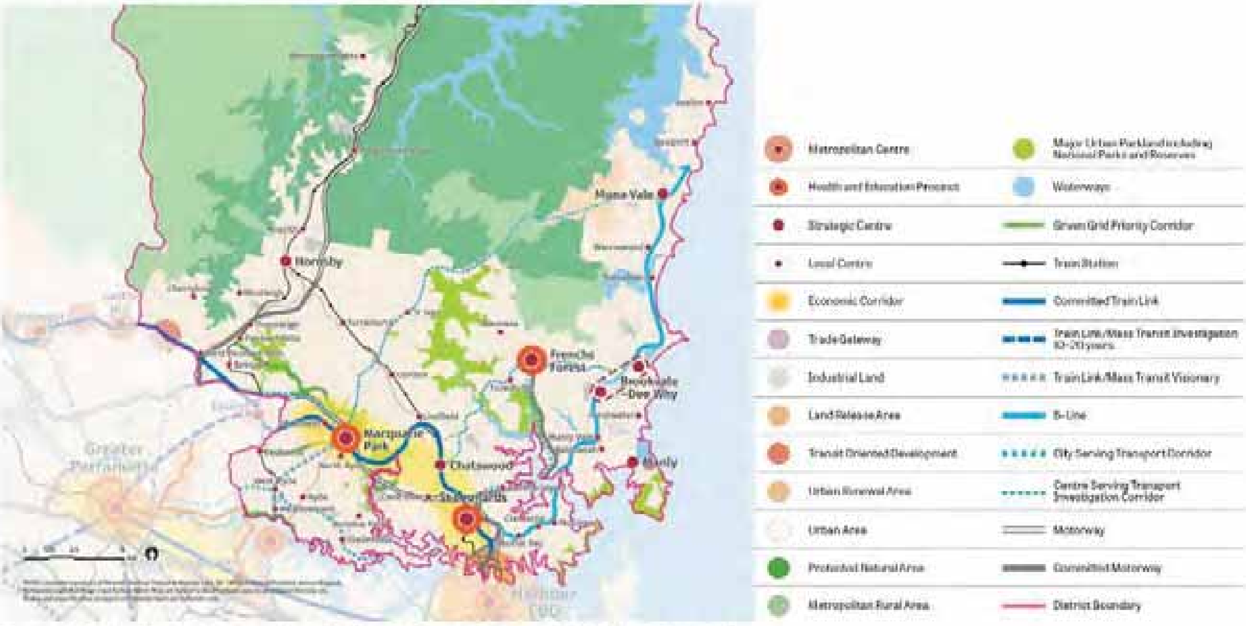
2.3 North District Plan

The Greater Sydney Commission's North District Plan[1] is a 20-year plan to manage growth in Sydney's North District, supporting the long-term vision for Sydney as a metropolis of three cities. The District Plan assists councils to plan for and support growth and change and align their local planning strategies to place-based outcomes. It guides the decisions of State agencies and informs the private sector and the wider community of approaches to manage growth and change.

The location of the current school site means it could benefit from the enhancement of the Eastern Economic Corridor due to a new mass transit public transport corridors and improvements to existing road infrastructure. (**Figure 2-4**).

[1] Greater Sydney Commission (2018), Our Greater Sydney 2056: North District Plan.

Figure 2-4 Future of the North District



Source: Greater Sydney Commission (2018), Our Greater Sydney 2056: North District Plan

Implications for the proposed future netball facility: The development's location in proximity to an existing City Serving Transport Corridor and a visionary Mass Transit/Train Link to Macquarie Park from West Ryde means travelling by public transport will become increasingly viable and attractive to people playing/watching netball at the site. The site also benefits from being located close to Greater Parramatta which is witnessing large amounts of money being invested in public transport corridors within its boundary and to the neighbouring centres.

2.4 Meadowbank Education and Employment Precinct

The NSW Government, in partnership with state agencies, is constructing a new education and employment precinct in Meadowbank at the current TAFE site. The education facilities are expected to be delivered by 2022. **Figure 2-5** shows an overview of the plan.

Figure 2-5 Meadowbank Education and Employment Precinct

The Meadowbank Education and Employment Precinct is designed to be a centre of excellence for education and lifelong learning and will aim to cater to the growing population in that part of Sydney.

In addition to the primary and secondary schools, it will feature a 10,000-square-metre Multi-Trades and Digital Technology Hub, with learning spaces, workshop areas, and digitally-enabled spaces, and a basement car park.

- The relocation of Meadowbank Public School to the site, with a capacity for up to 1,000 students
- The relocation of Marsden High School to the site, with a capacity for up to 1,500 students
- The construction of a revitalised Meadowbank TAFE, with a focus on technology
- The opening of the Wallamattagal learning centre
- The provision of open space for sports and recreation

As part of the relocation of Marsden High School to the new precinct, the NSW Government announced the old Marsden High School site will become a sports facility featuring four indoor netball courts, 32 outdoor courts, and car parking.

Implications for the proposed future netball facility: Relocating Marsden High School and installing netball facilities on the existing site will lead to changes in travel behaviour and conditions. The site will no longer have traffic implications during weekday mornings or afternoons during typical school pick-up/drop-off times but instead will be observed on Saturdays and some weeknights when most netball games are played.

2.5 Meadowbank Park and Memorial Park Masterplan (2018)

In 2018 the City of Ryde Council began developing a draft Masterplan for Meadowbank Park and Memorial Park. Due to residential and employment growth in the area in combination with the local council's desire for more outdoor space the masterplan aims to community demands and needs for open space.

The project area includes Meadowbank Park and Memorial Park, bounded to the south by Parramatta River and surrounded to the east, north, and west by a combination of low density and medium density residential developments. The parks have multiple access points off Constitution Road, Adelaide Street, Andrew Street, Ross

Smith Avenue, James Street, Lancaster Avenue, Crowley Crescent, and a regional pedestrian and cycle connection from the Ryde RiverWalk. **Figure 2-6** shows an overview of the draft masterplan for the park.

Figure 2-6 draft Meadowbank Park and Memorial Park Masterplan

Part of the masterplan involves the removal of 28 outdoor netball courts currently located within the park. The netball courts (currently located where labels 2 and 11 are situated) will be replaced by multi-purpose sports fields and a community lawn. The 28 outdoor netball courts will be relocated to the existing Marsden High School site as part of this planning proposal.

Implications for the proposed future netball facility: Relocating the netball courts to the Marsden High Site will help remove potential conflict relating to traffic, parking, and sports facility use at Meadowbank Park. Delivering the proposed netball facility at Marsden High School supports wider LGA plans for open space and needs for new sporting facilities.

