Ascham School

Ascham School Fiona Redevelopment

Green Travel Plan Report

FINAL | 23 March 2022

Job number 280586-00

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Contents

1 Green Travel Plan report updates

1.1 Traffic Comments Woollahra City Council (DA 330/2021)

Woollahra City Council in correspondence with Urbis provided comments on the traffic and parking assessment and green travel plan reports prepared by Arup (July 2021) related to the DA 330/2021 Fiona Building Redevelopment

1. *Parking Provision –*
    1. *A total shortfall of 51 spaces for on-site parking provision;*
    2. *A revised GTP using more recent data with consideration of work from home arrangement and staff preference on travel mode under pandemic be submitted for further assessment;*
2. *Pick-up/Drop-off – a more quantifiable analysis should be submitted regarding the pick-up/drop-off operation demonstrating:*
    - *Average pick-up/drop-off time per vehicle in the carline;*
    - *Travel mode split during Covid pandemic;*
    - *Size of Walkers Group to the Edgecliff Station;*
    - *Number of waiting spaces needed to prevent approaching queue spillback onto New South Head Road;*
    - *Number of waiting spaces needed to prevent egressing queue blocking the carline.*
3. *Construction Traffic Management Plan – A revised CTMP be provided containing additional information as per required in the report.*

1.2 Responses to Woollahra City Council (DA 330/2021) Traffic comments

A meeting was held on 7 March 2022 with Woollahra Council, Urbis, BVN Architects and Arup to clarify the traffic comments raised by council.

As discussed with Council in meeting from 7 March 2022, there is a total loss of 6 carpark spaces. These car spaces are required to be removed to improve current pick-up and drop-off operations within the school.

Council has noted that student and staff cap will remain the same. Removal of 6 carpark spaces will have minimum impacts in the carpark demand.

The pick-up and drop-off area is proposed to be relocated and extended to allow additional simultaneous operations.

The pick-up and drop-off area relocation requires to remove 6 car spaces in order to extend the queuing area within the carpark and facilitate a wider and safer area for the operations.

The existing pick-up and drop-off area has an area of approximately 80m for vehicles queuing.

The proposed relocated pick-up and drop-off area will extend approximately additional 30m the queuing capacity for vehicles entering the carpark.

The area is proposed to have adequate space for simultaneous pick-ups and drop-offs and overtaking without blocking the through traffic of the carpark aisle approaching the exit.

Table 1 provides a guide of the sections of the report updated following the traffic comments from Council and responses.

Table 1 Green Travel Plan report updates

	Previous report (Issued 20 July 2021)	**Updated report (Issued 23 March 2022)**	**Comments**
1	N/A	Section 1 Green Travel Plan report updates	New section added to the report
2	Section 1 Introduction	Section 2 Introduction	Changed heading number
3	Section 2 Existing transport conditions	Section 3 Existing transport conditions	Changed heading number
4	Section 2.3 Transport provisions within Ascham School (Table 2)	Section 3.3 Transport provisions within Ascham School (Table 3)	Updated Table 3 Existing and proposed off-street parking within Ascham School Campus
5	Section 2.3.3 Cycling and Walking	Section 3.3.3 – Cycling Section 3.3.4 – Walking	Split of section in separated subheadings
6	N/A	Section 3.4 Ascham School staff profile	Added section Added Table 4 and Table 5
7	Section 3 Operational opportunities to improve transport choices	Section 4 Operational opportunities to improve transport choices	Changed heading number
8	Section 3.1 Existing measures	Section 4.1 Existing measures traffic management	Changed title of subheading
		Section 4.2 Public transport and active transport management	Added subheading title as section 4.2
		Section 4.3 Observation and supervision	Added subheading title as section 4.3
		Section 4.4 Education and Awareness training	Added subheading title as section 4.4
9	N/A	Section 4.5 Ascham School working from home (WFH)	Added section
10	N/A	Section 4.6 Co-curricular activities after school	Added section Adde Table 6 Co-Curricular activities after school
11	Section 3.2 Existing mode share (Table 7)	Section 4.7 Mode share improvements (Table 11)	Changed subheading number Changed Table number updated details target staff mode share
12	N/A	Section 4.8 Proposed new pick-up and drop-off area	Added new section Added Figures 12, 13 and 14

	Previous report (Issued 20 July 2021)	Updated report (Issued 23 March 2022)	Comments
13	Section 3.3 Potential measures	Section 5 Potential Measures	Changed heading number
		Section 5.1 Actions	Added subheading title
14	Section 3.4 Target Mode share (Table 7)	Section 5.2 Target Mode share (Table 11)	Changed heading number Updated Table 2 Target staff mode share (existing and targeted percentages)
15	Section 3.5 Marketing and promotion	Section 5.3 Marketing and Promotion	Changed heading number
16	Section 4 Administration	Section 6 Administration	Changed heading number
17	Section 5 Conclusions	Section 7 Conclusions	Changed heading number Added subheadings Section 7.1 Traffic management Section 7.2 Cycling and walking Section 7.3 Public transport mode shift Section 7.4 Working from Home (WFH) Section 7.5 Co-curricular activities Section 7.6 Monitoring

2 Introduction

2.1 Background

This Green Travel Plan (GTP) has been prepared by Arup to support the Fiona Building redevelopment at Ascham School.

This plan has been prepared to identify measures that the school could implement to promote sustainable travel options and encourage trips by modes other than private vehicle. The principles of a GTP are applied to people travelling to, from and within the site. Government agencies are increasingly placing greater emphasis on the need to reduce individual trips using private vehicles by encouraging greater use of alternative transport methods that have lower environmental impacts.

This GTP aims to suggest measures that can have positive influences on travel behaviour for those who will use the facilities within the site. It provides a framework which assists in guiding initiatives for the proposed Fiona Building redevelopment. The initiatives listed within this document may be implemented by Ascham School to increase sustainable mode share.

2.2 Site location

The Fiona Building redevelopment forms part of the Ascham School Campus located in Edgecliff, in Sydney's Eastern Suburbs shown in Figure 1. Figure 2 illustrates the location of the Fiona Building within Ascham School.

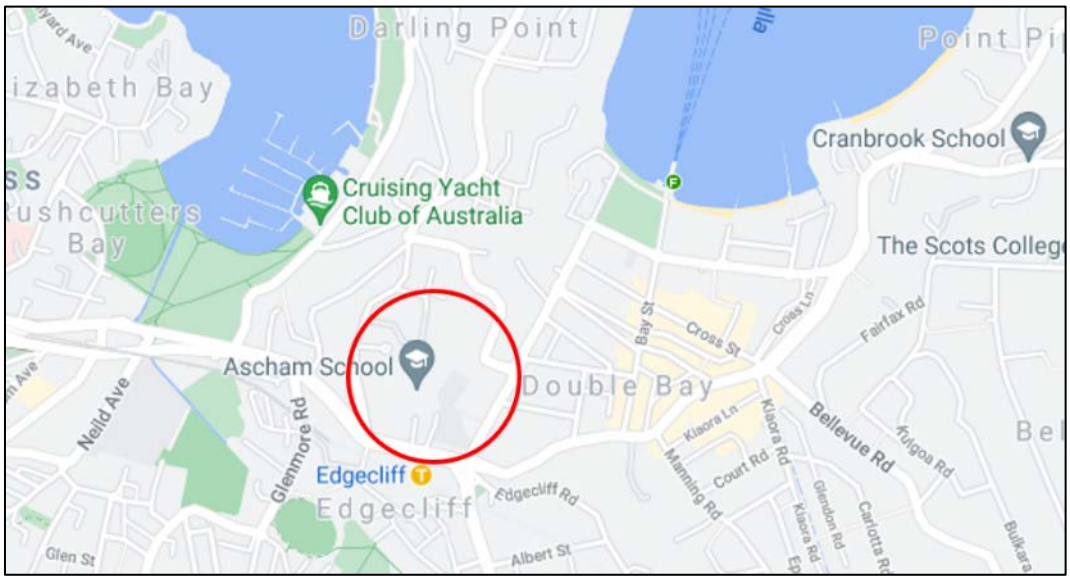

Figure 1 Site location

Source: Google Maps (2021)

Figure 2 Site location – Fiona Building

Source: SIX Maps (2021)

2.3 Proposed development

The Fiona Building redevelopment is located in the south-eastern corner of the Ascham School Campus adjacent to New South Head Road.

The Fiona Building Redevelopment comprises the heritage Fiona House, Fiona House extension and proposed new Hall building, relocation and upgrade of the existing pick-up and drop-off area and adjustments to the main entrance carpark.

The redevelopment would include approximately 468m^2 of additional gross floor area of improved existing amenities for the school; including a new hall, upgrade main office and school classrooms.

The redevelopment comprises on the following general activities:

- Demolition of existing commercial building on New South Head Road
- Refurbish and extension of the Fiona House
- Minor earthworks
- Front driveway car parking re-configuration
- New pick-up and drop-off area.

There are no changes to the self-imposed student cap of 1,240 students or staff cap of 255 staff is proposed.

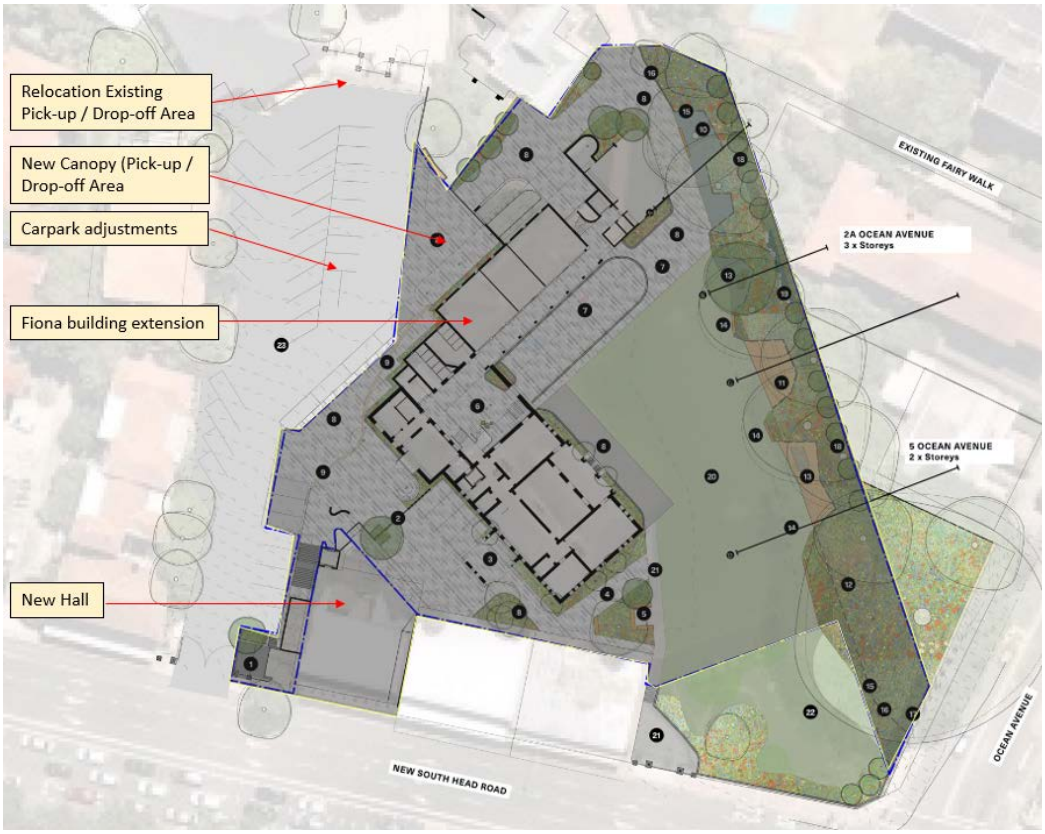

Figure 3 Proposed Fiona Building redevelopment

Source: BVN Architects (2021)

2.4 What is a Green Travel Plan?

A GTP is a package of measures put in place to encourage more sustainable travel whilst travelling to and from a development. It is a means for an organisation to demonstrate a commitment to and take a pro-active step towards improving the environmental sustainability of its activities.

2.5 Benefits of a Green Travel Plan

The GTP can bring numerous benefits for the environmental, social, and economic context of the redeveloped school. These include the following:

- The health of students, school staff and visitors by decreasing stress, travel costs, time, and broadening travel choice.
- Reducing traffic congestion.
- Improving air quality.
- Health benefits in response to obesity and an improved quality of life.

2.6 Green Travel Plan framework

This GTP addresses the following issues:

- What are the objectives for the school in terms of travel including trips by students, staff, and visitors?
- How are the set objectives going to be met? What measures are going to be implemented and encouraged?
- Who is going to be responsible for the management, implementation, and administration of the measures?
- Who does the GTP apply to?

The key aim of the plan is to reduce the reliance on private vehicle for the site through maximising the use of public transport, walking, and cycling in addition to the promotion of car sharing.

2.7 Green Travel Plan objectives

The objectives of a GTP are:

- **Encourage the use of more sustainable transport modes** i.e. walking, cycling, public transport (buses, trains) and car sharing in place of the higher energy consumption travel modes such as single occupant car and taxi use. This can be achieved by improving people's travel choices through making sustainable modes available and convenient.
- **Raise awareness** of sustainable modes of transportation for residents, staff or visitors who travel to, from and within the site.
- **Reduce traffic congestion and air pollution** around the site to enhance safer and more enjoyable journeys.
- **Travel demand management** by reducing the need for energy intensive car or taxi use through combining journeys for different purposes, travelling to alternative closer locations, or using other different modes.
- **Develop a monitoring strategy** to review and evaluate the travel patterns of residents, staff, and visitors.

2.8 Who does the Green Travel Plan apply to?

The GTP can be applied to students, staff, and visitors at the Ascham School.

3 Existing transport conditions

3.1 Local environment for pedestrians and cyclists

3.1.1 Walking connections

Edgecliff is an urbanised area, with footpaths provided on both sides of the road in most locations surrounding Ascham School. There are a number of safe crossing points that allow access to the surrounding areas of the site including:

- Midblock pedestrian crossing traffic signals on New South Head Road which facilitate direct access between the school and Edgecliff public transport interchange.
- Signals at the New South Head Road/Darling Point Road/New McLean Street intersection, in which pedestrians are able to cross in the east-west directions for western access to the site. Note that pedestrian crossings are not provided in the north-south directions across New South Head Road.
- Signals at the Ocean Street/Ocean Avenue/New South Head Road intersection which facilitates access to southern and eastern surrounding areas.
- Zebra crossing across Greenoaks Avenue at the Darling Point Road/Greenoaks Avenue roundabout, allowing north-south access to the northwest of the site.

Pedestrians may access to the site via any of the vehicular driveways (on separated footpaths) and a number of separate smaller stairwells on Ocean Avenue, Darling Point Road and New South Head Road.

The pedestrian crossings and access to Ascham School are shown graphically in Figure 4.

Figure 4 Pedestrian crossings and access to Ascham School

Source: SIX Maps (2021)

3.1.2 Cycling network

The cycling network surrounding Ascham School is shown in Figure 5. There are no off-road cycleways directly adjacent to Ascham School. However, there are several low to medium difficulty on-road cycle paths including on Darling Point Road, New South Head Road, Cooper Street and Bay Street. Students under the age of 16 are also permitted to cycle on the well-developed footpath network surrounding Ascham School.

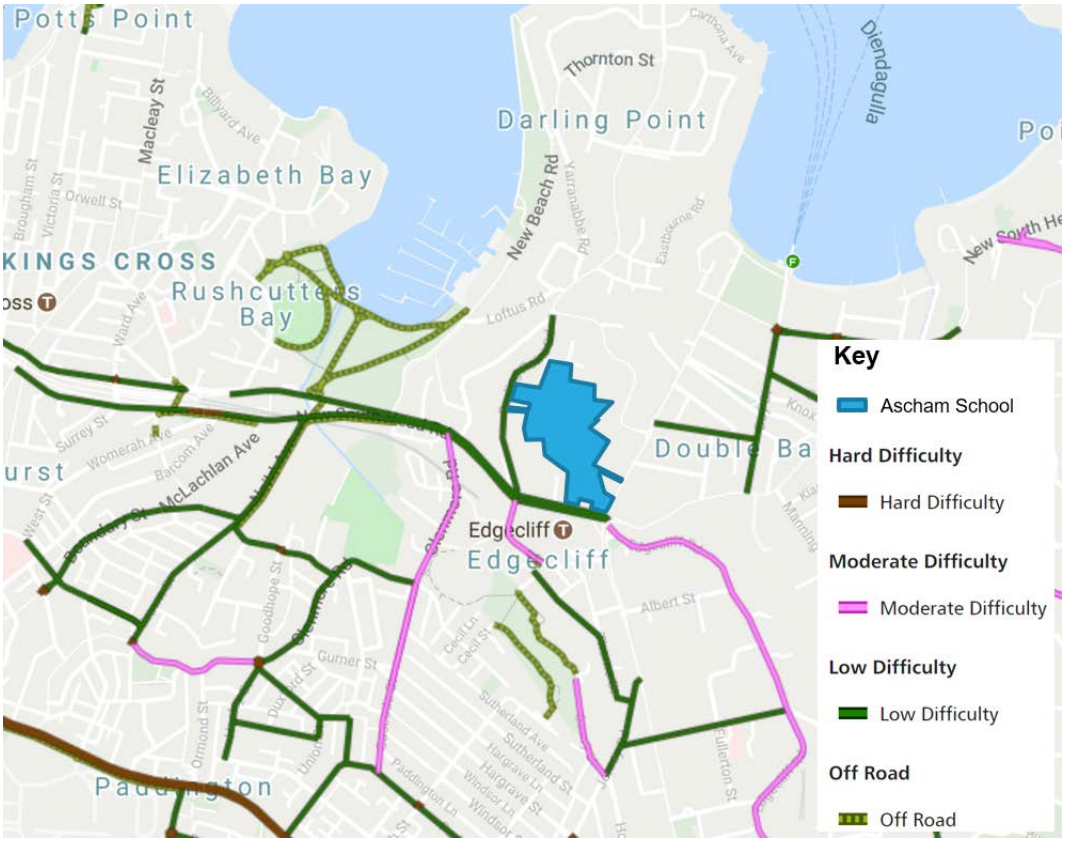

Figure 5 Cycling network

Source: Cycleway Finder (2021)

3.2 Public transport links that serve the site

3.2.1 Bus network

The Edgecliff bus interchange is located underneath the Edgecliff train station (Eastpoint centre and opposite Ascham School on New South Head Road. Public buses stop at Edgecliff bus interchange approximately every 5 minutes during school peak hours (7:30am - 8:30am and 2:30pm - 3:30pm) for both city-bound and eastbound buses. There are seven bus routes that service the Edgecliff transport interchange and are described further in Table 3.

Table 3 Bus routes at the Edgecliff bus interchange

Route number	Route name	Peak hour frequency (buses/hour)
200	Bondi Junction to Gore Hill	3
323	North Bondi to Edgecliff via New South Head Road	3
324	Watsons Bay to Walsh Bay via Old South Head Road	6
325	City Walsh Bay to Watsons Bay via Vaucluse Road	2
326	Edgecliff to Bondi Junction via Bellevue Hill	2
327	Bondi Junction to Edgecliff via Bellevue Rd & Manning Road	2
328	Bondi Junction to Darling Point via Edgecliff (Loop Service)	3

Source: Transport for NSW (2021)

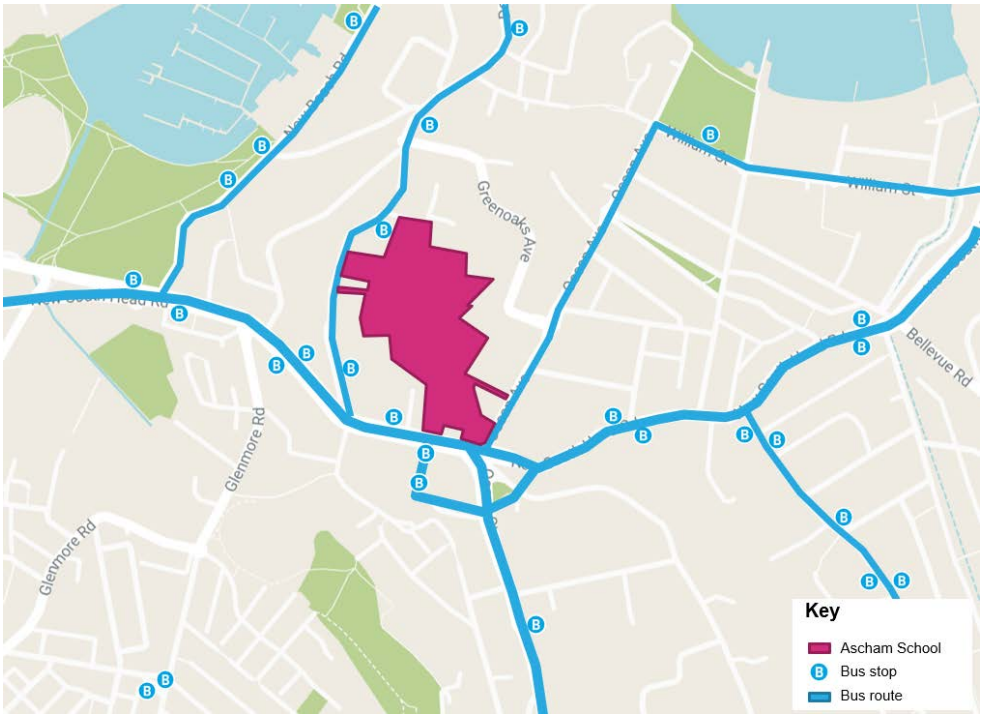

Figure 6 Public bus network surrounding Ascham School

Source: Transport for NSW (2021)

There is also a bus stop for private school buses on the southern side of New South Head Road, located approximately 50 metres west of the Ascham School New South Head Road access.

3.2.2 School bus network

In addition to public bus routes, school buses that operate to Cranbrook School and The Scots College are available for use by Ascham School students. Bus passes are available to students that live further than 2 kilometres from the school. School bus services include:

- Inner West and North Shore - Cranbrook School operates services from the Inner West and North Shore which pass by Ascham on the way to and from Cranbrook. The Inner West service starts at Birchgrove and travels via Central Station. The North Shore service starts at Seaforth.
- The Scots College bus service – The Scots College runs bus services which pass by Ascham. Up to eight services stop at the corner of Darling Point Road or opposite Edgecliff Station from the following locations shown in Figure 7:
  - Seaforth
  - Lower North Shore
  - Mosman
  - Roseville
  - Sutherland
  - Cronulla
  - Inner West
  - Beauty Point

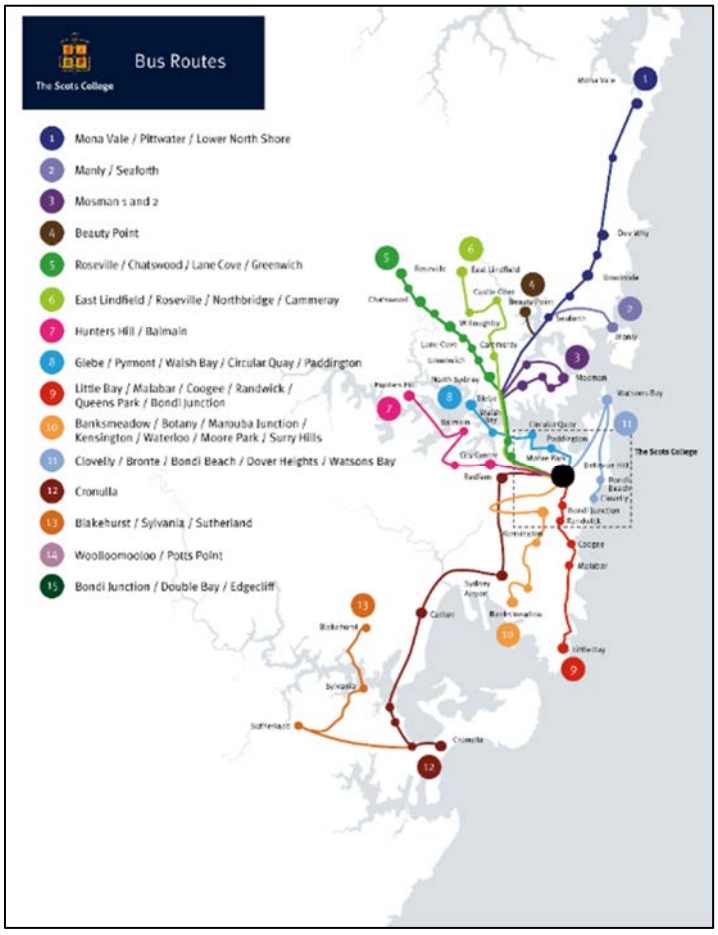

Figure 7: The Scots College Bus Routes

Source: The Scots College (2021)

3.2.3 Train network

Ascham School is located directly opposite Edgecliff train station. Edgecliff Station is the second last stop on the T4 Eastern Suburbs and Illawarra Line. Trains operate regularly on the line with a service every 3 minutes during peak periods in both directions and every 10 minutes during off-peak periods in both directions.

The T4 Eastern Suburbs and Illawarra Line provides a direct connection to Bondi Junction and Waterfall via Sutherland. Connections also exist to the rest of the Sydney Trains network via the Town Hall and Central Stations.

3.2.4 Ferry network

Ascham School is located near the Double Bay and Darling Point Wharves. The Double Bay Wharf is located approximately 700 metres northeast of Ascham School and the Darling Point Wharf is located approximately 1.25 kilometres north of Ascham School. These wharves are serviced by the F7 Double Bay ferries, which provide connections to Circular Quay. These services travel with a frequency of up to two services in the peak hours.

The Double Bay and Darling Point wharves are shown graphically in Figure 8.

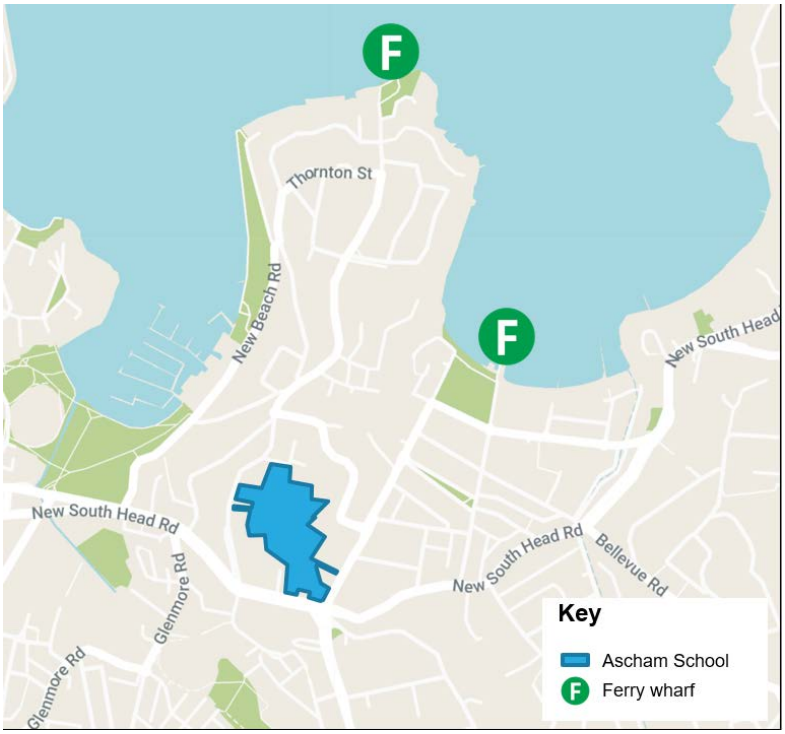

Figure 8 Ferry wharves near Ascham School

Source: Transport for NSW (2021)

3.2.5 Taxis

The closest taxi zone to Ascham School is located on the southern side of New South Head Road, approximately 35 metres southwest of the Ascham School New

South Head Road access. The taxi zone is shown in Figure 9 and can accommodate up to three taxis at one time.

Figure 9 Taxi rank near Ascham School

Source: SIX Maps (2021)

3.3 Transport Provisions within Ascham School

3.3.1 Site access

Vehicle access to the site is currently via three driveways. These are located at New South Head Road (main entrance), Octagon Road (via St Marks Road) and Darling Point Road. New South Head Road provides a two-way access driveway, which does not connect to any other parts of the school.

Figure 10 Fiona Building redevelopment - main entrance access at New South Head Road

Source: SIX Maps (2021)

Figure 11 Main Entrance – New South Head Road access

Source: Site visit (24 February 2021)

3.3.2 Off-street vehicle parking

There are currently 142 marked car parking spaces around the school, with most being located at the front of the school on the front driveway. Three other parking areas are located on the rear driveway, undercover off the rear driveway and at the Duntrim tennis courts. The breakdown of parking spaces by carpark within Ascham School is shown in Table 4.

Table 4: Existing and proposed off-street parking within Ascham School Campus

Car Park	Existing carpark	Proposed carpark
Front Driveway Fiona Redevelopment carpark	51	44
Underground Wallis	9	9
Fiona Building	4	**5**
Dower Garage and Hardstand	2	2
Rear Driveway	26	26
Undercover off Rear Driveway	21	21
St Marks Garage	2	2
43 Darling Point Road Garage	1	1
Duntrim	26	26
Total	**142**	**136**

3.3.3 Cycling

The school has cycling and walking initiatives which encourages staff and senior students to use alternative means of transportation to and from school. Scooter skills sessions have been conducted. There is a yearly increased number of students using a scooter under the supervision of their parents.

There are also some bicycle storage provisions located across Ascham School campus for students and staff who choose to ride.

There are shower/change facilities throughout the campus in Wallis House, Glenrock, MPB, Gym, Arts/Language and Fiona Building. The Fiona Junior and Hillingdon Prep schools have been excluded from this for safety reasons.

3.3.4 Walking

Ascham School has an existing initiative of walking groups during the afternoon peak times.

The walking group to Edgecliff train station comprises approximately 30 to 40 students each day.

The walking group to the corner of New South Head Road and Ocean Avenue comprised approximately 10-15 students each day.

3.4 Ascham School staff profile

As of March 2022, there are currently 254 staff at Ascham School with a cap of 255 staff. The breakdown of staff is provided in Table 5.

Table 5 Staff breakdown in March 2022

Category	Number
Teaching	163
Non-teaching (on-site)	89
Non-teaching (WFH)	2
Total	**254**

School travel questionaries were conducted as part of the *Ascham School Operational Transport Management Plan* (Arup, 2014) to establish the baseline mode share for staff at Ascham School is provided in Table 6.

Targeted mode shift details are provided in the Green Travel Plan report.

Table 6 Typical staff mode share

Staff Travel Mode	%
Car driver	66%
Car passenger	2%
Public transport	23%
Walk	9%

4 Operational opportunities to improve transport choices

4.1 Existing measures traffic management

Ascham School presently uses several measures to encourage the use of sustainable transport modes. These measures are detailed below.

- Management of traffic during morning peak periods (Fiona: 7.30am – 8:30am – Security Officer and Fiona Staff; Hillingdon: 7.45am – 9am – Security Officer and Hillingdon Staff) and afternoon peak periods (Hillingdon: 2:30pm - 3:15pm – Hillingdon Staff; Fiona: 3:00pm – 3:45pm – Fiona Staff and Security Officer) is focused on K-1 through to Year 2 students on Darling Point Road and Years 3 through 6 on New South Head Road.
- The Senior School students are not allowed to be dropped off or picked up within the school. Instead, Senior School students are encouraged to travel via public transport.
- Students are not permitted to drive to School / nor park within Ascham School.

4.2 Public transport and Active Transport Management

- Ascham School provides pedestrian access from three public roads - New South Head Road, Darling Point Road and Ocean Avenue.
- Pedestrian access is segregated from vehicular access with clearly defined paths.
- At off-street carparks, vehicle movements are separated from pedestrian movements by defined pathways, fences etc.
- The school has adopted a bicycle policy which encourages staff and senior students to ride a bicycle to and from school.
- Ascham School students are welcome to share both The Scots College and Cranbrook School bus services.

4.3 Observation and Supervision

- The school allocates and rosters staff to supervise and manage the pick-up/drop-off zone each day in both before and after-school periods.

  Staff member monitors vehicles entering the carpark and calls the student name up to the staff member at the pick-up area where the students are to wait. The student is called out and ready for their parent/ carer by the time they reach the pick-up area.

4.4 Education and Awareness Training

- Road safety education is taught as part of the school's personal development, health, and physical education curriculum.
- Regular travel questionaries are carried out to monitor travel patterns to the school and to develop appropriate strategies to encourage the use of public and active transport.
- Regular reminders are sent to parents to remind them of the available public transport facilities.
- Questionaries are sent to parents at the beginning of the year to understand and plan for travel arrangements.
- 'Walk to school' initiatives have been planned to encourage active transport options. Also, some scooters skills courses have been conducted.
- The Parents Association advocates car-pooling and encourages carpooling with other families.

4.5 Ascham School working from home (WFH)

Ascham School has implemented a Covid-19 working from home policy for their employees.

From time-to-time Ascham School may make an arrangement with an employee allowing them to work from home on an established regular basis.

There are currently 2 non-teaching staff members working from home.

4.6 Co-curricular activities after school

Ascham School within the Fiona campus has a daily average of 114 students taking co-curricular activities after school. In addition, there are approximately 10-15 students in daily after school care.

The impacts of the co-curricular activities after school offsets the pick-ups time and releases the pressure from the afternoon peak time demand.

Table 7 Co-Curricular activities after school

Day of the week	Typical number of students
Monday	83
Tuesday	135
Wednesday	74
Thursday	137
Friday	140

4.7 Mode share improvements

Council has imposed a student cap of 1,240 inclusive of boarders and a staff population cap of 255.

School travel questionaries conducted in previous traffic studies for the school campus established the baseline mode share for students and staff at Ascham School. The trends of the questionnaires are shown in Table 8 and Table 9 and identified that the majority of students were dropped-off and picked-up at Ascham School.

In the morning arrival period, a greater proportion of Year 7-12 Senior Students used car as the mode of transport when compared to the afternoon departure period. This was associated with the morning arrival period coinciding with the travel to work period. Furthermore, there is higher confidence with Senior Students taking public transport or walking when compared to younger students, who were generally dropped off and picked up.

Table 8 Existing student mode share

Morning Arrival	**Car (%)**	**Public Transport (%)**	**School Bus (%)**	**Walking and cycling (%)**
Prep	95%	0%	0%	5%
Year K-2 Hillingdon	95%	0%	0%	5%
Year 3-6 Fiona	55%	30%	10%	5%
Year 7-12 Senior (Day Girls)	55%	30%	10%	5%
Afternoon Departure	**Car (%)**	**Public Transport (%)**	**School Bus (%)**	**Walking and cycling (%)**
Prep	95%	0%	0%	5%
Year K-2 Hillingdon	95%	0%	0%	5%
Year 3-6 Fiona	55%	30%	10%	5%
Year 7-12 Senior (Day Girls)	33%	37%	10%	20%

Table 9 Existing staff mode share

Staff Travel Mode	**Percentage (%)**
Car driver	66%
Car passenger	2%
Public transport	23%
Walking and cycling	9%

4.8 Proposed new pick-up and drop-off area

The Fiona Building Redevelopment would include the reconfiguration of the car park near New South Head Road including the relocation of the drop-off/pick-up facility southeast of the existing location.

Access to the drop-off/pick-up facility would continue to be via a two-way access onto New South Head Road (of which the intersection allows left-in/left-out only). The relocation of the existing pick-up and drop-off areas will improve traffic operations with this carpark and reduce traffic conflicts at the main access by vehicles queuing on New South Head Road.

The existing pick-up and drop-off area has an area of approximately 80m length for vehicles queuing within the school carpark. The proposed relocated pick-up and drop-off area will extend approximately additional 30m the queuing capacity for vehicles entering the carpark.

The area is proposed to have adequate space for a total of 7 simultaneous pick-ups and drop-offs and adequate overtaking area without blocking the through traffic of the carpark traffic aisle approaching the exit.

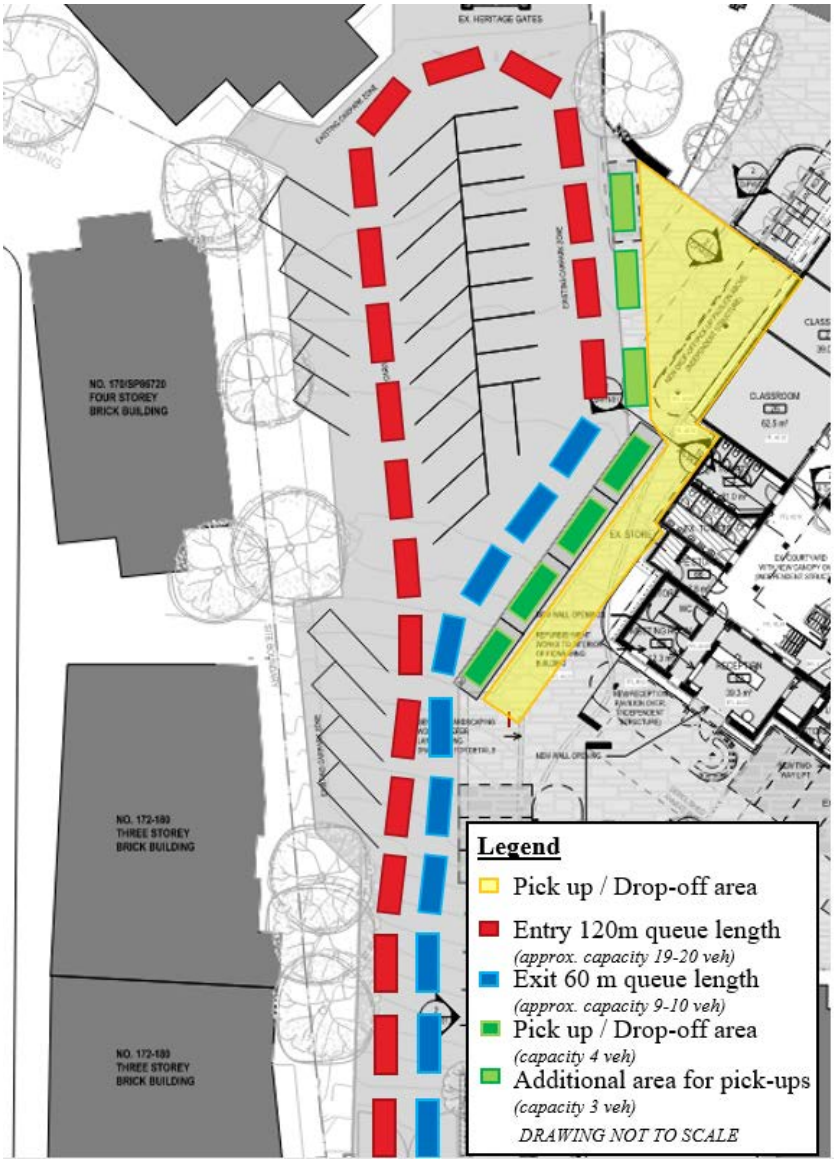

Figure 12 Vehicle queuing carpark, proposed pick-up / drop-off area

Figure 13 New South Head Road access - vehicles entering

Source: Site visit (24 February 2021)

Figure 14 New South Head Road access – traffic signals platoon afternoon peak time

Source: Site visit (24 February 2021)

5 Potential measures

5.1 Actions

As discussed in Section 4.1, Ascham School presently uses various measures to encourage the use of sustainable transport modes. Further potential measures to encourage shift to sustainable transport modes are described below to be implemented for students, staff, and visitors. These measures are focused on:

- Addressing existing constraints in the active transport network.
- Increasing awareness and reduce barriers to public transport, particularly for older Year 3-6 and Senior Students.
- Reducing private vehicle car usage.

Table 10 Potential measures

Action	Responsibility
Advocate to Transport for NSW and Woollahra Council for improved cycling connectivity at Edgecliff	Ascham School
Integrate a carpool system for staff to facilitate and encourage carpooling	Ascham School
Use marketing to encourage public transport use, such as trip plans to and from major student and staff places of residency	Ascham School

5.2 Target mode share

A target mode share was established by considering the existing mode share patterns in Section 4.7 and the proposed initiatives in Section 4.8. The target mode shares for students and staff are outlined in Table 11 and Table 12.

These targets reflect:

- An increase in public transport usage for older Year 3-6 and Senior Students as a result of improved awareness and lowered barriers to usage.
- An increase in cycling for Senior Students and staff as a result of improvements in the active transport network.
- Increase in staff carpooling as a result of an integrated carpool system.
- Associated reduction in private vehicle car usage.

Table 11 Target student mode share

Morning Arrival	Car (%)	Public Transport (%)	School Bus (%)	Walking and cycling (%)
Prep	95%	0%	0%	5%
Year K-2 Hillingdon	95%	0%	0%	5%
Year 3-6 Fiona	40%	40%	10%	10%
Year 7-12 Senior (Day Girls)	30%	50%	10%	10%
Afternoon Departure	**Car (%)**	**Public Transport (%)**	**School Bus (%)**	**Walking and cycling (%)**
Prep	95%	0%	0%	5%
Year K-2 Hillingdon	95%	0%	0%	5%
Year 3-6 Fiona	30%	45%	10%	15%
Year 7-12 Senior (Day Girls)	20%	55%	10%	15%

Mode shift increase
Mode shift decrease

Table 12 Target staff mode share

Staff Travel Mode	Existing percentage (%)	Targeted Percentage (%)
Car driver	66%	45%
Car passenger	2%	10%
Public transport	23%	30%
Walking and cycling	9%	15%

Mode shift increase
Mode shift decrease

5.3 Marketing and promotion

In addition to encouraging travel by sustainable modes, the GTP should aim to manage travel demand through reducing the number, length, and timing of trips.