2.6 City of Ryde Bicycle Strategy (2014)

In 2014 the City of Ryde Council updated its 2007 Bicycle Strategy to guide the future development of cycling until 2024. A key outcome of the strategy was to make cycling easier and more attractive in Ryde and to reduce the community's car use, especially for local or short-distance trips. The strategy focused on all types of cyclists and trip types, aiming to make all cycling trips comfortable, safe, and direct.

The strategy aimed to deliver its outcomes by focusing on both its bicycle network plan and a bicycle-use support plan. The bicycle network plan involves:

- Building a coherent network consisting of a system of bicycle routes: regional routes for quicker, longer trips; local routes for shorter, localised trips; and low-traffic local streets for easy access to all destinations
- Providing a system of signage and network mapping for easy wayfinding and place details to encourage and assist riders to better use the network
- Formulating a schedule of works consisting of standardised design solutions and specific design solutions; and
- Recommending an on-going monitoring system designed to track usage and to facilitate the removal of identified hazards

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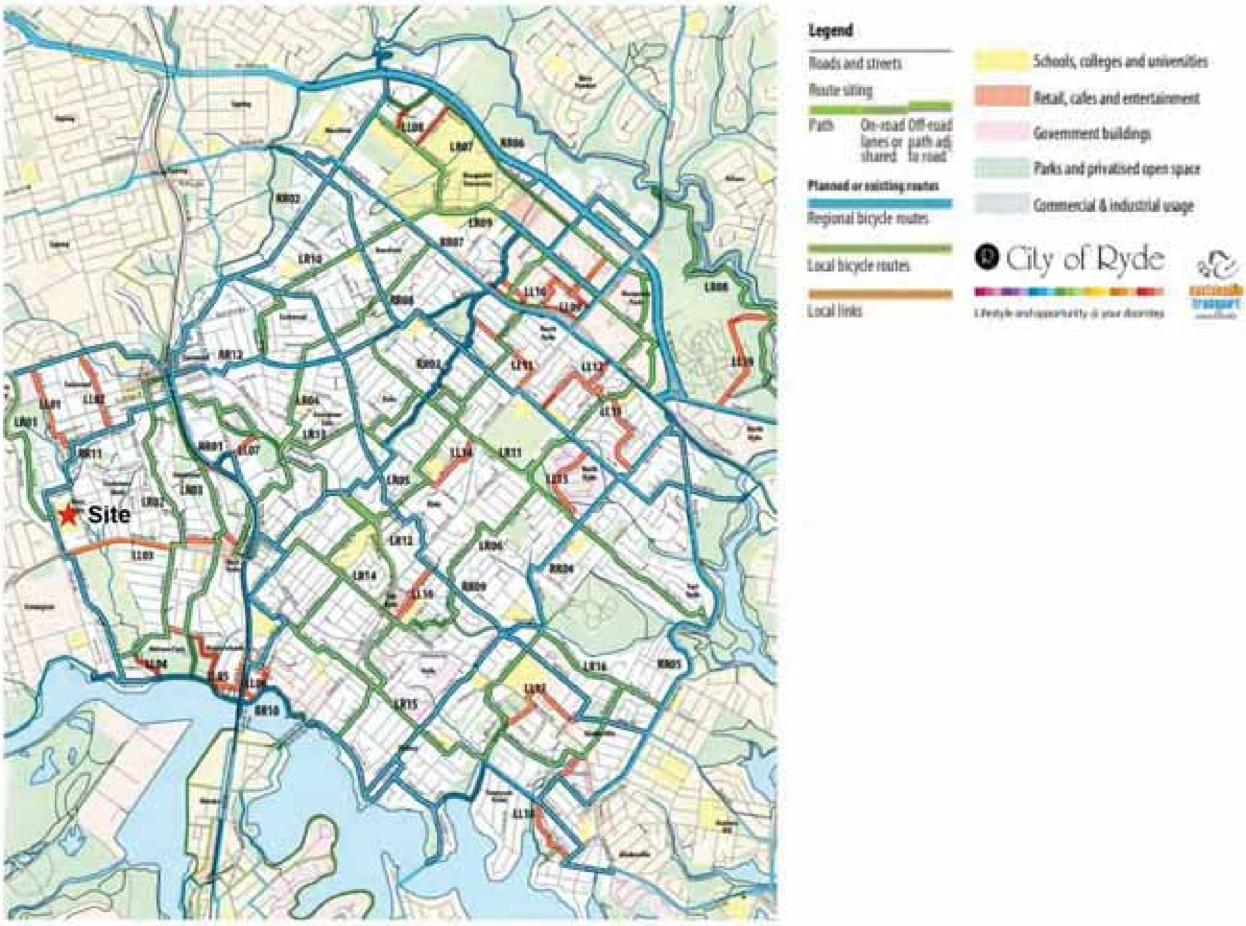
The bicycle-use support plan consists of a range of programs and initiatives which are designed to encourage residents to cycle and inform them of where cycling routes and facilities are located.

Figure 2-7 demonstrates where 'Regional Routes', existing and proposed, are/will be located within the City of Ryde LGA.

Figure 2-7 City of Ryde existing and proposed bicycle routes



RR11 which will be located along Winbourne Street would provide a north-south connection between Eastwood and Parramatta Valley Cycleway, located along the Parramatta River. Regional routes are described as the 'main roads' of the Ryde bicycle network and offer the highest level of facility and connection.

Implications for the proposed future netball facility: A high-quality cycle facility in proximity to the site could give people the confidence they need to cycle to the site. The cycle route will be part of a larger network across Ryde which means people who decide to ride will have much greater access to safer and more direct routes than what is currently present along Winbourne Street.

2.7 Parramatta Cycle Plan

The site's proximity to the City of Parramatta LGA means it also important to consider the Parramatta Cycle Plan as part of the strategic context. Cycling will play an important role in realising the vision for the Central City of Sydney. Cycling will support the liveability of Greater Parramatta by enabling residents, workers, and visitors to have more transport choices as the city densifies. Cycling will support growth by helping people access jobs, shopping, education, and recreation through a healthy and low-cost alternative that can help alleviate congestion.

The aspiration of the Parramatta Bike Plan is:

- To enhance the productivity and liveability of Parramatta through an increase in cycling, helping foster healthy and connected residents, workers, and visitors

- For cycling to be safe, and perceived as a safe and attractive option for all members of the community, for those aged 8 through to 80
- To increase the proportion of people cycling in Parramatta to five per cent of all trips to work and ten per cent for those ending in the CBD

Several factors have been identified that will increase the bicycle friendliness of Parramatta and therefore overall cycling participation. These opportunities directly address identified barriers to cycling in Parramatta. By taking advantage of the opportunities presented by cycling, Parramatta will be able to fulfil the local and regional aspirations of Local, State, and Federal Governments for a healthy and connected community. Key moves that will contribute to growing the role cycling plays in Parramatta include:

- Developing a network of separated bicycle lanes that connect future dense precincts with the CBD, train stations, and key destinations
- Improving the efficiency of the road network through line marking enhancements that create dedicated bicycle lanes without any significant consequence for other road users
- Creating lower speed, shared zones on streets too narrow to accommodate dedicated bicycle lanes
- Ensuring all schools and key public transport nodes are connected to the bicycle network
- Connecting the Parramatta bicycle network to key destinations in adjoining local government areas

Implications for the proposed future netball facility: A high proportion of the Eastwood and Ryde Netball association live within the Parramatta LGA, so having high-quality cycleways connecting across LGA boundaries will be important to allow for people to access the site directly and safely.

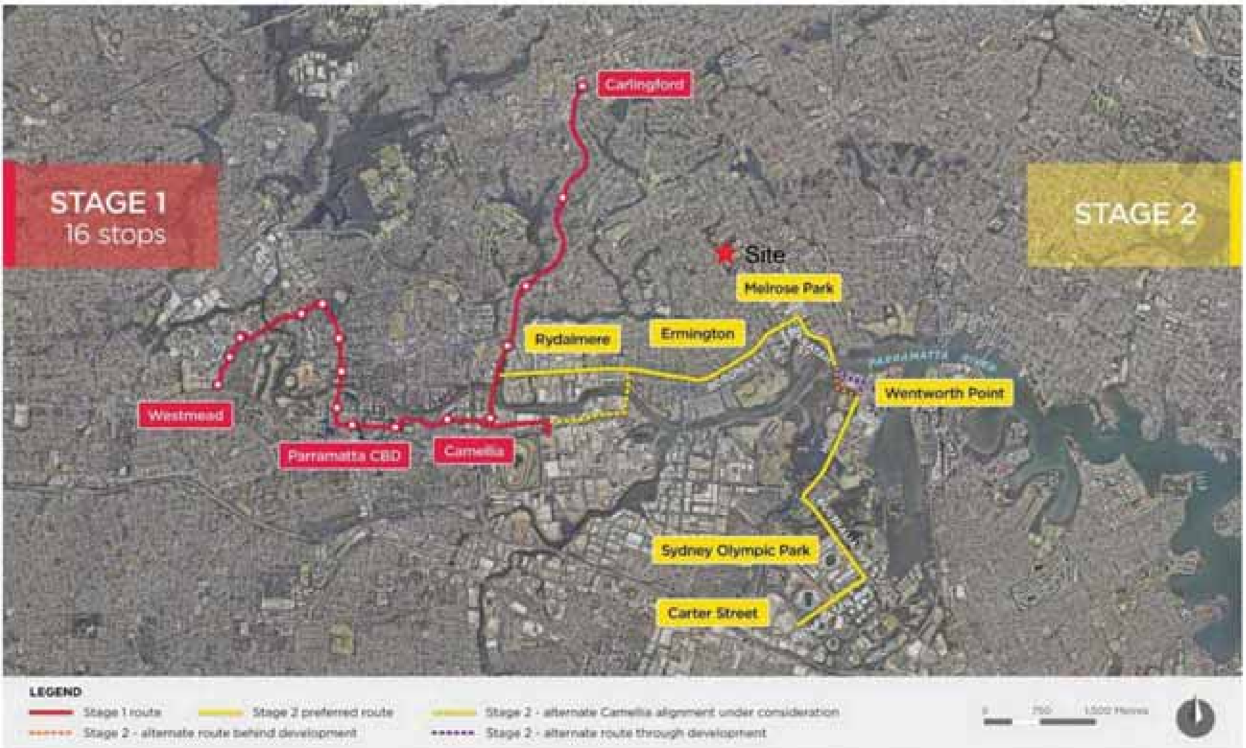
2.8 Parramatta Light Rail Stage 2

Parramatta Light Rail will deliver an integrated light rail service that supports population and employment growth as well as the additional development expected throughout the GPOP priority growth area. The light rail will also integrate with existing and future modes of transport including buses, trains, ferries, and active transport across the area as well as future metro services and the existing road network.

Stage 2 of PLR (the Project) was announced in October 2017 with the preferred route connecting to Stage 1 at Rydalmere and running north of the Parramatta River through the rapidly developing suburbs of Ermington and Melrose Park, before crossing the Parramatta River at Wentworth Point and continuing to Sydney Olympic Park.

Figure 2-8 shows an overview of both stages of the proposed PLR network. The proposed recreational facility would be within 1,500-1,700m of the preferred route at Melrose Park, equating to a 15–20-minute walk.

Figure 2-8 PLR network overview



Implications for the proposed future netball facility: Providing greater public transport infrastructure and access near the site would increase its attractiveness and provide a viable alternative to car use in the area. A proposed light rail stop at Melrose Park could provide ERNA members with better access to Parramatta and Sydney Olympic Park.