Marketing and promoting the benefits of sustainable travel alternatives is crucial when encouraging residents, retail, and commercial tenants to adopt the GTP objectives. It is essential that residents, workers, and visitors are made aware of the GTP at an early stage to emphasise the need to reduce single occupancy trips. Furthermore, increasing the awareness of a fully publicised GTP will motivate residents and other users to think about how they travel to work and how to encourage sustainable travel.

6 Administration

Part of an effective GTP is to nominate personnel to administer and champion the plan. Staff may form a Travel Plan Management team, enabling a consistent and organised approach for the whole development.

6.1 Revaluating, reviewing, and monitoring mechanisms

The GTP is a constantly evolving strategy, and its success will rely on its ongoing monitoring and review. Although the objectives of the Plan will not change, it may be possible over time to re-define specific targets. Target setting should aim to reflect an ambition for continued progress. Assessing the provided targets and identifying if they are being met will provide opportunities to re-define targets. Reviewing and monitoring mechanisms could include collecting data from residents and visitors on their journeys to and from the site. The recorded data will inform modes of transport and distance travelled by each mode, from which energy consumption and emissions can be estimated.

7 Conclusions

The GTP encourages the use of more sustainable transport modes i.e. walking, cycling, public transport (buses, trains) and car sharing in place of the higher energy consumption travel modes such as single occupant car and taxi use.

The GTP raises awareness of sustainable modes of transportation for residents, staff or visitors who travel to, from and within the site.

Ascham School presently uses several measures to encourage the use of sustainable transport modes as follow:

7.1 Traffic management

- The Senior School students are not allowed to be dropped off or picked up within the school. Instead, Senior School students are encouraged to travel via public transport. Ascham School students are welcome share both The Scots College and Cranbrook School bus services.
- The school allocates and rosters staff to supervise and manage the pick-up/drop-off zone each day in both before and after-school periods.

  Staff member monitors vehicles entering the carpark and calls the student name up to the staff member at the pick-up area where the students are to wait. The student is called out and ready for their parent/ carer by the time they reach the pick-up area.

7.2 Cycling and walking

- Road safety education is taught as part of the school's personal development, health, and physical education curriculum.
- The school has adopted a bicycle policy which encourages staff and senior students to ride a bicycle to and from school. 'Ride to school' and 'Walk to school' initiatives have been planned and undertaken to encourage active transport options. The Parents Association advocates car-pooling and encourages carpooling with other families.
- The school has an initiative to encourage students to use public transport by providing walking groups to Edgecliff train station comprises approximately 30 to 40 students each day.

  Additional walking groups are organised from the school to the corner of New South Head Road and Ocean Avenue comprised approximately 10-15 students each day.

7.3 Public transport mode shift

- The school has an initiative to encourage staff to use public transport. The target mode shift strategy is seeking to decrease the percentage of car usage from its current 66% to 45% and increase the percentage of public transport option from 23% to 30%.

7.4 Working from Home (WFH)

- The school has adopted where possible a working from home (WFH) policy for staff, particularly for non-teaching staff. Currently 2 staff members are part of the WFH program.

7.5 Co-curricular activities

- The co-curricular activities after school offsets the pick-ups time and releases the pressure from the afternoon peak time demand.

  Fiona campus has a daily average of 114 students taking co-curricular activities after school. In addition, there are approximately 10-15 students in daily after school care.

7.6 Monitoring

- Regular travel questionaries are carried out to monitor travel patterns to the school and to develop appropriate strategies to encourage the use of public and active transport. Reminders are sent to parents to remind them of the available public transport facilities.

Ascham School

Ascham School Fiona Redevelopment

Traffic and Parking Assessment report

Final | 4 April 2022

Job number 280586

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Document verification

ARUP

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Contents

Appendices

Appendix A

Fiona Building Redevelopment Design

Appendix B

Traffic Comments Action Plan letter to Council

Appendix C

Site Inspections Details

1 Introduction

Arup prepared this traffic and parking assessment report for the proposed Fiona Building Redevelopment at Ascham School, Edgecliff. The Fiona Building Redevelopment comprises the heritage Fiona House, Fiona House extension and proposed new Hall building, relocation of the existing pick-up and drop-off area and adjustments to the main entrance carpark.

The proposed modifications were assessed according to the requirements of the Woollahra Municipal Council DCP and AS2890 standards. The documents which were used in this assessment and the revisions of architectural drawings include:

- Woollahra Development Control Plan 2015
- AS2890.1:2004 Parking facilities: Off-street car parking
- AS2890.2:2018 Parking facilities: Off-street commercial vehicle facilities
- B-00-02 - FLOOR PLAN GROUND Proposed, Issue 4 25/03/21 Pre_DA
- Ascham Fiona landscape DA-21009-3 rev 4

1.1 Site location

The Fiona Building Redevelopment forms part of the Ascham School Campus located in Edgecliff, in Sydney's Eastern Suburbs shown in Figure 1. Figure 2 illustrates the location of the Fiona Building within Ascham School.

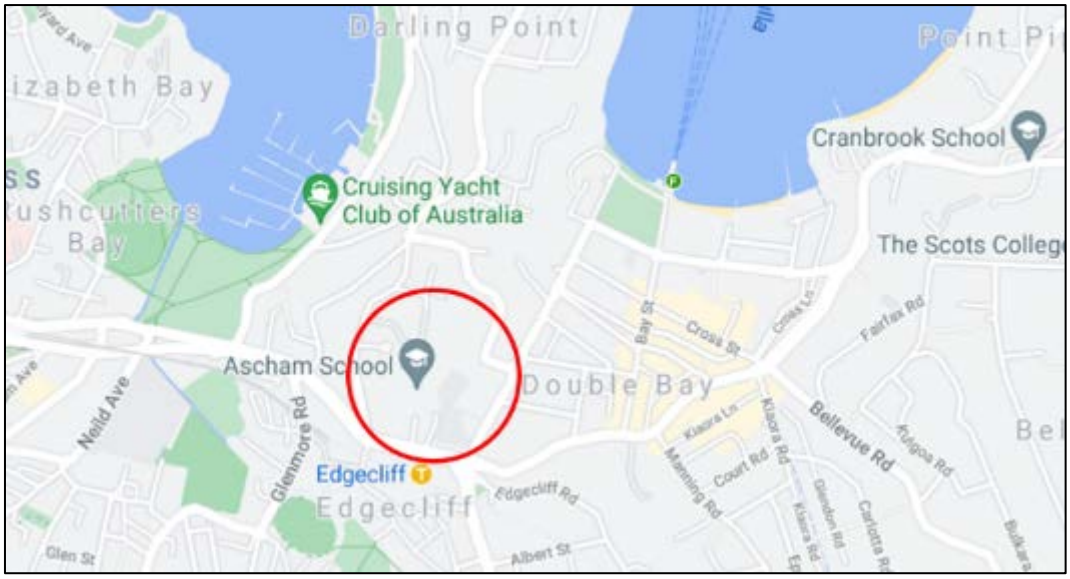


Figure 1 Site location

Source: Google Maps (2021)

Figure 2 Site location – Fiona Building

Source: SIX Maps (2021)

1.2 Pre-Development application (DA) meeting

A pre-DA meeting for DA 10/2021 was held on 6 May 2021 with Woollahra Municipal Council to discuss the transport and traffic requirements for the proposed DA.

Section 2.4 of the pre-DA meeting minutes outlines the comments and recommendations from Council's traffic and transport team. The comments in relation to the Traffic and Parking Assessment are shown below.

1. *Traffic/Parking Report*

To ensure the adequate provision of car parking, servicing facilities on the site and to minimise the impact on adjoining traffic and parking related to the proposed development, a traffic and parking impact analysis is required to assess the implications of the proposal on existing traffic, parking and transport conditions surrounding and within site. The report must be produced by a suitably qualified and experienced traffic engineer and must include (but not limited to) the following:

1. *Expected traffic generation rates and their impacts on the surrounding road networks.*
2. *Impact on existing parking conditions and transport requirements in the surrounding area.*
3. *Assessment of any vehicle access and accommodation proposed*
4. *Compliance with Council's off-street parking requirements.*

Table 1 Woollahra Municipal Council recommendations – report reference

Item	Woollahra Municipal Council recommendations	Reference	Status
1	Traffic generation rates and road networks impacts	- Traffic impacts and road network impacts are listed in Section 5 of this report	Closed 21/07/21
2	Existing parking conditions and transport requirements in the surrounding area.	- Existing parking conditions listed in Section 3.5 of this report - Transport requirements in the local area provided in Section 2.2 of this report. - Pedestrian and cycling requirements in the local area provided in Section 2.3 of this report - Additional information regarding transport requirements is provided in the Green Travel Plan (GTP) report.	Closed 21/07/21
3	Vehicle access assessment	- Vehicle access assessment is provided in Section 5 of this report	Closed 21/07/21
4	Compliance with Council's off-street parking requirements.	- Carpark checks are provided in Section 5 of this report - Future parking conditions and parking swept path checks are provided in Sections 5 - Changes in off-street parking provisions are listed in Section 5.6 of this report.	Closed 21/07/21

1.3 Traffic Comments Woollahra City Council (DA 330/2021)

Woollahra City Council in correspondence with Urbis provided comments on the traffic and parking assessment and green travel plan reports prepared by Arup (July 2021) related to the DA 330/2021 Fiona Building Redevelopment

1. *Parking Provision –*
    1. *A total shortfall of 51 spaces for on-site parking provision;*
    2. *A revised GTP using more recent data with consideration of work from home arrangement and staff preference on travel mode under pandemic be submitted for further assessment;*
2. *Pick-up/Drop-off – a more quantifiable analysis should be submitted regarding the pick-up/drop-off operation demonstrating:*
    - *Average pick-up/drop-off time per vehicle in the carline;*
    - *Travel mode split during Covid pandemic;*
    - *Size of Walkers Group to the Edgecliff Station;*
    - *Number of waiting spaces needed to prevent approaching queue spillback onto New South Head Road;*
    - *Number of waiting spaces needed to prevent egressing queue blocking the carline.*
3. *Construction Traffic Management Plan – A revised CTMP be provided containing additional information as per required in the report.*

1.4 Responses to Woollahra City Council (DA 330/2021) Traffic comments

A meeting was held on 7 March 2022 with Woollahra Council, Urbis, BVN Architects and Arup to clarify the traffic comments raised by council.

As discussed with Council in meeting from 7 March 2022, there is a total loss of 6 carpark spaces. These car spaces are required to be removed to improve current pick-up and drop-off operations within the school.

Council has noted that student and staff cap will remain the same. Removal of 6 carpark spaces will have minimum impacts in the carpark demand.

The pick-up and drop-off area is proposed to be relocated and extended to allow additional simultaneous operations.

The pick-up and drop-off area relocation requires to remove 6 car spaces in order to extend the queuing area within the carpark and facilitate a wider and safer area for the operations.

The existing pick-up and drop-off area has an area of approximately 80m for vehicles queuing.

The proposed relocated pick-up and drop-off area will extend approximately additional 30m the queuing capacity for vehicles entering the carpark.

The area is proposed to have adequate space for simultaneous pick-ups and drop-offs and overtaking without blocking the through traffic of the carpark aisle approaching the exit.

Table 2 provides a guide of the sections of the report updated following the traffic comments from Council and responses.

Table 2 Traffic and Parking report updates

	Previous report (Issued 27 July 2021)	Updated report (Issued 24 March 2022)	Comments
1	Section 1 - Introduction	Additional section	Added subheading Section 1.3 Traffic Comments Woollahra City Council (DA 330/2021)
2	Section 1 - Introduction	Additional Section Added Table 1	Added subheading Section 1.4 Responses to Woollahra City Council (DA 330/2021) Traffic comments Added Table 1 Traffic and parking report updates (this section)
3	Section 2 – Existing conditions	Section 2 – Existing traffic and transport conditions	Change title of section to 'Existing traffic and transport conditions'
4	Section 2 – Existing conditions	Additional sections	Added subheading Section 2.4 On-site inspection during Covid-19
5	Section 3 – Existing conditions	Section 3 – Ascham School existing conditions	Change title of section to 'Ascham School existing conditions'
6	Section 3.1 – Ascham School student profile (Table 3)	Section 3.1. Ascham School student profile (Table 4)	Change table number Typical student profile updated with latest data
7	Section 3.2 – Ascham School staff profile (Table 5)	Section 3.2 Ascham School staff profile (Table 6)	Change table number Staff data updated confirmed with latest data March 2022
8	Section 3.3 Vehicle and pedestrian access	Section 3.3 Vehicle and pedestrian access	Updated Figure 10
9	Section 3.4 – Existing drop-off and pick-up arrangements	Section 3.4 Existing drop-off and pick-up arrangements	Updated Figure 11
10	Section 3.5 – Existing of-street vehicle parking	Section 3.5 – Existing of-street vehicle parking	Added Figure 12 Ascham School Fiona carpark Section edited, references to the Duntrim development included in additional subsection 3.5.1
11	Section 3.6 – Cycling and Walking	Section 3.6 – Cycling Section 3.7 – Walking	Split of section in separated subheadings
12	Section 3 – Existing conditions	Additional sections	Added subheading Section 3.8 Co-curricular activities after school Section 3.9 Ascham School working from home (WFH)

	Previous report (Issued 27 July 2021)	Updated report (Issued 24 March 2022)	Comments
13	Section 4 – Proposed Development	Section 4 – Proposed Development	Added subheadings Section 4.1. Fiona Building redevelopment and Section 4.2 Proposed new pick-up and drop-off area Updated figure Added Table 10
14	Section 5 – Traffic Impacts	Additional section	Added subheading Section 5.2 Traffic volumes (ADT 2019-2021) Added Figure 15
15	Section 5.2 Road network impacts	Section 5.3 Road network impacts	Change of subheading number
16	Section 5 – Traffic Impacts	Additional section	Section 5.4 Road network impacts strategy
17	Section 5.3 – Proposed new drop-off and pick-up impacts (Figure 13)	Relocation of Figure	Updated Figure 14 and relocated to Section 4.2
18	Section 5.3 – Proposed new drop-off and pick-up impacts	Section 5.5 – Proposed new drop-off and pick-up impacts	Change of subheading number
19	Section 5.4 – Off-street vehicle parking impacts	Section 5.6 – Off-street vehicle parking impacts	Change of subheading number
20	Section 5.5 – Vehicle Access Assessment	Section 5.7 Ascham School carpark changes impacts	Change of subheading number and title
21	Section 5 – Traffic Impacts	Additional section	Section 5.8 Vehicle swept paths
22	Section 5 – Traffic Impacts	Additional section	Section 5.9 Site inspection findings
23	Section 5 – Traffic Impacts	Additional figures	Added Figures 17, 18 and 19
24	Section 6 – Conclusions	Section 6 – Conclusions	Updated section
25	New Appendix	Appendix C	Added section for details of site inspections

2 Existing traffic and transport conditions

2.1 Key roads near the site

The key roads surrounding Ascham School are New South Head Road, Ocean Street/Avenue and Darling Point Road.

- New South Head Road is a state road with six traffic lanes. There are three sets of traffic signals on New South Head Road between Darling Point Road and Ocean Avenue/Ocean Street. Ocean Street and midblock pedestrian signals allow pedestrians to cross between Ascham School and Edgecliff Station and bus interchange. The other signals permit local access for all movements to and from Darling Point Road.
- Ocean Street/Ocean Avenue is a regional road which allows access to Bondi Junction via Syd Einfeld Drive and Double Bay via William Street.
- Darling Point Road is a council-managed local road with single traffic lanes in each direction and parallel car parking permitted on both sides.

2.1.1 On-street parking provision

There are constrained on-street parking provisions around the school. Parking is generally provided on both sides of Darling Point Road and Ocean Avenue and mainly caters for residents of the area. The following restrictions apply on these roads:

- Darling Point Road (both sides): 2P provision between 7am – 6pm on Monday to Friday.
- Ocean Avenue (both sides): 2P provision between 8am – 6pm on Monday to Saturday.

2.2 Public transport links that serve the site

2.2.1 Bus network

The Edgecliff bus interchange is located underneath the Edgecliff train station on New South Head Road, opposite Ascham School. Public buses stop at Edgecliff bus interchange approximately every 5 minutes during school peak hours (7:30am - 8:30am and 2:30pm - 3:30pm) for both city-bound and eastbound buses. There are seven bus routes that service the Edgecliff transport interchange, which are described further in Table 3.

Table 3 Bus routes at the Edgecliff bus interchange

Route number	Route name	Peak hour frequency (buses/hour)
200	Bondi Junction to Gore Hill	3
323	North Bondi to Edgecliff via New South Head Road	3
324	Watsons Bay to Walsh Bay via Old South Head Road	6
325	City Walsh Bay to Watsons Bay via Vaucluse Road	2
326	Edgecliff to Bondi Junction via Bellevue Hill	2
327	Bondi Junction to Edgecliff via Bellevue Rd & Manning Road	2
328	Bondi Junction to Darling Point via Edgecliff (Loop Service)	3

Source: Transport for NSW (2021)

Figure 3 Public bus network surrounding Ascham School

Source: Transport for NSW (2021)

There is also a bus stop for private school buses on the southern side of New South Head Road, located approximately 50 metres west of the Ascham School New South Head Road access.

2.2.2 School bus network

In addition to public bus routes, school buses that operate to Cranbrook School and The Scots College are welcome for use by Ascham School students. Bus passes are available to students that live further than 2 kilometres from the school. School bus services include:

- Inner West and North Shore – Cranbrook School operates services from the Inner West and North Shore which pass by Ascham on the way to and from Cranbrook School. The Inner West service starts at Birchgrove and travels via Central Station. The North Shore service starts at Seaforth.
- The Scots College bus service – The Scots College runs bus services which pass by Ascham (shown in Figure 4). Up to eight services stop at the corner of Darling Point Road or opposite Edgecliff Station from the following locations:
  - Seaforth
  - Lower North Shore
  - Mosman
  - Roseville
  - Sutherland
  - Cronulla
  - Inner West
  - Beauty Point

Figure 4: The Scots College Bus Routes

Source: The Scots College (2021)

2.2.3 Train network

Ascham School is located directly opposite Edgecliff train station. Edgecliff train station is the second last stop on the T4 Eastern Suburbs and Illawarra Line. Trains operate regularly on the line with a service every 3 minutes during peak periods in both directions and every 10 minutes during off-peak periods in both directions.

The T4 Eastern Suburbs and Illawarra Line provides a direct connection to Bondi Junction and Waterfall via Sutherland. Connections are also available to the rest of the Sydney Trains network via the Town Hall and Central train stations.

2.2.4 Ferry network

Ascham School is located near the Double Bay and Darling Point Wharves. The Double Bay Wharf is located approximately 700 metres northeast of Ascham School and the Darling Point Wharf is located approximately 1.25 kilometres north of Ascham School. These wharves are serviced by the F7 Double Bay ferries, which provide connections to Circular Quay. These services travel with a frequency of up to two services in the peak hours.

The Double Bay and Darling Point wharves are shown in Figure 5.

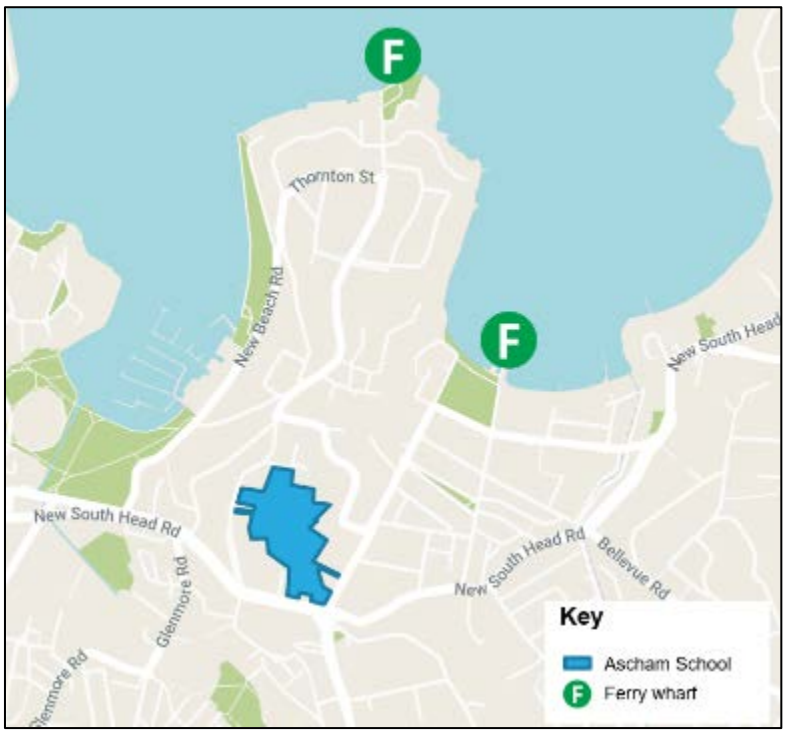


Figure 5 Ferry wharves near Ascham School

Source: Transport for NSW (2021)

2.2.5 Taxis

The nearest taxi zone to Ascham School is located on the southern side of New South Head Road, approximately 35 metres southwest of the New South Head Road access. The taxi zone is shown in Figure 6 and can accommodate up to three taxis at one time.

Figure 6 Taxi rank near Ascham School

Source: SIX Maps (2021)

2.3 Local environment for pedestrians and cyclists

2.3.1 Walking connections

Edgecliff is an urbanised area, with footpaths provided on both sides of the road in most locations surrounding Ascham School. There is a number of safe crossing points that allow access to the surrounding areas of the site including:

- Midblock pedestrian crossing traffic signals on New South Head Road which facilitate direct access between the school and Edgecliff public transport interchange.
- Signals at the New South Head Road/Darling Point Road/New McLean Street intersection, in which pedestrians are able to cross in the east-west directions for western access to the site. Note that pedestrian crossings are not provided in the north-south directions across New South Head Road.

- Signals at the Ocean Street/Ocean Avenue/New South Head Road intersection which facilitates access to southern and eastern surrounding areas.
- Zebra crossing across Greenoaks Avenue at the Darling Point Road/Greenoaks Avenue roundabout, allowing north-south access to the northwest of the site.

Pedestrians may access to the site via any of the vehicular driveways (on separated footpaths) and a number of separate smaller stairwells on Ocean Avenue, Darling Point Road and New South Head Road.

The pedestrian crossings and access to Ascham School are shown in Figure 7.

Figure 7 Pedestrian crossings and access to Ascham School

Source: SIX Maps (2021)

2.3.2 Cycling network

The cycling network surrounding Ascham School is shown in Figure 8. There are no off-road cycleways directly adjacent to Ascham School. However, there are several low to medium difficulty on-road cycle paths including on Darling Point Road, New South Head Road, Cooper Street and Bay Street. Students under the age of 16 are also permitted to cycle on the well-developed footpath network surrounding Ascham School.

Figure 8 Cycling network

Source: Cycleway Finder (2021)

2.4 On-site inspections during Covid-19

Arup conducted on-site inspections on Wednesday 24 of February 2021 during the afternoon pick-up time assessing the current conditions and operations of the existing carpark and pick-up / drop-off areas.

The site inspections took place between the lockdowns during the first window of Covid-19 lifting restrictions in early 2021.

It is understood that Covid-19 has temporarily modified commuting patterns and modes of transportation. The experienced disruptions to average commuting due to Covid19 are expected to reach similar patterns (pre Covid-19) by the time the Fiona Building redevelopment construction works are completed.

As restrictions are lifted and commuters are preparing for a post-pandemic scenario, working arrangements, travel patterns and mode splits are likely to be adjusted.

The outcomes of the on-site inspections also confirmed the previous assessment and findings from the traffic reports prepared in 2016. For details of the site inspections refer to Appendix C of this report.

3 Ascham School existing conditions

3.1 Ascham School student profile

Ascham School is separated into three distinct schools known as Preparatory (Hillingdon), Junior (Fiona) and Senior School. The average number of Junior students (Years 3 to 6) at the Fiona Building is 294 students.

The Ascham School student and facility masterplan includes a self-imposed student cap of 1,240 students (inclusive of 134 boarders).

A typical profile of students following current data provided by Ascham School in March 2022 is provided in Table 4. It is noted that student numbers may fluctuate based on family and student circumstances.

Table 4 Typical student profile

Class	**Typical number of students**
Prep	39
Year K-2	180
Year 3-6	294
Year 7-12 Senior (Day Girls)	565
Year 12 Senior (Boarders)	134
Total	**1,212**

In 2013, school travel questionaries were conducted to establish the baseline mode share for students at Ascham School is provided in Table 5. This travelling profile is assumed to be representative of the current travel patterns and mode shifts preferences.

Table 5 Typical student morning arrival and afternoon departure profile

Morning Arrival	**Car**	**Public Transport**	**School Bus**	**Walk**
Prep	95%	0%	0%	5%
Yr K-2 Hillingdon	95%	0%	0%	5%
Yr 3-6 Fiona	55%	30%	10%	5%
Yr 7-12 Senior (Day Girls)	55%	30%	10%	5%
Afternoon Departure	**Car**	**Public Transport**	**School Bus**	**Walk**
Prep	95%	0%	0%	5%
Yr K-2 Hillingdon	95%	0%	0%	5%
Yr 3-6 Fiona	55%	30%	10%	5%
Yr 7-12 Senior (Day Girls)	33%	37%	10%	20%

3.2 Ascham School staff profile

As of March 2022, there are currently 254 staff at Ascham School with a cap of 255 staff. The breakdown of staff is provided in Table 6.

Table 6 Staff breakdown in March 2022

Category	Number
Teaching	163
Non-teaching (on-site)	89
Non-teaching (WFH)	2
Total	**254**

School travel questionaries were conducted as part of the *Ascham School Operational Transport Management Plan* (Arup, 2014) to establish the baseline mode share for staff at Ascham School is provided in Table 7.

Targeted mode shift details are provided in the Green Travel Plan report.

Table 7 Typical staff mode share

Staff Travel Mode	%
Car driver	66%
Car passenger	2%
Public transport	23%
Walk	9%

3.3 Vehicle and pedestrian accesses

The main road for vehicle and pedestrian access to the Fiona Building is New South Head Road as shown in Figure 9. Pedestrian access (pickup and drop-off area) is delineated from vehicles by a footpath delineated by bollards and linemarking when accessing the school as shown in Figure 10.

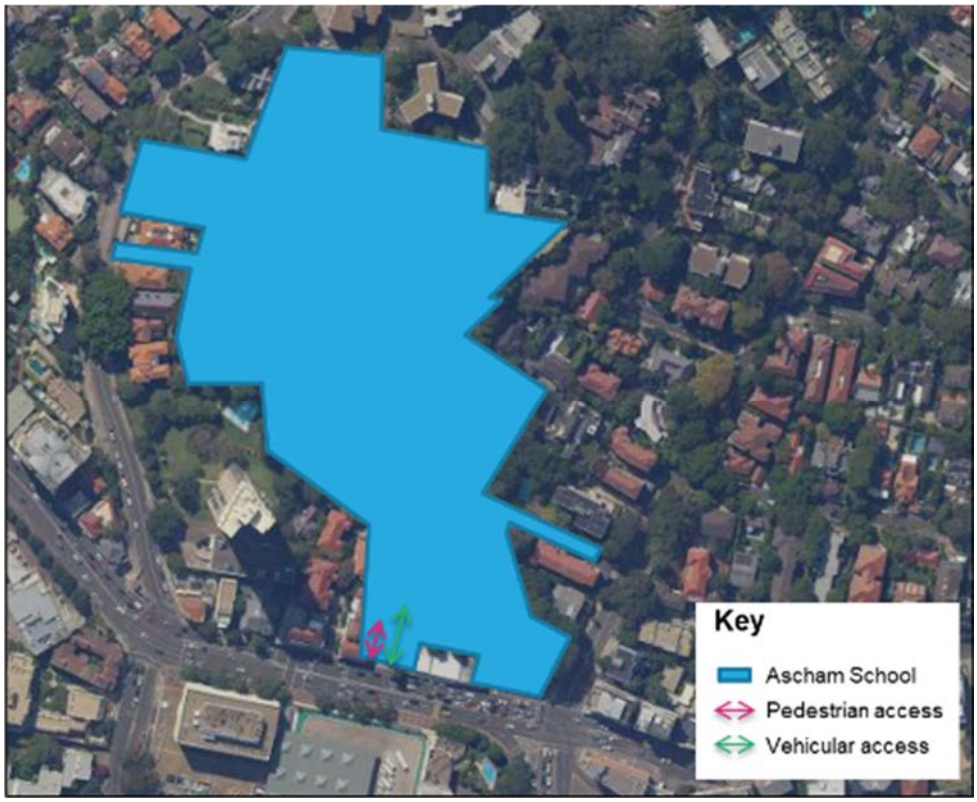


Figure 9 Main accesses to the Fiona Building

Figure 10 Main Entrance – Existing pick-up and drop-off area

Source: Site visit (24 February 2021)

3.4 Existing Drop-off and pick-up arrangements

Students who are driven to the school have designated drop-off and pick-up facilities. Junior students start at 8:20am, finish at 3:10pm and are picked up and dropped off within the southern areas of the school grounds. This area is accessed from the main entry on New South Head Road.

The capacity of this drop-off/pick-up facility is dictated by the two existing vehicle loading spaces at one time. There is queue space available within the site (from the entry gate to the drop off facility) for approximately 13 to 14 vehicles to queue while the pick-up bays are occupied.

3.5 Existing off-street vehicle parking

Ascham School has a total of 142 carpark spaces distributed in 9 different carparks within the school campus.

There is currently a total of 55 car parking spaces servicing the Fiona Building, consisting of 51 car parking spaces at the front driveway near New South Head Road and 4 spaces adjacent the Fiona Building. These parking spaces are provided for staff and visitors only.

Table 8: Existing off-street parking within Ascham School Campus

Car Park	Number of Spaces
Front Driveway Fiona Redevelopment carpark	51
Underground Wallis	9
Fiona Building	4
Dower Garage and Hardstand	2
Rear Driveway	26
Undercover off Rear Driveway	21
St Marks Garage	2
43 Darling Point Road Garage	1
Duntrim	26
Total	**142**

Figure 11: Fiona Building drop-off/pick-up location

Figure 12 Ascham School Fiona carpark

Source: Site visit (24 February 2021)

3.5.1 Off-street parking background

As part of the Duntrim development completed in 2015, there was a new basement car park provided to replace at-grade car parking spaces lost due to the development footprint. With other minor adjustments there is currently a total car parking provision of 142 spaces on the site. Three of these spaces are accessible parking spaces

The existing basement car park included 37 parking spaces. This was in excess of the 20 car spaces determined to be necessary with reference to Woollahra Council DCP, Part E1. Refer to Duntrim Traffic and Transport Assessment December 2013.

In addition, the Pre-DA Meeting held on 13 September 2016 outlined the requirements for the provision of car parking for the proposed Margaret Bailey Building in accordance with Woollahra DCP 2015. Refer to Table 2 of Part E 1.5.2 of the Woollahra DCP (2015) which outlines the minimum parking requirements for educational establishments.

As the school did not fully comply with this car parking requirement, a Traffic and Parking Assessment was required justifying the departure. Refer to Ascham School Margaret Bailey Building Traffic and Parking Assessment November 2016.

3.6 Cycling

The school has cycling initiatives which encourages staff and senior students to use alternative means of transportation to and from school. Scooter skills sessions have been conducted. There is a yearly increased number of students using a scooter under the supervision of their parents.

There are also some bicycle storage provisions located across Ascham School campus for students and staff who choose to ride.

There are shower/change facilities throughout the campus in Wallis House, Glenrock, MPB, Gym, Arts/Language and Fiona Building. The Fiona Junior and Hillingdon Prep schools have been excluded from this for safety reasons.

3.7 Walking

Ascham School has an existing initiative of walking groups during the afternoon peak times.

The walking group to Edgecliff train station comprises approximately 30 to 40 students each day.

The walking group to the corner of New South Head rad and Ocean Avenue comprised approximately 10-15 students each day.

3.8 Co-curricular activities after school

Ascham School within the Fiona campus has a daily average of 114 students taking co-curricular activities after school. In addition there are approximately 10-15 students in daily after school care.

The impacts of the co-curricular activities after school offsets the pick-ups time and releases the pressure from the afternoon peak time demand.

Table 9 Co-Curricular activities after school

Day of the week	Typical number of students
Monday	83
Tuesday	135
Wednesday	74
Thursday	137
Friday	140

3.9 Ascham School working from home (WFH)

Ascham School has implemented a Covid-19 working from home policy for their employees.

From time-to-time Ascham School may make an arrangement with an employee allowing them to work from home on an established regular basis.

There are currently 2 non-teaching staff members working from home.

4 Proposed development

4.1 Fiona Building redevelopment

The Fiona Building Redevelopment comprises the heritage Fiona House, Fiona House extension and proposed new Hall building, relocation and upgrade of the existing pick-up and drop-off area and adjustments to the main entrance carpark.

The redevelopment would include approximately 468m^2 of additional gross floor area of improved existing amenities for the school; including a new hall, upgrade main office and school classrooms.

The redevelopment comprises on the following general activities:

- Demolition of existing commercial building on New South Head Road
- Refurbish and extension of the Fiona House
- Minor earthworks
- Front driveway car parking re-configuration
- New pick-up and drop-off area
- Others.

There are no changes to the self-imposed student cap of 1,240 students or staff cap of 255 staff is proposed.

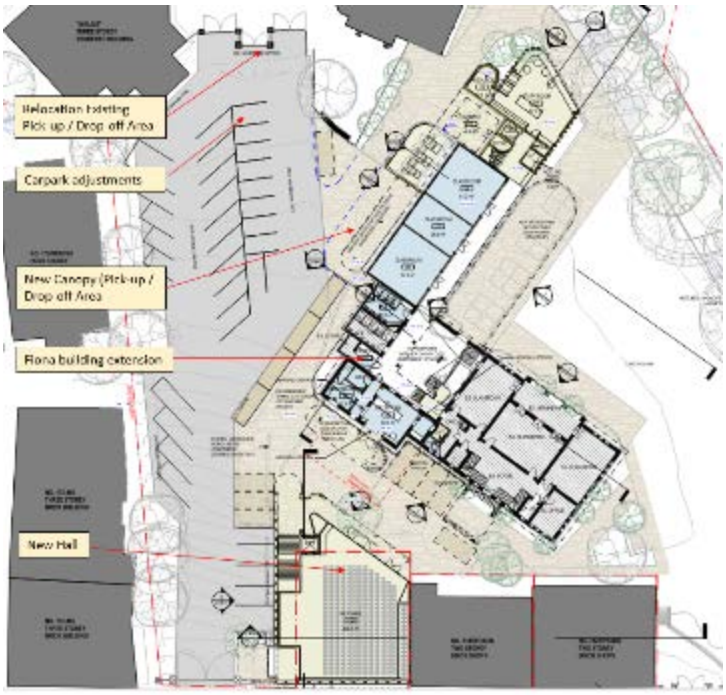


Figure 13 Proposed Fiona Building redevelopment

Source: BVN Architects (2021)

4.2 Proposed new pick-up and drop-off area

The pick-up and drop-off area is proposed to be relocated and extended to allow additional simultaneous operations.

The pick-up and drop-off area relocation requires to remove 6 car spaces to extend the queuing area within the carpark and facilitate a wider and safer area for the operations.

The existing pick-up and drop-off area has an area of approximately 80m length for vehicles queuing within the school carpark. The proposed relocated pick-up and drop-off area will extend approximately additional 30m the queuing capacity for vehicles entering the carpark.

The area is proposed to have adequate space for a total of 7 simultaneous pick-ups and drop-offs in comparison to the existing pick-up and drop-off arrangement of 2 spaces.

In addition the proposed area provides adequate overtaking space for vehicles that have completed a pick-up or drop-off without blocking the through traffic of the carpark traffic aisle approaching the exit.

Table 10 below provide details of the number of vehicles queuing in the current carpark and pick-up arrangement and the estimated queue with the proposed new pick-up and drop-off area.

Table 10 Existing and estimated queue lengths

Pick-up operations 15:00 to 15:35	**Entry Queueing (veh)**		**Exit Queueing (veh)**
	Ascham School carpark	New South Head Rd	Ascham School carpark
Existing Pick-up / drop-off Capacity queuing entry (13-14 vehicles) Capacity queuing exit (13-14 vehicles)	Max queue observed 10 veh within the carpark	(*)Max queue observed 12 veh	(*) Max queue observed 6 veh within the carpark
Proposed Pick-up / drop-off Capacity queuing entry (19-20 vehicles) Capacity queuing entry (9-10 vehicles)	19-20	Estimated queue on New South Head Rd 3-4 vehicles	Estimated queue within carpark 9-10 veh

(*) Queues length observed during the site inspections 24 February 2021

The proposed pick-up and drop-off area is likely to improve the queuing of vehicles on New South Head Rd from the observed queue lengths of 12 vehicles spilling back beyond Darling Point Rd to 3 to 4 vehicles contained between the signalised pedestrian crossing and the Ascham School access.

The queue length will still be subject to the pedestrian signals operation holding vehicles to the west of the crossing when the pedestrian phase is activated.

The queue length for exiting vehicles within the carpark was observed to hold a maximum of 6 vehicles before entering New South Head Road during the pick-up times.

The relocation and upgrade of the drop-off/pick-up would increase the capacity within the school campus for queuing vehicles (from the entry gate to the pick-up/drop-off area. For details of queuing observations refer to Appendix C.

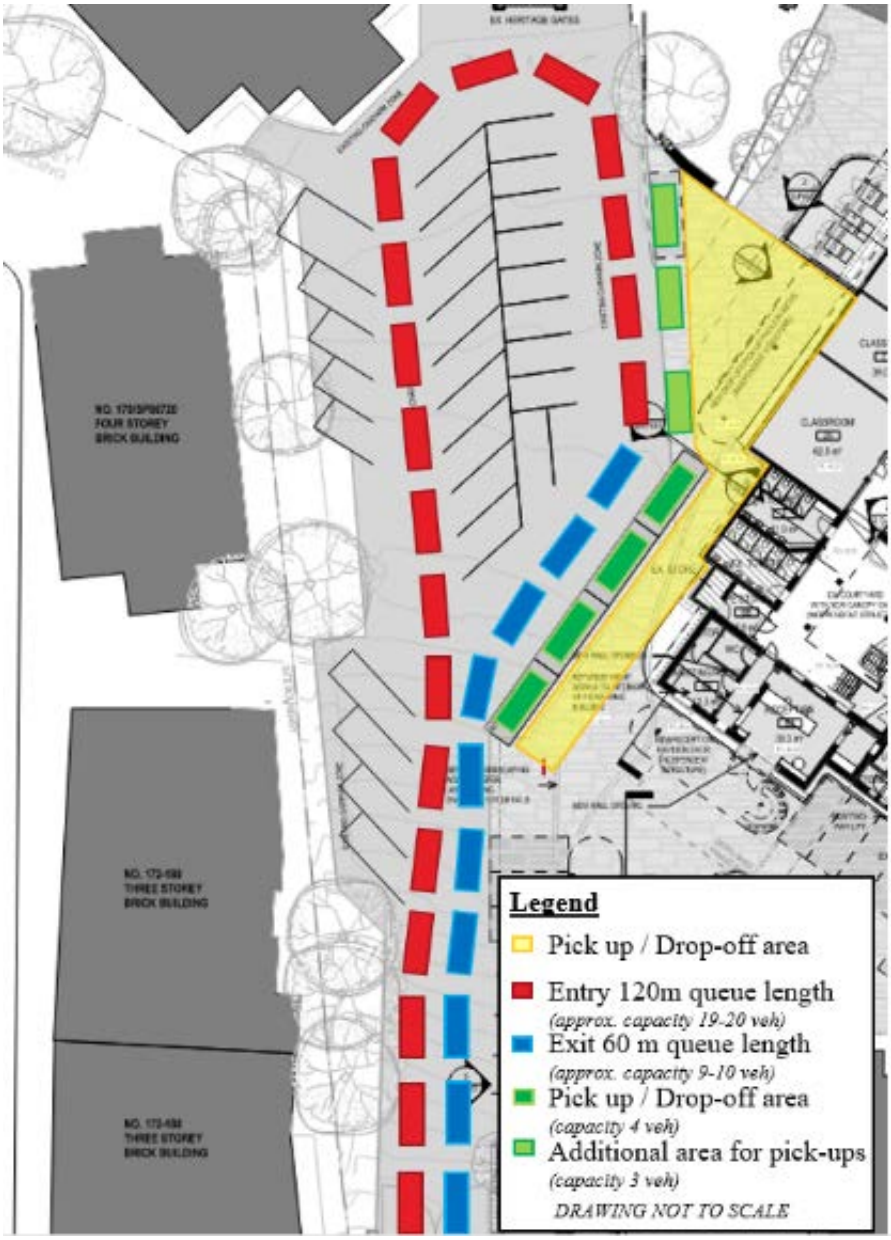


Figure 14 Vehicle queuing carpark, proposed pick-up / drop-off area

5 Traffic impacts

5.1 Traffic generation

Fiona Redevelopment does not propose any increases to the self-imposed student or staff cap. Furthermore, changes to the operation of the car park near New South Head Road are limited to a reconfiguration of the drop-off/pick-up facility and removal of six car parking spaces.