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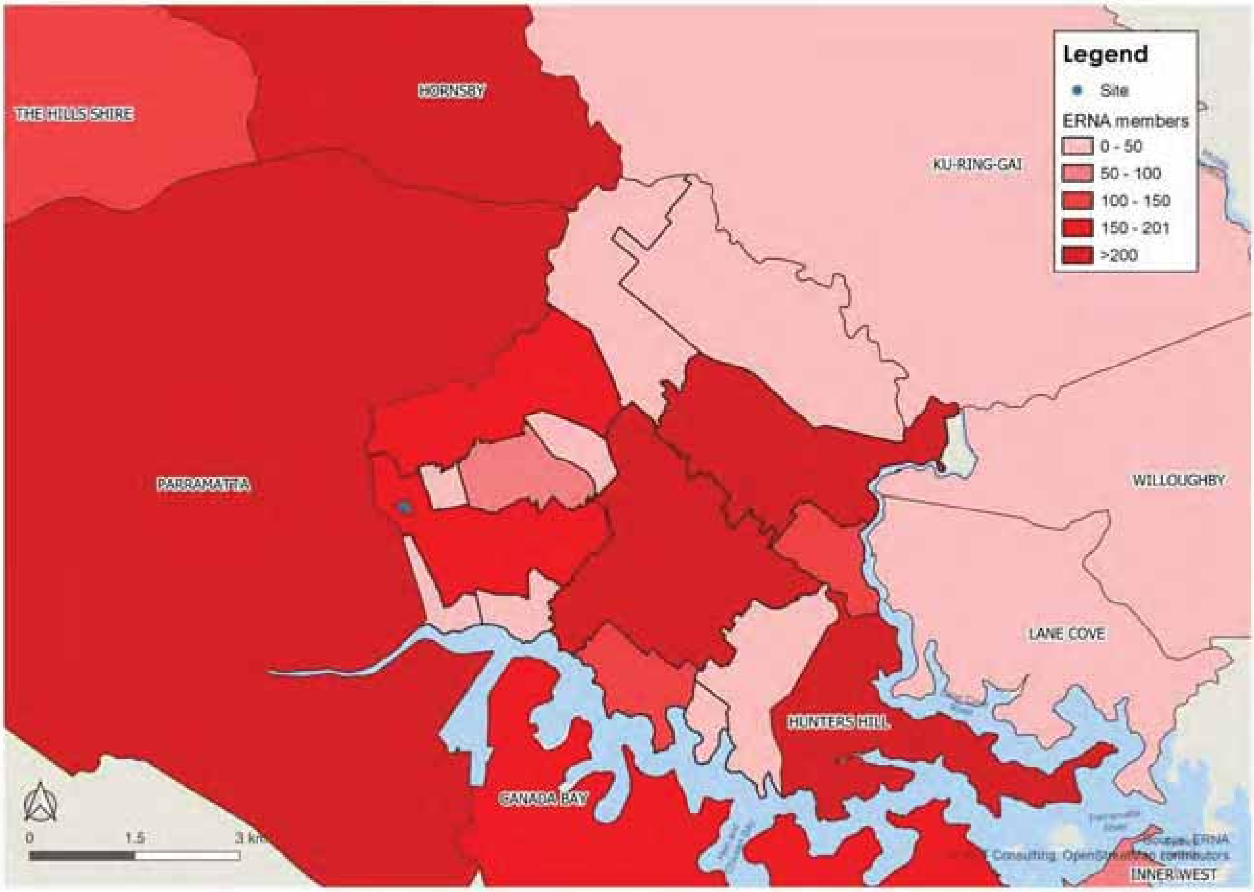
3.0 Existing Conditions

3.1 ERNA member locations

The approximated locations of the 4,300 active ERNA members were derived from the *Ryde Multi-Sports Facility Needs Assessment Draft Report* by the OTIUM Planning Group. As member locations are only stated at the suburb level within the City of Ryde and Local Government Area for members located outside of Ryde, for the purpose of analysis, members were assumed to be distributed equally within their given suburb/LGA. **Figure 3-1** provides a suburb/LGA overview of ERNA members.

Figure 3-1 Location of ERNA members



The figure indicates the proposed recreational facility is within 3km of suburbs which have 0-201 members and Parramatta LGA which has more than 200 members. This contrasts with the current primary netball facility at Meadowbank Park which is situated within a suburb of low member frequency. Proposed residential development both at Meadowbank and Melrose Park could result in a higher frequency of members being located within 0-3km of the site. As a result, walking and cycling may be attractive travel modes due to potential journey times.

3.2 Travel behaviour

3.2.1 Household Travel Survey mode shares and trip lengths

The study area sits within Ryde – Hunters Hill Statistical Area level 3 (SA3), as shown in **Figure 3-2**. TfNSW Household Travel Survey data for this SA3 has been analysed to determine mode shares and average trip lengths. Unlike the Census Journey to Work data, Household Travel Survey data covers all trip purposes, not just commuting trips. However, as the survey sample size is much smaller, Household Travel Survey data is only available at higher geographies such as SA3s.