Fiona redevelopment does not propose any changes to the existing Duntrim building and traffic generation listed in the Traffic and Transport Assessment December 2013.

Fiona redevelopment does not propose any changes to the existing Margaret Bailey Building in accordance with Woollahra DCP 2015 and traffic generation listed in the Traffic and Transport Assessment November 2016.

The self-imposed cap, including the staff cap of 255 members has not been reached as dated in March 2022.

5.2 Traffic volumes (ADT 2019-2021)

The Transport NSW permanent traffic classifier count station (ID-10011) located on New South Head Road 90m east of Bayswater Road provides details of the traffic conditions in the proximity to the Ascham School campus.

Permanent traffic counts indicate that during the AM peak period between 2019 to 2021 the eastbound traffic has slightly reduced from 6,670 ADT to 6,509ADT and during the PM peak period the traffic has experienced a reduction from 8,579ADT to 7,096 ADT.

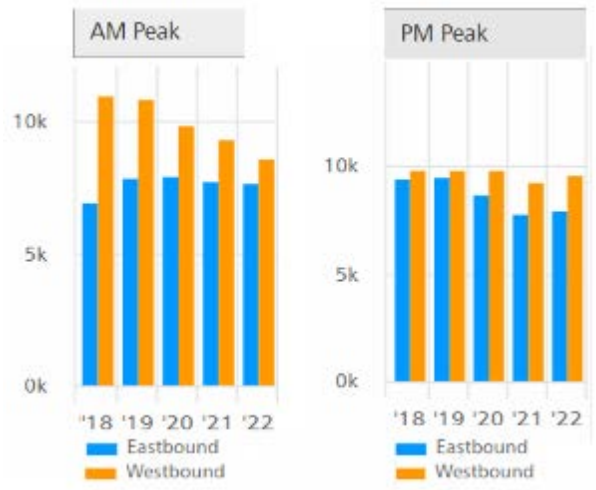


Figure 15 Permanent Traffic counts Transport NSW New South Head Road (2019-2021)

Source: Transport NSW Traffic Volume Viewer Station 10011

5.3 Road network impacts

Traffic counts indicate that the AM peak traffic conditions had minimal disruptions due to Covid-19 pandemic. Traffic counts also indicate that the PM peak traffic conditions are gradually recovering to pre-pandemic volumes.

The self-imposed cap, for staff and students in placed since 2016 indicates that the traffic generated by the school has retained a similar profile and impacts in the local road network in the last 5 years and it is most likely to continue with the same profile beyond the opening of the Fiona building redevelopment.

5.4 Road network impacts strategy

To minimise the impacts in the local road network by the reduction in car parking spaces, further potential measures would be implemented to encourage staff to use public transport and reduce private vehicle to Ascham School (shown in Table 11).

Traffic generation and impacts to road network operation following the Fiona Building Redevelopment is expected to be consistent or slightly lower than existing traffic conditions.

This change would be consistent with the Ascham School's Green Travel Plan, which aims to promote sustainable travel options and encourage trips by modes other than private vehicle.

Table 11 Potential measures

Action	Responsibility
Advocate to Transport for NSW and Woollahra Council for improved cycling connectivity at Edgecliff	Ascham School
Integrate a carpool system for staff to facilitate and encourage carpooling	Ascham School
Use marketing to encourage public transport use, such as trip plans to and from major student and staff places of residency	Ascham School

Furthermore, the reduction in car parking spaces would be required to help reduce potential impacts on the surrounding road network.

The reconfigured car park will increase drop-off/pick-up queueing capacity and reduce potential impacts of queue spillback on to New South Head Road.

5.5 Proposed new Drop-off and pick-up impacts

The Fiona Building Redevelopment would include the reconfiguration of the car park near New South Head Road including the relocation of the drop-off/pick-up facility southeast of the existing location.

Access to the drop-off/pick-up facility would continue to be via a two-way access onto New South Head Road (of which the intersection allows left-in/left-out only).

The relocation of the existing pick-up and drop-off areas will improve traffic operations with this carpark and reduce traffic conflicts at the main access by vehicles queuing on New South Head Road.

The proposed pick-up and drop-off areas will provide adequate space for simultaneous pick-ups and drop-offs and flexibility for additional space for additional multiple pick-ups and drop-offs in the event of heavy congestion.

The proposed pick-up and drop-off areas provide adequate space for vehicles to overtake safely standing vehicles.

The capacity at the proposed new pick-up/drop-off area is dictated by the number of vehicles loading spaces at one time (approximately 7 vehicles at the proposed area).

The relocation and upgrade of the drop-off/pick-up would increase the capacity within the school campus for queuing vehicles (from the entry gate to the pick-up/drop-off area.

It is expected that in a worst-case scenario the carpark can cater for 29 to 30 vehicles queuing within the carpark from entry to exit points. Comprising of 19 to 20 vehicles queuing for pick-ups and drop-off operations and 9 to 10 vehicles queuing for exiting the carpark without disrupting vehicles that pull over for pick-ups and drop-offs. This would reduce the potential for queue spillback on to New South Head Road.

The operational timing for pick-ups and drop-off for vehicles entering and exiting the carpark is estimated to be reduced from the current average time of 3 minutes and 48 seconds.

5.6 Off-street vehicle parking impacts

As discussed in Section 3.5, there are currently 55 car parking spaces at the front driveway servicing the Fiona Building.

The Fiona Building Redevelopment would include the re-configuration of the car park near New South Head Road, to allow improvements to the pick-up and drop-off areas, which would result in the loss of six car parking spaces.

Table 12: Proposed off-street parking within Ascham School Campus

Car Park	Existing carpark	Proposed carpark
Front Driveway Fiona Redevelopment carpark	51	44
Underground Wallis	9	9
Fiona Building	4	**5**
Dower Garage and Hardstand	2	2
Rear Driveway	26	26
Undercover off Rear Driveway	21	21
St Marks Garage	2	2
43 Darling Point Road Garage	1	1
Duntrim	26	26
Total	**142**	**136**

5.7 Ascham School carpark changes impacts

The existing carpark access at the front driveway near New South Head Road would remain as per the existing conditions.

The internal circulation within the carpark front Driveway Fiona Redevelopment carpark would remain as per the existing conditions.

Removal of a total of 6 carpark spaces will have minimum impacts in the carpark demand.

Details of the changes to the existing carpark as provided in Table 13.

Table 13 Carpark changes

Car Park	Changes
Front Driveway Fiona Redevelopment carpark	Removal of 7 parking bays to allow improvements for the new pick-up and drop-off areas
Underground Wallis	No changes
Fiona Building	1 additional parking bay
Dower Garage and Hardstand	No changes
Rear Driveway	No changes
Undercover off Rear Driveway	No changes
St Marks Garage	No changes
43 Darling Point Road Garage	No changes
Duntrim	No changes

5.8 Vehicle swept paths

A swept path check was undertaken for a SRV design vehicle and smaller vehicles (B99) confirming the adjustments to the front driveway carpark and removal of 5 parking bays do not impact the traffic operations.

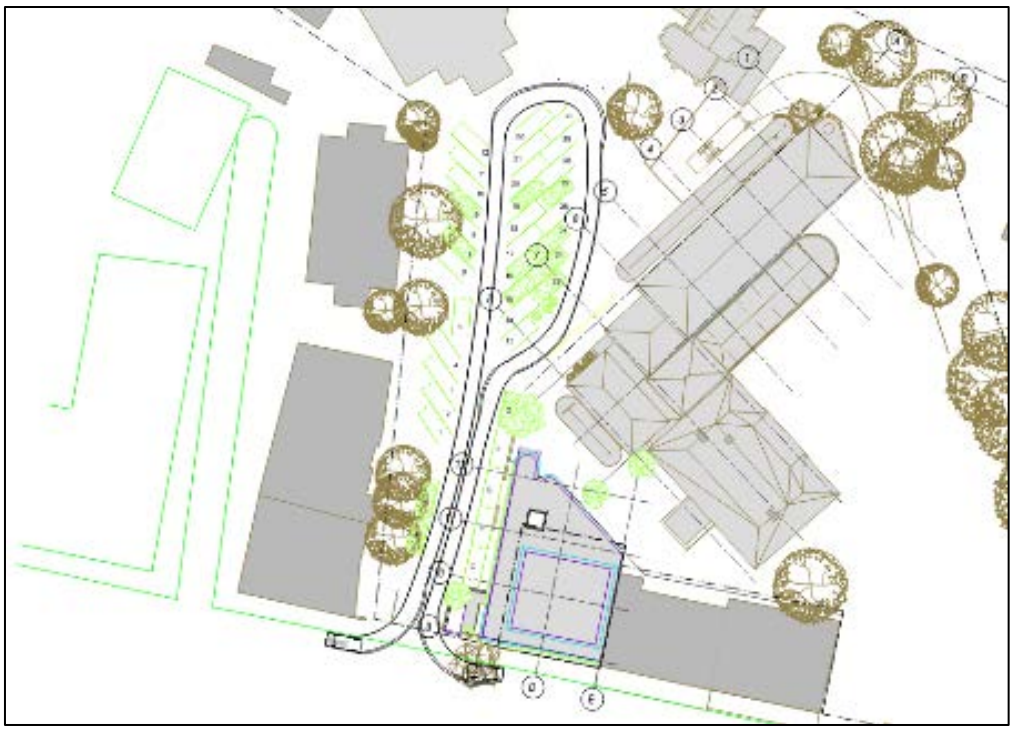


Figure 16 Swept patch check

5.9 Site inspection findings

Site inspections conducted by Arup on Wednesday 24 February 2021 indicate that during the afternoon pick-up time, vehicles entering the carpark take an average of 3 minutes and 51 seconds to complete a pick-up operation and leave the carpark.

This is based on a sample of vehicles counting entering and exiting the carpark between 3:25pm and 3:40pm on 24 February 2021 under wet weather conditions.

Vehicles exiting the carpark are subject to the traffic platoons from the signalised pedestrian crossing on New South Head Road – Edgecliff train station and gaps from the signalised intersection of New South Head Road and Ocean Avenue.

The school allocates and rosters staff to supervise and manage the pick-up/drop-off zone each day in both before and after-school periods.

Staff member monitors vehicles entering the carpark and calls the student's name up to the staff member at the pick-up area where the students are to wait. The student is called out and ready for their parent/ carer by the time they reach the pick-up area. For details of site inspections findings refer to Appendix C.

Figure 17 New South Head Road access - vehicles entering

Source: Site visit (24 February 2021)

Figure 18 New South Head Road access – traffic signals platoon afternoon peak time

Source: Site visit (24 February 2021)

Figure 19 New South Head Road access – traffic signals platoon afternoon peak time

Source: Site visit (24 February 2021)

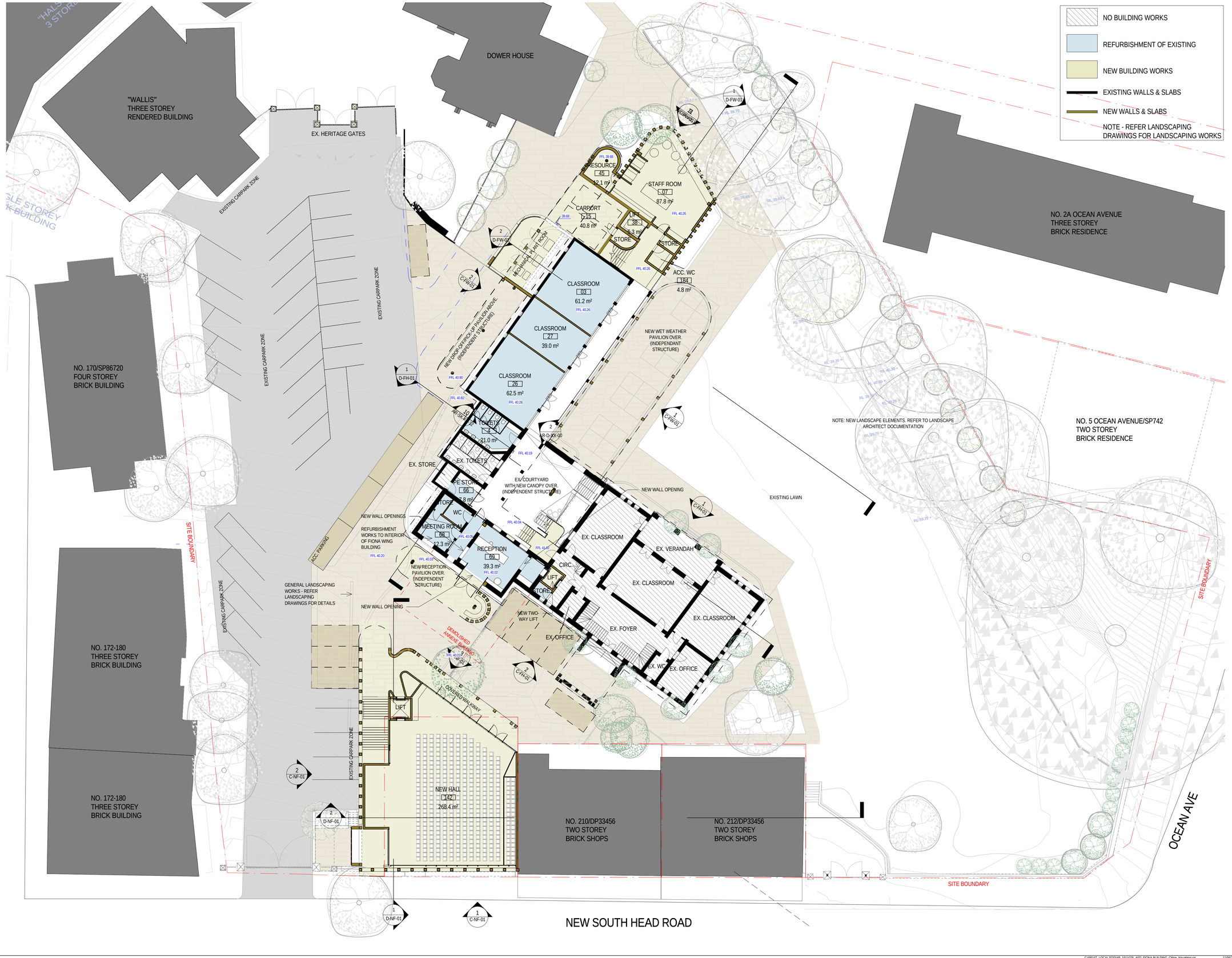
6 Conclusions

- The Fiona Building Redevelopment does not propose any increases to the self-imposed student or staff cap.
- The self-imposed cap, including the staff cap of 255 members has not been reached as dated in March 2022.
- The relocation and upgrade of the drop-off/pick-up would increase the capacity within the school campus for queuing vehicles (from the entry gate to the pick-up/drop-off area.

  It is expected that in a worst-case scenario the carpark can cater for 29 to 30 vehicles queuing within the carpark from entry to exit points. Comprising of 19 to 20 vehicles queuing for pick-ups and drop-off operations and 9 to 10 vehicles queuing for exiting the carpark without disrupting vehicles that pull over for pick-ups and drop-offs. This would reduce the potential for queue spillback on to New South Head Road.
- The operational timing for pick-ups and drop-off for vehicles entering and exiting the carpark is estimated to be reduced from the current average time of 3 minutes and 48 seconds.
- The impacts of the co-curricular activities after school offsets the pick-ups time and releases the pressure from the afternoon peak time demand.
- The existing carpark access at the front driveway near New South Head Road would remain as per the existing conditions. The internal circulation within the carpark front Driveway Fiona Redevelopment carpark would remain as per the existing conditions.
- A swept path check was undertaken for a SRV design vehicle and smaller vehicles (B99) confirming the adjustments to the front driveway carpark and removal of 5 parking bays do not impact the traffic operations.
- The existing carpark access at the front driveway near New South Head Road would remain as per the existing conditions.
- The reconfiguration of the car park near New South Head Road would result in the loss of six car parking spaces. However, this change would be in alignment with Ascham School's Green Travel Plan, which aims to promote sustainable travel options and courage trips by modes other than private vehicle.
- To minimise the impacts of the reduction in car parking spaces, further potential measures would be implemented to encourage staff to use public transport and reduce private vehicle traffic generation to Ascham School. For details refer to the Green Travel Plan report for Ascham School
- Traffic generation and impacts to road network operation following the Fiona Building Redevelopment are expected to be consistent or slightly lower than existing traffic conditions.

Appendix A

Fiona Building Redevelopment Design



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1	16/02/2021	FOR INFORMATION
2	01/03/2021	FOR INFORMATION
3	04/03/2021	FOR INFO - 50% DA
4	25/03/2021	FOR INFO - PRE DA
5	26/04/2021	FOR INFO - PRE DA
6	11/06/2021	FOR DA

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CONSULTANT: STRUCTURAL
SDA STRUCTURES
TEL (02) 9277 7777

CONSULTANT BCA/PCA/DDA
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CLIENT
Ascham School
ASCHAM SCHOOL

PROJECT
ASCHAM FIONA DEVELOPMENT
188 NEW SOUTH HEAD RD, EDGECLIFF

BVN PROJECT NUMBER
1911025

DRAWING KEY

TRUE NORTH PROJECT NORTH

GRAPHIC SCALE
0 2000 5000

SCALE
1 : 200@A1

STATUS
DEVELOPMENT APPLICATION

DRAWING
FLOOR PLAN GROUND

AR-B-00-02 ISSUE 6

Appendix B

Traffic Comments Action Plan letter to Council

Your ref
Our ref 280586
File ref

ARUP

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Candice Heapes
Business Manager
Ascham School
188 New South Head Road
Edgecliff NSW 2027 Australia

9 March 2022

Dear Candice,

Fiona Building Redevelopment - Ascham DA 330/2021 Traffic Comments

Background

Woollahra City Council in correspondence with Urbis provided comments on the traffic and parking assessment and green travel plan reports prepared by Arup (July 2021) related to the DA 330/2021 Fiona Building Redevelopment. A meeting was held on 7 March 2022 with Woollahra Council, Urbis, BVN Architects and Arup to clarify the traffic comments raised by council and this included the following points:

1. *Parking Provision –*
    1. *A total shortfall of 51 spaces for on-site parking provision;*
    2. *A revised GTP using more recent data with consideration of work from home arrangement and staff preference on travel mode under pandemic be submitted for further assessment;*
2. *Pick-up/Drop-off – a more quantifiable analysis should be submitted regarding the pick-up/drop-off operation demonstrating:*
    - *Average pick-up/drop-off time per vehicle in the carline;*
    - *Travel mode split during Covid pandemic;*
    - *Size of Walkers Group to the Edgecliff Station;*
    - *Number of waiting spaces needed to prevent approaching queue spillback onto New South Head Road;*
    - *Number of waiting spaces needed to prevent egressing queue blocking the carline.*
3. *Construction Traffic Management Plan – A revised CTMP be provided containing additional information as per required in the report.*

Purpose

The purpose of this letter is to outline the actions plan addressing the traffic comments from Woollahra City Council for the panel meeting scheduled for 10th March 2022.

Action Plan

The following table provides details of traffic comments from Woollahra Council, recent discussion with Council clarifying their comments and a summary of the actions in order to update accordingly the traffic and parking assessment report and the green travel plan report (GTP).

	Woollahra Council comments	Action plan	Reference
1	- *A total shortfall of 51 spaces for on-site parking provision;*	As discussed with Council in meeting from 7 March 2022, there is a total loss of 6 carpark spaces. These car spaces are required to be removed to improve current pick-up and drop-off operations within the school. Council has noted that student and staff cap will remain the same. Removal of 6 carpark spaces will have minimum impacts in the carpark demand. Ascham School has an existing total provision of 142 car spaces distributed in 9 different parking locations within the campus. **Action 1** - Include details in the green travel plan report (GTP) on mitigation measures proposed to minimise the impacts on carpark spaces shortfall.	Updates required in GTP report: **Section 1.3** **Section 3**
2	- *A revised GTP using more recent data with consideration of work from home arrangement and staff preference on travel mode under pandemic be submitted for further assessment;*	Arup raised a question regarding the assessment of traffic indicators and performance under Covid pandemic scenario by the time the Fiona Building construction works are completed. Council mentioned during the meeting their concern for the additional usage of private vehicles by parents opting for this mode of transportation instead of public transport during Covid pandemic **Action 2** - Include in the traffic reports additional permanent strategies that the school may implement with consideration of work from home arrangement and staff preference on travel mode	Updates required in GTP report: **Section 1.3** **Section 3** Updates required in traffic and parking report: **Sections 3.1, 3.2, 3.4** **Section 4** **Section 5**
3	- *Pick-up/Drop-off – a more quantifiable analysis should be submitted regarding the pick-up/drop-off operation demonstrating:* - *Average pick-up/drop-off time per vehicle in the carline;* - *Size of Walkers Group to the Edgecliff Station;*	**Action 3** - Include in the traffic reports updated number students comprising a walking group to the Edgecliff Station - Identify impacts on pick-up and drop-off operation from co-curricular activities after school	Updates required in GTP report: **Section 3** Updates required in traffic and parking report: **Section 4** **Section 5**
4	- *Travel mode split during Covid pandemic;*	Refer to item 2 comments Working arrangements, travel patterns and mode splits were and are affected by the Covid pandemic. As restrictions are lifted and commuters are preparing for a post-pandemic scenario, working arrangements, travel patterns and mode splits are likely to be adjusted. There are measures implemented	Updates required in GTP report: **Section 3** Updates required in traffic and parking report: **Section 4** **Section 5**

	Woollahra Council comments	Action plan	Reference
		temporarily and other measures that are constantly monitored to establish a permanent strategy. **Action 4** - Update latest profile of student and staff population in the traffic and parking report and in the green travel plan. - Provide details of the site inspection conducted in February 2021 between the lockdown periods. - Include in the traffic reports additional permanent strategies that the school may implement with consideration of work from home arrangement and staff preference on travel mod	
5	- *Number of waiting spaces needed to prevent approaching queue spillback onto New South Head Road;* - *Number of waiting spaces needed to prevent egressing queue blocking the carline.*	The pick-up and drop-off area is proposed to be relocated and extended to allow additional simultaneous operations. The new pick-up and drop-off area requires to remove 6 car spaces in order to extend the queuing area within the carpark and facilitate a wider and safer area for the operations. The existing pick-up and drop-off area has an area of approximately 80m for vehicles queuing. The proposed relocated pick-up and drop-off area will extend approximately additional 30m the queuing capacity for vehicles entering the carpark. The area is proposed to have adequate space for simultaneous pick-ups and drop-offs and overtaking without blocking the through traffic of the carpark aisle approaching the exit. **Action 5** - Include in the traffic reports details of the pick-up and drop-off area, showing vehicle queuing capacity for vehicles entering and exiting.	Updates required in GTP report: **Section 3** Updates required in traffic and parking report: **Section 4**
6	- *Construction Traffic Management Plan – A revised CTMP be provided containing additional information as per required in the report.*	- Requirements to update the construction traffic management plan (CTMP) to be confirmed after the panel briefing on 10 March 2022.	- TBA

Should you have any questions, please contact the undersigned on telephone 02 9320 9272

Yours sincerely

Antonio Villacorta
Senior Traffic Planner

Appendix C

Site Inspections Details

Memorandum

ARUP

To	Candice Heaps Business Manager, Ascham School	Date	31 March 2022
Copies	Chloe Naughton Nicholas Souksamrane	Reference number	280586
From	Antonio Villacorta, Jordan Cashel	File reference	ASC-MEM-003
Subject	**SITE INSPECTION FINDINGS**		

1 Site inspection details

Table 1 Project details

Project Number	**280586**
Title	Site inspection findings – Ascham School
Site	Ascham School campus, 188 New South Head Rd, Edgecliff NSW 2027
Project Description	The Fiona Building Redevelopment forms part of the Ascham School Campus located in Edgecliff. The Fiona Building Redevelopment comprises the heritage Fiona House, Fiona House extension and proposed new Hall building, relocation of the existing pick-up and drop-off area and adjustments to the main entrance carpark.
Client Company	BVN Architects on behalf Ascham School
Client contact details	Chloe Naughton, Chloe_Naughton@bvn.com.au Nicholas Souksamrane, Nicholas_Souksamrane@bvn.com.au Candice Heaps, Candice.heapes@ascham.nsw.edu.au
Project Contact	Antonio Villacorta, Antonio.Villacortya@arup.com
Project Phone	02 93209072
Observers	Antonio Villacorta Jordan Cashel
Date and Time of inspections	24 February 2021 14:00 to 16:30
Location	Refer Map
Weather conditions	Wet weather
Notes	The site inspections took place between the lockdowns during the first window of Covid-19 lifting restrictions in early 2021.

2 Existing carpark details

Ascham School has a total of 142 carpark spaces distributed in 9 different carparks within the school campus.

There is currently a total of 55 car parking spaces servicing the Fiona Building, consisting of 51 car parking spaces at the front driveway near New South Head Road and 4 spaces adjacent the Fiona Building. These parking spaces are provided for staff and visitors only.

Table 2: Existing off-street parking within Ascham School Campus

Car Park	Number of Spaces
Front Driveway Fiona Redevelopment carpark	51
Underground Wallis	9
Fiona Building	4
Dower Garage and Hardstand	2
Rear Driveway	26
Undercover off Rear Driveway	21
St Marks Garage	2
43 Darling Point Road Garage	1
Duntrim	26
Total	**142**

3 Map references

Figure 1 Map reference location

4 Entry and exit operations

1. The capacity of this drop-off/pick-up facility is dictated by the two existing vehicle loading spaces at one time. There is queue space available within the site (from the entry gate to the drop off facility) for approximately 13 to 14 vehicles to queue while the pick-up bays are occupied.
2. Vehicles exiting the carpark are subject to the traffic platoons from the signalised pedestrian crossing on New South Head Road – Edgecliff train station and gaps from the signalised intersection of New South Head Road and Ocean Avenue.
3. The school allocates and rosters staff to supervise and manage the pick-up/drop-off zone each day in both before and after-school periods.
4. Staff member monitors vehicles entering the carpark and calls the student's name up to the staff member at the pick-up area where the students are to wait. The student is called out and ready for their parent/ carer by the time they reach the pick-up area.

5 Vehicle counting (entry-exit)

Table 3 Vehicle counting driveway New South Head Road

	Site: Ascham	Entry 15:25 15:30	Entry 15:30 15:35	Entry 15:35pm 15:40pm	Entry 15:40pm -	Exit 15:25pm 15:30pm	Exit 15:30pm 15:35pm	Exit 15:35pm 15:40pm	Exit 15:40pm -
01	Dark grey (*)	-	-	-	-	X	-	-	-
02	White SUV	X	-	-	-	Y	-	-	-
03	Grey SUV (*)	-	-	-	-	X	-	-	-
04	Blue SUV	X	-	-	-	Y	-	-	-
05	Grey sedan (*)	-	-	-	-	X	-	-	-
06	Grey station wagon	X	-	-	-	-	-	Y	-
07	White SUV	X	-	-	-	-	-	-	-
08	Brown SUV	-	X	-	-	-	-	-	-
09	Black SUV (*)	-	-	-	-	-	X	-	-
10	Blue SUV (*)	-	-	-	-	-	X	-	-
11	Green sedan	-	X	-	-	-	-	-	-
12	Black SUV	-	X	-	-	-	-	Y	-
13	Blue SUV	-	X	-	-	-	Y	-	-
14	Red sedan (*)	-	-	-	-	-	-	X	-
15	Black SUV	-	-	X	-	-	-	-	-
16	Grey sedan	-	-	X	-	-	-	-	-
17	White SUV	-	-	X	-	-	-	Y	-
18	Black SUV (*)	-	-	-	-	-	-	X	-
19	Black Sedan	-	-	X	-	-	-	-	-

(*) Vehicle not recorded entry time

Table 4 Entry and exit timing

Range	Number of Vehicles	Average Timing (sec) per veh
Entry and exit (<5 minutes)	4	190
Entry and exit (<10 minutes)	1	437
Entry and exit (>10 minutes)	1	759
Average time vehicles entry and exit 15:25 to 15:40		**231**

6 Vehicle Queuing

6.1 New South Head Road Queuing

Table 5 Queue length details

New South Head Rd (EASTBOUND) Point of Observation: East of pedestrian crossing	Lane 1 (veh)	Lane 2 (veh)	Lane 3 (veh)	Time	Queue Length (m)	Comments
Darling Point Road to Pedestrian crossing	5	n/a	n/a	15:00	35	
	4	n/a	n/a	15:05	28	
	7	n/a	n/a	15:10	49	Observed spill beyond Darling Point Rd
	2	n/a	n/a	15:15	14	
	3	n/a	n/a	15:20	21	
	6	n/a	n/a	15:25	42	
	5	n/a	n/a	15:30	35	
	4	n/a	n/a	15:35	28	
Signalised pedestrian crossing						
Pedestrian crossing to Ascham School Driveway	5	n/a	n/a	15:00	35	
	3	n/a	n/a	15:05	21	Ped crossing holding vehicles
	5	n/a	n/a	15:10	35	
	2	n/a	n/a	15:15	14	Ped crossing holding vehicles
	5	n/a	n/a	15:20	35	
	4	n/a	n/a	15:25	28	Ped crossing holding vehicles
	5	n/a	n/a	15:30	35	
	5	n/a	n/a	15:35	35	

6.2 Ascham School carpark queuing

New South Head Rd (EASTBOUND) Point of Observation: Approx. 30m from pick up	Entry lane	Exit lane	Time	Entry Queue Length (m)	Exit Queue Length (m)	Comments
Ascham School carpark	5	2	15:00	35	14	
	8	3	15:05	56	21	
	10	4	15:10	70	28	
	10	6	15:15	70	42	
	9	6	15:20	63	42	

7 Photographic records

Figure 2 Vehicles turning into the Ascham School Driveway

Source: Site visit (24 February 2021)

Figure 3 New South Head Road access - vehicles entering

Source: Site visit (24 February 2021)

Figure 4 New South Head Road access – traffic signals platoon afternoon peak time

Source: Site visit (24 February 2021)

Figure 5 Ascham School Fiona carpark

Source: Site visit (24 February 2021)

Figure 6 Main Entrance – Existing pick-up and drop-off area

Source: Site visit (24 February 2021)

Ascham School

Ascham School Fiona School Redevelopment

Operational Transport Management Plan

Final | 9 July 2021

Job number 280586-00

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Contents

Appendices

1 Introduction

Ascham School is located in Edgecliff, in Sydney's Eastern Suburbs, directly opposite Edgecliff Station as shown in Figure 1. Ascham School is a non-selective day and boarding school for girls. The school is separated into three distinct schools known as Preparatory (Hillingdon), Junior (Fiona) and Senior School. Student numbers are limited to a self-imposed cap of 1,240 students, inclusive of boarders, and a population staff cap of 255. The average number of Junior students (Years 3 to 6) at the Fiona building is 290 students.

This Operational Transport Management Plan (OTMP) defines the roles and responsibilities of the school, Woollahra Municipal Council, parents and carers of students attending the school and the various government agencies for management of access to the school for all modes of transport. The scope of this OTMP is the Fiona Building redevelopment. The OTMP for the wider Ascham School is consistent with the *Ascham School Operational Transport Management Plan* (Arup, 2014).

An aerial photograph showing the location of the Fiona Building within Ascham School is shown in Figure 1.

Figure 1: Site location – Fiona Building

Source: SIX Maps (2021)

2 Responsibilities

The *Traffic Management and Parking near Schools Policy, 2013 from* Woollahra Municipal Council (WMC) outlines a number of school 'responsibilities' that are not reflected in *State Environmental Planning Policies* (SEPP), the WMC *Local Environment Plan* (LEP) 1995 or the WMC *Educational Establishments Development Control Plan* (DCP) 2012.

The following sections are extracted from the policy, which outline the responsibilities of various authorities and stakeholders. Responsibilities for each section have been reviewed for particular relevance to Ascham School.

2.1 Woollahra Municipal Council (WMC)

WMC has the following responsibilities with regard to traffic and parking management measures near schools, and childcare centres:

Infrastructure & Speed Management

- To analyse statistical traffic information such as crash data, vehicle volume counts and speed counts to help determine if there are any specific infrastructure or speed management measures required.
- To undertake road safety audits near schools, in consultation with the school staff and parent groups. The road safety audit should be based on a risk minimisation strategy (rather than responding solely to historical accident statistics).
- To install appropriate local area traffic management and traffic calming, subject to prioritisation through the annual traffic strategy review process.
- To install appropriate line marking and signage relating to safety and traffic management on public roads, in accordance with the delegation from Transport for NSW (Section 50 *Transport Administration Act 1988*).
- To refer relevant traffic and parking matters to the Woollahra Traffic Committee.
- To refer relevant matters, which are outside the delegations to Council, to Transport for NSW for further investigation.
- To install appropriate on-street pick-up/drop-off parking restrictions for schools. The pick-up/drop-off zone should be on the school side of the road, as far as possible. Where a school has multiple entrances, the pick-up/drop-off zone should be on the least busy road.
- To install Bus Zone signage and bus stop furniture, where appropriate. The Bus Zone should be located as close to the school or childcare centre as practical. If feasible, the Bus Zone (inbound and outbound) should be located on the school, or childcare centre side of the road. If this cannot be achieved, where possible, a pedestrian crossing should be provided to the other side of the road to provide access to the Bus Zone.
- To identify locations near a school, where appropriate, which provide larger quantities of parking. This allows parents to park and walk the final part of the

journey to school (e.g. within a Council park, shopping centre, community centre).

- To provide safe and accessible footpaths for pedestrians.
- To provide safe bicycle facilities, in accordance with the Woollahra Bicycle Strategy.
- To provide adequate street lighting, particularly at pedestrian facilities.
- To undertake road pavement reconstruction where the road surface is unsafe or in poor condition, in accordance with the priorities outlined in the capital works program.
- To trim street trees, where appropriate, which impact on sight distance to pedestrians.

Education and Awareness Raising

- To provide information on Council's website regarding the operation of the Woollahra Traffic Committee and school road safety tips for use near schools.

Enforcement

- To allocate Council Rangers and Parking Patrol Officers to enforce parking restrictions near schools, and childcare centres, particularly where offences create safety concerns (cg. parking across a pedestrian crossing, double parking, parking across a driveway).

Planning

- To develop, review and impose appropriate planning controls, including an Education Establishments Development Control Plan.

2.2 Ascham School

Schools including Ascham School have the following responsibilities regarding traffic and parking management measures near their premises:

Infrastructure & Speed Management

- To provide appropriate pedestrian access, generally to all frontages that adjoin the public road. All pedestrian accesses should be segregated from vehicular access with clearly defined paths.
- To provide driveway accesses which ensure adequate pedestrian sight lines.
- If there is on-site parking, all vehicle movements should be separated from pedestrian movements by fencing, defined pathways, gates or other means.
- To provide on-site bicycle parking for staff and students.
- To consider the provision of school owned or chartered buses to transport students to and from school.
- To assist Council staff by providing feedback on road safety audit questionnaires.
- To provide observational advice and work with Council staff when they are undertaking a road safety audit near schools.

- To make recommendations to Council on the school 's desired pick-up/drop-off zone parking restrictions (e.g. No Parking, 5 Minute Parking or 15 Minute Parking restrictions). Note: the length of the pick-up/drop-off zone will not generally be increased. This reflects the objective for Council to balance the needs of the school with the needs of local residents.

Observation and Supervision

- To allocate staff to supervise and manage the pick-up/drop-off zone. This may be undertaken in conjunction with parent supervisors. Staff are to encourage parents to move efficiently through the pick-up/drop-off zone and not to park and loiter for extended periods.
- Staff are to encourage parents who are visiting for a longer period or socialising with other parents to park outside the pick-up/drop-off zone and walk the remaining distance.

Education and Awareness Raising

- To continue to provide road safety education as part of the school curriculum.
- To develop a Sustainable Transport Plan for staff and parents that addresses the following:
    - States formally, in writing that the school, or childcare centre supports the use of public and active transport and encourages families to leave their car at home.
    - States formally, in writing that students are discouraged from driving to school.
    - Identification of nearby public transport options.
    - Identification of safe walking routes.
    - Identification of nearby bicycles facilities.
    - Provides support to walking buses.
    - Provides support to cycling groups.
- To carry out regular travel questionaries in order to monitor travel patterns to the school and to develop appropriate strategies in response to overcome barriers and encourage the use of public and active transport.
- To participate in "Ride to School" and "Walk to School" events as a means to encourage active transport options. Schools could consider providing participants with a reward, such as a breakfast event.
- Consideration should be given to setting up temporary in-ground bike/scooter skills courses form students to utilise during lunchtimes.
- To develop a Traffic Management Plan for staff and parents that addresses the following:
    - Identifies potential impacts to the surrounding road network, specifically in relation to pedestrian safety and vehicle traffic, and recommends a course of action to address these impacts.
    - Identifies the safe traffic routes to the school.

    - Identifies the pick-up/drop-off zone for the school and advises parents of the parking restrictions and rules relating to the management of the pick-up/drop-off zone.
    - Reminds parents of the rules relating to parking restrictions, particularly where offences create safety concerns (e.g. parking across a pedestrian crossing, double parking, parking across a driveway).
- To develop a car pooling database that parents can sign up to and arrange to share lifts with other families.
- To promote the Sustainable Transport Plan and Traffic Management Plan through the school newsletter and website. To promote the Sustainable Transport Plan and Traffic Management Plan in welcome packs which are provided to families new to the school.
- To consider the creation of a road safety committee made up of parents, students and staff, who can be responsible for promoting road safety amongst parents and who can liaise with the other groups (Council, Transport for NSW, etc.) who also share responsibility for road safety near schools.

Planning

- To consider "sharing" parking spaces with another nearby property. For example, a nearby business or church may have parking spaces which are under-utilised during the school peak pick-up/drop-off time.
- To consider the introduction of staggered start and finish times for students in different school years.
- To try to minimise the number of days that students have to bring equipment, instruments and/or books to school with them in order to minimise barriers to active travel.

2.3 Parents/carers of students attending Ascham School

Parents and carers have the following responsibilities with regard to traffic and parking management measures near the schools:

Observation and Supervision

- To assist staff to supervise and manage the pick-up/drop-off zone. Parent supervisors are to encourage parents to move efficiently through the pick-up/drop-off zone and not to park and loiter for extended periods. Parent supervisors are to encourage parents who are visiting for a longer period or socialising with other parents to park outside the pick-up/drop-off zone and walk the remaining distance.

Education and Awareness Raising

- To educate and encourage children to utilise the following road safety tips:
    - Utilise designated pedestrian facilities (crossings, refuges, signals) where available. Pedestrians should take care when crossing the road. Cars don't always stop even when they should.

  - Do not cross the road, from between parked vehicles. Children are often too short to be observed by motorists.
  - Where there is a school crossing supervisor, pedestrians must wait on the footpath, at least one step back from the edge of the road, until the school crossing supervisor indicates that it is safe to cross.
- To utilise the following road safety tips:
  - Children aged four years to under seven years must be secured in a forward-facing restraint or booster seat.
  - Children should always get in and out of the car through the rear kerb side or 'safety door'. Where possible, children should remain in the car until an adult opens the "safety door". This helps ensure that children get out of the car safely.
  - Children should be dropped off and picked up from the school's designated pick-up/drop-off zone, in compliance with the school's road safety procedures and with care and courtesy.
  - Children should be met on the school side of the road, preferably at the school gate, particularly in wet weather. Do not wait (in a vehicle or standing) on the opposite side of the road, as this may encourage children to run across the road.
  - Parents should not call to their children to from across the road. Children should be taught to wait until parents come to them.
  - Children up to at least eight years old should hold an adult's hand in the car park, on the footpath and when crossing the road. Children between eight and at least ten years old should be closely supervised by an adult in the traffic environment and should hold an adult's hand when crossing the road.
  - Parents should talk their child through the 'STOP! LOOK! LISTEN! THINK!' routine every time they cross the road together.
  - Comply with the Australian Road Rules.
  - Comply with reasonable directions made by school crossing supervisors, school-designated parking supervisors, Council Rangers and the NSW Police.
  - Comply with 40 km/h School Zones which operate 8am to 9.30am and 2.30pm to 4pm on gazetted school days. The 40 km/h speed limit must be observed even if school children are not visible.
  - Comply with 40 km/h speed limit for traffic passing a school bus that is pick up or setting down school children.
  - Slow down on the approach to pedestrian crossings.
  - Do not perform U-tum manoeuvres in the vicinity of the school, including U-turns in driveways.

  - Comply with parking restrictions particularly where offences create safety concerns (e.g. parking across a pedestrian crossing, double parking, and parking across a driveway).
- To utilise the following cycling safety tips:
  - Identify safe bicycle routes, preferably on low-trafficked roads.
  - Ensure your child has a helmet that complies with AS2063.
  - Children under twelve and those adults accompanying them may ride on the footpath, unless there are signs specifically prohibiting cycling.

2.4 Transport for NSW

Transport for NSW have the following responsibilities with regard to traffic and parking management measures near schools, preschools and childcare centres:

Infrastructure & Speed Management

- To install School Zones adjacent to schools, including the signage, line marking and flashing lights where appropriate.
- To install speed cameras, where appropriate.
- To install pedestrian signals and pedestrian phases at traffic signals.
- To review and modify the traffic signal phasing near schools to ensure it is appropriate to meet the needs of the school, particularly during the morning and afternoon peaks.
- To install appropriate traffic calming on State Roads.
- To install appropriate line marking and signage relating to safety and traffic management on public roads, where it has not been delegated to Council (Section 50 *Transport Administration Act 1988*).
- To investigate matters, which are outside the delegations to Council, at the request of Council and/or the school.

Observation and Supervision

- To provide a school crossing supervisor, where needed.

Education and Awareness Raising

- To continue to provide road safety education materials to be taught as part of the school curriculum.
- To develop general road safety education policies and develop appropriate education materials.

Research

- To continue to fund a Centre for Road Safety, which includes the investigation of safety around schools.

2.5 Education Agencies

The Education Agencies in NSW include the NSW Department of Education, the Catholic Schools NSW, the Association of Independent Schools of NSW and the NSW Education Standards Authority.

Education Agencies have the following responsibilities with regard to traffic and parking management measures near schools:

Education and Awareness Raising

- To continue to require road safety education to be part of the school curriculum.

Planning

- To plan new schools, preschools and childcare centres in appropriate locations, taking into consideration the surrounding land use and any traffic or parking management issues in the area.
- To consider "sharing" parking spaces with another nearby property. For example, a nearby business or church may have parking spaces which arc under-utilised during the school peak pick-up/drop-off time.

2.6 NSW Police

The NSW Police have the following responsibilities with regard to traffic and parking management measures near schools:

Enforcement

- To enforce parking restrictions near the school, particularly where offences create safety concerns (e.g. parking across a pedestrian crossing, double parking, parking across a driveway).
- To enforce traffic restrictions near the school, particularly where offences create safety concerns (e.g. speeding).

2.7 Public Transport Providers

Public transport providers have the following responsibilities with regard to traffic and parking management measures near the school:

Infrastructure & Speed Management

- To provide appropriate public transport options to meet the needs of the travelling public, including school children and their parents.

3 Measures to reduce traffic impacts

Ascham School presently uses several measures to encourage the use of sustainable transport modes and manage current traffic operation activities. These measures are detailed below.

Traffic management

- Management of traffic during morning peak periods (Fiona: 7.30am – 8:30am – Security Officer and Fiona Staff; Hillingdon: 7.45am – 9am – Security Officer and Hillingdon Staff) and afternoon peak periods (Hillingdon: 2:30pm - 3:15pm – Hillingdon Staff; Fiona: 3:00pm – 3:45pm – Fiona Staff and Security Officer) is focused on K-1 through to Year 2 students on Darling Point Road and Years 3 through 6 on New South Head Road.
- The Senior School students are not allowed to be dropped off or picked up within the school. Instead, Senior School students are encouraged to travel via public transport.
- Students are not permitted to drive to School / nor park within Ascham School.

Public transport and Active Transport Management

- Ascham School provides pedestrian access from three public roads - New South Head Road, Darling Point Road and Ocean Avenue. New South Head Road is the main road for access to the Fiona Building.
- Pedestrian access is segregated from vehicular access with clearly defined paths.
- At off-street carparks, vehicle movements are separated from pedestrian movements by defined pathways, fences etc.
- The school has adopted a bicycle policy which encourages staff and senior students to ride a bicycle to and from school.
- Ascham School students are welcome to share both The Scots College and Cranbrook School bus services.

Observation and Supervision

- The school allocates and rosters staff to supervise and manage the pick-up/drop-off zone each day in both before and after-school periods.

  Staff member monitors vehicles entering the carpark and calls the student name up to the staff member at the pick-up area where the students are to wait. The student is called out and ready for their parent/ carer by the time they reach the pick-up area.
- The school allocates at least 3 staff members along the driveway on New South Head Road and 4 staff members within the buildings with students to ensure they are on carline promptly.
- During critical peak periods (starting of the school terms) additional staff members are allocated to manage traffic along the main driveway on New South Head Road.

- In addition, the school allocates 1 staff member for the walking group and 1 staff member for students using public transport.

Education and Awareness Training

- Road safety education is taught as part of the school's personal development, health and physical education curriculum.
- Regular travel questionaries are carried out to monitor travel patterns to the school and to develop appropriate strategies to encourage the use of public and active transport.
- Regular reminders are sent to parents to remind them of the available public transport facilities.
- Questionaries and notice hubs are sent to parents at the beginning of the year to understand and plan for travel arrangements.
- 'Ride to school' and 'Walk to school' initiatives have been planned and undertaken to encourage active transport options.
- The Parents Association advocates car-pooling and encourages carpooling with other families.

4 Student and staff profiles

4.1 Student profile

The Ascham School student and facility masterplan includes a self-imposed student cap of 1,240 students (inclusive of boarders and spare spaces to cover natural attrition). A typical profile of students is shown in the table below. It is noted that student numbers may fluctuate based on family and student circumstance.

Class	Typical number of students
Prep	40
Year K-2	180
Year 3-6	290
Year 7-12 Senior (Day Girls)	596
Year 12 Senior (Boarders)	134
Total	**1,240**

School travel questionaries were conducted to establish the baseline mode share for students at Ascham School as shown below. It is noted that these findings are likely to not account for the impacts of the ongoing COVID-19 pandemic and recent work from home travel patterns.

Morning Arrival	Car	Public Transport	School Bus	Walk
Prep	95%	0%	0%	5%
Yr K-2 Hillingdon	95%	0%	0%	5%
Yr 3-6 Fiona	55%	30%	10%	5%
Yr 7-12 Senior (Day Girls)	55%	30%	10%	5%
Afternoon Departure	**Car**	**Public Transport**	**School Bus**	**Walk**
Prep	95%	0%	0%	5%
Yr K-2 Hillingdon	95%	0%	0%	5%
Yr 3-6 Fiona	55%	30%	10%	5%
Yr 7-12 Senior (Day Girls)	33%	37%	10%	20%

4.2 Staff profile

As of June 2021, there are currently 254 staff at Ascham School with a cap of 255 staff. The breakdown of staff is shown in the following table.

Category	Number
Teaching	163
Non-teaching	91
Total	**254**

School travel questionaries were conducted as part of the *Ascham School Operational Transport Management Plan* (Arup, 2014) to establish the baseline mode share for staff at Ascham School as shown below.

It is noted that these findings are likely to not account for the impacts of the ongoing COVID-19 pandemic and recent work from home travel patterns.

Staff Travel Mode	%
Car driver	66%
Car passenger	2%
Public transport	23%
Walk	9%

5 Pick-up /drop-off facilities

5.1 Provision of on-site facilities

Students who are driven to/from the school have a designated drop-off and pick-up area. Younger students are more likely to be dropped off and picked up due to their age and the perceived safety concerns from traffic surrounding the school. Therefore, Junior students are picked up and dropped off at internal loops within school grounds at the Fiona Building. These students start at 8.20am and finish at 3.10pm and it is estimated that approximately 120 cars will drop-off in the morning and pick-up in the afternoon.

The Fiona Building Redevelopment would include the relocation of the drop-off/pick-up facility southeast of the existing location. The proposed drop-off/pick-up arrangements with the relocation of the drop-off/pick-up area is shown in Figure 2.

Access to the drop-off/pick-up facility would continue to be via a two-way access onto New South Head Road (of which the intersection allows left-in/left-out only).

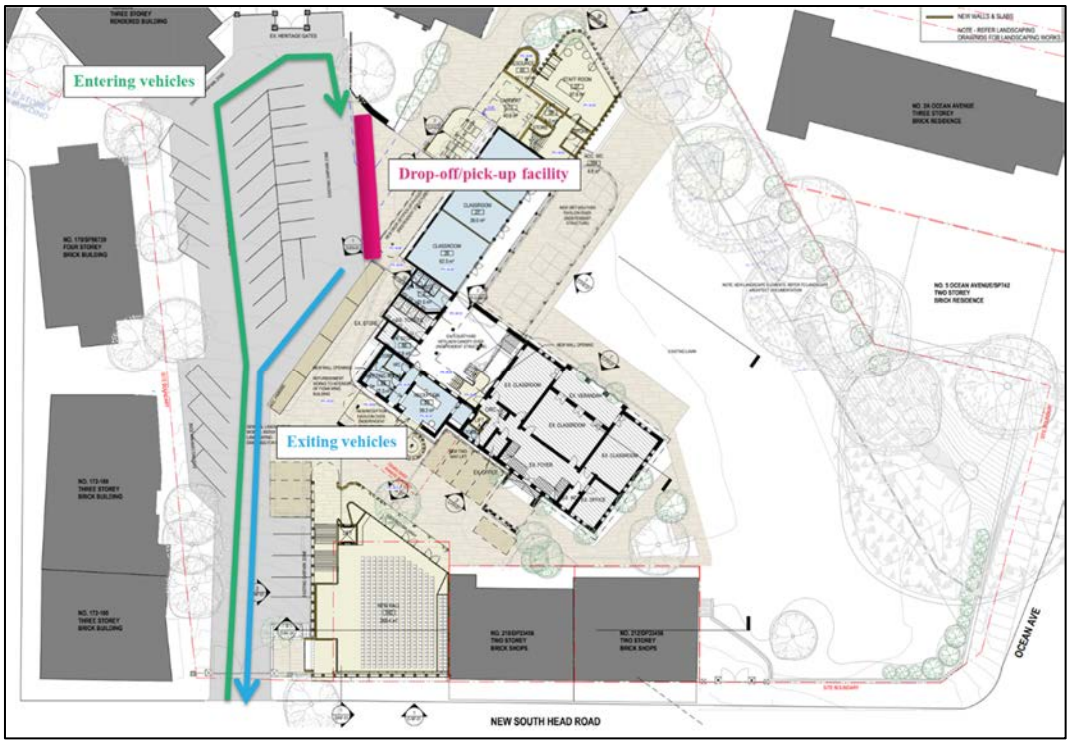

Figure 2 Proposed drop-off/pick-up arrangements

The capacity at the proposed new pick-up/drop-off area is dictated by the number of vehicles loading spaces at one time, (approximately 3 vehicles at one time) with additional space to safely overtake vehicles completing the pick-up / drop-off operation.

The proposed location of the new pick-up / drop-off area increases the capacity within the site for queuing vehicles (from the entry gate to the pick-up / drop-off

area) from approximately 13 vehicles to 16 vehicles to queue while the pick-up bays are occupied.

There would also likely be no impact from egressing vehicles as there is queue space of approximately 10 vehicles from the exit gate.

The Ascham Transport Management Policy which outlines the drop-off/pick-up operations is shown in Appendix A.

5.2 Safe management of facilities

Staff manage each of the pick-up/drop-off facilities in the morning and afternoon. Staff members are rotated on a roster, similarly to playground duty. There are up to three staff members at each facility, which manage traffic flow and students during the morning/afternoon.

The school will be using security guards to manage and monitor pick-up/drop-off to supplement the staff that are already rostered for Fiona Building car lines.

Operational times in the morning drop-off are 7.30am to 8.30am. In the afternoon, operational times are 3.00pm until 4.00pm. These times ensure that students have all been picked up and traffic flows are monitored correctly.

School starts at 8.20am with nominal finishing times staggered up to 3.30pm:

- Years 3-4 finish at 3.05pm
- Years 5-6 finish at 3.15pm

6 Travel demand management

As discussed in Section 3, Ascham School presently uses various measures to encourage the use of sustainable transport modes. Further potential measures to encourage shift to sustainable transport modes are described below to be implemented for students, staff and visitors. These measures are focused on:

- Addressing existing constraints in the active transport network.
- Increasing awareness and reduce barriers to public transport, particularly for older Year 3-6 and Senior Students.
- Reducing private vehicle car usage.

Table 1 Potential measures

Action	Responsibility
Advocate to Transport for NSW and Woollahra Council for improved cycling connectivity at Edgecliff	Ascham School
Integrate a carpool system for staff to facilitate and encourage carpooling	Ascham School
Use marketing to encourage public transport use, such as trip plans to and from major student and staff places of residency	Ascham School

7 Safe management of pedestrians

The main road for access to the Fiona Building is New South Head Road as shown in Figure 3 and Figure 4. Pedestrians are separated from vehicles when accessing the school.

- New South Head Road provides the main pedestrian access to the school. Pedestrians have separate access points and paths either side of the vehicular access. Access across New South Head Road is summarised below:
  - A midblock signalised pedestrian crossing is provided so that students are able to cross from the Edgecliff interchange to the school entry.
  - Signalised pedestrian crossings are provided on all approaches of the New South Head Road/Ocean Street/Ocean Avenue intersection.
  - Signalised pedestrian crossings are also provided on the east-west crossings of Darling Point Road/New South Head Road intersection.

Figure 3 Main accesses to the Fiona Building

Figure 4 Main Entrance – New South Head Road access

Source: Site visit (2021)

Appendix A

Ascham School Transport Management Policy

Contents

Purpose and principles

Ascham School respectfully requests the Ascham community to consider the safety of students, the environment, the local traffic conditions and the amenity and rights of local residents when deciding how to travel to and from Ascham.

- Ascham encourages students to travel to and from school whenever possible by public transport, private buses, bicycle or walking
- Ascham provides restricted campus access for parent/guardian vehicles for the purposes of student drop off/pick up during regulated hours
- Students are prohibited from driving to school
- On-campus parking is available for staff on an allocated or balloted basis (refer Parking Policy).

General policies

Transport

Ascham is well served by public transport. Accordingly students and staff are encouraged to travel to and from school by public transport.

- Trains and buses: Edgecliff railway station and bus terminal are opposite the School's main entrance on New South Head Road
- Ferries: Ascham is also within easy walking distance of Darling Point and Double Bay ferry wharves
- Private buses: A number of private bus services are available to students either run by Ascham or nearby schools.

Ascham encourages students and staff to walk or bicycle to school. Bicycle storage racks are located across the campus and showers and change facilities are also available.

Vehicle movements on campus

- Parent/guardian vehicular access to the Ascham campus is limited to the times specified below according to the section of the school the student attends
- For the safety of students and pedestrians all vehicles must observe the 10kph speed limit and the stop signs and the traffic calming devices when exiting
- 'No stopping/no standing/no parking' signs are there for safety reasons and must be observed
- There is no stopping on pedestrian crossings
- Surveillance cameras record all traffic movements on campus.

Parking

- On-campus parking is available for staff on an allocated or balloted basis (refer Parking Policy)
- Hourly or all-day parking is available at the Eastpoint Food Fair opposite Ascham on New South Head Road
- Parents visiting out of school hours (before 7am and after 4pm) or during the weekend or in vacation times may park in the school grounds in the designated parking spaces only
- Members of the Ascham community are discouraged from parking on local streets.

Senior School

All Senior School girls are encouraged to travel to and from school by public transport. Edgecliff railway station and bus terminal are opposite the School's main entrance in New South Head Road. Ascham is also within easy walking distance of Darling Point and Double Bay ferry wharves.

In addition to the excellent local public transport, a number of **private bus services** are available. These are as follows:

- Randwick via Centennial Park and Bellevue Hill - Holdsworth bus service. For details of the current bus route please contact Joe at the Holdsworth Centre, phone 9302 3605
- Inner West and North Shore - Cranbrook School operates services from the Inner West and North Shore which pass by Ascham on the way to and from Cranbrook and are available to our students. The Inner West service starts at Birchgrove and goes via Central Station. The North Shore service starts at Seaforth. The details of the routes, timetables and prices together with application forms are here
- The Scots College bus service - Scots runs a large number of bus services which pass by Ascham and are available to our students. The details of the routes, timetables and prices together with application forms are here.

Travelling by car

As the School is situated on a busy road (New South Head Road entrance) and in an area with many apartment buildings (St Mark's Road entrance) it is very important to be considerate of traffic flow and our neighbours' ease of movement.

Parents of Senior School students may use both the St. Marks Road entry and the New South Head Road entry for drop-off or pick-up at times which do not impact on the Hillingdon or Fiona carlines.

AT ALL TIMES:

- There is a **10kph** speed limit in the School grounds
- Do not block any of the pedestrian crossings as they are in constant use
- Do not park your car or wait in any of the staff parking spaces, or in visitor parking spaces outside of the School grounds.

The front drive (New South Head Road)

- Senior School girls may be driven into the School, however, the latest time for Senior School drop off in the front drive is 7.45am
- After 7.45am only those cars with specific Fiona identification will be allowed in
- Girls can be picked up in the front drive between 3.45pm and 4.15pm. There can be no waiting in the school driveway or on New South Head Rd obstructing traffic.

St Marks Road entrance (Octagon Road)

- Senior School parents may enter until 7.45am. Please remember this is a boarding area of the School and the speed limit is 10 kilometres per hour. Girls may **only** be dropped off near the kitchen/dining room
- It is essential that Senior School parents do not attempt to use the St Marks Road entrance after 7.45am or the whole Preparatory School program will be disrupted. After 7.45am only those cars with specific Hillingdon identification will be allowed in
- Senior School girls can be picked up from the area near the kitchen after 3.45pm. There can be no waiting on the School roadway obstructing traffic.

Fairy Walk

For girls walking to and from school, Fairy Walk is open from 7.30am - 9am and from 2.30pm - 6pm

Areas not to be used for drop off

- New South Head Road
- St Marks Road
- Ocean Avenue
- Do not park in any private parking spaces or across driveways.

Bicycles

Students are encouraged to ride to school. Bicycle racks are provided near the Fiona entry and under the Tennis Courts. Shower and change facilities are available in the gym.

Student Drivers

The School does not allow students to drive to school.

Fiona (Years 3 – 6)

Fiona girls, especially girls in Years 5-6, are encouraged to travel to and from school by public transport.

Edgecliff railway station and bus terminal are opposite the School's main entrance in New South Head Road. Ascham is also within easy walking distance of Darling Point and Double Bay ferry wharves.

In addition to the excellent local public transport, a number of **private bus services** are available. These are as follows:

- Randwick via Centennial Park and Bellevue Hill - Holdsworth bus service. For details of the current bus route please contact Joe at the Holdsworth Centre, phone 9302 3605.
- Inner West and North Shore - Cranbrook School operates services from the Inner West and North Shore which pass by Ascham on the way to and from Cranbrook and are available to our students. The Inner West service starts at Birchgrove and goes via Central Station. The North Shore service starts at Seaforth. The details of the routes, timetables and prices together with application forms are here
- The Scots College bus service - Scots runs a large number of bus services which pass by Ascham and are available to our students. The details of the routes, timetables and prices together with application forms are here.

Travelling by car

As the School is situated on a busy road (New South Head Road entrance) and in an area with many apartment buildings (St Marks Road entrance) it is very important to be considerate of traffic flow and our neighbours' ease of movement.

Fiona Carline procedures

AT ALL TIMES:

The following protocols have been developed to provide maximum safety for all children, parents and carers who use the carline. Adherence to these rules will also assist with an efficient pick-up and drop-off.

- The carline is to be used like a quick-moving taxi rank. Please remain alert to other vehicles and children in the vicinity. Follow the directions of staff that are on duty
- Stay in the queue and move forward as a space becomes available
- Drivers must remain in the car while in the carline; no-one is to leave the car – even momentarily – while it is in the carline
- There is a **10kph** speed limit in the School grounds
- Please do not block any of the pedestrian crossings as they are in constant use
- Please do not park your car or wait in any of the staff parking spaces, or in visitor parking spaces outside of the School grounds
- Please do not block New South Head Road or the exit driveways of the neighbouring apartments.

MORNING PROCEDURES:

The front drive (New South Head Road)

- Fiona girls may be driven into the front drive of the School
- Fiona supervision begins at **8am**
- All Fiona girls should arrive by 8.15am in time to prepare for class that begins at 8.20am
- A staff member is on duty at the car line until 8.20am
- Girls who are late for any reason and arrive after 8.30am need to report to the Fiona office to be signed in on arrival.

St Marks Road entrance (Octagon Road)

- Fiona parents may enter via St. Marks Road. Please remember this is a boarding area of the School and the speed limit is 10 kilometres per hour. Fiona girls may **only** be dropped off near the kitchen/dining room.

AFTERNOON PROCEDURES:

The front drive (New South Head Road)

- Collection times:
    - Years 3 and 4 3.05pm
    - Years 5 and 6 3.15pm
- If you arrive early please drive around again. There can be no waiting in the School driveway or on New South Head Rd obstructing traffic
- Parents in the car line need to display a name card and remain in their car at all times, so as not to slow down the carline. We ask parents to be mindful of not blocking traffic on New South Head Road
- After-school departure supervision for Fiona girls concludes at 3.40pm at White Gate.

Bus/train line

The bus/train line assembles outside Wallis Reception and the girls are taken across to the Edgecliff Centre via the crossing at the traffic lights at 3.25pm. The Holdsworth bus girls wait in the Norah Street Library in Fiona until the driver collects them.

Walkers

'Walkers' assemble near the Fiona building verandah steps and leave Fiona with a staff member via the pedestrian gate near the playground equipment. At approximately 3.20pm, a teacher escorts the girls to the corner of Ocean Ave and New South Head Rd from where girls are dismissed and cross the road or head down Ocean Ave, to walk home. Parents in cars may not take children out of the 'Bus/Train' or 'Walkers' groups part way along the journey.

Girls waiting for older sisters from the Senior School

Girls waiting for older sisters are to be collected no later than 3.45pm from supervision in the Norah Street Library in Fiona. Any girls not collected at White Gate by 3.40pm will be taken to the Fiona Reception where parents will be telephoned.

After school care

After School Care is available for all Fiona girls for occasions when parents know they cannot collect girls by 3.40pm, or in an emergency. For bookings, phone Belinda Bedingfield on 0408 273 366.

Hillingdon (Prep to Year 2)

Hillingdon Carline procedures

AT ALL TIMES:

The following protocols have been developed to provide maximum safety for all children, parents and carers who use the carline. Adherence to these rules will also assist with an efficient pick-up and drop-off.

- The carline is to be used like a quick-moving taxi rank. Please remain alert to other vehicles and children in the vicinity. Follow the directions of staff that are on duty
- Stay in the queue and move forward as a space becomes available
- Drivers must remain in the car while in the carline; no-one is to leave the car – even momentarily – while it is in the carline
- There is a **10kph** speed limit in the school grounds
- Please do not block any of the pedestrian crossings as they are in constant use
- Please do not park your car or wait in any of the staff parking spaces, or in visitor parking spaces outside of the School grounds
- Please do not block the entry to Octagon Road or the exit driveways of the neighbouring apartments
- All Hillingdon cars should keep to the right side of the School road (Octagon Road)
- Please do not overtake queuing cars that are waiting for a clear road ahead at the entry and exit points listed above.

MORNING PROCEDURES:

- Hillingdon supervision begins at **8am**
- Please do not arrive before 8am as it blocks the carline for through traffic and staff members
- Girls should not be left unsupervised on the carline before 8am
- All Kindergarten, Year 1 and Year 2 girls should arrive by 8.25am in time to prepare for their lessons that begin at 8.30am
- Prep girls should arrive by 8.55am for the commencement of their classes at 9am
- A staff member is on duty at the carline until 9am
- Girls who are late for any reason and arrive after 9am need to report to the Hillingdon office to be signed in on arrival
- Once the teacher on carline duty is sighted, girls should alight quickly and walk along the path to the playground
- Children's school bags and other items need to be with children in the car, **not** in the boot. Please do not ask children to get school bags in or out of the boot, nor should adults leave the car to do so
- Cars should be able to leave in 'batches' of four or five provided the children are ready with their bags and alight vehicles promptly
- Those with two-door vehicles only should alight to allow the children to get out on the right hand side
- Children are not permitted to alight on their own from the left hand side of the car.

AFTERNOON PROCEDURES:

- Parents in the carline need to display a name card and remain in their car at all times, so as not to slow down the carline. Your Hillingdon child will be directed to your car by a teacher. Please cooperate with staff directions and comply with parking signs
- Collection times:
    - Prep 2.30pm
    - Kindergarten 2.40pm
    - Year 1 2.50pm
    - Year 2 3pm
- If you arrive early please drive around again. Cars waiting in St Marks Road or inside Ascham before the class collection time cause a bottleneck and inconvenience everyone else.

After school care

After School Care is available for all Hillingdon girls for occasions when parents know they cannot collect girls by 3.20pm, or in an emergency. For bookings, phone Belinda Bedingfield on 0408 273 366.

Ascham Hub Notice

28 Jan 2021

Important Fiona Car Line Information

Dear Fiona Parents and Carers,

It has been delightful welcoming the girls yesterday and today for the start of the 2021 school year. We extend a warm welcome to all our new students and their families.

As the safety and wellbeing of all girls and staff is our priority, it is vital that we all work together to ensure a safe and efficient car line now that the girls have returned to School.

Collecting children at Whitegate via the front drive off New South Head Road
The Fiona car line, accessed via the front drive off New South Head Road, will operate as usual. The collection times are staggered to enable physical distancing for students, as well as to keep the car line flowing.

Please do not arrive before your daughter's class collection time. Cars arriving before these times only create congestion, and will be required to exit the front drive, go around the block and rejoin the carline. Please remember that the NSW Police have previously advised that it is not possible to queue on a clearway.

Class Collection times:
3.10pm - Years 3 and 4
3.20pm - Years 5 and 6

You will need to display your daughter's School name card upon entering the carpark and until your daughter has been collected. If you do not have a name card, please request one from the Fiona Office.

It is much more preferable for you to arrive later to collect your daughter than earlier. Families with more than one daughter in the Junior School are able to collect their daughters at their eldest daughter's class collection time. Supervision is provided on the Fiona car line until 3.40pm.

Other options for the collection of your daughter in the afternoons:
Walkers group to the Edgecliff Centre—As the School site is currently closed to parents, you may wish to meet your daughter at the Edgecliff Centre. A Walkers group assembles outside Wallis Reception where a staff member meets them. The girls are escorted to the Edgecliff Centre via the crossing at the traffic lights at 3.25pm.

Walkers group via Ocean Street or towards Double Bay—Students who are walking home via Ocean Street or towards Double Bay via New South Head Road must join the walkers group. Walkers assemble near the Fiona building veranda steps, outside the Year 3 classrooms, and leave Fiona with a staff member via the pedestrian gate near the playground equipment at 3.25pm.

Bus/train line—Fiona students are able to utilise public transport or private coaches. The bus/train line assembles outside Wallis Reception and the girls are taken across to the Edgecliff Centre via the crossing at the traffic lights at 3.25pm.

Camp Australia Outside School Hours Care—Camp Australia provides outside school hours care in Fiona. Girls may be booked in on a permanent or casual basis. Camp Australia provides afternoon tea, a time for girls to play and relax and homework supervision too. Camp Australia can be contacted on **oshc@campaustralia.com.au** or phone 1300 105 343.

Thank you for your understanding in regard to this matter.

Kind regards,

Mrs Judith Butcher,
Head of Junior School

By: Ascham Junior School Communications

Notice Link:

Important Fiona Car Line Information

Attachment:

N/A

URBIS

CLAUSE 4.6 VARIATION - HEIGHT OF BUILDINGS

Ascham School
188 New South Head Road,
Edgecliff

Prepared for
ASCHAM SCHOOL
17 May 2022

URBIS STAFF RESPONSIBLE FOR THIS REPORT WERE:

Director	Peter Strudwick
Senior Consultant	Brigitte Bradley
Project Code	P0030564
Report Number	2

Urbis acknowledges the important contribution that Aboriginal and Torres Strait Islander people make in creating a strong and vibrant Australian society.

We acknowledge, in each of our offices, the Traditional Owners on whose land we stand.

urbis.com.au

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FIGURES

PICTURES

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EXECUTIVE SUMMARY

This Clause 4.6 Variation Request ('the Request') has been prepared on behalf of Ascham School ('the applicant') and accompanies a Development Application ('DA') for the redevelopment of the Fiona Junior School and additional buildings along New South Head Road associated with Ascham School.

Ascham School

Ascham has been providing high quality education for day and boarding students since 1886 and currently accommodates facilities for Prep to Year 12 students.

The heritage listed Fiona Building has been used by Ascham for educational facilities since 1943 and currently is used for core facilities for Years 3 -6, known as the Fiona Junior School. The current classrooms within the Fiona School do not meet the educational needs of students and additional facilities.

208 New South Head Road was also previously owned by the school before being sold in 1959 to pay for upgrades to other school buildings. The lot has recently been reacquired by Ascham and is currently used by the school as a uniform shop.

The Proposal

The proposal involves various works that allow for the consolidation of the Fiona Junior School facilities within the overall school Campus. In turn, this allows greater space and efficiency for other facilities currently used by Junior School students across the broader Campus. The proposal does not result in any increase to current school or staffing numbers. These works will also improve the connection to the heritage-listed Fiona building and will provide a more conveniently located reception for the entire school.

The proposed development will result in two height non-compliances summarised in the table below:

Location	WLEP Control	Proposed height of building	Variation to WLEP
Fiona Hall (208 New South Head Road)	8 metres	8.2 metres (top of ventilators) 8.43 metres (top of mechanical plant)	Top of ventilators – 0.2 metres (2.5% contravention) Top of mechanical plant – 0.43 metres (5.38% contravention)
Fiona Wing (188 New South Head Road)	9.5 metres	12.528 metres	3.14 metres (31.9% contravention)

Consultation with Council

The applicant has engaged with Council since March 2021 to ensure that the design reflects the desired future character of the Edgecliff local centre. The project team has met with senior Council officers as well as Council's heritage officers on multiple occasions as part of an iterative and consultative process. The feedback provided by Council following the lodgement of the original DA in August 2021 and re-lodgement in September 2021 has resulted in refinements to the Fiona Hall building including the reduction of rooftop screening and re-massing of rooftop mechanical plant to reduce rooftop services and improve views of the rear of the Fiona Building from New South Head Road.

Overall, both non-compliances have been reviewed by Council's urban design and heritage team during the assessment of DA/330/2021. Key commentary from these assessments is provided below:

- The works are considered to be of a high standard of design, with forms, elements, details, materials and landscaping acceptable from an urban design perspective.
- Council's heritage officers have supported the contemporary materiality of the Fiona Hall with specific mention of the 'siting, footprint and height' of the proposed development along New South Head Road.
- In relation to the second storey addition to the northern wing of the Fiona building, the proposed height is supported as it would not be seen to visually dominate Fiona due to the distance and siting of the structure as well as the topography of the site.

Suitability of Proposed Development

Fiona Hall Building (208 New South Head Road)

- The design responds positively to the site conditions and the surrounding environment. It represents a minor non-compliance with the height control that specifically applies to Lot 1 DP102868 on the New South Head Road frontage (8 metres), however comfortably complies with the prevailing height control of the primary Ascham Campus (9.5 metres).
- The proposed development retains a two storey built form along New South Head Road to respond sensitively to the scale, form and materiality of the desired future character. The area of non-compliance is a non-trafficable and non-habitable area. Accordingly, the potential for adverse privacy and overlooking impacts is considered negligible.
- The street-front height of the proposed building complies with the 8 metre height control. The mechanical roof structure is recessed within the site and is not readily viewed from the streetscape This area of non-compliance sits back from New South Head Road (ie toward the boundary of the 9.5m height control). Hence the proposal represents a form, when viewed from within the streetscape, that is encouraged by the height controls.
- The proposed development provides an opportunity to redevelop an ageing retail tenancy with a new contemporary building which is complementary to the character of the established Edgecliff centre. The additional height being sought provides mechanical plant required to facilitate the redevelopment of the site to meet the needs of Ascham staff, students and visitors.
- An alternative design was considered involving the relocation of the mechanical plant into the main Ascham land holding (with a 9.5 metre height limit). As discussed further in **Section 6.2**, it has been considered by the project team that the alternative location of mechanical plant resulted in negative heritage impacts to the heritage curtilage of Fiona and was not a suitable outcome for the site.

Fiona Wing (188 New South Head Road)

- The Fiona Wing extension will not result in any undue impacts in relation to, bulk and scale, heritage, or environmental amenity (including views and overshadowing) on surrounding residential properties particularly along Ocean Avenue.
- The increase in height allows for a built form which respects the heritage significance of the Fiona building by providing a hipped roof structure to reflect the design of the original Fiona house. If a compliant flat roof was required, this would result in negative heritage impacts for Ascham.
- The proposal provides community infrastructure within an existing educational establishment to meet the needs of the school.

Conclusion

Compliance with the height of building development standard is unreasonable and unnecessary in the circumstances of the proposed development.

- The proposal, notwithstanding the non-compliance, is consistent with the objectives of the height of building standard as well as both the SP2 Infrastructure and B4 Mixed Use zone objectives.
- Both non-compliances are minor and inconsequential in terms of the visual catchment in which the site is located. They are required to provide functional learning and school community space that are adequately serviced.
- There are sufficient environmental planning grounds to justify the contravention, which results in a better planning outcome than a strictly compliant development in the circumstances of this particular case. The overall design has been refined to retain and protect the heritage curtilage of the Fiona Building and provide a built form which reflects the streetscape character and retains a sympathetic built form to heritage items within the site.
- There are no environmental impacts arising from the proposed variations including views, overshadowing and privacy.
- The proposed non-compliance with the height of building standard will not result in any matter of significance for State or regional environmental planning.

We understand that Council have indicated the possibility of incorporating a Condition of Consent requiring strict compliance with the height control associated with the Fiona Hall Building. This will compromise the intent of the development and reduce the functionality for the use of staff and students. Overall, the proposed development has been designed to optimise the purpose and functionality of the Fiona Junior School. A condition of consent would unduly impact the function of the building and is unwarranted from an environmental impact assessment.

1. INTRODUCTION

This Clause 4.6 Variation Request ('the Request') has been prepared on behalf of Ascham School ('the applicant') and accompanies a Development Application ('DA') for the redevelopment of the Fiona Junior School and additional buildings along New South Head Road associated with Ascham School. The primary street address for Ascham is 188 New South Head Road, Edgecliff.

The Request seeks an exception from the height of buildings development standard prescribed for the site under clause 4.3 of Woollahra Local Environmental Plan 2014 (WLEP). This variation request is made pursuant to clause 4.6 of WLEP.

This report should be read in conjunction with the Architectural Plans prepared by BVN and the Heritage Impact Statement prepared by Hector Abrahams Architects.

The following sections of the report include:

- **Section 2:** description of the site and its local and regional context, including key features relevant to the proposed variation.
- **Section 3:** brief overview of the proposed development as outlined in further detail within the SEE and accompanying drawings.
- **Section 4:** identification of the development standard which is proposed to be varied, including the extent of the contravention.
- **Section 5:** outline of the relevant assessment framework for the variation in accordance with clause 4.6 of the LEP.
- **Section 6:** detailed assessment and justification of the proposed variation in accordance with the relevant guidelines and relevant planning principles and judgements issued by the Land and Environment Court.
- **Section 7:** summary and conclusion.

2. SITE CONTEXT

2.1. SITE DESCRIPTION

Ascham School covers a significant landholding within the suburbs of Edgecliff and Darling Point as illustrated in red in **Figure 1** and identified in **Table 1.** Ascham has been providing high quality education for day and boarding students since 1886, driven by a strong and widely respected academic program from Prep to Year 12.

The site is located within the Edgecliff local centre within the Eastern Suburbs of Sydney. The site is well connected via pedestrian and cycle networks as well as public transport including Edgecliff Train Station and Bus Interchange.

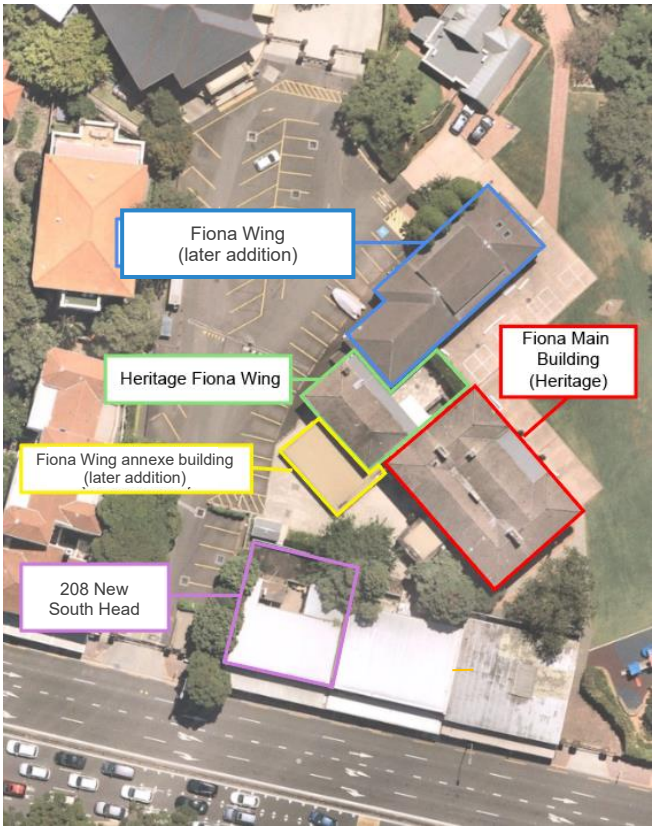
The proposed works relate to the Fiona Building, a listed heritage building which is separated into two wings and a main building as illustrated in Picture 1. The Fiona Wing currently accommodates the following uses:

- Fiona Main Building (Heritage) – classrooms
- Fiona Wing (Heritage) – classrooms
- Fiona Wing (non-heritage) – classrooms, Junior School library and staff room
- Fiona Wing (non-heritage) annexe – classrooms

The school recently acquired 208 and 210 New South Head Road (illustrated in purple and orange in **Figure 2**). 208 has been used as a uniform shop and is proposed to be demolished and incorporated into the Junior Campus as additional learning spaces and hall for Junior students. Given the recent acquisition of for 210 New South Head Road, the overall design and intent of the site is still being finalised and does not form part of the proposed scope of works of this application.

Figure 1 Ascham School Site Boundary

Figure 2 Location of Proposed works



Source: Urbis

The key features of the site are summarised in the **Table 1** overleaf.

Table 1 Site Description

Address	Legal Description	Current Development
188 New South Head Road, Edgecliff	Lot 81 DP217078 Lots 4 and 5 DP33456 Lot 1 DP74398 Lot 1 DP224844 Lots 1 and 2 DP183645 Lot 1 DP69838 Lot 1 DP225312 Lots 4, 9 and 10 DP5444 Lot 1 DP68900 Lot 1 DP723473	Ascham School including the Fiona Building which provides administration offices and learning spaces for the junior students (years 3-6)
37 Darling Point Road, Darling Point	Lot A DP108600	Ascham School including Duntrim House which provides accommodation for boarders and the Centre for the Sciences *The proposed works does not sit on this part of the site*
45 Darling Point Road, Darling Point	Lot 5 DP5444	Ascham School including teaching and learning spaces, specifically relating to speech and drama, group music and instrumental lessons *The proposed works does not sit on this part of the site*
208 New South Head Road, Edgecliff	Lot 1 DP102868	Two storey retail shop incorporating the current Ascham uniform shop
210 New South Head Road, Edgecliff	Lot 2 DP33456	Two storey retail shop *The proposed works does not sit on this part of the site*

2.2. HERITAGE

Ascham School is a locally listed heritage item 239 within the *Woollahra Local Environmental Plan 2014*. The item is identified as:

> *Ascham school precinct comprising: "Fiona" including interiors and former entrance gates, "Glenrock" including interiors and inner and outer gates, the Dower House including interiors, sand-stone works, remaining open space and oval adjacent to "Fiona", 4 Moreton Bay Figs,*

The proposed development relates specifically to "Fiona" and its associated buildings. Fiona is the second largest house on the site. Fiona is a stone villa in the Italian Renaissance style. It is oriented toward the north (ie. away from New South Head Road) and opens up to a large lawn terrace that extends from the house to a line of large noble trees. A servant's wing flanks the main house to the west and a port cochere is located at the rear of the building.

3. PROPOSED DEVELOPMENT

This Clause 4.6 Variation Request has been prepared to accompany a DA for alterations and additions to Ascham School to consolidate Junior School facilities and administration offices within the campus.

A detailed description of the proposed development is provided in the Statement of Environmental Effects prepared by Urbis Pty Ltd and dated 27 September 2021. The proposal is also detailed within the architectural, civil and landscape drawings that from part of the DA.