Figure 3-2 Study area for household travel survey analysis

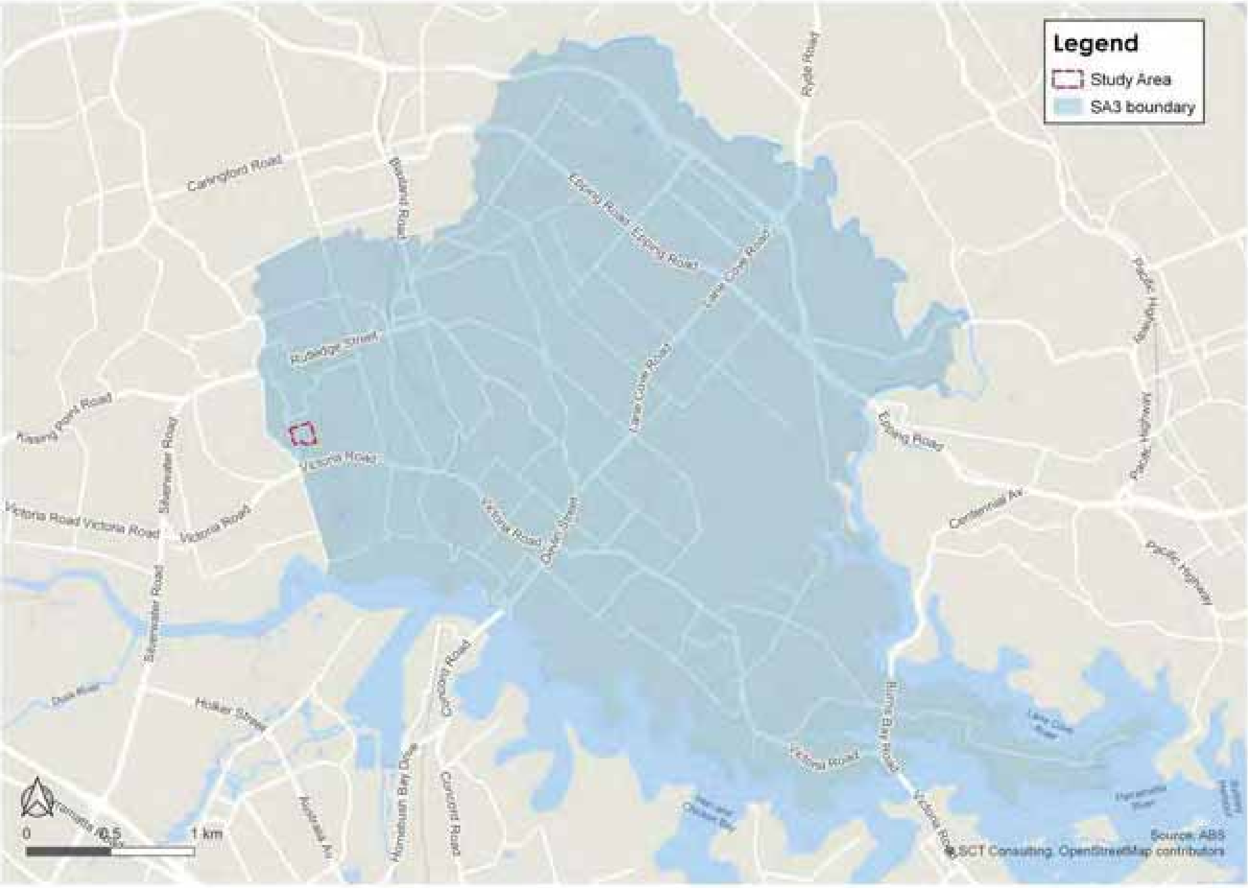


Table 3-1 and **Table 3-2** provide summary mode shares and trip purposes by residents of the Ryde – Hunters Hill SA3 against the Sydney average. The average travel distance for each category is also listed.

Table 3-1 Household Travel Survey – residents in the Ryde – Hunters Hill SA3, travel by mode

Mode of travel	Ryde – Hunters Hill		Greater Sydney	
	Percentage of total trips	Average distance	Percentage of total trips	Average distance
Vehicle Driver	37%	8 km	41%	10 km
Vehicle Passenger	16%	5 km	18%	9 km
Train	4%	16 km	5%	18 km
Bus	10%	8 km	5%	8 km
Walk Only	17%	1 km	15%	1 km
Other	3%	9 km	2%	6 km
Total	**100%**	-	**100%**	-

Source: TfNSW Household Travel Survey data by SA3, 2018/19

The study area has vehicle driver and passenger levels similar to the Sydney average. The bus mode has the greatest difference compared to the Sydney average, which may be a result of public transport corridors such as Victoria Road providing regular bus services between Parramatta CBD and Sydney CBD.

Table 3-2 Household travel survey – residents in the Ryde – Hunters Hill SA3, travel by purpose

Trip purpose	Ryde – Hunters Hill		Greater Sydney	
	Percentage of total trips	Average distance	Percentage of total trips	Average distance
Commute	20%	15 km	17%	15km
Work related business	6%	27 km	7%	16 km
Education/childcare	8%	6 km	10%	6 km
Shopping	16%	7 km	15%	6 km
Personal business	5%	5 km	5%	7 km
Social/recreation	28%	6 km	25%	9 km
Serve passenger	15%	5 km	19%	6 km
Other	2%	5 km	2%	4 km
Total	**100%**	-	**100%**	-

Source: TfNSW Household Travel Survey data by SA3, 2018/19

For almost all modes and trip purposes, the average distance travelled by residents of the Ryde - Hunters Hill was consistent with the Sydney average. The higher average distance for 'Work-related business may reflect a higher proportion of self-employed workers within the SA3 who may be in professions that require visiting multiple addresses in a typical day.

3.3 Active transport network

There is no dedicated cycle infrastructure near the site with only an 80m section of shared path situated along Marsden Road at the intersection with Victoria Road.

However, according to NSW road rules, children under 16 years old can ride on a footpath for safety purposes. An adult rider who is supervising a bicycler under 16 may also use a footpath. Riders must keep left and give way to pedestrians.

As such, footpaths provide infrastructure for younger ERNA members to cycle on. This is not free from safety risks, as cyclists often move at faster speeds than pedestrians and can cause injury. This is often the case because the footpaths provided are minimum width and minimise room for manoeuvring. Delivery of the proposed City of Ryde Bicycle Plan would provide a substantial improvement on selected corridors by delivering shared paths that allow greater width for manoeuvring.

A lack of crossing facilities is also likely to be a factor in limited cycling uptake. Pedestrian refuge islands in the surrounding areas provide some level of protection whilst crossing but do not provide any priority. These likely increase barriers to cycling due to perceived safety risks.

Figure 3-3 shows most of the street network within 1,200m of the site is walkable with footpaths located along at least one side of the street. Regarding crossing opportunities, Winbourne Street has two sets of wombat crossings as well as traffic calming measures in the form of speed bumps. Brush Road only has a supervised school crossing, which will not be operational when the recreational facility is being used. Crossing opportunities along Victoria Road are limited apart from the traffic signals at the four-arm intersection with Marsden Road and Wharf Road.

Figure 3-3 Walking catchments from the site

3.4 Public transport network

Public transport facilities around the site are shown in **Figure 3-4**.

Figure 3-4 Public transport around the site

The site is located within walking distance of the bus stops located along Winbourne Street, Tramway Street, and Victoria Road.

Route 544 which goes along Winbourne Street and Tramway Street connects Macquarie Centre to Auburn via Eastwood. Between 9-10am on Saturday there are two services in each direction. The frequency is similar throughout the day. Victoria Road has a higher bus frequency with four services between 9-10am on Saturday. These routes include the 501 (Parramatta to Central Station), 513 (Parramatta to West Ryde), and 523 (Parramatta to West Ryde). Rail connections to Hornsby, Sydney CBD, and Metro services can be accessed via Meadowbank Station which would equate to 25-30 minutes in walking time from the proposed site.

Overall, the site's location relative to Victoria Road means accessing by bus could be viable due to frequency and speed. Plans to improve the public transport offering along Victoria Road may further increase the attractiveness of the bus for ERNA members. Nevertheless, Victoria Road is a busy movement corridor where there may be long pedestrian wait times to cross which could prolong travel times making the bus an uncompetitive travel mode in comparison to the car.

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3.5 Road network and classification

The main roads in the vicinity of the study area include Victoria Road, Marsden Road, Winbourne Street, Brush Road, and Tramway Street. The road network surrounding the proposed neighbourhood centre is shown in **Figure 3-5**.