A summary of the key features of the proposed works is provided below:

- Partial demolition of the non-heritage Fiona Wing including removal of roof and staff room.
- Demolition of the Fiona Annexe Building that adjoins the south of the Fiona Wing.
- Demolition of existing shop located at 208 New South Head Road.
- Upgrades to current learning facilities including:
  - Internal refurbishment to Fiona Heritage wing including relocation of school reception and additional meeting rooms and bathrooms.
  - Replacement of current non-compliant stairs in Heritage Fiona Wing courtyard to meet BCA requirements.
  - Installation of new lift within the Main Fiona Building to improve accessibility.
  - Minor internal refurbishment to the first two floors of the Fiona Wing Building and an extension of the existing building footprint for additional classrooms.
  - New circulation node with lift, stair and accessible bathroom blocks connecting existing Fiona Wing building and new Fiona Wing Addition Building which houses staff room and classrooms.
- Construction of a new school hall, servery kitchen, bathrooms, plant room and classrooms at 208 New South Head Road.
- External works including:
  - Construction of new entrance courtyard adjacent to new hall.
  - Construction of new wet weather canopy/COLA next to Fiona Wing.
  - Construction of new canopy over heritage courtyard for weather protection.
  - Construction of new entry pavilion at relocated reception area of the Heritage Fiona Wing.
  - New paving and landscaping to improve connection between the Fiona Main Building and the new Junior School hall.
  - Construction of new pick-up/drop-off shelter adjacent to the Fiona Wing building and carpark.
- Reconfiguration of the Junior School pick-up/drop-off zone to improve queuing. This results in a total reduction of 6 approved car spaces, however will result in an increased total queuing capacity of 17 cars (up from 13 cars).

4. VARIATION OF HEIGHT OF BUILDINGS STANDARD

This section of the report identifies the development standard that is proposed to be varied, including the extent of the contravention. A detailed justification for the proposed variation is provided in **Section 6** of the report.

4.1. DEVELOPMENT STANDARD

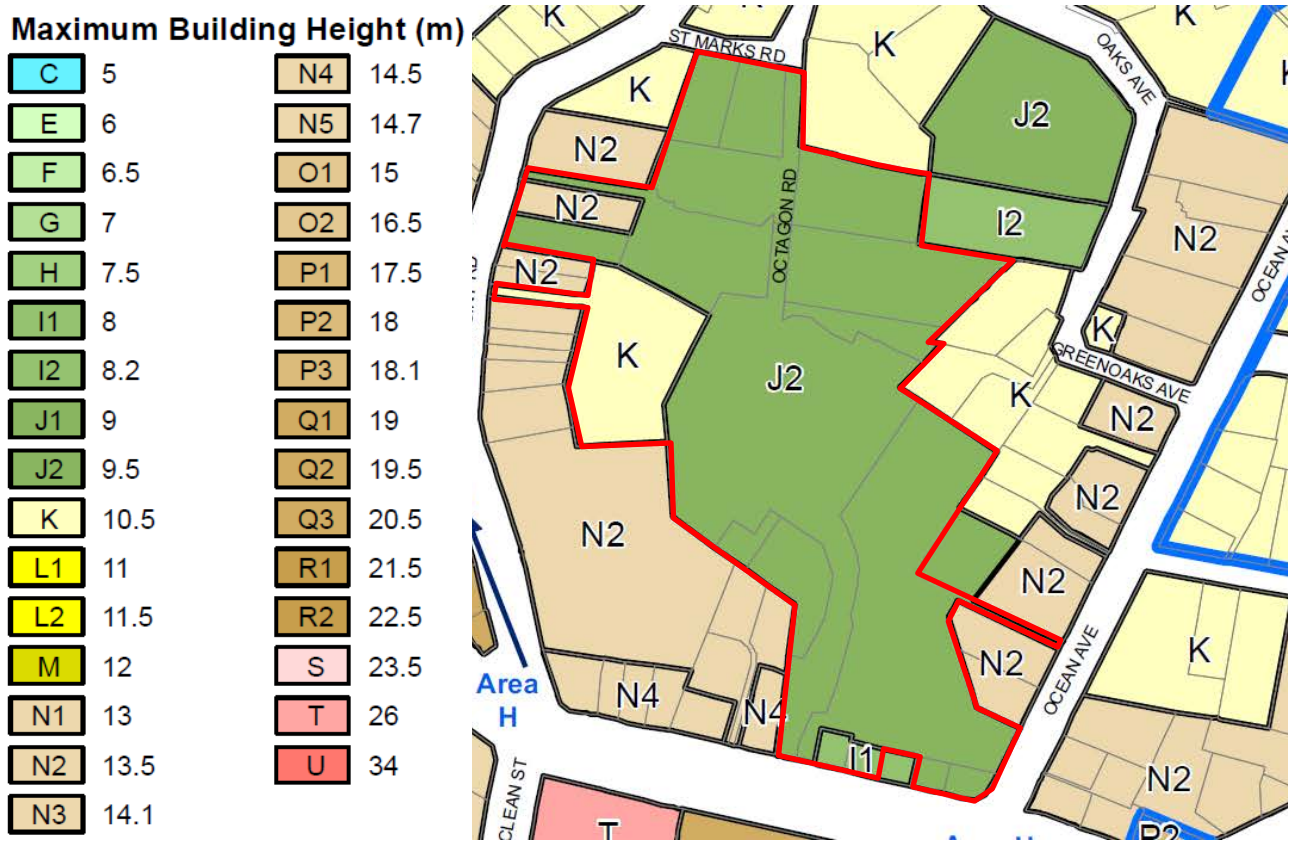
The following height of building controls apply for the site as prescribed within Clause 4.3 of the WLEP and the associated Height of Building Map (**Figure 3**):

- Ascham School (main landholding) J2 – 9.5 metres
- 208 New South Head Road I1 – 8 metres

The WLEP defines 'building height' or 'height of building' as:

> *(a) in relation to the height of a building in metres—the vertical distance from ground level (existing) to the highest point of the building, or*
>
> *(b) in relation to the RL of a building—the vertical distance from the Australian Height Datum to the highest point of the building,*
>
> *including plant and lift overruns, but excluding communication devices, antennae, satellite dishes, masts, flagpoles, chimneys, flues and the like.*

Figure 3 Height of Buildings Map with Ascham School boundary in red



Source: WLEP

4.2. PROPOSED VARIATION TO HEIGHT OF BUILDINGS

The proposed development presents a varied maximum height of 8.82 metres for the proposed hall and learning building (referent to as the Fiona Hall) on New South Head Road and 12.64 metres for the alterations to the later addition of the Fiona building (referred to as the Fiona Wing) as described in the **Table 2** and **Figure 4** below.

Fiona Hall

The proposed Fiona Hall building is located at 208 New South Head Road with the rear of the building located in the main Ascham landholding. While the building presents as a two storey building which reflects the height of building development standard for 208 New South Head Road, mechanical plant has been located on the roof to provide air-conditioning and other services. The mechanical plant has a maximum height of 2.5 metres. It is noted that if the plant was located in the main Ascham landholding, the proposed development would remain compliant with the height of building control.

The current location of the plant has been designed to provide an increase curtilage to the heritage elements of the Fiona Building. Placing the required plant on the roof rather than at ground level, improves pedestrian circulation through the site and ensures there is no impact on the updated pick up/drop off zone adjacent to the Fiona Building and hall.

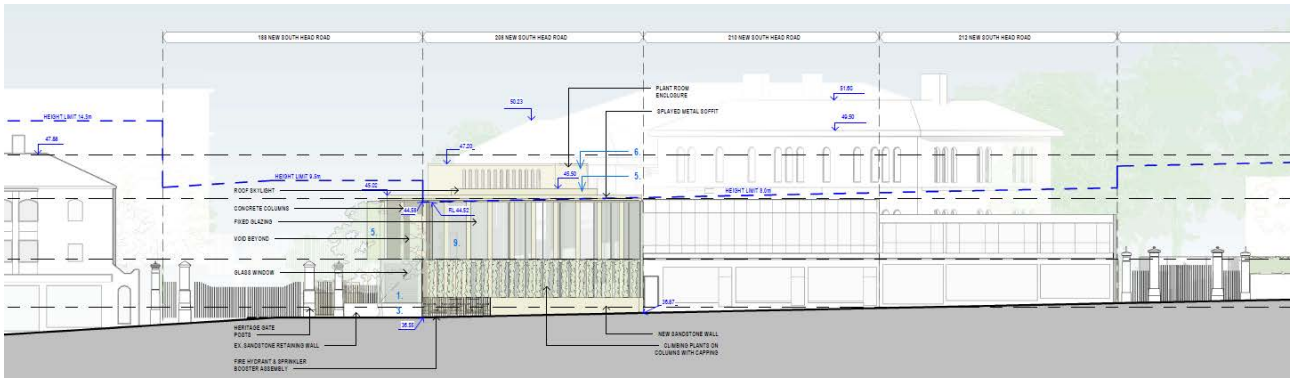
Fiona Wing

Alterations and additions are proposed to the non-heritage northern wing of the Fiona building to upgrade current classrooms used by Ascham. The overall design has raised the roof approximately 2.5 metres higher than the existing roof ridge line to ensure new rooms provide adequate floor to floor ceiling heights for their proposed use. While a flat roof would result in a development scheme which better reflects the numerical height of buildings development standard, the proposed roof structure has been designed to remain sympathetic to the heritage significance of the Fiona building and curtilage and is considered to improve the heritage character of Fiona.

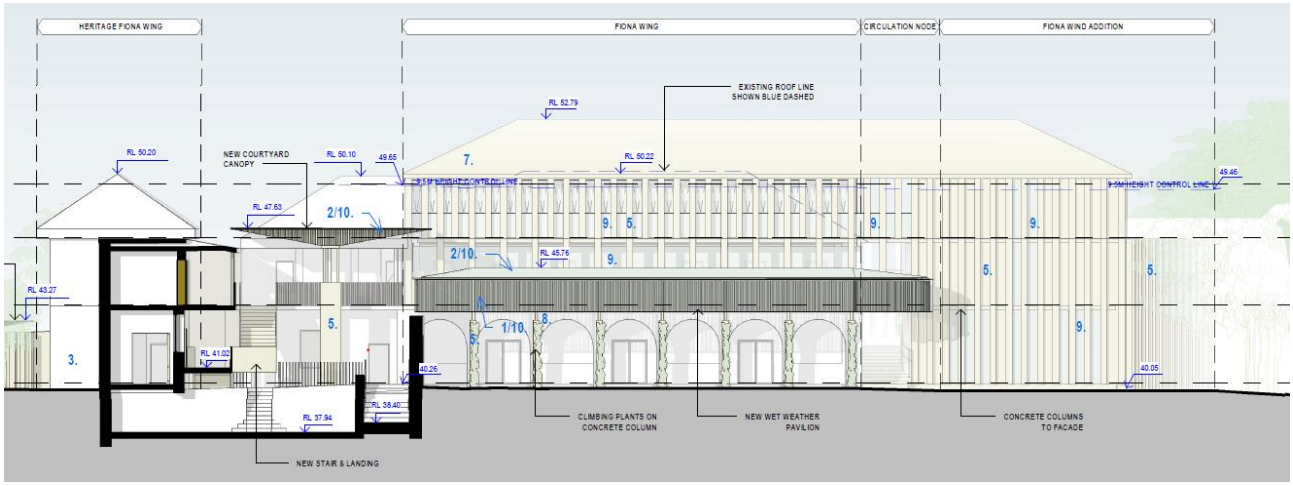
Table 2 Proposed height non-compliances

Location	WLEP Control	Proposed height of building	Variation to WLEP
Fiona Hall (208 New South Head Road)	8 metres	8.2 metres (top of ventilators) 8.43 metres (top of mechanical plant)	Top of ventilators – 0.2 metres (2.5% contravention) Top of mechanical plant – 0.43 metres (5.38% contravention)
Fiona Wing (188 New South Head Road)	9.5 metres	12.528 metres	3.14 metres (31.9% contravention)

Figure 4 Elevations of proposed height non-compliances



Picture 1 New Fiona Hall South Elevation identifying contravention of 8 metre height of building control



Picture 2 Fiona Wing East Elevation identifying contravention of 9.5 metre height of building control

Source: BVN

5. RELEVANT ASSESSMENT FRAMEWORK

Clause 4.6 of WLEP includes provisions that allow for exceptions to development standards in certain circumstances. The objectives of clause 4.6 of WLEP are:

(a) to provide an appropriate degree of flexibility in applying certain development standards to particular development,

(b) to achieve better outcomes for and from development by allowing flexibility in particular circumstances.

Clause 4.6 provides flexibility in the application of planning provisions by allowing the consent authority to approve a DA that does not comply with certain development standards, where it can be shown that flexibility in the particular circumstances of the case would achieve better outcomes for and from the development.

In determining whether to grant consent for development that contravenes a development standard, clause 4.6(3) requires that the consent authority to consider a written request from the applicant that seeks to justify the contravention of the development by demonstrating:

(a) that compliance with the development standard is unreasonable or unnecessary in the circumstances of the case, and

(b) that there are sufficient environmental planning grounds to justify contravening the development standard.

Clause 4.6(4)(a) requires the consent authority to be satisfied that the applicant's written request adequately addresses each of the matters listed in clause 4.6(3). The consent authority should also be satisfied that the proposed development will be in the public interest because it is consistent with the objectives of the standard and the objectives for development within the zone in which it is proposed to be carried out.

Clause 4.6(4)(b) requires the concurrence of the Secretary to have been obtained. In deciding whether to grant concurrence, subclause (5) requires that the Secretary consider:

(a) whether contravention of the development standard raises any matter of significance for State or regional environmental planning, and

(b) the public benefit of maintaining the development standard, and

(c) any other matters required to be taken into consideration by the Planning Secretary before granting concurrence.

The concurrence of the Secretary can be assumed to have been granted for the purpose of this variation request in accordance with the Department of Planning Circular PS 18–003 'Variations to development standards', dated 21 February 2018. This circular is a notice under section 64(1) of the Environmental Planning and Assessment Regulation 2000 and provides for assumed concurrence. A consent granted by a consent authority that has assumed concurrence is as valid and effective as if concurrence had been given.

The Secretary can be assumed to have given concurrence if the matter is determined by an independent hearing and assessment panel or a Sydney district or regional planning panel in accordance with the Planning Circular.

This clause 4.6 request demonstrates that compliance with the height of buildings development standard prescribed for the site in clause 4.3 of WLEP is unreasonable and unnecessary, that there are sufficient environmental planning grounds to justify the requested variation and that the approval of the variation is in the public interest because it is consistent with the development standard and zone objectives.

In accordance with clause 4.6(3), the applicant requests that the height of buildings development standard be varied (subject to the applicant's position that such a request should not actually be necessary).

6. ASSESSMENT OF CLAUSE 4.6 VARIATION

The following sections of the report provide a comprehensive assessment of the request to vary the development standards relating to the height of buildings development standard in accordance with clause 4.3 of WLEP.

Detailed consideration has been given to the following matters within this assessment:

- *Varying development standards: A Guide, prepared by the Department of Planning and Infrastructure* dated August 2011.
- Relevant planning principles and judgements issued by the Land and Environment Court.

The following sections of the report provides detailed responses to the key questions required to be addressed within the above documents and clause 4.6 of the LEP.

6.1. IS THE PLANNING CONTROL A DEVELOPMENT STANDARD THAT CAN BE VARIED? – CLAUSE 4.6(2)

The height of buildings development standard prescribed by clause 4.3 of WLEP is a development standard capable of being varied under clause 4.6(2) of WLEP.

The proposed variation is not excluded from the operation of clause 4.6(2) as it does not comprise any of the matters listed within clause 4.6(6) or clause 4.6(8) of WLEP.

6.2. IS COMPLIANCE WITH THE DEVELOPMENT STANDARD UNREASONABLE OR UNNECESSARY IN THE CIRCUMSTANCES OF THE CASE? – CLAUSE 4.6(3)(A)

Historically, the most common way to establish a development standard was unreasonable or unnecessary was by satisfying the first method set out in Wehbe v Pittwater Council [2007] NSWLEC 827. This method requires the objectives of the standard are achieved despite the non-compliance with the standard.

This was recently re-affirmed by the Chief Judge in *Initial Action Pty Ltd v Woollahra Municipal Counci*l [2018] NSWLEC 118 at [16]-[17]. Similarly, in *Randwick City Council v Micaul Holdings Pty Ltd* [2016] NSWLEC 7 at [34] the Chief Judge held that "establishing that the development would not cause environmental harm and is consistent with the objectives of the development standards is an established means of demonstrating that compliance with the development standard is unreasonable or unnecessary".

This Request addresses the first method outlined in *Wehbe v Pittwater Council* [2007] NSWLEC 827. This method alone is sufficient to satisfy the 'unreasonable and unnecessary' requirement.

The Request also addresses the third method, that the underlying objective or purpose of the development standard would be undermined, defeated or thwarted if compliance was required with the consequence that compliance is unreasonable (Initial Action at [19] and *Linfield Developments Pty Ltd v Cumberland Council* [2019] NSWLEC 131 at [24]). Again, this method alone is sufficient to satisfy the 'unreasonable and unnecessary' requirement.

The Request also seeks to demonstrate the 'unreasonable and unnecessary' requirement is met because the burden placed on the community by not permitting the variation would be disproportionate to the non-existent or inconsequential adverse impacts arising from the proposed non-complying development. This disproportion provides sufficient grounds to establish unreasonableness (relying on comments made in an analogous context, in *Botany Bay City Council v Saab Corp* [2011] NSWCA 308 at [15]).

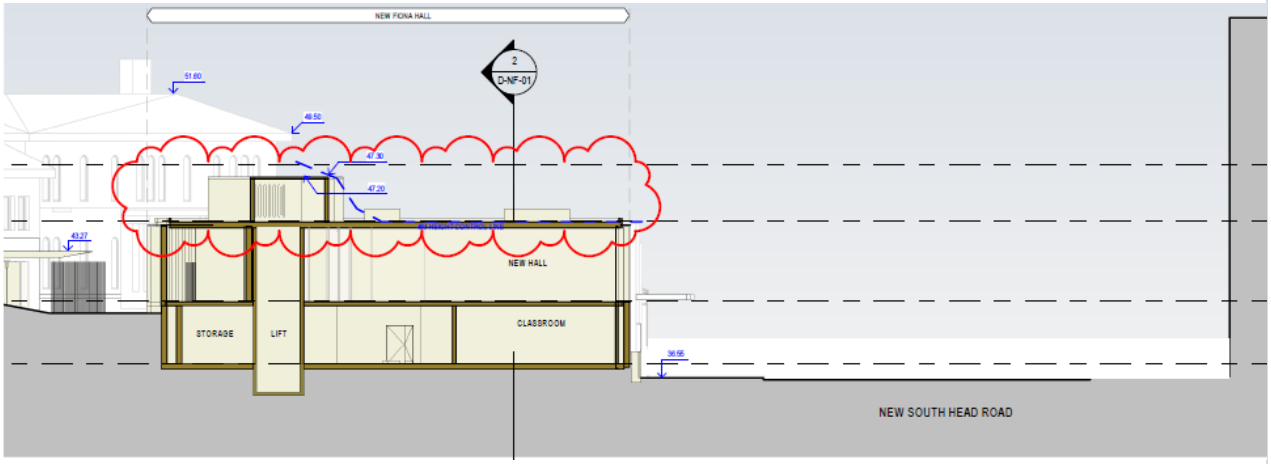
- ***The objectives of the standard are achieved notwithstanding non-compliance with the standard*** (the first method in Wehbe v Pittwater Council [2007] NSWLEC 827 [42]-[43])

The specific objectives of the height of buildings development standard as specified in clause 4.3 of WLEP are detailed in **Table 3** below. An assessment of the consistency of the proposed development with each of the objectives is also provided.

Table 3 Assessment of consistency with clause 4.3 objectives

Objectives	Assessment
(a) to establish building heights that are consistent with the desired future character of the neighbourhood,	Fiona Hall Building (208 New South Head Road) 208 New South Head Road is zoned B4 Mixed Use Zone and is identified in the Edgecliff Mixed Use Centre (Edgecliff Centre). Chapter D2.2 of the *Woollahra Development Control Plan 2015* (the DCP) provides a desired future character statement for the Edgecliff Centre. As stated in the DCP: '*This mixed use corridor is a highly urban environment and it is important that it meets high standards of visual quality and pedestrian amenity*.' The proposed development has been designed by BVN in close collaboration with Hector Abrahams Architects to ensure that a high level of design excellence is achieved which also respects the heritage significance of the heritage listed Fiona building located to the rear of the hall and the entire Ascham campus. The desired future character requires development along New South Head Road to have particular consideration on how the buildings are interpreted from moving vehicles as well as responding to pedestrians by providing human scale design elements. Given the need to address the impacts of road noise and privacy and hence meet the practical and functional requirements of a school, this location presents constraints to the design in terms of the provision of window openings and glazing generally required for activated frontages. Nevertheless, the broader site's heritage significance also presents an opportunity to integrate interpretive and decorative elements to the hall building that result in a contemporary building which provides a much higher degree of visual interest than is currently provided by the uniform shop as well as other street-front buildings along New South Head Road. A review is also currently being undertaken of the relevant planning controls for the Edgecliff Commercial Centre (ECC). Both 208 and 210 New South Head Road are identified as potential sites for additional uplift in height and floor space ratio if the proposed development is considered consistent with the objectives of the *Draft Edgecliff Commercial Centre Planning and Urban Design Strategy.* This strategy can be considered the desired future character of the New South Head Road properties. The proposed development aims to reflect the objectives of the Draft Edgecliff Centre Strategy through the following design inputs: ▪ There is the potential to amalgamate 208 and 210 New South Head Road as part of a future development application to improve the overall efficiency of the Ascham Junior School facilities without impeding on current access points along New South Head Road.

Objectives	Assessment
	▪ The proposed development has been designed by BVN in close collaboration with Hector Abrahams Architects to ensure that a high level of design excellence is achieved which also respects the heritage significance of Fiona and the Ascham campus. Given the need to address the impacts of road noise and privacy and hence meet the practical and functional requirements of a school, this location presents constraints to the design in terms of the provision of window openings and glazing. Nevertheless, the broader site's heritage significance also presents an opportunity to provide an interpretive and decorative element to the new hall building that provides much higher degree of visual interest than is currently provided by the Uniform shop as well as other street-front buildings within the immediate visual catchment. ▪ The proposed development will include the provision of new learning facilities and hall for Ascham's Junior School students to ensure that their educational needs are met. There may also be opportunities for the hall to be let out for public events outside of school terms. Overall, the built form strategy for the site has been thoroughly planned to ensure it provides a holistic approach to the site and has considered its positive impact in the ECC. The proposal draws on elements that contribute to the existing streetscapes that surround the site, including the prevalent street wall height at the boundary, but also utilises the size of the site to located taller built form away from the street frontage. <u>Fiona Wing (188 New South Head Road)</u> The additional height associated with the Fiona Wing is also considered to reflect the desired future character of the Ascham School as it will provide state of the art facilities for the use of future students. The overall design has raised the roof approximately 2.5 metres higher than the existing roof ridge line to ensure new rooms provide adequate floor to floor ceiling heights for their proposed use. While a flat roof would result in a development scheme which better reflects the numerical height of buildings development standard, the proposed roof structure has been designed to remain sympathetic to the heritage significance of the Fiona building and curtilage and is considered to improve the heritage character of Fiona as noted in the Heritage Impact Statement enclosed in **Appendix E**. Having regard to the above, the proposal is consistent and compatible with the desired future character of the neighbourhood and heritage significance of the site despite the height non-compliance.
(b) to establish a transition in scale between zones to protect local amenity,	The site is located between the B4 Mixed Use zone (208 New South Head Road) and the SP2 Special Infrastructure Zone (188 New South Head Road).

Objectives	Assessment
	Fiona Hall Building (208 New South Head Road) The Fiona Hall building has been designed to reflect the bulk and scale of development along this corridor and provide a consistent street wall. The minor height exceedance is set back from the frontage as illustrated in **Figure 5**. Fiona Wing (188 New South Head Road) The Fiona Wing is located within the Ascham School primary landholding and retains adequate setbacks to the site boundaries to ensure the built form will have no impacts on the transition to surrounding residential properties along the Ocean Street frontage.
Figure 5 Section of Fiona Hall  *Source: BVN*	
(c) to minimise the loss of solar access to existing buildings and open space,	Overshadowing analysis has been prepared by BVN as part of the Architectural Plans (**Appendix B**). Fiona Hall Building (208 New South Head Road) The shadow analysis demonstrates the proposed hall building does not impact on solar access to surrounding properties. Fiona Wing (188 New South Head Road) The shadow analysis demonstrates that the majority of additional shadowing occurs within the site's own open space used for outdoor learning and play between 12.00pm and 3.00pm. The open space still retains over 3 hours of unimpeded solar access with shadows between 9.00am and 12.00pm on the play area minimised due to the orientation of the site and steep topography along the eastern boundary.
(d) to minimise the impacts of new development on adjoining or nearby properties from disruption of views, loss of	The proposal has been designed, positioned and orientated to ensure the additional height does not adversely impact on the amenity of adjoining and neighbouring properties as outlined below. **Views**

Objectives	Assessment
privacy, overshadowing or visual intrusion,	Fiona Hall Building (208 New South Head Road) The area of non-compliance for 208 New South Head Road sits back from the street wall and is considered non-trafficable and non-habitable area (see **Figure 5**). The rooftop plant has been designed to sit back from New South Head. While screening is generally not consistent with the DCP, given the unique use of the site as a school hall, mechanical ventilation is required to be located on the roof rather that an internal plant room to provide circulation within the building. The proposed screening integrates with the building design Heritage advice prepared by Hector Abrahams (**Appendix E**) states that the rear of the heritage building was not originally visible from New South Head Road or the public domain. As such, the proposal does not reduce any identified heritage views and maintains an improved curtilage to the Fiona Building. Accordingly, the potential for adverse privacy and overlooking impacts is considered negligible. Fiona Wing (188 New South Head Road) The proposed height non-compliances associated with the Fiona Wing is situated internally to the site without any direct streetscape interface. While the Fiona Wing extension is visible from the New South Head Road/Ocean Avenue intersection (see **Figure 6**), the overall built form of the Fiona Wing has been designed to remain below the ridge line of the Fiona Building when viewed from this point. Heritage advice has been prepared by Hector Abrahams (**Appendix E**) which confirmed that the Fiona Wing extension does not detract from the heritage significance of Ascham for the following reasons: ▪ The retention of the pitched roof form minimises the visual impacts and provides a sympathetic design to the existing heritage roof. ▪ The new built form is located at some distance from the existing heritage fabric and is visually separated by the new shade structure. ▪ The structure is of masonry character and is broken up in a similar proportion to the main villa. ▪ The addition will not have any archaeological impacts. **Privacy** Fiona Hall Building (208 New South Head Road) The proposal has been appropriately designed to prevent privacy impacts on surrounding residents and future students. The Fiona Hall building is located approximately 18 metres from the closest residential properties to the east along New South Head Road providing sufficient separation distance for privacy.

Objectives	Assessment
	The street-front height of the proposed hall building complies with the 8 metre height control. The roof top mechanical plant is recessed within the site and is not readily viewed from the streetscape. Hence the proposal represents a form, when viewed from the street, that is encouraged by the current height controls. There are no additional impacts expected on residents as the hall and classrooms will only be used within the existing hours of operation of Ascham. Fiona Wing (188 New South Head Road) The proposal has been appropriately designed to prevent privacy impacts on surrounding residents and future students. The proposed additions to the Fiona Wing Building are located approximately 20 metres from the closest residential properties along Ocean Avenue providing sufficient separation distance for privacy with existing and proposed landscaping providing adequate screening between play/learning areas. Heavy vegetation is also located along the site boundary which further screens the development from neighbours as illustrated in the Landscape Plans prepared by Aspect Studios (**Appendix D**). **Overshadowing** Fiona Hall Building (208 New South Head Road) As noted above, the proposed hall building does not impact on solar access to surrounding properties. Fiona Wing (188 New South Head Road) As illustrated in the overshadowing analysis prepared by BVN (**Appendix B**), the proposed development does not impact on solar access to surrounding properties with minor impacts on 5 Ocean Avenue restricted to between 2.00pm and 3.00pm. Generally, this impact is from the hipped roof structure rather than trafficable areas within the Fiona Wing. As noted above, a hipped roof structure has been designed to remain sympathetic to the heritage significance of the Fiona building and curtilage.

Figure 6 Photomontage from the intersection of New South Head Road and Ocean Avenue

Source: BVN

(e) to protect the amenity of the public domain by providing public views of the harbour and surrounding areas.	The proposed development will have no impacts on harbour views. Consideration has been given to views of the heritage aspects of the Fiona building from New South Head Road as part of the Heritage Impact Assessment prepared by Hector Abraham Architects (**Appendix E**). Overall, because of the position of the hall sitting lower on the hill, the new building is not considered to visually dominate the heritage item from New South Head Road or Ocean Avenue, the two key street frontages.

In summary, the objectives of the development standard are achieved, notwithstanding the non-compliance with the standard in the circumstances described in this variation report.

- **The underlying object or purpose would be undermined, if compliance was required with the consequence that compliance is unreasonable** (the third method in Wehbe v Pittwater Council [2007] NSWLEC 827 [42]-[43] as applied in Linfield Developments Pty Ltd v Cumberland Council [2019] NSWLEC 131 at [24])

The proposal consolidates facilities to providing learning spaces and associated facilities including a new hall.

Fiona Hall Building (208 New South Head Road)

The new hall building along New South Head Road has been designed to meet the requirements of the Junior School. During design development, consideration has been undertaken on whether the proposed mechanical plant located on the roof could be relocated to other areas of the site including the ground floor plant room, currently planned for the future redevelopment of 210 New South Head Road.

The overall design of the hall has integrated services associated with the lift into the upper level ceiling. The rooftop plant is required to service this building and due to ventilation requirements cannot be located in an enclosed space such as the ground floor plant area. Whilst the school campus is a considerably large site, the Junior School is particularly constrained with multiple competing elements including the main reception building and car line. As noted in **Section 4.2**, the current proposal aims to improve the Junior School and provide a development which:

- Increases sightlines to heritage elements by removing later, insensitive additions;

- Improves existing traffic conditions along New South Head Road and the school driveway by providing safer and more efficient pick-up/drop-off zones; and
- Provides a safe and accessible pathway to the new main reception office.

The relocation of the required mechanical equipment in a separate structure or enclosure at ground level it would undermine the intent of the development to improve connectivity and movement within the school and would negatively impact the surrounding areas of the site including the updated pick up/drop off area.

Given the hall building overlaps the two height controls for the site (8 metres and 9.5 metres), investigations have been undertaken by BVN to identify if a majority of the rooftop plant could be relocated on the roof to sit within the main landholding (and associated 9.5 metre height control). BVN have prepared 3D models to show the potential view impacts associated with three scenarios:

- Scenario 1: The original proposed rooftop plant lodged with DA/330/21
- Scenario 2: The refined rooftop plant
- Scenario 3: A generally compliant scheme, with the only exceedance caused by the 0.65 m ventilators

Figure 7 illustrates that the non-compliant roof elements are not visible from the opposite site of New South Head Road and do not impact any views of the rear of the Fiona Building.

Figure 8 to **11** illustrate that the refined scheme provides an increased separation between the rooftop elements of the hall building and the rear of the Fiona building. By providing mechanical plant within the 208 New South Head Road lot, the proposed scheme improves views of the Fiona heritage roof from New South Head Road and increases the heritage curtilage. If mechanical plant was required to be move into the main landholding, it would increase the bulk and scale of rooftop elements, particularly form internal views (refer to **Figure 10** and **Figure 11**).

Given the location of the mechanical plant on the rooftop, the proposed height exceedance does not add to the overall bulk and scale of the development. The removal of these elements would reduce the amenity of the building and not reflect the underlying purpose of the proposal to provide educational facilities on school owned land.

Fiona Wing (188 New South Head Road)

The Fiona Wing extension has been designed to provide improved classrooms and associated facilities which remain sympathetic to the heritage character of the site. If the proposed building was reduced in height, a greater footprint would be required to facilitate additional learning spaces required by Ascham which would result in a reduced heritage curtilage to the Fiona building or a loss of high quality outdoor play. Retention of existing classrooms would also result in negative outcomes for students and staff as spaces do not reflect the educational ethos of Ascham.

The increase in height allows for a built form which respects the heritage significance of the Fiona building by providing a hipped roof structure to reflect the design of the original Fiona house. As noted above, heritage advice has been prepared by Hector Abrahams (**Appendix E**) which confirmed that the Fiona Wing extension does not detract from the heritage significance of Ascham for the following reasons:

- The retention of the pitched roof form minimises the visual impacts and provides a sympathetic design to the existing heritage roof.
- The new built form is located at some distance from the existing heritage fabric and is visually separated by the new shade structure.
- The structure is of masonry character and is broken up in a similar proportion to the main villa.
- The addition will not have any archaeological impacts.

If a flat roof was proposed for the Fiona Wing, this would result in a compliant scheme but would have a negative heritage impact on the Fiona Building and overall Ascham Campus. If compliance was required, it would either result in the loss of classroom space required by Ascham or a reduced curtilage to the heritage listed Fiona building.

Compliance in the circumstances provided above is therefore unreasonable for both the Fiona Hall and Fiona Wing.

Figure 7 Views from New South Head Road

Picture 3 Original DA Scheme

Picture 4 Refined Scheme

Picture 5 Generally Compliant Scheme

Source: BVN

Figure 8 Views from southern site of New South Head Road

Picture 6 Original DA Scheme

Picture 7 Refined Scheme

Picture 8 Generally Compliant Scheme

Source: BVN

Figure 9 Views from current walkway into the school

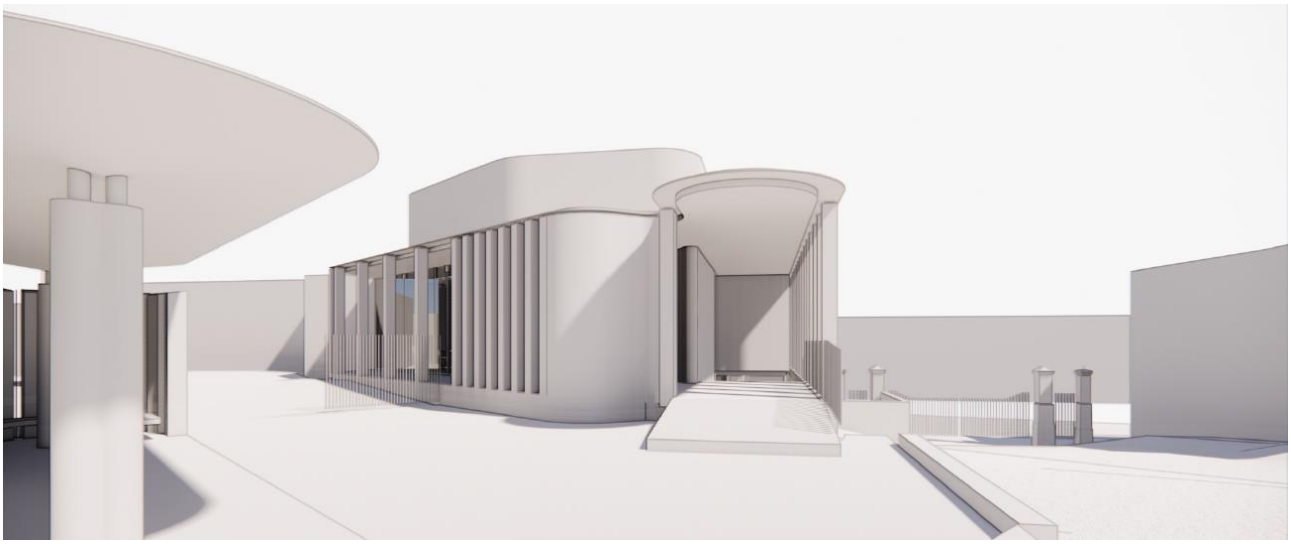
Picture 9 Original DA Scheme

Picture 10 Refined Scheme

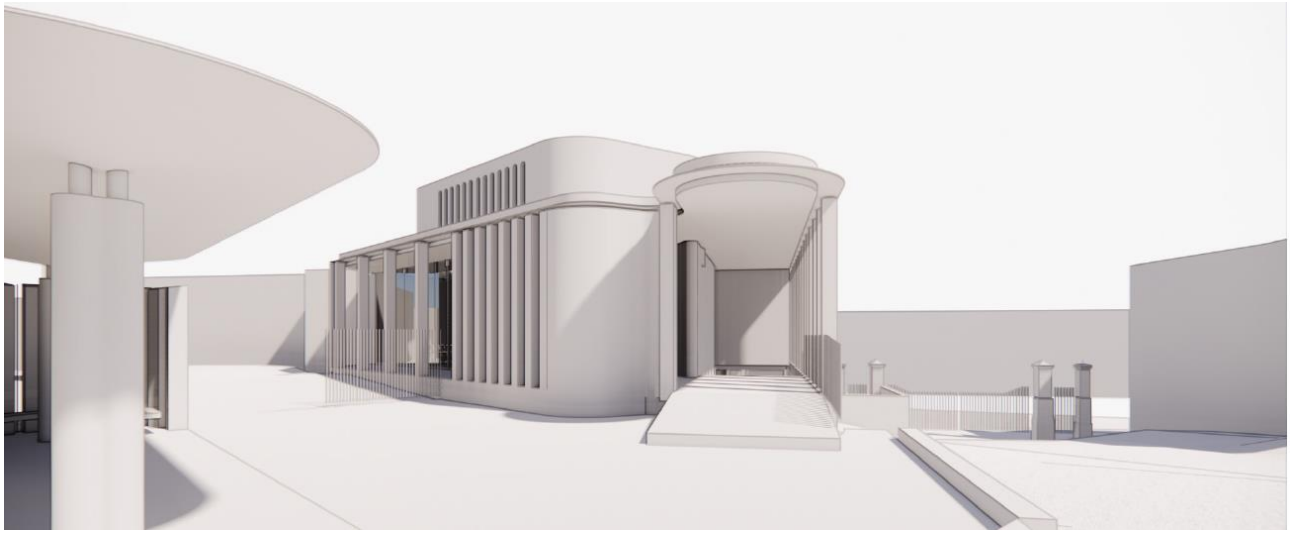
Picture 11 Generally Compliant Scheme

Source: BVN

Figure 10 Views from Fiona Reception area



Picture 12 Original DA Scheme



Picture 13 Refined Scheme

Picture 14 Generally Compliant Scheme

Source: BVN

Figure 11 Views from rear of Fiona building

Picture 15 Original DA Scheme

Picture 16 Refined Scheme

Picture 17 Generally Compliant Scheme

Source: BVN

- **The burden placed on the community (by requiring strict compliance with the height of buildings standard) would be disproportionate to the (non-existent or inconsequential) adverse consequences attributable to the proposed non-compliant development** (cf Botany Bay City Council v Saab Corp [2011] NSWCA 308 at [15]).

This way is not relevant in the circumstances of this particular application.

6.3. ARE THERE SUFFICIENT ENVIRONMENTAL PLANNING GROUNDS TO JUSTIFY CONTRAVENING THE DEVELOPMENT STANDARD? – CLAUSE 4.6(3)(B)

The Land & Environment Court judgment in Initial Action Pty Ltd v Woollahra Council [2018] NSWLEC 2018, assists in considering the sufficient environmental planning grounds. Preston J observed:

> *"…in order for there to be 'sufficient' environmental planning grounds to justify a written request under clause 4.6, the focus must be on the aspect or element of the development that contravenes the development standard and the environmental planning grounds advanced in the written request must justify contravening the development standard, not simply promote the benefits of carrying out the development as a whole; and*
>
> *…there is no basis in Clause 4.6 to establish a test that the non-compliant development should have a neutral or beneficial effect relative to a compliant development"*

There is an absence of environmental harm arising from the contravention and positive planning benefits arising from the proposed development as outlined in detail above. A summary is provided below:

- The proposed development achieves the objectives of the development standard prescribed in clause 4.3 of the WELP, as described in **Table 3** above and achieves the objectives of the B4 Mixed Use zone (for 208 New South Head Road) and the SP2 Infrastructure Zone (for the main Ascham landholding including the Fiona Wing) as described within **Table 4** and **Table 5** below. The proposal seeks to consolidate current facilities for the use of the Junior School.
- The proposed development has been designed by BVN in close collaboration with Hector Abrahams Architects to ensure that a high level of design excellence is achieved which also respects the heritage significance of Fiona and the Ascham campus. The current development has undergone a vigorous design integrity process, including a formal pre-lodgement meeting and ongoing discussions with Council's planning and heritage staff.
- The additional height will not result in detrimental environmental impacts having regard to the following:

<u>Fiona Hall Building (208 New South Head Road)</u>

- The proposed development retains a two storey built form along New South Head Road to respond sensitively to the scale, form and materiality of the desired future character. The area of non-compliance sits back from New South Head Road and is considered non-trafficable and non-habitable area (see **Figure 5**). Accordingly, the potential for adverse privacy and overlooking impacts is considered negligible;
- The design responds positively to the site conditions and the surrounding environment and generally reflects the height control of the primary Ascham Campus (9.5 metres). While mechanical plant could be located on the hall roof but within the main landholding (thus complying with the height control), the current location improves views to and from the heritage listed Fiona building resulting in an improved outcome from a heritage perspective;
- The street-front height of the proposed building complies with the 8 metre height control. The mechanical roof structure is recessed within the site and is not readily viewed from the streetscape (see **Figure 7**). Hence the proposal represents a form, when viewed from within the streetscape, that is encouraged by the height controls; and
- The proposed development provides an opportunity to redevelop an ageing retail tenancy with a new contemporary building which is complementary to the character of the established Edgecliff centre. The additional height being sought provides mechanical plant required to facilitate the redevelopment of the site to meet the needs of Ascham staff, students and visitors.

Fiona Wing (188 New South Head Road)

- As described in **Table 3**, due to the distance and siting of the structure as well as the topography of the site, the Fiona Wing extension will not result in any undue impacts in relation to, bulk and scale, heritage, or environmental amenity on surrounding residential properties particularly along Ocean Avenue; a
- The increase in height allows for a built form which respects the heritage significance of the Fiona building by providing a hipped roof structure to reflect the design of the original Fiona house. If a compliant flat roof was required, this would result in negative heritage impacts for Ascham; and
- The proposal provides community infrastructure centrally located within an existing educational establishment to meet the needs of the school.

Based on the above, it has been demonstrated that there are sufficient environmental planning grounds to justify the proposed non-compliance with the height of buildings development standard in this instance.

6.4. HAS THE WRITTEN REQUEST ADEQUATELY ADDRESSED THE MATTERS IN SUB-CLAUSE (3)? – CLAUSE 4.6(4)(A)(I)

Clause 4.6(4)(a)(i) states that development consent must not be granted for development that contravenes a development standard unless the consent authority is satisfied that the applicant's written request has adequately addressed the matters required to be demonstrated by subclause (3).

Each of the sub-clause (3) matters are comprehensively addressed in this written request, including detailed consideration of whether compliance with a development standard is unreasonable or unnecessary in the circumstances of the case. The written request also provides sufficient environmental planning grounds, including matters specific to the proposal and the site, to justify the proposed variation to the development standard.

6.5. IS THE PROPOSED DEVELOPMENT IN THE PUBLIC INTEREST? – CLAUSE 4.6(4)(B)(II)

Clause 4.6(4)(a)(ii) states development consent must not be granted for development that contravenes a development standard unless the consent authority is satisfied the proposal will be in the public interest because it is consistent with the objectives of the development standard and the objectives for the zone.

The consistency of the development with the objectives of the development standard is demonstrated in **Table 3** above. The proposal is also consistent with the land use objectives that apply to the site under WLEP. The site, including the Fiona Wing building is generally located within the SP2 Infrastructure (Educational Establishment) zone. The proposal incorporates 208 New South Head Road which is located within the B4 Mixed Use Zone.

The proposed development is consistent with the relevant land use zone objectives as outlined in **Tables 4** and **5** below.

Table 4 Assessment of compliance with the SP2 Infrastructure zone objectives (main Ascham landholding)

Objective	**Assessment**
To provide for infrastructure and related uses	The proposed development seeks to consolidate and improve facilities for the use of Ascham students and results in an increase in height to the existing Fiona Wing classrooms. The proposal is considered to reflect the objectives of the SP2 zone as it will result in an improved development which provides necessary and contemporary designed educational facilities for the staff and students of Ascham including new classrooms and staff facilities.
To prevent development that is not compatible with or that may detract from the provision of infrastructure	

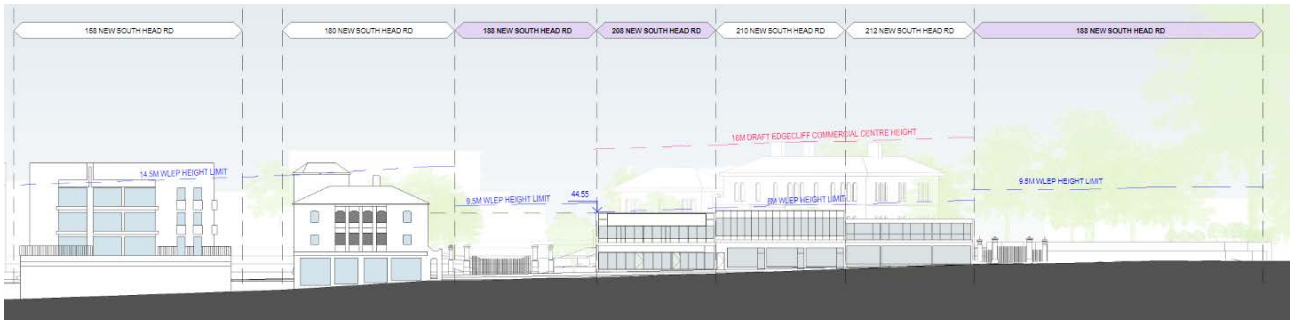
Table 5 Assessment of compliance with the B4 Mixed Use zone objectives (208 New South Head Road)

Objective	Assessment
To provide a mixture of compatible land uses.	The proposed development provides an extension of an existing use within the Edgecliff local centre. The Fiona Building has been used as an educational establishment since 1943 and will continue to provide education and employment opportunities within Edgecliff. The proposed development (inclusive of the area the subject of the non-compliance) maintains a compatible land use within the zone. Further, the building itself is compatible in land use terms as part of the Ascham Campus.
To integrate suitable business, office, residential, retail and other development in accessible locations so as to maximise public transport patronage and encourage walking and cycling.	The proposed development serves to augment the existing School use on the site which is ideally located in terms of access to public transport. Further, the proposed development has also incorporated an updated Green Travel Plan (prepared by Arup) continuing to encourage staff and students to use active and public transport.
To provide active ground floor uses to create vibrant centres.	Given the need to address the impacts of road noise and privacy and hence meet the practical and functional requirements of a school, this location presents constraints to the design in terms of the provision of street activation through window openings and glazing. Nevertheless, the proposed design provides a much higher degree of visual interest than is currently provided by the uniform shop as well as other street-front buildings within the immediate visual catchment which will encourage activation of other areas of the Edgecliff Centre. More specifically, the areas of non-compliance (related to the Fiona Hall) are non-habitable and non-trafficable and have been designed to improve views of the heritage listed Fiona building. The location of mechanical plant on the roof allows design activation and maintains pedestrian activity and vibrancy along the New South Head Road frontage.
To provide for development of a scale and type that is compatible with the amenity of the surrounding residential area.	The position of the proposed hall building does not have an immediate residential interface, nor is within a genuine residential area- rather the proposal fronts New South Head Road which is characterised by a mix of uses, with a predominant commercial character. The proposed hall building fronts New South Head Road and has no immediate residential neighbours. The closest neighbour is a shop-top housing building fronting New South Head Road located approximately 18m to the west (across the driveway entrance to the School). The nearest residential

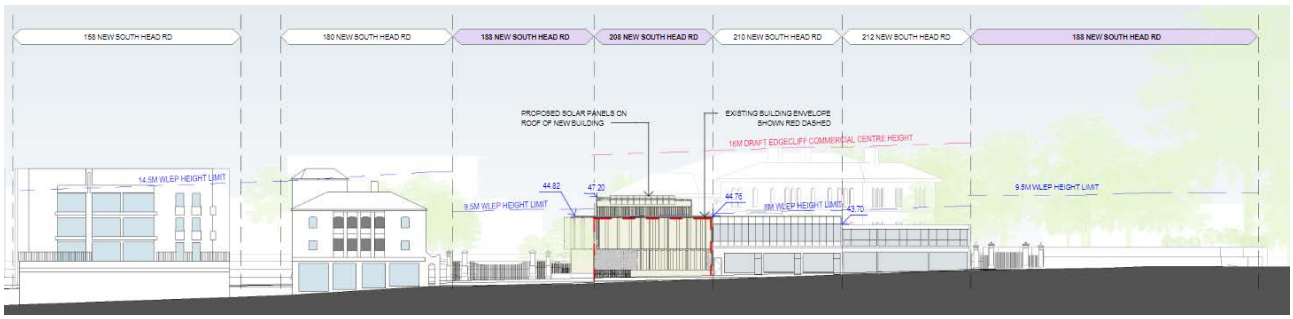
Objective	Assessment
	apartment development is located approximately 90m to the north of the hall building fronting Ocean Street. The proposal is of a nature, and has been designed in a manner, that provides compatibility with the broader residential area and nearby mixed-use development (including residential apartments). The proposed development provides improvements to an existing educational establishment which will continue to provide for the local community. The overall built form is consistent with the bulk and scale of development along New South Head Road and does not result in any negative impacts on surrounding residential development.
To ensure that development is of a height and scale that achieves the desired future character of the neighbourhood.	This matter has previously been addressed under the corresponding objective contained within Clause 4.3 (refer to the response within **Table 3** above). The desired future character statement for the Edgecliff Centre identifies a general height of four to six storeys within the Centre with an indicative height of 4 storeys with an associated maximum FSR of 2.5:1 identified for 208 New South Head Road. Notwithstanding the desired future character statement, the current controls for the site intend for a two storey development. The proposed hall building reflects the desired character by presenting as a two storey development with the minor exceedance of height relating to the rooftop mechanical plant associated with the new hall building. The proposed height of 208 New South Head Road also retains the existing street wall height of the surrounding buildings as shown in **Figure 12**. The non-compliance relates specifically to the roof top mechanical plant which sits behind the street wall and is generally not visible from the street.

The above assessment demonstrates the proposed development will be in the public interest notwithstanding the proposed variation to the height of buildings development standard as it is consistent with the objectives of the particular standard and the objectives for development within the zone in which the development is proposed to be carried out.

Figure 12 New South Head Road elevation



Picture 18 Existing street elevation



Picture 19 Proposed street elevation

Source: BVN

6.6. HAS THE CONCURRENCE OF THE PLANNING SECRETARY BEEN OBTAINED? – CLAUSE 4.6(4)(B) AND CLAUSE 4.6(5)

The Secretary can be assumed to have concurred to the variation under Department of Planning Circular PS 18–003 'Variations to development standards', dated 21 February 2018. This circular is a notice under 64(1) of the *Environmental Planning and Assessment Regulation 2000*.

The Secretary can be assumed to have given concurrence as the matter will be determined by an independent hearing and assessment panel or a Sydney district or regional planning panel in accordance with the Planning Circular.

The matters for consideration under clause 4.6(5) are considered below.

- **Clause 4.6(5)(a) – does contravention of the development standard raise any matter of significance for State or regional environmental planning?**

The proposed non-compliance with the height of buildings development standard will not raise any matter of significance for State or regional environmental planning. It has been demonstrated that the proposed variation is appropriate based on the specific circumstances of the case and would be unlikely to result in an unacceptable precedent for the assessment of other development proposals.

- **Clause 4.6(5)(b) - is there a public benefit of maintaining the planning control standard?**

The proposed development achieves the objectives of the height of buildings development standard and the relevant land use zone objectives despite the technical non-compliance.

The principal aim of the proposal is to consolidate current facilities for the use of the Junior School which respects the heritage significance of the Fiona Building. The proposed variation to the height control of the WLEP does not result in the loss of amenity to the adjoining properties from overshadowing or loss of privacy. The proposed height is therefore considered to be acceptable, particularly when balanced against the benefits of the project which are:

- The proposal provides contemporary and improved educational facilities for an existing education establishment which has been located in Edgecliff since 1886.

- The introduction of the Fiona Hall building along New South Head Road and the redevelopment of the Fiona Wing will allow for the removal of existing low-quality retail and educational spaces and replace with additional learning spaces and staff facilities which remains sympathetic to the heritage character of the site; and
- The siting, scale and design of the new buildings have been designed having regard to the character of the area including heritage views and the desired future character of the Edgecliff Centre and will provide an improved contribution to the streetscape.

There is no material impact or benefit associated with strict adherence to the development standard and there is no compelling reason or public benefit derived from maintenance of the standard.

- **Clause 4.6(5)(c) – are there any other matters required to be taken into consideration by the Secretary before granting concurrence?**

Concurrence can be assumed, however, there are no known additional matters that need to be considered within the assessment of the clause 4.6 variation request prior to granting concurrence, should it be required.

7. CONCLUSION

For the reasons set out in this written request, strict compliance with the height of buildings development standard contained within clause 4.3 of *Woollahra Local Environmental Plan 2014* is unreasonable and unnecessary in the circumstances of the case. Further, there are sufficient environmental planning grounds to justify the proposed variation and it is in the public interest to do so.

The development is consistent with the objects of the *Environmental Planning and Assessment Act 1979* by promoting the orderly and economic use and development of the land and promoting and delivering good design and amenity. This is achieved through the delivery of improved educational facilities associated with an established school that will continue to support the Edgecliff centre. The proposal will also greatly improve the public domain interface along the main spine of the Edgecliff centre, and in doing so will facilitate high quality development which has considered the heritage significance of the site and aligns with the desired future character of the centre.

It is reasonable and appropriate to vary the height of buildings development standard to the extent proposed for the reasons detailed within this submission and as summarised below:

- Compliance with the height of building development standard is unreasonable and unnecessary in the circumstances of the proposed development.
- The proposal, notwithstanding the non-compliance, is consistent with the objectives of the height of building standard as well as both the SP2 Infrastructure and B4 Mixed Use zone objectives.
- There are sufficient environmental planning grounds to justify the contravention, which results in a better planning outcome than a strictly compliant development in the circumstances of this particular case.
- There are unique circumstances arising from the site, with the contravention of the development standard arising to retain and protect the heritage curtilage of the Fiona Building and provide a built form which reflects the streetscape character and retains a sympathetic built form to heritage items within the site. The height of the Fiona Hall also provides an extension of the height across the Ascham campus.
- There are no environmental impacts arising from the proposed variation including views, overshadowing and privacy.
- The proposed non-compliance with the height of building standard will not result in any matter of significance for State or regional environmental planning.

For the reasons outlined above, the clause 4.6 request is well-founded. The development standard is unnecessary and unreasonable in the circumstances, and there are sufficient environmental planning grounds that warrant contravention of the standard. In the circumstances of this case, flexibility in the application of the height of buildings development standard should be applied.

DISCLAIMER

This report is dated 17 May 2022 and incorporates information and events up to that date only and excludes any information arising, or event occurring, after that date which may affect the validity of Urbis Pty Ltd **(Urbis)** opinion in this report. Urbis prepared this report on the instructions, and for the benefit only, of Ascham School **(Instructing Party)** for the purpose of Clause 4.6 Variation **(Purpose)** and not for any other purpose or use. To the extent permitted by applicable law, Urbis expressly disclaims all liability, whether direct or indirect, to the Instructing Party which relies or purports to rely on this report for any purpose other than the Purpose, and to any other person which relies or purports to rely on this report for any purpose whatsoever (including the Purpose).

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All surveys, forecasts, projections and recommendations contained in or associated with this report are made in good faith and on the basis of information supplied to Urbis at the date of this report, and upon which Urbis relied. Achievement of the projections and budgets set out in this report will depend, among other things, on the actions of others over which Urbis has no control.

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This report has been prepared with due care and diligence by Urbis and the statements and opinions given by Urbis in this report are given in good faith and in the reasonable belief that they are correct and not misleading, subject to the limitations above.

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CLAUSE 4.6 VARIATION - FLOOR SPACE RATIO

Ascham School 188 New South Head Road, Edgecliff

Prepared for
ASCHAM SCHOOL
17 May 2022

URBIS STAFF RESPONSIBLE FOR THIS REPORT WERE:

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We acknowledge, in each of our offices, the Traditional Owners on whose land we stand.

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1. INTRODUCTION

This Clause 4.6 Variation Request ('the Request') has been prepared on behalf of Ascham School ('the applicant') and accompanies a Development Application ('DA') for the redevelopment of the Fiona Junior Campus at 188 New South Head Road, Edgecliff. The primary street address for Ascham is 188 New South Head Road, Edgecliff.

The Request seeks an exception from the floor space ratio (FSR) development standard prescribed for the site under clause 4.4 of Woollahra Local Environmental Plan 2014 (WLEP). This variation request is made pursuant to clause 4.6 of WLEP.

The Request relates specifically to the proposed Fiona Hall building and associated entrance courtyard located at 208 New South Head Road, Edgecliff (Lot 1 DP 102868). As is identified in Section 4.1 below, the technical variation is extremely minor (2.3sqm or 0.5%), however as discussed with Council's Officers, there are other areas that have also been included as part of this Request for 'abundant caution' given these areas could also be interpreted as being part of GFA, and hence contributing to the variation. Even when including these other areas, the total variation (being 68sqm or 16% on Lot 1 DP 102868) represents a minor variation when considering the totality of the project- the majority of which sits outside of Lot 1 DP 102868, and hence not the subject of a specific FSR control.

This report should be read in conjunction with the Architectural Plans prepared by BVN and the Heritage Impact Statement prepared by Hector Abrahams Architects.

The following sections of the report include:

- **Section 2:** description of the site and its local and regional context, including key features relevant to the proposed variation.
- **Section 3:** brief overview of the proposed development as outlined in further detail within the SEE and accompanying drawings.
- **Section 4:** identification of the development standard which is proposed to be varied, including the extent of the contravention.
- **Section 5:** outline of the relevant assessment framework for the variation in accordance with clause 4.6 of the LEP.
- **Section 6:** detailed assessment and justification of the proposed variation in accordance with the relevant guidelines and relevant planning principles and judgements issued by the Land and Environment Court.
- **Section 7:** summary and conclusion.

2. SITE CONTEXT

2.1. SITE DESCRIPTION

Ascham School covers a significant landholding within the suburbs of Edgecliff and Darling Point as illustrated in red in **Figure 1** and identified in **Table 1.** Ascham has been providing high quality education for day and boarding students since 1886, driven by a strong and widely respected academic program from Prep to Year 12.

The site is located within the Edgecliff local centre within the Eastern Suburbs of Sydney. The site is well connected via pedestrian and cycle networks as well as public transport including Edgecliff Train Station and Bus Interchange.

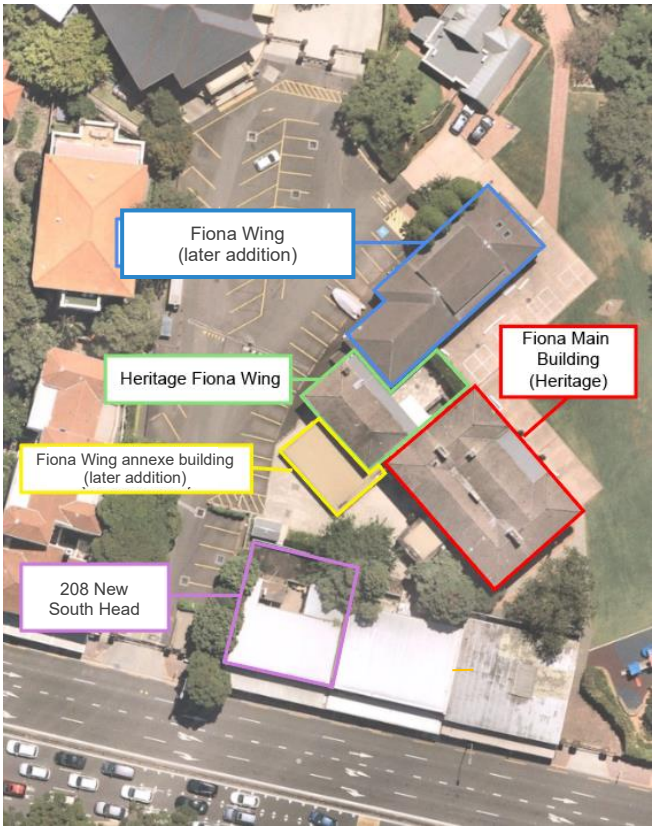
The proposed works relate to the Fiona Building, a listed heritage building which is separated into two wings and a main building as illustrated in Picture 1. The Fiona Wing currently accommodates the following uses:

- Fiona Main Building (Heritage) – classrooms
- Fiona Wing (Heritage) – classrooms
- Fiona Wing (non-heritage) – classrooms, Junior School library and staff room
- Fiona Wing (non-heritage) annexe – classrooms

The school recently acquired 208 and 210 New South Head Road (illustrated in purple and orange in **Figure 2**). 208 has been used as a uniform shop and is proposed to be demolished and incorporated into the Junior Campus as additional learning spaces and hall for Junior students. Given the recent acquisition of for 210 New South Head Road, the overall design and intent of the site is still being finalised and does not form part of the proposed scope of works of this application.

Figure 1 Ascham School Site Boundary

Figure 2 Location of Proposed works



Source: Urbis

The key features of the site are summarised in the following table.

Table 1 Site Description

Address	Legal Description	Current Development
188 New South Head Road, Edgecliff	Lot 81 DP217078 Lots 4 and 5 DP33456 Lot 1 DP74398 Lot 1 DP224844 Lots 1 and 2 DP183645 Lot 1 DP69838 Lot 1 DP225312 Lots 4, 9 and 10 DP5444 Lot 1 DP68900 Lot 1 DP723473	Ascham School including the Fiona Building which provides administration offices and learning spaces for the junior students (years 3-6)
37 Darling Point Road, Darling Point	Lot A DP108600	Ascham School including Duntrim House which provides accommodation for boarders and the Centre for the Sciences *The proposed works does not sit on this part of the site*
45 Darling Point Road, Darling Point	Lot 5 DP5444	Ascham School including teaching and learning spaces, specifically relating to speech and drama, group music and instrumental lessons *The proposed works does not sit on this part of the site*
208 New South Head Road, Edgecliff	Lot 1 DP102868	Two storey retail shop incorporating the current Ascham uniform shop
210 New South Head Road, Edgecliff	Lot 2 DP33456	Two storey retail shop *The proposed works does not sit on this part of the site*

2.2. HERITAGE

Ascham School is a locally listed heritage item 239 within the *Woollahra Local Environmental Plan 2014*. The item is identified as:

> *Ascham school precinct comprising: "Fiona" including interiors and former entrance gates, "Glenrock" including interiors and inner and outer gates, the Dower House including interiors, sand-stone works, remaining open space and oval adjacent to "Fiona", 4 Moreton Bay Figs,*

The proposed development relates specifically to "Fiona" and its associated buildings. Fiona is the second largest house on the site. Fiona is a stone villa in the Italian Renaissance style. It is oriented toward the north (ie. away from New South Head Road) and opens up to a large lawn terrace that extends from the house to a line of large noble trees. A servant's wing flanks the main house to the west and a port cochere is located at the rear of the building.

3. PROPOSED DEVELOPMENT

This Clause 4.6 Variation Request has been prepared to accompany a DA for alterations and additions to Ascham School to consolidate Junior School facilities and administration offices within the campus.

It relates specifically to the proposed Fiona Hall building and associated entrance courtyard located at 208 New South Head Road, Edgecliff (Lot 1 DP102868).

A detailed description of the overall proposed development is provided in the Statement of Environmental Effects prepared by Urbis Pty Ltd and dated 27 September 2021. The proposal is also detailed within the architectural, civil and landscape drawings that from part of the DA.

A summary of the key features of the proposed works is provided below **(our emphasis added):**

- Partial demolition of the non-heritage Fiona Wing including removal of roof and staff room.
- Demolition of the Fiona Annexe Building that adjoins the south of the Fiona Wing.
- Demolition of existing shop located at 208 New South Head Road.
- Upgrades to current learning facilities including:
  - Internal refurbishment to Fiona Heritage wing including relocation of school reception and additional meeting rooms and bathrooms.
  - Replacement of current non-compliant stairs in Heritage Fiona Wing courtyard to meet BCA requirements.
  - Installation of new lift within the Main Fiona Building to improve accessibility.
  - Minor internal refurbishment to the first two floors of the Fiona Wing Building and an extension of the existing building footprint for additional classrooms.
  - New circulation node with lift, stair and accessible bathroom blocks connecting existing Fiona Wing building and new Fiona Wing Addition Building which houses staff room and classrooms.
- **Construction of a new school hall (Fiona Hall), servery kitchen, bathrooms, plant room and classrooms at 208 New South Head Road.**
- External works including:
  - Construction of new entrance courtyard adjacent to the new Fiona Hall.
  - Construction of new wet weather canopy/COLA next to Fiona Wing.
  - Construction of new canopy over heritage courtyard for weather protection.
  - Construction of new entry pavilion at relocated reception area of the Heritage Fiona Wing.
  - New paving and landscaping to improve connection between the Fiona Main Building and the new Junior School hall.
  - Construction of new pick-up/drop-off shelter adjacent to the Fiona Wing building and carpark.
- Reconfiguration of the Junior School pick-up/drop-off zone to improve queuing. This results in a total reduction of 6 approved car spaces, however will result in an increased total queuing capacity of 17 cars (up from 13 cars).

4. VARIATION OF FLOOR SPACE RATIO STANDARD

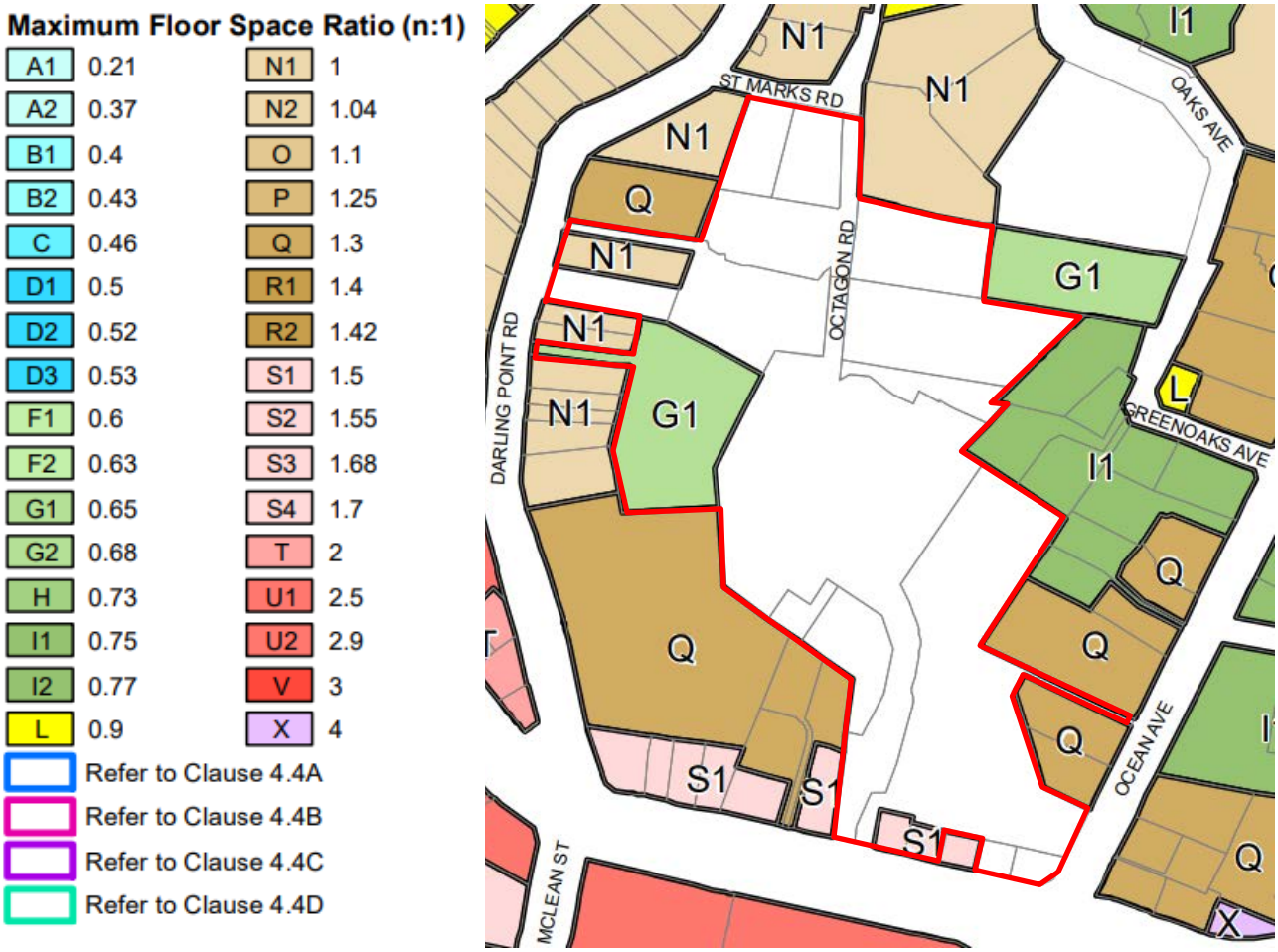
This section of the report identifies the development standard which is proposed to be varied, including the extent of the contravention. A detailed justification for the proposed variation is provided in **Section 6** of the report.

4.1. DEVELOPMENT STANDARD

The following floor space controls apply for the site as prescribed within Clause 4.4 of the WLEP and the associated Floor Space Ratio Map (**Figure 3**):

- Ascham School (main landholding) – no applicable FSR control
- 208 New South Head Road – S1 1.5:1

Figure 3 Floor Space Ratio Map with Ascham School boundary in red



Source: WLEP

WLEP defines 'gross floor area' as:

the sum of the floor area of each floor of a building measured from the internal face of external walls, or from the internal face of walls separating the building from any other building, measured at a height of 1.4 metres above the floor, and includes—

(a) the area of a mezzanine, and

(b) habitable rooms in a basement or an attic, and

(c) any shop, auditorium, cinema, and the like, in a basement or attic,

but excludes—

(d) any area for common vertical circulation, such as lifts and stairs, and

(e) any basement—

(i) storage, and

(ii) vehicular access, loading areas, garbage and services, and

(f) plant rooms, lift towers and other areas used exclusively for mechanical services or ducting, and

(g) car parking to meet any requirements of the consent authority (including access to that car parking), and

(h) any space used for the loading or unloading of goods (including access to it), and

(i) terraces and balconies with outer walls less than 1.4 metres high, and

(j) voids above a floor at the level of a storey or storey above.

4.2. PROPOSED VARIATION TO FLOOR SPACE RATIO

The proposed variation specifically relates to the proposed Fiona Hall building located at 208 New South Head Road, Edgecliff (Lot 1 DP102868). The specific lot has a total area of 278.8 sqm and is outlined in dark blue in **Figure 4** below. All area considered GFA in accordance with the WLEP definition is shaded light blue with GFA outside of the lot boundary associated with the hall building shaded purple.

An external, partly covered, access walkway is proposed along the western elevation of the hall building. This access route is located outside Lot 1 DP102868, and hence outside of the area that applies to the FSR control. An open colonnade runs along the western extremity of this access walkway, and therefore this space is not fully enclosed.

A small portion of the access walkway is located within Lot 1 DP102868 (hatched in light blue in **Figure 4**). Emanating from this walkway is a fully covered vestibule area at the lower-ground floor and toward the rear of the building as illustrated in **Figure 5**. This area provides weather-protected access to lower-ground floor hall amenities. While this vestibule area is open to the external western façade of the building and does not meet the definition of GFA under WLEP, it has been incorporated into the GFA calculation for 'abundant caution' given that it is located internally to the overall building footprint.

A plant room is also proposed on the lower-ground floor to provide adequate space for mechanical plant associated with the future redevelopment of 210 New South Head Road (Lot 2 DP33456) which is owned by Ascham and the subject of ongoing design development. Like the vestibule area, this plant room is located at the lower ground floor and located 'within' and toward the rear of the hall. While 'plant rooms' are excluded from GFA calculations (in accordance with the GFA definition within the WLEP), the area associated with this plant room has been incorporated into the GFA calculation- again for abundant caution given the uncertainty of timing associated with the redevelopment of 210 New South Head Road.

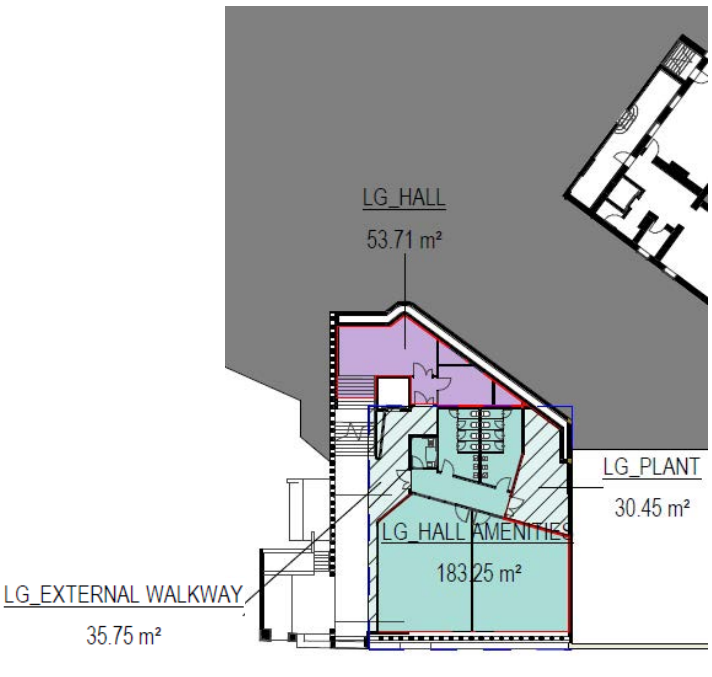
Table 2 provides a summary of the overall GFA variation.

Table 2 Proposed FSR variation

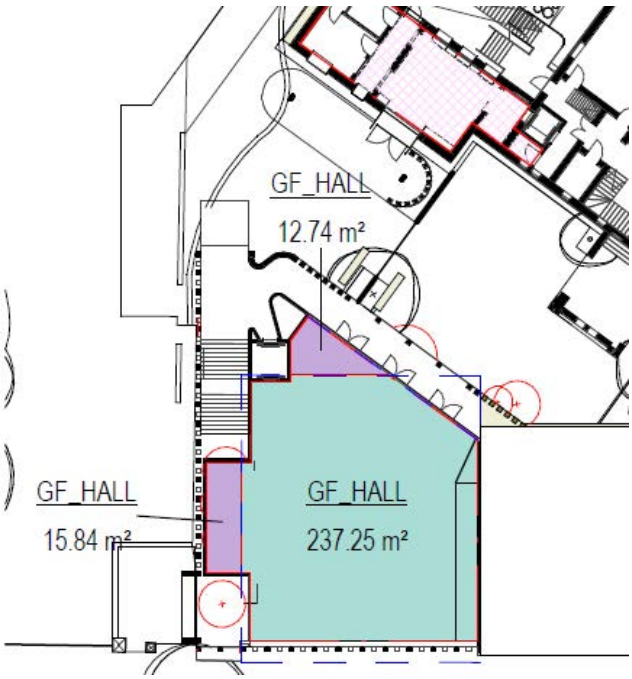
Maximum GFA & FSR	**Proposed Development (within Lot 1 DP102868)**	**GFA / FSR Exceedance**
418.20 sqm (1.5:1)	Excluding the whole of the external access walkway (and associated vestibule area) and LG plant room- 420.5sqm (=1.51:1)	2.3sqm (0.5% exceedance
	Including the external access walkway within Lot 1 DP 102868 (and associated vestibule area)- 456.25sqm (=1.64:1)	38.05sqm (9% exceedance)

Maximum GFA & FSR	Proposed Development (within Lot 1 DP102868)	GFA / FSR Exceedance
	Including the external access walkway within Lot 1 DP 102868 (and associated vestibule area) and LG plant room- 486.7sqm (=1.75:1)	68.5sqm (16% exceedance)

Figure 4 Proposed works



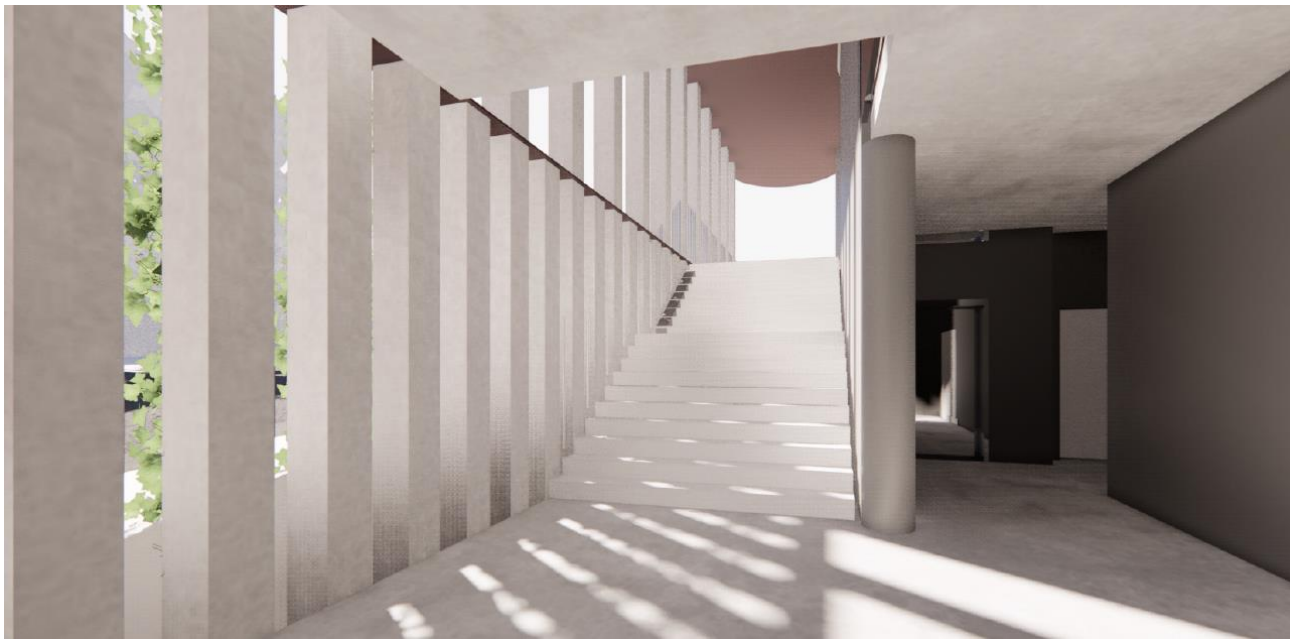
Picture 1 Lower Ground floor plan



Picture 2 Ground floor plan

Source: BVN

Figure 5 Fiona Hall external walkway



Source: BVN

5. RELEVANT ASSESSMENT FRAMEWORK

Clause 4.6 of WLEP includes provisions that allow for exceptions to development standards in certain circumstances. The objectives of clause 4.6 of WLEP are:

(a) to provide an appropriate degree of flexibility in applying certain development standards to particular development,
(b) to achieve better outcomes for and from development by allowing flexibility in particular circumstances.

Clause 4.6 provides flexibility in the application of planning provisions by allowing the consent authority to approve a DA that does not comply with certain development standards, where it can be shown that flexibility in the particular circumstances of the case would achieve better outcomes for and from the development.

In determining whether to grant consent for development that contravenes a development standard, clause 4.6(3) requires that the consent authority to consider a written request from the applicant that seeks to justify the contravention of the development by demonstrating:

(a) that compliance with the development standard is unreasonable or unnecessary in the circumstances of the case, and
(b) that there are sufficient environmental planning grounds to justify contravening the development standard.

Clause 4.6(4)(a) requires the consent authority to be satisfied that the applicant's written request adequately addresses each of the matters listed in clause 4.6(3). The consent authority should also be satisfied that that the proposed development will be in the public interest because it is consistent with the objectives of the standard and the objectives for development within the zone in which it is proposed to be carried out.

Clause 4.6(4)(b) requires the concurrence of the Secretary to have been obtained. In deciding whether to grant concurrence, subclause (5) requires that the Secretary consider:

(a) whether contravention of the development standard raises any matter of significance for State or regional environmental planning, and
(b) the public benefit of maintaining the development standard, and
(c) any other matters required to be taken into consideration by the Secretary before granting concurrence.

The concurrence of the Secretary can be assumed to have been granted for the purpose of this variation request in accordance with the Department of Planning Circular PS 18–003 'Variations to development standards', dated 21 February 2018. This circular is a notice under section 64(1) of the Environmental Planning and Assessment Regulation 2000 and provides for assumed concurrence. A consent granted by a consent authority that has assumed concurrence is as valid and effective as if concurrence had been given.

The Secretary can be assumed to have given concurrence if the matter is determined by an independent hearing and assessment panel or a Sydney district or regional planning panel in accordance with the Planning Circular.

This clause 4.6 request demonstrates that compliance with the floor space ratio development standard prescribed for the site in clause 4.4 of WLEP is unreasonable and unnecessary, that there are sufficient environmental planning grounds to justify the requested variation and that the approval of the variation is in the public interest because it is consistent with the development standard and zone objectives.

In accordance with clause 4.6(3), the applicant requests that the floor space ratio development standard be varied (subject to the applicant's position that such a request should not actually be necessary).

6. ASSESSMENT OF CLAUSE 4.6 VARIATION

The following sections of the report provide a comprehensive assessment of the request to vary the development standards relating to the floor space ratio development standard in accordance with clause 4.4 of WLEP.

Detailed consideration has been given to the following matters within this assessment:

- Varying development standards: A Guide, prepared by the Department of Planning and Infrastructure dated August 2011.
- Relevant planning principles and judgements issued by the Land and Environment Court.

The following sections of the report provides detailed responses to the key questions required to be addressed within the above documents and clause 4.6 of the LEP.

6.1. IS THE PLANNING CONTROL A DEVELOPMENT STANDARD THAT CAN BE VARIED? – CLAUSE 4.6(2)

The floor space ratio development standard prescribed by clause 4.4 of WLEP is a development standard capable of being varied under clause 4.6(2) of WLEP.