Figure 3-5 Road network around the site

The characteristics of the roads surrounding the subject site are:

- **Victoria Road** is the primary movement corridor in the area providing connections to Parramatta CBD in the west and Sydney CBD in the east. It is a state road (A40) with a three-lane carriageway configuration with the near-side lanes becoming a bus lane at the section closest to the site. Victoria Road has a posted speed limit of 70 km/h. There is a four-arm intersection of Marsden Road / Victoria Road / Wharf road, which provides the main access to the proposed recreational facility.
- **Marsden Road** is a north-south movement corridor connecting Victoria Road in the south with Carlingford in the north. The road is state-managed with a dual-lane configuration and a posted speed limit of 70 km/h. Access to the site would at the T-junction with Winbourne Street close to the traffic signals with Victoria Road.
- **Winbourne Street** is a local street on a north-south axis located along the western perimeter of the site. The street has a one-lane carriageway configuration with a posted speed limit of 50km/h. The street is located within a low-density residential neighbourhood with both sides of the street used for on-street parking. The locations of Marsden High School site and Ermington Public School means a school zone is in operation along 450m of the street, starting in proximity to the intersection with Marsden Road and ending close to the junction with Hermoyne Street which north of the site. There are several small off-street car parks connected with the two schools and three kindergartens located along the street
- **Brush Road** is a local street on a north-south axis located along the eastern perimeter of the site. The street has a one-lane carriageway configuration with a posted speed limit of 50km/h. The street is located within a low-density residential neighbourhood with both sides of the street used for on-street parking. The locations of Marsden High School site and Ermington Public School means a school zone is in operation along 450m of the

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street, starting in proximity to the intersection with Victoria Road and ending close to the junction with Hermoyne Street which north of the site.

– **Tramway Street** is a local street on an east-west axis between Brush Road and Darvall Road, respectively. The street is located within a low-density residential neighbourhood with both sides of the street used for on-street parking. The street has a one-lane carriageway configuration with a posted speed limit of 50km/h. A four-arm roundabout is located where Tramway Street meets Darvall Road.

3.6 Kiss and drop operations

On the 16th of February 2021, SCT Consulting engaged Matrix Traffic and Transport Data to perform vehicle count surveys in the vicinity of Marsden High School. Three locations were chosen on Winbourne Street and four locations on Brush Road to assess the existing kiss and drop operations during the peak hours (8:15-9:15am & 2:30-3:30pm) **Figure 3-6** shows the locations of where the kiss and drop vehicle counts were taken, **Table 3-3** shows the data derived from the surveys.

Figure 3-6 Kiss and drop vehicle count locations

Brush Road locations	Winbourne Street locations
	

Table 3-3 Traffic volume count survey data for Marsden High School

Road	Location	AM Peak Hour	PM Peak Hour
		Drop-off	Pick-up
Brush Road	1	2	10
	2	2	2
	3	7	0
	4	12	6
Subtotal		*23*	*18*
Winbourne Street	1	39	8
	2	6	5
	3	4	3
Subtotal		*49*	*16*
Total		**72**	**34**

The proximity of Ermington Public School to the Marsden High School site means the proportionality of drop-off/pick-up cannot be fully verified. Furthermore, other streets may have used for kiss and drop arrangements which would not have been included in the traffic volume counts.

4.0 The Planning Proposal

4.1 Proposed development

The planning proposal is seeking to amend the 'land use zone' Development Standard in Ryde City Local Environmental Plan 2014 to RE1 Public Recreation from SP2 Educational Establishments. The rezoning will accommodate a future recreation use for 32 outdoor netball courts, a four-court indoor netball facility with associated support spaces, and at grade car parking at the site. The proposed indoor and outdoor courts will function as a community facility and will be delivered by School Infrastructure NSW.

Plans for the Meadowbank Education and Employment Precinct involve a new secondary school catering for up to 1,500 students. As part of these plans, the existing Marsden High School will relocate to Meadowbank. The relocation of the school will create greater public transport accessibility options for staff and students. A higher frequency of school related trips completed by public transport could lead to a reduction in congestion and safety impacts on the road network within the City of Ryde LGA.

Delivery of the *Meadowbank-Park and Memorial Park Draft-Masterplan (2018)* is expected to lead to the relocation of the existing 28 outdoor courts from the park to the existing school site with the addition of four outdoor courts and four indoor courts. Due to the location of the existing school site, and its proximity to Victoria Road, public transport accessibility will improve as the proposed recreational facility will be within walking distance of the high frequency bus corridor between Sydney CBD, Ryde, and Parramatta.

The changing function of the site will create a different weekly traffic profile than is currently present on the street network surrounding the proposed development. The proposed recreational facility will lead to a decrease in vehicle trips during the week but an increase on Saturday. Nevertheless, the proposed development could result in a small reduction in overall vehicle trips compared to the existing school's operations. Furthermore, at an LGA level only the proposed plans for the eight additional courts, above the existing 28 at Meadowbank Park, has the potential to result in new vehicle trips. Active traffic management and the promotion of sustainable travel modes will help to mitigate the potential for car dependency at the site. Plans for 50 secure bicycle stands will help in the promotion of cycling to the site.

4.2 Access

The primary access point to the site will be via Winbourne Street, which is closer to the indoor facility and car park. Brush Road will provide a secondary access.

Both Winbourne Street and Brush Road have pedestrian crossing facilities in proximity of the site, enabling pedestrian access from all directions. Access from along Victoria Road is facilitated with a series of signalised pedestrian crossings at the intersection with Marsden Road.

The Car park entry and exit will be provided off Winbourne Street. The distribution of ERNA members means it is assumed most drivers will approach the site from the south, entering Winbourne Street at the junction with Marsden Road. A smaller proportion of drivers are expected to approach the site from the north entering Winbourne Street East at the junction the A6 Stewart Street.

4.3 Expected modes shares

Consultation with the ERNA, use of City of Ryde Council's previous traffic impact assessment, analysis of walking, cycling, and public transport catchments were all used to refine the mode share forecasts for the site.

Advice from ERNA is that a typical game would attract 20 players and coaches. With a total of 32 courts, 720 players and coaches are expected. Parents and spectators are assumed to be not significant in that they would travel together with the players and coaches.

Advice from ERNA is that some players may stay for multiple matches, for example when siblings play at different games. As such, there is a reduction factor of the total travel demand reflecting players staying for multiple games. A spreadsheet model was developed to match the traffic generation proposed in the *Meadowbank Park Netball Courts Traffic Impact Assessment Report (City of Ryde Council, 2009)*, which was based on traffic surveys. The non-car mode share and length of stay factors were then calibrated to capture the expected multi-modal travel behaviour.

Table 4-1 provides an estimate of the mode share of the netball courts and **Table 4-2** shows the analysis for the total mode share capturing players who are already at the courts.