The proposed variation is not excluded from the operation of clause 4.6(2) as it does not comprise any of the matters listed within clause 4.6(6) or clause 4.6(8) of WLEP.

6.2. IS COMPLIANCE WITH THE DEVELOPMENT STANDARD UNREASONABLE OR UNNECESSARY IN THE CIRCUMSTANCES OF THE CASE? – CLAUSE 4.6(3)(A)

Historically, the most common way to establish a development standard was unreasonable or unnecessary was by satisfying the first method set out in Wehbe v Pittwater Council [2007] NSWLEC 827. This method requires the objectives of the standard are achieved despite the non-compliance with the standard.

This was recently re-affirmed by the Chief Judge in Initial Action Pty Ltd v Woollahra Municipal Council [2018] NSWLEC 118 at [16]-[17]. Similarly, in Randwick City Council v Micaul Holdings Pty Ltd [2016] NSWLEC 7 at [34] the Chief Judge held that "establishing that the development would not cause environmental harm and is consistent with the objectives of the development standards is an established means of demonstrating that compliance with the development standard is unreasonable or unnecessary".

This Request addresses the first method outlined in Wehbe v Pittwater Council [2007] NSWLEC 827. This method alone is sufficient to satisfy the 'unreasonable and unnecessary' requirement.

The Request also addresses the third method, that the underlying objective or purpose of the development standard would be undermined, defeated or thwarted if compliance was required with the consequence that compliance is unreasonable (Initial Action at [19] and Linfield Developments Pty Ltd v Cumberland Council [2019] NSWLEC 131 at [24]). Again, this method alone is sufficient to satisfy the 'unreasonable and unnecessary' requirement.

The Request also seeks to demonstrate the 'unreasonable and unnecessary' requirement is met because the burden placed on the community by not permitting the variation would be disproportionate to the non-existent or inconsequential adverse impacts arising from the proposed non-complying development. This disproportion provides sufficient grounds to establish unreasonableness (relying on comments made in an analogous context, in Botany Bay City Council v Saab Corp [2011] NSWCA 308 at [15]).

- ***The objectives of the standard are achieved notwithstanding non-compliance with the standard*** (the first method in Wehbe v Pittwater Council [2007] NSWLEC 827 [42]-[43])

The specific objectives of the floor space ratio development standard as specified in clause 4.4 of WLEP are detailed in **Table 3** below. An assessment of the consistency of the proposed development with each of the objectives is also provided.

Table 3 Assessment of Consistency with Clause 4.4 Objectives

Objectives	Assessment
(a) for development in Zone R3 Medium Density Residential— (i) to ensure the bulk and scale of new development is compatible with the desired future character of the area, and (ii) to minimise adverse environmental effects on the use or enjoyment of adjoining properties and the public domain, and (iii) to ensure that development allows adequate provision on the land for deep soil planting and areas of private open space,	This is not applicable to the site.
(b) for buildings in Zone B1 Neighbourhood Centre, Zone B2 Local Centre, and Zone B4 Mixed Use—to ensure that buildings are compatible with the desired future character of the area in terms of bulk and scale.	208 New South Head Road is zoned B4 Mixed Use Zone and is identified in the Edgecliff Mixed Use Centre (Edgecliff Centre). Chapter D2.2 of the *Woollahra Development Control Plan 2015* (the DCP) provides a desired future character statement for the Edgecliff Centre. As stated in the DCP: '*This mixed use corridor is a highly urban environment and it is important that it meets high standards of visual quality and pedestrian amenity*.' The proposed development has been designed by BVN in close collaboration with Hector Abrahams Architects to ensure that a high level of design excellence is achieved which also respects the heritage significance of the heritage listed Fiona building (located to the rear of the hall) and the entire Ascham campus. The desired future character requires development along New South Head Road to have particular consideration on how the buildings are interpreted from moving vehicles as well as responding to pedestrians by providing human scale design elements. Given the need to address the impacts of road noise and privacy and hence meet the practical and functional requirements of a school, this location presents constraints to the design in terms of the provision of window openings and glazing generally required for activated frontages. Nevertheless, the broader site's heritage significance also presents an opportunity to integrate interpretive and decorative elements to the hall building that result in a contemporary building which provides a much higher degree of

Objectives	Assessment
	visual interest than is currently provided by the uniform shop as well as other street-front buildings along New South Head Road. The overall built form is consistent with the bulk and scale of lower development along New South Head Road and retains the desired two storey built form reflecting the objectives of the current development standards for the site. The New South Road frontage and its visual context accommodates far greater development than is proposed. The minor exceedance of GFA associated with the hall is internal to the site and hence is not viewed or perceived as additional bulk from either the street frontage or nearby areas. The use of the site by Ascham will capitalise on the excellent access to public transport, high visual exposure and proximity to the Sydney CBD. The proposed hall building also introduces a new pedestrian entrance into Ascham. The undercover walkway associated with the hall building allows students to enter the school from the west without crossing the existing driveway (which is used as a car line during pick up and drop off times), thereby increasing amenity and safety for pedestrians. A review is also currently being undertaken of the relevant planning controls for the Edgecliff Commercial Centre (ECC). That review is incorporated within the Draft Edgecliff Commercial Centre Planning and Urban Design Strategy which has recently been publicly exhibited. The desired future character statement for the site as part of this Draft Strategy identifies a maximum height of 4 storeys with an associated maximum FSR of 2.5:1. The proposal (being 2 storeys and having an FSR of 1.75:1) is easily contained within these future bulk and scale parameters established within this Draft Strategy.

The objectives of the development standard are achieved, notwithstanding the non-compliance with the standard in the circumstances described in this variation report.

- **The underlying object or purpose would be undermined, if compliance was required with the consequence that compliance is unreasonable** (the third method in Wehbe v Pittwater Council [2007] NSWLEC 827 [42]-[43] as applied in Linfield Developments Pty Ltd v Cumberland Council [2019] NSWLEC 131 at [24])

The underlying purposed of the development is to provide new educational facilities within the existing school grounds to meet the needs of current students and maintain the heritage character of the site.

The proposed development will replace an ageing retail tenancy to provide learning spaces and associated facilities including a new hall. The proposed development has been designed with consideration of the relevant educational requirements. If the proposed building was reduced in GFA, the proposed classrooms and hall would need to be reduced in size which would not meet the needs of Ascham. Retention of the existing building would result in negative outcomes for students and staff as the current shop does not provide any learning facilities for the school.

There is no applicable development standard for floor space ratio for the main Ascham landholding under WLEP. As such, If the hall was located within the main landholding, there would be no requirement for a calculation of floor space. The hall has been designed to provide an appropriate curtilage to the Fiona building within the Ascham campus while also defining and providing visual interest from New South Head Road. If compliance with the floor space development standard was required, it is likely these facilities would be located closer to the Fiona building resulting in a negative heritage outcome.

As noted above, the current design provides weather protection and direct access from New South Head Road into the junior school which maintain student safety and reduce the need to cross the Ascham driveway with entrances to be provided on both sides of the current driveway. The small portion (ie slither) of the external access walkway which sits within Lot 1 DP 102868 is open at both ends as well as on its western side adjoining the colonnade, as illustrated in **Figure 6**. This space is not considered 'habitable' and is not defined as GFA. The associated vestibule remains open to the western colonnade however is fully covered and is inbound of the access walkway. While both areas are not considered 'habitable', are not fully enclosed and remain open to the external elements, they have been incorporated into the GFA calculation for an abundance of caution.

Given the location of the external walkway, hallway and plant room within the building envelope, the proposed GFA exceedance does not add to the overall bulk and scale of the development. The removal of these elements would reduce the amenity of the building and not reflect the underlying purpose of the proposal to provide educational facilities on school owned land. Removal of the new external walkway would also reduce student safety and require students to cross the car line to access the new reception area within the Fiona building.

Figure 6 Fiona Hall entry walkway

Source: BVN

As such, compliance in the circumstances is therefore unreasonable.

- **The burden placed on the community (by requiring strict compliance with the FSR standard) would be disproportionate to the (non-existent or inconsequential) adverse consequences attributable to the proposed non-compliant development** (cf Botany Bay City Council v Saab Corp [2011] NSWCA 308 at [15]).

This way is not relevant in the circumstances of this particular application.

6.3. ARE THERE SUFFICIENT ENVIRONMENTAL PLANNING GROUNDS TO JUSTIFY CONTRAVENING THE DEVELOPMENT STANDARD? – CLAUSE 4.6(3)(B)

The Land & Environment Court judgment in Initial Action Pty Ltd v Woollahra Council [2018] NSWLEC 2018, assists in considering the sufficient environmental planning grounds. Preston J observed:

> *"…in order for there to be 'sufficient' environmental planning grounds to justify a written request under clause 4.6, the focus must be on the aspect or element of the development that contravenes the development standard and the environmental planning grounds advanced in the written request must justify contravening the development standard, not simply promote the benefits of carrying out the development as a whole; and*
>
> *…there is no basis in Clause 4.6 to establish a test that the non-compliant development should have a neutral or beneficial effect relative to a compliant development"*

There are sufficient environmental planning grounds to justify the proposed variation to the development standard. As identified earlier in this submission the areas primarily in contention in relation to a breach in floor space (plant room and vestibule area) have been addressed for 'abundant caution' as there are clear reasons why these areas could be excluded from GFA. There are a number of environmental grounds that justifies contravention of the FSR standard in respect of these lower ground floor spaces.

The additional floor space at the lower ground level is set within the site. The ability for the proposed hall building to utilise floor space within this part of the site means that the footprint of the building can be contained and that re-distribution of floor spaces is not required at the upper level of the building. This in turn provides environmental planning benefits in relation to:

- Heritage and curtilage: containing the building within the proposed envelope means an improved relationship between the proposed building and the Fiona Building and that additional bulk is not required at the roof level that may otherwise compromise the heritage setting and views to/from the Fiona Building.
- Solar access: containing the building within the proposed envelope maintains appropriate levels of solar access on the surrounding public domain and adjoining properties.
- Vibrancy in activity and pedestrian safety: designing the building in the proposed manner allows appropriate student gathering space and access to facilities at the lower ground floor. This, in combination with the need to provide a clear access through the site, increases the ability to activate the site's entrance as well as providing sufficient room for pedestrian safety near a main road entrance.

As such, the non-compliant GFA has no noticeable impacts on surrounding development and will benefit the Ascham community.

6.4. HAS THE WRITTEN REQUEST ADEQUATELY ADDRESSED THE MATTERS IN SUB-CLAUSE (3)? – CLAUSE 4.6(4)(A)(I)

Clause 4.6(4)(a)(i) states that development consent must not be granted for development that contravenes a development standard unless the consent authority is satisfied that the applicant's written request has adequately addressed the matters required to be demonstrated by subclause (3).

Each of the sub-clause (3) matters are comprehensively addressed in this written request, including detailed consideration of whether compliance with a development standard is unreasonable or unnecessary in the circumstances of the case. The written request also provides sufficient environmental planning grounds, including matters specific to the proposal and the site, to justify the proposed variation to the development standard.

6.5. IS THE PROPOSED DEVELOPMENT IN THE PUBLIC INTEREST? – CLAUSE 4.6(4)(B)(II)

Clause 4.6(4)(a)(ii) states development consent must not be granted for development that contravenes a development standard unless the consent authority is satisfied the proposal will be in the public interest because it is consistent with the objectives of the development standard and the objectives for the zone.

The consistency of the development with the objectives of the development standard is demonstrated in **Table 3** above. The proposal is also consistent with the land use objectives that apply to the site under WLEP. While Ascham School is generally located in the SP2 Infrastructure zone, 208 New South Head Road which is located within the B4 Mixed Use Zone. The proposed development is consistent with the relevant land use zone objectives as outlined in **Table 4** below.

Table 4 Assessment of Compliance with Land Use Zone Objectives

Objective	**Assessment**
To provide a mixture of compatible land uses.	The proposed development provides an extension of an existing use within the Edgecliff local centre. The Fiona Building has been used as an educational establishment since 1943 and will continue to provide education and employment opportunities within Edgecliff. The proposed development (inclusive of the area the subject of the non-compliance) maintains a compatible land use within the zone. Further, the building itself is compatible in land use terms as part of the Ascham Campus.
To integrate suitable business, office, residential, retail and other development in accessible locations so as to maximise public transport patronage and encourage walking and cycling.	The proposed development serves to augment the existing School use on the site which is ideally located in terms of access to public transport. Further, the proposed development has also incorporated an updated Green Travel Plan (prepared by Arup) continuing to encourage staff and students to use active and public transport.
To provide active ground floor uses to create vibrant centres.	Given the need to address the impacts of road noise and privacy and hence meet the practical and functional requirements of a school, this location presents constraints to the design in terms of the provision of street activation through window openings and glazing. Nevertheless, the proposed design provides a much higher degree of visual interest than is currently provided by the uniform shop as well as other street-front buildings within the immediate visual catchment which will encourage activation of other areas of the Edgecliff Centre. More specifically, the areas of non-compliance (being the plant room and vestibule area) are located deep 'within the site'. The design in these positions allows design activation and pedestrian activity and vibrancy along the New South Head Road frontage.
To provide for development of a scale and type that is compatible	The position of the proposed building the subject of variation does not have an immediate residential interface, nor is within a genuine residential area- rather the proposal fronts New South

Objective	Assessment
with the amenity of the surrounding residential area.	Head Road which is characterised by a mix of uses, with a predominant commercial character. The proposed hall building fronts New South Head Road and has no immediate residential neighbours. The closest neighbour is a shop-top housing building fronting New South Head Road located approximately 18m to the west (across the driveway entrance to the School). The nearest residential apartment development is located approximately 90m to the north of the hall building fronting Ocean Street. The proposal is of a nature, and has been designed in a manner, that provides compatibility with the broader residential area and nearby mixed-use development (including residential apartments). It has no impacts on these residential properties, as outlined below: **Views** The overall built form is consistent with the bulk and scale of lower development along New South Head Road and retains the desired two-storey built form reflecting the objectives of the current development standards for the site, as illustrated in Figure 7. The New South Road frontage and its visual context accommodates far greater development than is proposed. The minor exceedance of GFA associated with the hall is internal to the site and hence is not viewed or perceived as additional bulk from either the street frontage or residential development in the surrounding area.
Figure 7 Render of Fiona Hall building  *Source: BVN*	
	Privacy The separation of the proposed building from its neighbours, the internal nature of the proposed hall building, and the intervening

Objective	Assessment
	buildings and topography around the hall, all mean the proposal does not contribute to any visual or aural impact on nearby residential properties. **Overshadowing** As illustrated in the shadow analysis prepared by BVN (**Appendix B**), the proposed hall building does not impact on solar access to surrounding properties.
To ensure that development is of a height and scale that achieves the desired future character of the neighbourhood.	This matter has previously been addressed under the corresponding objective contained within Clause 4.4 (refer to the response within Table 3 above).

The above assessment demonstrates the proposed development will be in the public interest notwithstanding the proposed variation to the height of buildings development standard as it is consistent with the objectives of the particular standard and the objectives for development within the zone in which the development is proposed to be carried out.

6.6. HAS THE CONCURRENCE OF THE PLANNING SECRETARY BEEN OBTAINED? – CLAUSE 4.6(4)(B) AND CLAUSE 4.6(5)

The Secretary can be assumed to have concurred to the variation under Department of Planning Circular PS 18–003 'Variations to development standards', dated 21 February 2018. This circular is a notice under 64(1) of the *Environmental Planning and Assessment Regulation 2000*.

The Secretary can be assumed to have given concurrence as the matter will be determined by an independent hearing and assessment panel or a Sydney district or regional planning panel in accordance with the Planning Circular.

The matters for consideration under clause 4.6(5) are considered below.

- **Clause 4.6(5)(a) – does contravention of the development standard raise any matter of significance for State or regional environmental planning?**

The proposed non-compliance with the floor space ratio development standard will not raise any matter of significance for State or regional environmental planning. It has been demonstrated that the proposed variation is appropriate based on the specific circumstances of the case and would be unlikely to result in an unacceptable precedent for the assessment of other development proposals.

- **Clause 4.6(5)(b) - is there a public benefit of maintaining the planning control standard?**

The proposed development achieves the objectives of the floor space ratio development standard and the land use zone objectives despite the technical non-compliance.

The principal aim of the proposal is to consolidate current facilities for the use of the Junior School which respects the heritage significance of the Fiona Building. The proposed variation to the height control of the WLEP does not result in the loss of amenity to the adjoining properties from overshadowing or loss of privacy. The proposed height is therefore considered to be acceptable, particularly when balanced against the benefits of the project which are:

- The proposal provides contemporary and improved educational facilities for an existing education establishment which has been located in Edgecliff since 1886.
- The introduction of the Fiona Hall building along New South Head Road will allow for the removal of existing low-quality retail spaces and replace with additional learning spaces and staff facilities which remains sympathetic to the heritage character of the site; and

- The siting, scale and design of the new buildings have been designed having regard to the character of the area including heritage views and the desired future character of the Edgecliff Centre and will provide an improved contribution to the streetscape.

There is no material impact or benefit associated with strict adherence to the development standard and there is no compelling reason or public benefit derived from maintenance of the standard.

- **Clause 4.6(5)(c) – are there any other matters required to be taken into consideration by the Secretary before granting concurrence?**

Concurrence can be assumed, however, there are no known additional matters that need to be considered within the assessment of the clause 4.6 variation request prior to granting concurrence, should it be required.

7. CONCLUSION

For the reasons set out in this written request, strict compliance with the floor space ratio development standard contained within clause 4.4 of WLEP is unreasonable and unnecessary in the circumstances of the case. Further, there are sufficient environmental planning grounds to justify the proposed variation and it is in the public interest to do so.

It is reasonable and appropriate to vary the floor space ratio development standard to the extent proposed for the reasons detailed within this submission and as summarised below:

- Compliance with the floor space ratio development standard is unreasonable and unnecessary in the circumstances of the proposed development.
- The proposal, notwithstanding the non-compliance, is consistent with the objectives of the floor space ratio development standard as well as the objectives of the B4 Mixed Use zone.
- There are sufficient environmental planning grounds to justify the contravention, which results in a better planning outcome than a strictly compliant development in the circumstances of this particular case.
- There are no environmental impacts arising from the proposed variation.
- The proposed non-compliance with the floor space ratio development standard will not result in any matter of significance for State or regional environmental planning.

For the reasons outlined above, the clause 4.6 request is well-founded. The development standard is unnecessary and unreasonable in the circumstances, and there are sufficient environmental planning grounds that warrant contravention of the standard. In the circumstances of this case, flexibility in the application of the floor space ratio development standard should be applied.

DISCLAIMER

This report is dated 17 May 2022 and incorporates information and events up to that date only and excludes any information arising, or event occurring, after that date which may affect the validity of Urbis Pty Ltd **(Urbis)** opinion in this report. Urbis prepared this report on the instructions, and for the benefit only, of Ascham School **(Instructing Party)** for the purpose of Clause 4.6 Variation **(Purpose)** and not for any other purpose or use. To the extent permitted by applicable law, Urbis expressly disclaims all liability, whether direct or indirect, to the Instructing Party which relies or purports to rely on this report for any purpose other than the Purpose, and to any other person which relies or purports to rely on this report for any purpose whatsoever (including the Purpose).

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This report has been prepared with due care and diligence by Urbis and the statements and opinions given by Urbis in this report are given in good faith and in the reasonable belief that they are correct and not misleading, subject to the limitations above.

URBIS

Ascham School

Geotechnical Assessment: Ascham School, 188 New South Head Road, Edgecliff, NSW

P2108194JR02V02
May 2021

Limitations Statement

The sole purpose of this report and the associated services performed by Martens & Associates Pty Ltd is to complete a preliminary geotechnical assessment in accordance with the scope of services set out in the contract / quotation between Martens & Associates Pty Ltd and Ascham School (hereafter known as the Client). That scope of works and services were defined by the requests of the Client, by the time and budgetary constraints imposed by the Client, and by the availability of access to the site.

Martens & Associates Pty Ltd derived the data in this report primarily from a number of sources which may include for example site inspections, correspondence regarding the proposal, examination of records in the public domain, interviews with individuals with information about the site or the project, and field explorations conducted on the dates indicated. The passage of time, manifestation of latent conditions or impacts of future events may require further examination / exploration of the site and subsequent data analyses, together with a re-evaluation of the findings, observations and conclusions expressed in this report.

In preparing this report, Martens & Associates Pty Ltd may have relied upon and presumed accurate certain information (or absence thereof) relative to the site. Except as otherwise stated in the report, Martens & Associates Pty Ltd has not attempted to verify the accuracy of completeness of any such information (including for example survey data supplied by others).

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This report has been prepared on behalf of and for the exclusive use of the Client, and is subject to and issued in connection with the provisions of the agreement between Martens & Associates Pty Ltd and the Client. Martens & Associates Pty Ltd accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report by any third party.

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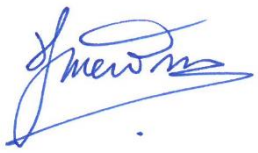
Shaun van Kal	Surendran Karasu	Surendran Karasu	

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All enquiries regarding this project are to be directed to the Project Manager.

Contents

Abbreviations

ABC – Allowable bearing capacity

ASS – Acid Sulfate Soil

BH – Borehole

DBYD – Dial Before You Dig

DCP – Dynamic cone penetrometer

E' – Drained elastic modulus

kN – kilo Newtons

kN/m^3 – kilo Newtons per cubic metre

K_a – Active earth pressure coefficient

K_p – Passive earth pressure coefficient

K_s – Modulus subgrade reaction

K_0 – Earth pressure at rest coeficient

kPa – kilo Pascal

LGA – Local government area

MA – Martens & Associates Pty Ltd

mAHD – metres Australian height datum

mbgl – metres below ground level

MDD – Maximum Dry Density

MPa – Mega Pascal

Ø – Effective internal friction angle

Y – material in-situ unit weight

1 Proposed Development and Investigation Scope

The proposed development details are summarised in Table 1.

Table 1: Summary of the proposed development.

Item	Details
Property Address	188 and 208 New South Head Road, Edgecliff, NSW 2027
Lot/DP	Lot 1 in DP224844 and Lot 1 DP102868 (Land and Property Information, 2021).
LGA	Woollahra Municipal Council (Land and Property Information, 2021).
Investigation area	The investigation area, hereafter referred to as "the site" is approximately 5100 m^2 and comprises Lot 1 in DP102868 and the southern part of Lot 1 in DP 22484. The site is shown in the Geotechnical Investigation Plan enclosed as Map GE01, Attachment A.
Proposed Development	The proposed development is to consist of: o A new second floor addition and a northern extension to the existing Fiona wing building. o Strengthening works for the existing Fiona wing Building to support the proposed second floor addition. o Demolition of the existing building at No. 208 New South Head Road and the construction of a new hall building, which will be set into the hillside requiring excavation and retention for the lower ground level. The southern half is proposed to have a ground floor level at 37.0 m above Australian Height Datum (AHD) while the northern half will have a ground floor level at 37.3 mAHD (BVN Architecture Pty Ltd, 2021). Bulk excavation depths are estimated to be between 0.4 m in the south to 3.7 m in the north.
Assessment Purpose	The purpose of this geotechnical assessment is to inform the application for a Development Application (DA) and assist the preliminary structural design of the proposed development.
Previous Geotechnical Investigation	Martens and Associates (MA) undertook a geotechnical investigation for the construction of the English and Languages Centre, located approximately 60 m to the west of the site in October 2016. Refer to MA report reference P1605566JR01V01 (MA, 2016). The key findings of the previous investigation included: o The area of the English and Languages Centre is underlain by: • Sand fill to between 0.5 m below ground level (bgl) and 0.8 mbgl. • Medium dense to dense sand to between 0.8 mbgl and 2.4 mbgl. • Medium to high strength sandstone was encountered at depths ranging from 0.8 mbgl and 2.4 mbgl o Groundwater was not encountered during the auger drilling.

2 Site Details and Subsurface Conditions

Table 2 summarises the general site details considered relevant to the investigation and the proposed development.

Table 2: Summary of site details and conditions.

Element	Description/Detail
Site location	The site is located on the north side of New South Head Road, Edgecliff, NSW 2027.
Topography	The site forms part of the Gymea Landscape characterised by undulating to rolling low hills with slopes of 10% to 25% gradients on the Hawkesbury Sandstone (NSW Planning, Industry & Environment, 2021). The site is located on the side of a small hill within gently undulating land.
Site Elevation	Ground levels across the site range between 35 mAHD in the south-west and 40 mAHD in the north-east.
Site Aspect	South-west.
Typical Site Slope	Less than 10%.
Investigation area description	At the time of the geotechnical investigation, the site consisted of: o School buildings in the central portion. o Grass-covered fields in the north, north-east and east. o A retail building in the south. o Paved car park in the west.
Surrounding land uses	The site is bounded by: o Turfed sports field to the north. o Residential properties to the north-east and east. o Retail buildings followed by New South Head Road to the south. o Paved car park followed by school buildings to the west and north west.
Site Drainage	Via stormwater intercepts located on the site and overland flow towards the south-west.
Expected Geology Soil and Soil Landscape Soils	The published geological map covering this area indicates that the majority of the site is underlain by Hawkesbury Sandstone comprising medium to coarse-grained quartz sandstone with minor shale and laminite lenses (*Herbert, 1983)*. Quaternary deposits comprising fine to medium-grained marine sand is indicated beneath the north-west part of the site as shown on the Geotechnical Investigation Plan, Attachment A. The Gymea landscape soils generally consist of sand with lesser amounts of clay, silt and gravel and range in thickness from 0.3 m to 1 m (NSW Planning, Industry & Environment, 2021).

3 Geotechnical Assessment

3.1 Field Investigation Scope of Works

In accordance with the scope of works outlined in MA quotation P2108194BC01V03, dated 31 March 2021, the field investigation conducted on 15 and 16 April 2021 included:

- Review of available maps covering the site.
- Review of DBYD survey plans and clearance of borehole locations of underground services.
- A walkover inspection of the site to review local geology, soil exposures, surface hydrology, topography and drainage.
- Drilling of three augered boreholes (BH104 to BH106) to a maximum depth of 7.5 mbgl using a ute-mounted drill rig at the northern end of the site.
- Drilling of three boreholes (BH101, BH103 and BH107) to a maximum depth of 2.0 mbgl using a push tube. Boreholes BH101 and BH103 were carried out at No. 208 New South Head Road. Borehole BH102 was abandoned due to the presence of underground services.
- Dynamic cone penetrometer (DCP) tests at each borehole location.
- Concrete coring though the concrete slab at the location of test pit (TP102) at the Fiona wing building to facilitate the excavation.
- Excavation of two hand-dug test pits (TP101 and TP102) at the Fiona wing building to determine the existing school building footing type, size, depth and foundation material.

3.2 Observed Subsurface Conditions

The following generalised subsurface units are expected to underlie the site:

Unit A: Topsoil/Fill: sand, fine to medium grained, grey to brown with silt, trace clay, trace gravel to between 0.6 mbgl and 0.9 mbgl.

Unit B: Sand; fine to medium grained, pale brown, trace silt and clay, loose to medium dense to the maximum investigation termination depth of 7.5 mbgl inferred to be marine sands.

The borehole locations are indicated on the Geotechnical Investigation Plan enclosed as Map GE01, Attachment A. Encountered conditions are

described in more detail on the borehole logs in Attachment B and associated explanatory notes in Attachment G.

3.3 Anticipated Footing Type and Founding Level

The drawing by Architects EA & TM Scott (1979) indicates that the Fiona School building is supported by shallow footings founded at approximately 0.9 mbgl. The drawing indicated strip footings, approximately 0.5 m wide supporting the main walls and square pads, approximately 0.3 m wide, supporting the brick arch columns.

Test pit TP101 revealed that the main building wall is supported by a concrete footing approximately 1.0 mbgl in medium dense sand. The concrete footing extends approximately 0.34 m horizontally from the brick wall. The footing is inferred to be a strip footing approximately 0.9 m wide.

Test pit TP102 revealed that the brick arch column is supported by a concrete footing founded approximately 0.55 mbgl in medium dense sand. The concrete footing extends approximately 0.26 m horizontally from the brick column. The footing is inferred to be a square pad approximately 0.7 m wide.

The test pit locations are indicated on the Geotechnical Investigation Plan enclosed as Map GE01, Attachment A. Sketches of the test pits are provided in Figures 2 and 3, Attachment C. Photos of the test pits are provided in Attachment E.

3.4 Preliminary Material Properties

Preliminary material properties inferred from observations during borehole drilling, such as auger penetration resistance and DCP test results as well as engineering judgement are summarised in Table 3.

Table 3: Preliminary material properties.

Layer [1]	$Y_{in\text{-}situ}$ [2] (kN/m³)	Ø' [3] (deg)	E' [4] (MPa)	K_s [5] (kN/m³)	K_0 [6]	K_a [7]	K_p [8]
Unit A: Topsoil/Fill: sand	14	NA [9]	NA [9]	NA [9]	NA [9]	NA [9]	NA [9]
Unit B: Sand; F – M grained, L – MD.	16	30	15	15	0.5	0.33	3.0

Notes:

1. Abbreviations:
   F – fine; M – medium.
   L – loose; MD – medium dense.
2. Material in-situ unit weight, based on visual assessment.
3. Effective internal friction angle estimate, assuming drained conditions.
4. Effective elastic modulus estimate.

5. Modulus of subgrade reaction.
6. Earth pressure coefficient at rest.
7. Active earth pressure coefficient.
8. Passive earth pressure coefficient.
9. Not applicable

3.5 Risk of Slope Instability

No evidence of former land instability was observed within the site and surrounding land during the site walkover survey.

The risk of potential slope instability, such as landslide or soil creep, is considered to be very low subject to the recommendations in this report and the adoption of relevant engineering standards and guidelines. A detailed slope risk assessment in accordance with the Australian Geomechanics Society's Landslide Risk Management Guidelines (2007) was not undertaken.

3.6 Exposure Classification

Laboratory exposure classification test results are summarised in Table 4. The laboratory test certificate is provided in Attachment F.

Table 4: Exposure classification test results.

Sample ID [1]	Material	EC (µS/cm)[2]	EC_e (dS/m) [2]	pH	Sulphate (mg/kg)	Chloride (mg/kg)	Exposure Classification		
							AS 2159 [3]	AS 2159 [4]	AS 3600 [5]
BH103 / 0.5 – 0.7	Sand (Fill)	34	0.58	7.3	<10	<10	Mild	Non-aggressive	A2
BH104 / 1.5 – 2.0	Marine Sand	16	0.27	7.3	<10	<10	Mild	Non-aggressive	A2
BH105 / 0.3 – 0.5	Sand (Fill)	18	0.31	6.6	<10	<10	Mild	Non-aggressive	A2

Notes:

1. Borehole#/Depth (mbgl).
2. Based on EC (Electrical Conductivity) to EC_e multiplication factors from Table 6.1 in *Site Investigations for Urban Salinity* (2002) guidelines.
3. Exposure classification for concrete piles in soil based on Table 6.4.2(C) of AS 2159-2009 for soil conditions A – high permeability soils (sand).
4. Exposure classification for steel piles in soil based on Table 6.5.2(C) of AS 2159-2009 for soil conditions A – high permeability soils (sand).
5. Exposure classification for buried reinforced concrete based on Tables 4.8.1 and 4.8.2 of AS 3600-2018 for soil conditions A – high permeability soils (sand).

In accordance with AS2159 (2009), an exposure classification of 'mild' should be adopted for design of the buried concrete piles and 'non-aggressive' for steel piles. In accordance with AS3600 (2018), an exposure classification of 'A2' should be adopted for shallow concrete footings.

4 Hydrogeological Assessment

4.1 NSW Department of Primary Industries Bore Search

A review of the WaterNSW groundwater bore database revealed that there are six groundwater monitoring bores within 500 m of the subject site (WaterNSW, 2021). Groundwater data from these boreholes is summarised in Table 5.

Table 5: Summary of bores located within approximately 500 m of the site.

Bore	Approximate RL (mAHD) [1]	Water Bearing Zone(s) (mBGL)	Standing Water Level (mBGL)
GW106265	65	28.8 – 29.2 131.0 – 133.0	59.2
GW107358	45	22.50 – 24.30 60.60 – 61.00	41.80
GW107539	8	8.50 – 13.00	8.50
GW108583	6	4.55 – 7.93	4.55
GW108791	8	6.71 – 8.23	3.05
GW109375	5	NA [2]	NA [2]

Notes:

1. Ground surface levels estimated from Land and Property Information (2021).
2. No information given.

4.2 Groundwater Observations

No groundwater seepages were observed during the drilling of the boreholes.

4.3 Conclusions

The groundwater table is unlikely to be located within a depth of 4.0 mbgl. Given the site location, site elevation and the inferred subsurface profile, it is considered unlikely that the proposed foundation excavations will intercept the permanent groundwater table. However, ephemeral perched groundwater may be encountered near the fill-marine sand transition, originating from infiltration of surface water during prolonged or intense precipitation events.

Ephemeral groundwater inflow may be encountered during excavations following periods of heavy rainfall. We expect a sump and pump method to be adequate in managing expected inflow rates. For long term inflow management, a sub-surface drainage system is to be included in the proposed development, where necessary.

Further site investigations would need to be carried out to assess permanent and fluctuating groundwater levels, if required, which may include rock coring and installation of groundwater monitoring wells.

5 Desktop Acid Sulfate Soil Assessment

5.1 Risk Mapping

Woollahra Municipal Council (WMC) has mapped the site within ASS risk 'Class 5' as shown in Figure 1.

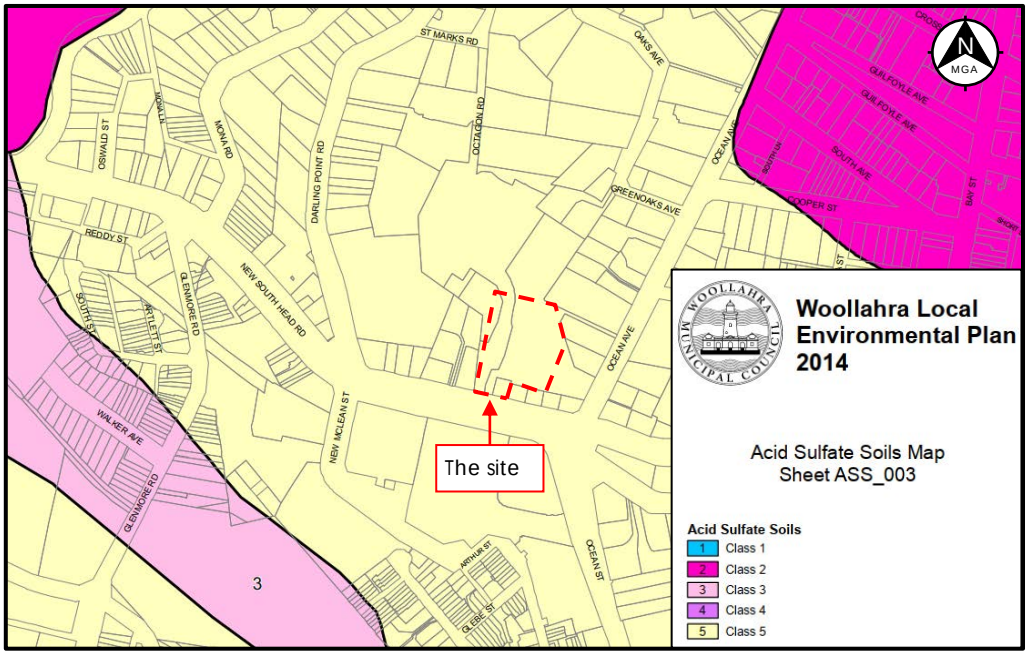

Figure 1: ASS risk map and site location relative to risk (WMC, 2015).

Based on Table 2.1 of the ASSMAC (1998) guidelines, works within 500 m of adjacent Class 1, 2, 3 or 4 land, which are likely to lower the water table below 1 mAHD on adjacent Class 1, 2, 3 or 4 land must not be carried out at the site without council consent.

Considering the investigation results, the proposed development is not expected to impact the groundwater levels of adjacent Class 1 to 4 land.

5.2 Geomorphic Setting

The likelihood of ASS occurrence at a site is a function of various geomorphic parameters, in particular those listed in Table 6 (ASSMAC, 1998). Each is an indicator that ASS are likely to be present onsite.

Table 6: Geomorphic features indicative of ASS.

Geomorphic Feature	Present on site?
Holocene sediments	Yes
Soil horizons less than 5 m AHD	No
Marine / estuarine sediments or tidal lakes	No
Coastal wetland; backwater swamps; waterlogged or scaled areas; interdune swales or coastal sand dunes.	No
Dominant vegetation is mangroves, reeds, rushes and other swamp or marine tolerant species.	No
Geologies containing sulfide bearing material / coal deposits or former marine shales/sediments	Yes
Deep older (Pleistocene) estuarine sediments	No

Two of seven geomorphic features listed in Table 6 are present or possibly present onsite. However, the geomorphic setting of the site, the absence of shallow groundwater and the field investigation results indicate that actual or potential ASS are unlikely to be present. Laboratory testing of soils is considered unnecessary.

5.3 Conclusions

It is unlikely that ASS exist beneath this site within the anticipated depth of the proposed works.

6 Geotechnical Recommendations

6.1 General Recommendations

General geotechnical recommendations are provided in Attachment G. Specific recommendations are provided in the following sections for the proposed development.

6.2 Preliminary Site Classification

The site is classified as a class "P" site in accordance with AS 2870 (2011), due to the presence of soil layers with low bearing capacities (fill and loose marine sand) extending to between 0.6 mbgl and 0.9 mbgl. This site classification is subject to the recommendations presented in this report and the design of footings in accordance with the relevant Australian Standards and guidelines.

A reclassification to class "A" may be considered for shallow footings founding on at least 0.5 m of granular / engineered fill.

6.3 Excavation

The proposed excavation for the proposed new hall building lower ground level will encounter a variable layer of fill overlying loose to medium dense sand. It is anticipated that these soils can be readily excavated using conventional earthmoving equipment.

6.4 Foundation Assessment

6.4.1 Existing building

The existing school building footings are assessed to be suitable for an allowable bearing capacity (ABC) of 100 kPa. Ongoing settlement of the existing school building footings are expected to be negligible based on an ABC of 100 kPa.

Alternatively, if higher bearing capacities are required to support the proposed second floor addition, or to minimise differential settlements to less than 10 mm, the existing school building may be supported by piles founded into the medium dense to dense sand at a minimum founding depth of 3.0 mbgl with an allowable bearing capacity of 300 kPa. Screw piles, bored piles or Continuous Flight Auger (CFA) are considered suitable. Bored piles will likely need to be cased during drilling to prevent hole collapse.

For screw piles, pile design length and end-bearing capacity will depend on adopted pile torque and type of proprietary system adopted during construction.

6.4.2 Proposed building

It is expected that shallow footings, such as pad or strip footings with suspended floor slabs or slab on-ground (raft) may be adopted for the proposed new school building and proposed new hall building founded on at least 0.5 m of granular / engineered fill. The existing fill comprising loose sand should be removed to 0.5 m depth and re-compacted to achieve a minimum density index of 70%. Traces of clay, vegetation and unsuitable material could be removed using a sieve on site. All earthworks should be carried out in accordance with AS3798 (2007), and should be inspected / approved by a qualified geotechnical engineer. An ABC of 100 kPa may be adopted for shallow footing design, subject to at least 0.5 m thick compacted/engineered fill below the base of footing. Maximum settlements are anticipated to be less than 25 mm.

Alternatively, if higher bearing capacities are required, or to minimise differential settlements to say less than 10 mm, the proposed northern extension to the existing Fiona wing building may be supported by screw piles founded into the medium dense to dense sand at approximately 3.0 mbgl with an allowable bearing capacity of 300 kPa. To limit long-term differential movements, it is recommended that all foundations are founded within similar type of founding material.

Further geotechnical investigation for the proposed new hall building should be undertaken following demolition of the existing building to confirm the ground conditions for foundation design.

All foundation excavations should be inspected by a geotechnical engineer to confirm expected conditions outlined in this report and encountered conditions satisfy design assumptions.

6.5 Temporary Shoring

Batter slopes may typically be considered where there is sufficient space between the basement and site boundaries. However, batter slopes should be avoided within the zone of influence of site boundaries and existing foundations. The zone of influence is defined as a 45-degree line extending from horizontal downwards from the foundation of nearby structures. Due to the close proximity of the proposed hall building lower ground level to the boundary and the required 3.7 m depth of excavation, it is considered that batter slopes are likely unstable for this site and that shoring piled walls should be adopted to provide the required temporary excavation support (shoring).

Based on the ground conditions encountered and the depth of the proposed excavation, consideration should be given to suitably

designed retention system such as a contiguous pile wall. The pile wall could be designed as a cantilevered wall based on a triangular pressure distribution. CFA piles or bored piles are acceptable as excavation support (retaining) structure options. For preliminary design purposes, allowable shaft friction and allowable end bearing resistance (ABC) of 10 kPa and 200 kPa, respectively, may be adopted for piles embedded in medium dense sand. For bored / CFA piles founded in dense to very dense sand, an allowable shaft friction and allowable end bearing resistance (ABC) of 20 kPa and 350 kPa, respectively may be adopted. Piles founded in bedrock may be adopted with an allowable end bearing of 600 kPa, subject to confirmation based on additional geotechnical investigation.