Table 4-1 Forecast mode share for the proposed recreational facility for unique trips

Travel Mode	Base case mode share	Member frequency at peak game time (9:30-10:41am)
Walking	6%	30
Cycling	1%	5
Bus	8%	40
Car	85%[2]	428
Total	**100%**	**503**

Table 4-2 Forecast mode share for the proposed recreational facility for all players

Travel Mode	Base case mode share	Member frequency at peak game time (9:30-10:41am)
Walking	4%	30
Cycling	<1%	5
Bus	6%	40
Car	59%	428
Players and coaches staying from previous games	41%	292
Total	**100%**	**720**

[2] Expected passenger occupancy is 1.25 netball players per car

5.0 Traffic and Transport Impact Appraisal

This section assesses the impact of the proposed recreational facility on the transport network. The rezoning will accommodate a future recreational use for netball courts.

5.1 Active transport impacts

The location of the proposed recreational facility provides improved active transport accessibility and better connectivity compared to the existing netball facility. It will be important to ensure a safe, quality, and well-connected footpaths and cycle path system around the site to promote sustainable transport use.

The delivery of future pedestrian paths and cycleways, as part of the City of Ryde Bicycle Strategy and Parramatta Cycle Plan, would enable pedestrians and people who ride bicycles to get to the safety and efficiency. Winbourne Street has been identified as a future segregated cycle route connecting to the Parramatta Cycle Link to Eastwood in the north. This cycle route would provide direct access to the site from other parts of the LGA where the ERNA members are located, reducing dependency on the car. Furthermore, the proposed recreational facility will make Winbourne Street a more attractive cycle route for commuter cyclists due to the removal of school traffic associated with Marsden High School during the week.

As discussed in **Section 3.3**, there is no dedicated cycling infrastructure on any of the approaches to the proposed recreational vicinity. NSW Road Rules allow for people who ride to share the footpath, potentially creating a safer cycling environment than the road alternative. However, this could create safety issues for pedestrians due to the differential in speeds between the two user groups. Full delivery of the bicycle plans outlined by both the City of Ryde Council and the City of Parramatta Council could help create safer and more direct links to the site and remove the potential conflict between pedestrians and cyclists. Furthermore, it is recommended that:

- ERNA coordinate with council and police to ensure cars are following road rules concerning speed and parking. Shared agreement with Ermington PS to share on-site parking
- Coordinate an ERNA cycling group.

5.2 Public transport impacts

The potential customers resulting from the proposal would be located within a short walking distance to bus stops on Winbourne Street and Victoria Road. The existing recreational facility is not easily accessed by public transport leading to high car dependency at the site. Relocating to Winbourne Street will mean a higher proportion of ERNA members can use the bus potentially leading to localised reductions in car trips.

The proposed development's proximity to Victoria Road means accessing the site via bus is an achievable and viable alternative to the car. Plans to improve the public transport offering along Victoria Road may further increase the attractiveness of the bus for ERNA members. It is recommended that:

- TfNSW consider trialling an on-demand shuttle bus to extend the lower frequency public transport network on the weekends
- TfNSW consider increase frequency of bus services along Winbourne Street during peak times for netball activity
- ERNA to encourage visiting associations to hire a coach/mini-bus.

5.3 Road network impacts

The change in the purpose of the study site will result in a different traffic profile for an average week compared to the existing one. The proposed recreational facility will produce fewer vehicle trips between Monday-Friday with the netball courts only in use on one weekday evening. Saturday will be when most of the netball activity occurs accounting for 80% of the overall vehicle trips. No games will occur on Sundays at the facility. Consequently, there could be localised transport improvements during the week along the streets (Winbourne Street and Brush Road) adjacent to the site in terms of vehicle speeds, safety, and air quality.

The concentration of vehicle trips on Saturday will be mitigated by the spacing of the netball games over the day. This will mean the intersections on the approach to the site (Winbourne Street/ Marsden Road, Victoria Road / Marsden Road) are unlikely to exceed operational capacity.

The relocation of Marsden High School to Meadowbank as part of the wider precinct plans could potentially result in fewer vehicle trips across the LGA (if there were no additional courts). This would be due to improved public transport access by train at Meadowbank Station and bus along Victoria Road. Localised transport improvements along Adelaide Street would be expected due to the removal of the netball courts at Meadowbank Park as part of the *Meadowbank-Park and Memorial Park Draft-Masterplan (2018).*

5.3.1 School traffic generation rate

In conjunction with the traffic generation rates calculated from the vehicle count surveys along Winbourne Street and Brush Road the *RMS* (now formally TfNSW), *Trip Generation Surveys Schools Analysis Report was* also used. Trip generation rates were calculated by conducting traffic surveys at a range of secondary schools located across both urban and rural NSW. For this report the average AM and PM trip generation rates for secondary schools located in Metropolitan Sydney were used, 0.51 and 0.28 respectively. Due to the difference between the trip generation rate calculated from the survey results and the trip generation rates derived from RMS guidance, as well as the assumption kiss and drop occurred on other streets in addition to Winbourne Street and Brush Road, trip generation rates of 0.28 and 0.14 were chosen for the AM and PM, respectively.

5.3.2 Netball courts traffic generation rate

The traffic generation rates for the proposed netball courts were derived from a Transport Impact Assessment for the Meadowbank Park Netball Courts approved by the City of Ryde Council in 2009. This report included reference to surveys that existing netball courts generated 78 vehicles per hour (vph) for 4 courts. A 0.85 confidence rate was applied for the proposed facility of 28 courts, which equated to a trip generation of 17vph per court. This same traffic generation rate was applied for the traffic impact portion of this assessment. The rate was also used to help in benchmarking non-car mode share.

5.3.3 Net traffic generation

The assumed arrival profile for the proposed recreational facility was based on the trip generations rates from the Transport Impact Assessment for the Meadowbank Park Netball Courts (2009), the *Ryde Multi-Sports Facility Needs Assessment Draft Report* by the OTIUM Planning Group and information gathered from consultation with the ERNA surrounding game times, frequency of players, player dwell time, and potential travel modes shares.

ERNA noted the following profile of games on a Saturday, which is the busiest traffic day for the facility:

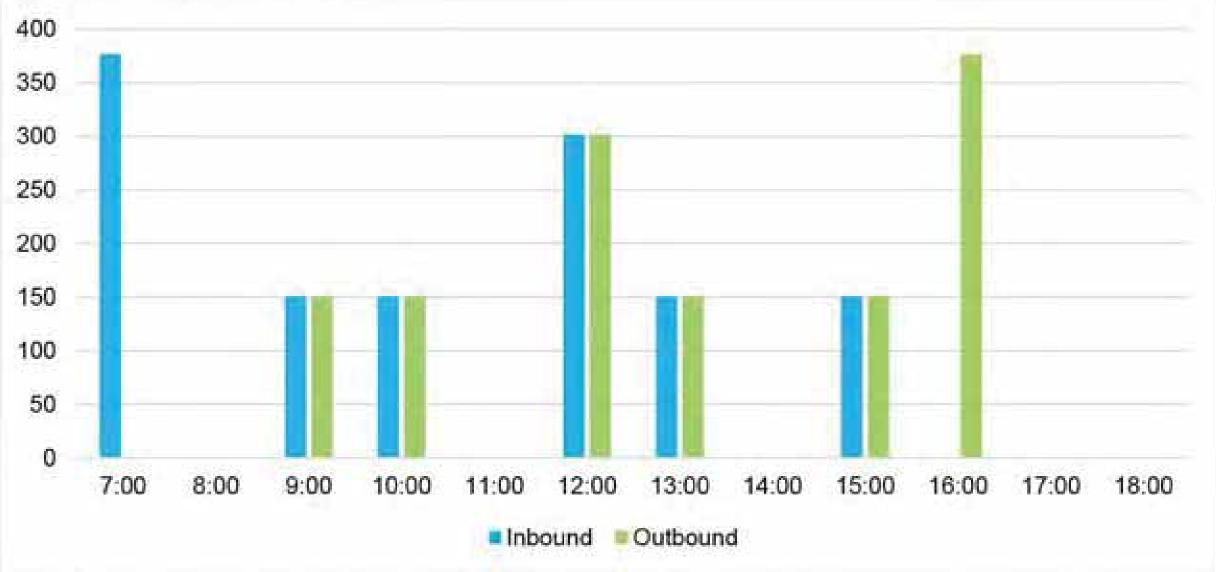
- Game 1: 8:00 – 9:15
- Game 2: 9:30 – 10:41
- Game 3: 11:00 – 12:11
- Game 4: 12:30 – 13:41
- Game 5: 14:00 – 15:11
- Game 6: 15:30 – 16:41

This means that the worst case traffic generation is when games overlap in an hour. This would have been the case for a 28 court facility as much as for a 36 court facility. Hence, the traffic generation rate is assumed to capture these effects.

The worst case scenario therefore occurs when two games overlap in an hour, so that traffic arriving and leaving the facility occurs in the same hour. This occurs several times on a Saturday. The traffic profile is shown in **Figure 5-1** for a typical Saturday.

Evening games occur once a week on a Wednesday.

Figure 5-1Traffic generation profile by hour



Source: SCT Consulting based on City of Ryde, 2021

Based on these assumptions, the forecasted traffic volumes for the proposed recreational facility (**Table 5-2**) were contrasted with the traffic volumes and arrival profile of the existing Marsden High School site (**Table 5-1**). **Table 5-3** shows the hourly and total difference between the proposed recreational facility and the existing school site. As can be observed, the proposed recreational facility results in 132 fewer trips over an average week profile.

Table 5-1 Marsden High School hourly traffic generation

Direction	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00
Monday	0	142	283	0	0	0	0	0	0	142	28	43	0	0	0	0
Tuesday	0	142	283	0	0	0	0	0	0	142	28	43	0	0	0	0
Wednesday	0	142	283	0	0	0	0	0	0	142	28	43	0	0	0	0
Thursday	0	142	283	0	0	0	0	0	0	142	28	43	0	0	0	0
Friday	0	142	283	0	0	0	0	0	0	142	28	43	0	0	0	0
Saturday	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sunday	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7 Day Total	**3,187**															

Table 5-2 Proposed recreational facility hourly traffic generation

Direction	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00
Monday	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tuesday	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wednesday	0	0	0	0	0	0	0	0	0	0	0	0	209	184	0	100
Thursday	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Friday	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Saturday	0	377	0	301	301	0	603	301	0	301	377	0	0	0	0	0
Sunday	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7 Day Total	**3,055**															

Table 5-3 Difference between the Marsden High School and the proposed recreational facility hourly traffic generation (net increase in traffic)

Direction	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	Total
Monday	0	-142	-283	0	0	0	0	0	0	-142	-28	-43	0	0	0	0	**-637**
Tuesday	0	-142	-283	0	0	0	0	0	0	-142	-28	-43	0	0	0	0	**-637**
Wednesday	0	-142	-283	0	0	0	0	0	0	-142	-28	-43	209	184	0	100	**-144**
Thursday	0	-142	-283	0	0	0	0	0	0	-142	-28	-43	0	0	0	0	**-637**
Friday	0	-142	-283	0	0	0	0	0	0	-142	-28	-43	0	0	0	0	**-637**
Saturday	0	377	0	301	301	0	603	301	0	301	377	0	0	0	0	0	**2,561**
Sunday	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
7 Day Total									**-132**								

5.3.4 Operational proposals

To mitigate some of the potential impacts on the road network the following operational management approaches are proposed:

- Volunteers for parking management
- Potential use of Ermington Public School on-site parking to distribute traffic across multiple locations
- Encouraging carpooling with players
- Share parking information across all Sydney netball associations
- Longer breaks between games to limit parking crossover
- Split games across more days.

6.0 Conclusion

6.1 Conclusion

The proposed recreational facility will be in an area of higher accessibility, in contrast to Meadowbank Park, by both active transport and public transport. Regardless of proposed capital or operational initiatives analysis of the ERNA member's locations in conjunction with the street and public networks mean car mode share could fall. Encouraging the ERNA to take active responsibility for access management to the site, with assistance from the City of Ryde Council, School Infrastructure NSW, and TfNSW could help to limit car travel and increase the likelihood of members choosing to walk, cycle, or ride public transport.

This traffic and transport impact assessment concludes that:

- The proposed recreational facility is positively aligned with the ambitions of the City of Ryde Council and the NSW Government to cater for new community sporting facilities in the area.
- The planning proposal aligns with the initiatives proposed in the City of Ryde Bicycle Strategy due to the site's proximity to planned high quality walking and cycling infrastructure which will help to promote active transport access to the site.
- The proximity of the site to Victoria Road, and the plans proposed in the Future transport 2056 by the NSW Government for the road to become a high-frequency bus corridor means public transport will become a more attractive travel option compared to the existing netball courts at Meadowbank Park.
- The planning proposal is estimated to generate 132 fewer vehicle trips over an average week compared to the existing Marsden High School.
- Without infrastructure upgrades, the road network will have sufficient capacity to accommodate the additional and redistributed netball related trips.
- The study concluded that the impacts of the planning proposal are at a level able to be accommodated by the existing and planned infrastructure.

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