Temporary walls may be designed to provide long term retention as permanent walls with lateral restraint provided by the ground floor slab.

However, where it is necessary to limit horizontal deflection (e.g. adjacent to existing foundations or infrastructure), additional support could be provided in the form of tie back anchors or internal bracing to limit lateral deflections of the shoring wall. Tie back anchors may also be considered as an alternative option to the cantilevered pile option.

The geotechnical parameters provided in Table 3 may be used for shoring design.

6.6 Construction Inspections

It is recommended that the exposed material at the foundation level be inspected by an experienced geotechnical engineer to verify the adopted bearing capacity has been achieved, prior to the placement of steel and construction of the footings and to check that they are reasonably dry and free of loose debris and moisture softened material.

6.7 Supplementary Geotechnical Investigation

Due to the limited depth of investigation, it is recommended that supplementary geotechnical investigation for the proposed new hall be undertaken following demolition of the existing building to confirm the ground conditions as part of the Construction Certificate application. The supplementary geotechnical investigation should include the drilling of boreholes to at least 10 mbgl to intercept very dense soil layer or bedrock and in-situ testing such as standard penetration tests at regular depth intervals. The additional borehole information will be required to confirm he pile design parameters provided in Section 6.4.1 and also pile founding depths.

7 References

Architects EA & TM Scott, drawing titled Ascham School Edgecliff Addition to Junior School 'Fiona', reference 806, Sheet 4, dated 27 June 1979,

Australian Geomechanics Society Landslide Taskforce, "Practice Note Guidelines for Landslide Risk Management – AGS 2007c", Vol. 2 No. 1 March 2007.

BVN Architecture Pty Ltd (2021), drawing titled Section – New Fiona Hall, referenced AR-D-NF01, issue 3, dated 03.04.2021.

Herbert C. (1983) *Sydney 1:100 000 Geological Sheet 9130, 1st edition*, Geological Survey of New South Wales, Sydney.

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Standards Australia Limited (2011) AS 2870-2011, *Residential slabs and footings*, SAI Global Limited.

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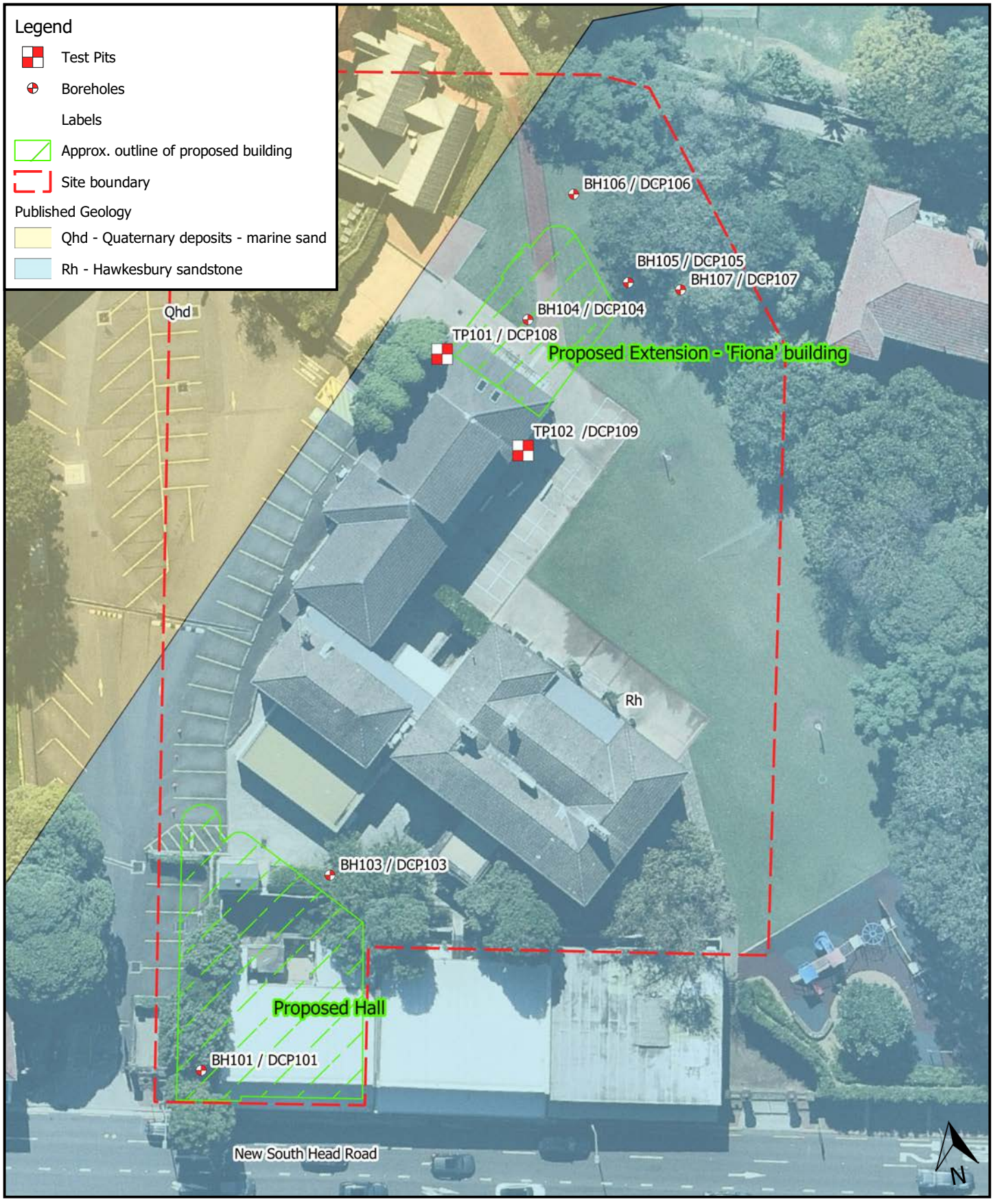
WaterNSW (2021), *Real Time Data*, accessed 12.04.2021, (https://realtimedata.waternsw.com.au/water.stm?ppbm=GW105261&ag&0&agpf_org).

Attachment A – Geotechnical Investigation Plan



Project No: P2108194 Map Set: MS02-R01 EPSG: 7856

0 6 12 18 24 30 m

1:500 @ A4

Viewport 1

Nearmaps image: EPSG7856_Date20210410_Lat-33.877760_Lon151.236972_Mpp0.075.
Geology: Herbert C. (1983) Sydney 1:100 000 Geological Sheet 9130, 1st edition, Geological Survey of New South Wales, Sydney.

Map Title / Figure:

Geotechnical Investigation Plan

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Environment | Water | Geotechnics | Civil | Projects

GE01	Map
188 South Head Road, Edgecliff, NSW	Site
Ascham School, 188 South Head Road, Edgecliff, NSW	Project
Geotechnical Assessment	Sub-Project
Ascham School Ltd c/- SDA Structures Pty Ltd	Client
27/04/2021	Date

Attachment B – Test Borehole Logs

CLIENT	Ascham School		COMMENCED	15/04/2021	COMPLETED	15/04/2021	**REF BH101**
PROJECT	Geotechnical Assessment		LOGGED	SVK	CHECKED	SK	Sheet 1 OF 1
SITE	188 New South Head Road, Edgecliff, NSW		GEOLOGY	Quaternary Deposits	VEGETATION	Trees	PROJECT NO. P2108194
EQUIPMENT		Push tube	EASTING	151.2366	RL SURFACE	37.6 m	DATUM AHD
EXCAVATION DIMENSIONS		⌀75 mm x 0.90 m depth	NORTHING	-33.8788	ASPECT	South West	SLOPE <5%

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	*DEPTH* RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS / ASCS CLASSIFICATION	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
PT	L	Not Encountered		37.60				SP	FILL: SAND; fine to medium grained; grey to brown; with silt; trace clay; trace gravel; poorly graded; poorly compacted.	M		FILL
	H			*0.90*					Hole Terminated at 0.90 m			0.90: Borehole terminated on obstruction at 0.9 mbgl.
			1									
			2									
			3									
			4									
			5									
			6									
			7									

EXCAVATION LOG TO BE READ IN CONJUCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS

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Engineering Log - BOREHOLE

CLIENT	Ascham School		COMMENCED	15/04/2021	COMPLETED	15/04/2021	**REF BH103**
PROJECT	Geotechnical Assessment		LOGGED	SVK	CHECKED	SK	Sheet 1 OF 1
SITE	188 New South Head Road, Edgecliff, NSW		GEOLOGY	Quaternary Deposits	VEGETATION	Bushes	PROJECT NO. P2108194
EQUIPMENT		Push tube	EASTING	151.2368	RL SURFACE	49 m	DATUM AHD
EXCAVATION DIMENSIONS		⌀75 mm x 2.00 m depth	NORTHING	-33.8786	ASPECT	South West	SLOPE <10%

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS / ASCS CLASSIFICATION	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
				49.00								
				0.20				SP	FILL: SAND; fine to medium grained; grey to brown; with silt; trace clay; trace gravel; poorly graded; poorly compacted.			FILL
				48.80				SP	FILL: SAND; fine to medium grained; pale brown; with gravel; trace silt; trace clay; poorly graded; poorly compacted.			
				0.70								
PT	L	Not Encountered	1	48.30				SP	SAND; fine to medium grained; pale brown; trace silt; trace clay.	M	MD	MARINE DEPOSITS
											L	
											MD	
				2.00							D	
			2						Hole Terminated at 2.00 m			2.00: Target depth reached.
			3									
			4									
			5									
			6									
			7									

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CLIENT	Ascham School		COMMENCED	15/04/2021	COMPLETED	15/04/2021	**REF BH104**
PROJECT	Geotechnical Assessment		LOGGED	SVK	CHECKED	SK	Sheet 1 OF 1
SITE	188 New South Head Road, Edgecliff, NSW		GEOLOGY	Quaternary Deposits	VEGETATION	Grass	PROJECT NO. P2108194
EQUIPMENT		4WD ute-mounted hydraulic dril rig	EASTING	151.2371	RL SURFACE	39.9 m	DATUM AHD
EXCAVATION DIMENSIONS		Ø100 mm x 6.30 m depth	NORTHING	-33.8782	ASPECT	North East	SLOPE <5%

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS / ASCS CLASSIFICATION	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/V	L	Not Encountered	0	0.10 39.80				SP	TOPSOIL: SAND; fine to medium grained; dark grey to dark brown; with silt; trace clay.			TOPSOIL
								SP	FILL: SAND; fine to medium grained; dark grey to brown; with silt; trace clay; trace gravel; poorly graded; poorly compacted.			FILL
				0.60 39.30				SP	SAND; fine to medium grained; grey to pale grey; trace silt and clay.			MARINE DEPOSITS
			1								L	
			2								MD	
				2.50 37.40					From 2.5 m; becoming orange to brown.		L	
			3							M	MD	
			4	4.00 35.90					From 4.0 m; becoming pale brown.		D	
			5									
			6	6.30					Hole Terminated at 6.30 m			6.30: Target depth reached.
			7									

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CLIENT	Ascham School		COMMENCED	15/04/2021	COMPLETED	15/04/2021	**REF BH105**
PROJECT	Geotechnical Assessment		LOGGED	SVK	CHECKED	SK	Sheet 1 OF 1
SITE	188 New South Head Road, Edgecliff, NSW		GEOLOGY	Quaternary Deposits	VEGETATION	Grass	PROJECT NO. P2108194
EQUIPMENT		4WD ute-mounted hydraulic dril rig	EASTING	151.2372	RL SURFACE	39.7 m	DATUM AHD
EXCAVATION DIMENSIONS		Ø100 mm x 7.50 m depth	NORTHING	-33.8782	ASPECT	North East	SLOPE <5%

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS / ASCS CLASSIFICATION	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/V	L	Not Encountered	0	0.10 39.60				SP	TOPSOIL: SAND; fine to medium grained; dark grey to dark brown; with silt; trace clay.			TOPSOIL
								SP	FILL: SAND; fine to medium grained; dark grey to brown; with silt; trace clay; trace gravel; poorly graded; poorly compacted.			FILL
				0.60 39.10				SP	SAND; fine to medium grained; grey to pale grey; trace silt and clay.	M	MD	MARINE DEPOSITS
			1									
			2								L	
			3									
			4									
			5								MD	
			6									
			7									
				7.50					Hole Terminated at 7.50 m			7.50: Target depth reached.

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Engineering Log - BOREHOLE

CLIENT	Ascham School		COMMENCED	15/04/2021	COMPLETED	15/04/2021	**REF BH106**
PROJECT	Geotechnical Assessment		LOGGED	SVK	CHECKED	SK	Sheet 1 OF 1
SITE	188 New South Head Road, Edgecliff, NSW		GEOLOGY	Quaternary Deposits	VEGETATION	Grass	PROJECT NO. P2108194
EQUIPMENT		4WD ute-mounted hydraulic dril rig	EASTING	151.2372	RL SURFACE	39.8 m	DATUM AHD
EXCAVATION DIMENSIONS		Ø100 mm x 7.50 m depth	NORTHING	-33.8781	ASPECT	North East	SLOPE <5%

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS / ASCS CLASSIFICATION	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/V	L	Not Encountered	0	0.10 39.70				SP SP	TOPSOIL: SAND; fine to medium grained; dark grey to dark brown; with silt; trace clay. FILL: SAND; fine to medium grained; dark grey to brown; with silt; trace clay; trace gravel; poorly graded; poorly compacted.	M		TOPSOIL FILL
				0.60 39.20				SP	SAND; fine to medium grained; grey to pale grey; trace silt and clay.		MD L D	MARINE DEPOSITS
			1									
			2									
			3									
			4									
			5									
			6									
			7	7.50					Hole Terminated at 7.50 m			7.50: Target depth reached.

EXCAVATION LOG TO BE READ IN CONJUCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS

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Engineering Log - BOREHOLE

CLIENT	Ascham School		COMMENCED	15/04/2021	COMPLETED	15/04/2021	**REF BH107**
PROJECT	Geotechnical Assessment		LOGGED	SVK	CHECKED	SK	Sheet 1 OF 1
SITE	188 New South Head Road, Edgecliff, NSW		GEOLOGY	Quaternary Deposits	VEGETATION	Grass	PROJECT NO. P2108194
EQUIPMENT		Push tube	EASTING	151.2373	RL SURFACE	37 m	DATUM AHD
EXCAVATION DIMENSIONS		⌀75 mm x 2.00 m depth	NORTHING	-33.8782	ASPECT	North East	SLOPE 50%

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS / ASCS CLASSIFICATION	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
				0.10 36.90				SP	TOPSOIL: SAND; fine to medium grained; dark grey to dark brown; with silt; trace clay.			TOPSOIL
								SP	FILL: SAND; fine to medium grained; dark grey to brown; with silt; trace clay; trace gravel; poorly graded; poorly compacted.			FILL
PT	L	Not Encountered	1	*0.70* 36.30				SP	SAND; fine to medium grained; pale brown; trace silt and clay.	M	L	MARINE DEPOSITS
											MD	
			2	*2.00*					Hole Terminated at 2.00 m			2.00: Target depth reached.
			3									
			4									
			5									
			6									
			7									

EXCAVATION LOG TO BE READ IN CONJUCTION WITH ACCOMPANYING REPORT NOTES AND ABBREVIATIONS

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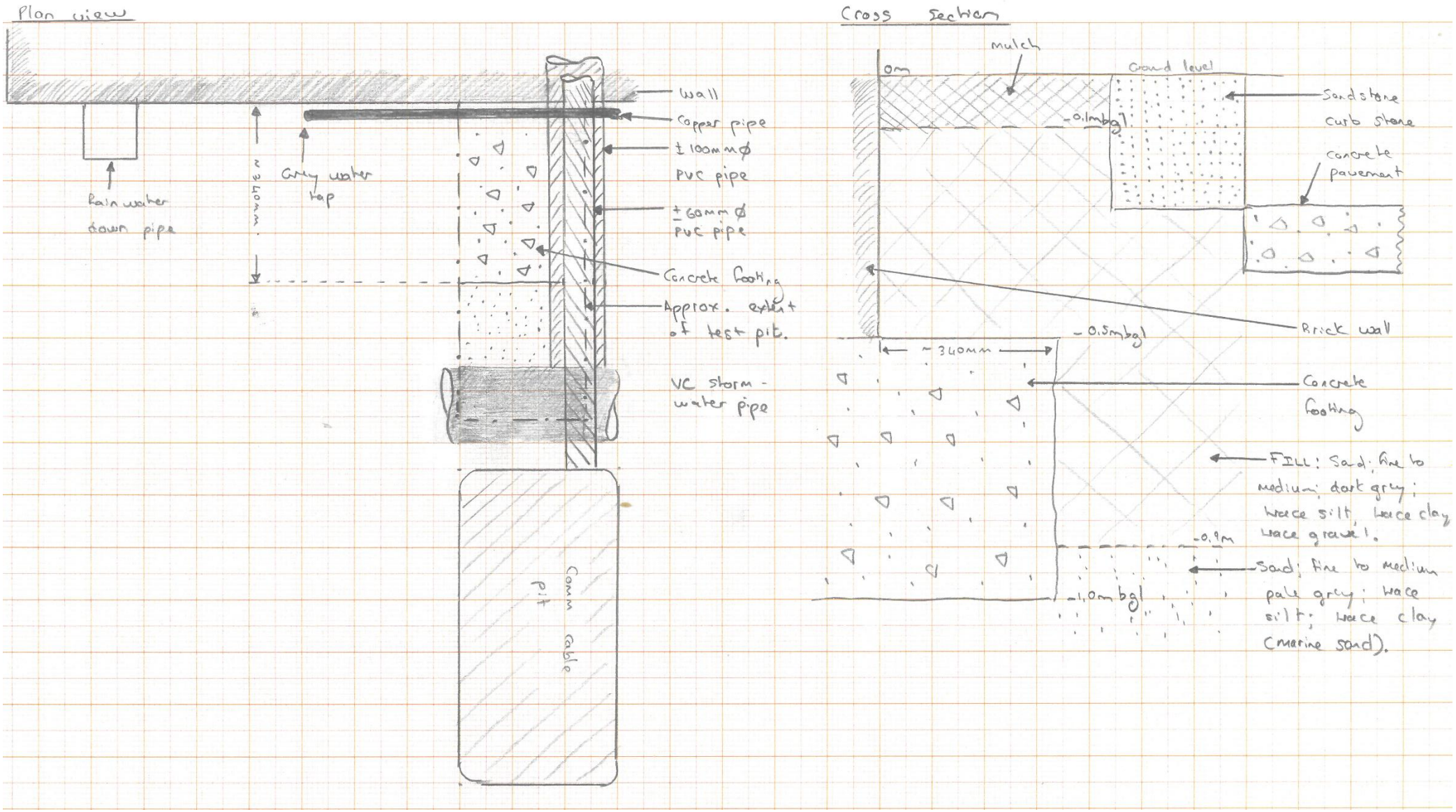
Engineering Log - BOREHOLE

Attachment C – Test Pit Sketches



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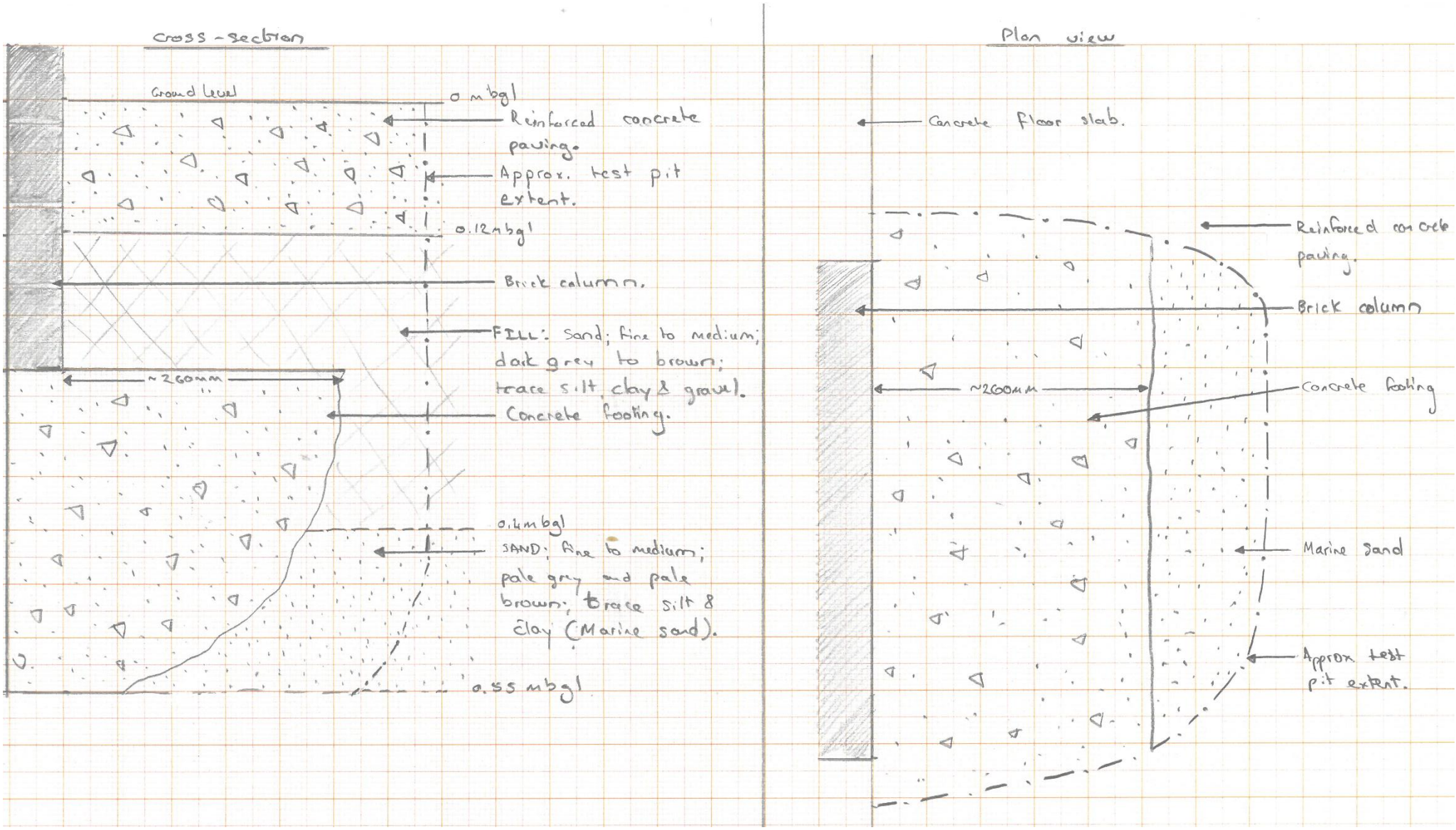
Martens & Associates Pty Ltd ABN 85 070 240 890		Environment | Water | Wastewater | Geotechnical | Civil | Management	
Drawn:	SvK	TEST PIT TP101 SKETCH Ascham School, 188 New South Head Road, Edgecliff, NSW	Drawing: FIGURE 2
Approved:	SK		
Date:	12.05.2021		
Scale:	1:100 in A4.		File No: P2108194JR02V02



martens

Martens & Associates Pty Ltd ABN 85 070 240 890		Environment | Water | Wastewater | Geotechnical | Civil | Management	
Drawn:	SvK	TEST PIT TP102 SKETCH Ascham School, 188 New South Head Road, Edgecliff, NSW	Drawing: FIGURE 3
Approved:	SK		
Date:	12.05.2021		
Scale:	1:50 in A4.		File No: P2108194JR02V02

Attachment D – DCP ‘N’ Counts

Dynamic Cone Penetrometer Test Log Summary

martens consulting engineers since 1989

Suite 201, 20 George Street, Hornsby, NSW 2077 Ph: (02) 9476 9999 Fax: (02) 9476 8767, mail@martens.com.au, www.martens.com.au

Site	Ascham School, 188 New South Head Road, Edgecliff, NSW	DCP Group Reference	P2108194
Client	Ascham School Ltd	Log Date	15/04/2021 - 16/04/2021
Logged by	SvK		
Checked by	SK		
Comments	DCP 101, 103 - 107 commenced 50 mm below ground level. DCP 108 and 109 commenced at 1.1 mbgl.		

TEST DATA

Depth Interval (m)	DCP101 (BH101)	DCP103 (BH103)	DCP104 (BH104)	DCP105 (BH105)	DCP106 (BH106)	DCP107 (BH107)	DCP108 (TP101)	DCP109 (TP102)
0.15	1	1	0	2	3	1	-	-
0.30	1	7	4	7	7	2	-	-
0.45	1	13	5	5	6	3	-	-
0.60	1	6	5	8	4	1	-	-
0.75	3	5	4	4	4	2	-	-
0.90	2	5	2	4	5	2	-	-
1.05	3	2	2	4	4	2	-	-
1.20	2	2	1	3	4	3	3	4
1.35	4	1	2	2	4	3	4	5
1.50	3	2	2	1	1	3	3	4
1.65	2	4	3	2	2	2	3	4
1.80	3	6	3	1	2	3	4	4
1.95	2	6	4	2	3	5	5	5
2.10	2	7	4	2	2	3	7	5
2.25	3	7	4	2	1	2	9	6
2.40	3	9	3	2	1	4	7	8
2.55	4	7	2	2	2	3	6	9
2.70	2	12	3	1	2	Target	5	10
2.85	2	12	4	2	5	depth	3	12
3.00	2	12	6	2	5	reached.	3	12
3.15	2	16	8	3	4		5	12
3.30	4	13	Target	Target	Target		6	13
3.45	4	13	depth	depth	depth		7	Target
3.60	Target	Target	reached.	reached.	reached.		Target	depth
3.75	depth	depth					depth	reached.
3.90	reached.	reached.					reached.	
4.05								
4.20								
4.35								
4.50								
4.65								
4.80								
4.95								
5.10								

Attachment E – Site Photographs

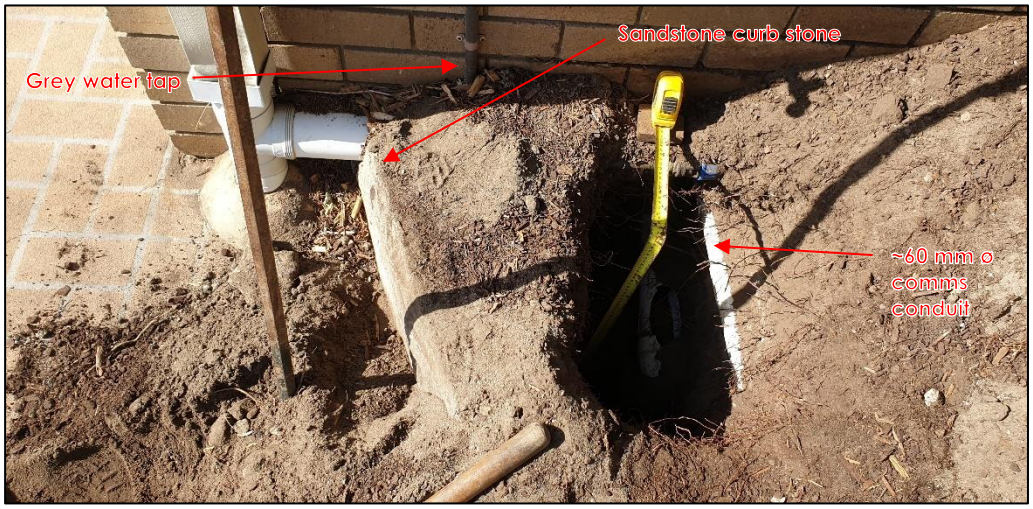


Photo 1: The location of test pit TP101.

Photo 2: Concrete footing exposed in test pit TP101.

Photo 3: The location of test pit TP102.

Photo 3: The location of test pit TP102.

Attachment F – Laboratory Test Certificate

Envirolab Services Pty Ltd
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customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 267011

Client Details

Client	Martens & Associates Pty Ltd
Attention	Shaun van Kal
Address	Suite 201, 20 George St, Hornsby, NSW, 2077

Sample Details

Your Reference	**P2108194 - Ascham School, 188 South Head Road**
Number of Samples	3 Soil
Date samples received	19/04/2021
Date completed instructions received	19/04/2021

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	26/04/2021
Date of Issue	26/04/2021

NATA Accreditation Number 2901. This document shall not be reproduced except in full.

Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Priya Samarawickrama, Senior Chemist

Authorised By

Nancy Zhang, Laboratory Manager

Soil Aggressivity				
Our Reference		267011-1	267011-2	267011-3
Your Reference	UNITS	BH103/0.5-0.7m	BH104/1.5-2.0m	BH105/0.3-0.5m
Date Sampled		15/04/2021	15/04/2021	15/04/2021
Type of sample		Soil	Soil	Soil
pH 1:5 soil:water	pH Units	7.3	7.3	6.6
Electrical Conductivity 1:5 soil:water	µS/cm	34	16	18
Chloride, Cl 1:5 soil:water	mg/kg	<10	<10	<10
Sulphate, SO4 1:5 soil:water	mg/kg	<10	<10	<10

Method ID	Methodology Summary
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-002	Conductivity and Salinity - measured using a conductivity cell at 25°C in accordance with APHA latest edition 2510 and Rayment & Lyons.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.

QUALITY CONTROL: Soil Aggressivity						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	101	[NT]
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Chloride, Cl 1:5 soil:water	mg/kg	10	Inorg-081	<10	[NT]	[NT]	[NT]	[NT]	101	[NT]
Sulphate, SO4 1:5 soil:water	mg/kg	10	Inorg-081	<10	[NT]	[NT]	[NT]	[NT]	102	[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.

Attachment G – General Geotechnical Recommendations

Geotechnical Recommendations

Important Recommendations About Your Site (1 of 2)

These general geotechnical recommendations have been prepared by Martens to help you deliver a safe work site, to comply with your obligations, and to deliver your project. Not all are necessarily relevant to this report but are included as general reference. Any specific recommendations made in the report will override these recommendations.

Batter Slopes

Excavations in soil and extremely low to very low strength rock exceeding 0.75 m depth should be battered back at grades of no greater than 1 Vertical (V) : 2 Horizontal (H) for temporary slopes (unsupported for less than 1 month) and 1 V : 3 H for longer term unsupported slopes.

Vertical excavation may be carried out in medium or higher strength rock, where encountered, subject to inspection and confirmation by a geotechnical engineer. Long term and short term unsupported batters should be protected against erosion and rock weathering due to, for example, stormwater run-off.

Batter angles may need to be revised depending on the presence of bedding partings or adversely oriented joints in the exposed rock, and are subject to on-site inspection and confirmation by a geotechnical engineer. Unsupported excavations deeper than 1.0 m should be assessed by a geotechnical engineer for slope instability risk.

Any excavated rock faces should be inspected during construction by a geotechnical engineer to determine whether any additional support, such as rock bolts or shotcrete, is required.

Earthworks

Earthworks should be carried out following removal of any unsuitable materials and in accordance with AS3798 (2007). A qualified geotechnical engineer should inspect the condition of prepared surfaces to assess suitability as foundation for future fill placement or load application.

Earthworks inspections and compliance testing should be carried out in accordance with Sections 5 and 8 of AS3798 (2007), with testing to be carried out by a National Association of Testing Authorities (NATA) accredited testing laboratory.

Excavations

All excavation work should be completed with reference to the *Work Health and Safety (Excavation Work) Code of Practice (2015)*, by Safe Work Australia. Excavations into rock may be undertaken as follows:

1. Extremely low to low strength rock - conventional hydraulic earthmoving equipment.

2. Medium strength or stronger rock - hydraulic earthmoving equipment with rock hammer or ripping tyne attachment.

Exposed rock faces and loose boulders should be monitored to assess risk of block / boulder movement, particularly as a result of excavation vibrations.

Fill

Subject to any specific recommendations provided in this report, any fill imported to site is to comprise approved material with maximum particle size of two thirds the final layer thickness. Fill should be placed in horizontal layers of not more than 300 mm loose thickness, however, the layer thickness should be appropriate for the adopted compaction plant.

Foundations

All exposed foundations should be inspected by a geotechnical engineer prior to footing construction to confirm encountered conditions satisfy design assumptions and that the base of all excavations is free from loose or softened material and water. Water that has ponded in the base of excavations and any resultant softened material is to be removed prior to footing construction.

Footings should be constructed with minimal delay following excavation. If a delay in construction is anticipated, we recommend placing a concrete blinding layer of at least 50 mm thickness in shallow footings or mass concrete in piers / piles to protect exposed foundations.

A geotechnical engineer should confirm any design bearing capacity values, by further assessment during construction, as necessary.

Shoring - Anchors

Where there is a requirement for either soil or rock anchors, or soil nailing, and these structures penetrate past a property boundary, appropriate permission from the adjoining land owner must be obtained prior to the installation of these structures.

Shoring - Permanent

Permanent shoring techniques may be used as an alternative to temporary shoring. The design of such structures should be in accordance with the findings of this report and any further testing recommended by this report. Permanent shoring may include [but not be limited to] reinforced block work walls, contiguous and semi contiguous pile walls, secant pile walls and soldier pile walls with or without reinforced shotcrete infill panels. The choice of shoring system will depend on the type of structure, project budget and site specific geotechnical conditions.

Permanent shoring systems are to be engineer designed and backfilled with suitable granular

material and free-draining drainage material. Backfill should be placed in maximum 100 mm thick layers compacted using a hand operated compactor. Care should be taken to ensure excessive compaction stresses are not transferred to retaining walls.

Shoring design should consider any surcharge loading from sloping / raised ground behind shoring structures, live loads, new structures, construction equipment, backfill compaction and static water pressures. All shoring systems shall be provided with adequate foundation designs.

Suitable drainage measures, such as geotextile enclosed 100 mm agricultural pipes embedded in free-draining gravel, should be included to redirect water that may collect behind the shoring structure to a suitable discharge point.

Shoring - Temporary

In the absence of providing acceptable excavation batters, excavations should be supported by suitably designed and installed temporary shoring / retaining structures to limit lateral deflection of excavation faces and associated ground surface settlements.

Soil Erosion Control

Removal of any soil overburden should be performed in a manner that reduces the risk of sedimentation occurring in any formal stormwater drainage system, on neighbouring land and in receiving waters. Where possible, this may be achieved by one or more of the following means:

1. Maintain vegetation where possible
2. Disturb minimal areas during excavation
3. Revegetate disturbed areas if possible

All spoil on site should be properly controlled by erosion control measures to prevent transportation of sediments off-site. Appropriate soil erosion control methods in accordance with Landcom (2004) shall be required.

Trafficability and Access

Consideration should be given to the impact of the proposed works and site subsurface conditions on trafficability within the site e.g. wet clay soils will lead to poor trafficability by tyred plant or vehicles.

Where site access is likely to be affected by any site works, construction staging should be organised such that any impacts on adequate access are minimised as best as possible.

Vibration Management

Where excavation is to be extended into medium or higher strength rock, care will be required when using a rock hammer to limit potential structural distress from excavation-induced vibrations where nearby structures may be affected by the works.

To limit vibrations, we recommend limiting rock hammer size and set frequency, and setting the hammer parallel to bedding planes and along defect planes, where possible, or as advised by a geotechnical engineer. We recommend limiting vibration peak particle velocities (PPV) caused by construction equipment or resulting from excavation at the site to 5 mm/s (AS 2187.2, 2006, Appendix J).

Waste – Spoil and Water

Soil to be disposed off-site should be classified in accordance with the relevant State Authority guidelines and requirements.

Any collected waste stormwater or groundwater should also be tested prior to discharge to ensure contaminant levels (where applicable) are appropriate for the nominated discharge location.

MA can complete the necessary classification and testing if required. Time allowance should be made for such testing in the construction program.

Water Management - Groundwater

If the proposed works are likely to intersect ephemeral or permanent groundwater levels, the management of any potential acid soil drainage should be considered. If groundwater tables are likely to be lowered, this should be further discussed with the relevant State Government Agency.

Water Management – Surface Water

All surface runoff should be diverted away from excavation areas during construction works and prevented from accumulating in areas surrounding any retaining structures, footings or the base of excavations.

Any collected surface water should be discharged into a suitable Council approved drainage system and not adversely impact downslope surface and subsurface conditions.

All site discharges should be passed through a filter material prior to release. Sump and pump methods will generally be suitable for collection and removal of accumulated surface water within any excavations.

Contingency Plan

In the event that proposed development works cause an adverse impact on geotechnical hazards, overall site stability or adjacent properties, the following actions are to be undertaken:

1. Works shall cease immediately.
2. The nature of the impact shall be documented and the reason(s) for the adverse impact investigated.
3. A qualified geotechnical engineer should be consulted to provide further advice in relation to the issue.

Attachment H – Notes Relating To This Report

Information

Important Information About Your Report (1 of 2)

These notes have been prepared by Martens to help you interpret and understand the limitations of your report. Not all are necessarily relevant to all reports but are included as general reference.

Engineering Reports - Limitations

The recommendations presented in this report are based on limited investigations and include specific issues to be addressed during various phases of the project. If the recommendations presented in this report are not implemented in full, the general recommendations may become inapplicable and Martens & Associates accept no responsibility whatsoever for the performance of the works undertaken.

Occasionally, sub-surface conditions between and below the completed boreholes or other tests may be found to be different (or may be interpreted to be different) from those expected. Variation can also occur with groundwater conditions, especially after climatic changes. If such differences appear to exist, we recommend that you immediately contact Martens & Associates.

Relative ground surface levels at borehole locations may not be accurate and should be verified by on-site survey.

Engineering Reports – Project Specific Criteria

Engineering reports are prepared by qualified personnel. They are based on information obtained, on current engineering standards of interpretation and analysis, and on the basis of your unique project specific requirements as understood by Martens. Project criteria typically include the general nature of the project; its size and configuration; the location of any structures on the site; other site improvements; the presence of underground utilities; and the additional risk imposed by scope-of-service limitations imposed by the Client.

Where the report has been prepared for a specific design proposal (e.g. a three storey building), the information and interpretation may not be relevant if the design proposal is changed (e.g. to a twenty storey building). Your report should not be relied upon, if there are changes to the project, without first asking Martens to assess how factors, which changed subsequent to the date of the report, affect the report's recommendations. Martens will not accept responsibility for problems that may occur due to design changes, if not consulted.

Engineering Reports – Recommendations

Your report is based on the assumption that site conditions, as may be revealed through selective point sampling, are indicative of actual conditions throughout an area. This assumption often cannot be substantiated until project implementation has commenced. Therefore your site investigation report recommendations should only be regarded as preliminary.

Only Martens, who prepared the report, are fully familiar with the background information needed to assess whether or not the report's recommendations are valid and whether or not changes should be considered as the project develops. If another party undertakes the implementation of the recommendations of this report, there is a risk that the report will be misinterpreted and Martens cannot be held responsible for such misinterpretation.

Engineering Reports – Use for Tendering Purposes

Where information obtained from investigations is provided for tendering purposes, Martens recommend 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.

Martens would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Engineering Reports – Data

The report as a whole presents the findings of a site assessment and should not be copied in part or altered in any way.

Logs, figures, drawings *etc* are customarily included in a Martens report and are developed by scientists, engineers or geologists based on their interpretation of field logs (assembled by field personnel), desktop studies and laboratory evaluation of field samples. These data should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

Engineering Reports – Other Projects

To avoid misuse of the information contained in your report it is recommended that you confer with Martens before passing your report on to another party who may not be familiar with the background and purpose of the report. Your report should not be applied to any project other than that originally specified at the time the report was issued.

Subsurface Conditions - General

Every care is taken with the report in relation to interpretation of subsurface conditions, discussion of geotechnical aspects, relevant standards and recommendations or suggestions for design and construction. However, the Company cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions - the potential will depend partly on test point (eg. excavation or borehole) spacing and sampling frequency, which are often limited by project imposed budgetary constraints.

Important Information About Your Report (2 of 2)

- Changes in guidelines, standards and policy or interpretation of guidelines, standards and policy by statutory authorities.
- The actions of contractors responding to commercial pressures.
- Actual conditions differing somewhat from those inferred to exist, because no professional, no matter how qualified, can reveal precisely what is hidden by earth, rock and time.

  The actual interface between logged materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions.

If these conditions occur, Martens will be pleased to assist with investigation or providing advice to resolve the matter.

Subsurface Conditions - Changes

Natural processes and the activity of man create subsurface conditions. For example, water levels can vary with time, fill may be placed on a site and pollutants may migrate with time. Reports are based on conditions which existed at the time of the subsurface exploration / assessment.

Decisions should not be based on a report whose adequacy may have been affected by time. If an extended period of time has elapsed since the report was prepared, consult Martens to be advised how time may have impacted on the project.

Subsurface Conditions - Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those that were expected from the information contained in the report, Martens requests that it immediately be notified. Most problems are much more readily resolved at the time when conditions are exposed, rather than at some later stage well after the event.

Report Use by Other Design Professionals

To avoid potentially costly misinterpretations when other design professionals develop their plans based on a Martens report, retain Martens to work with other project professionals affected by the report. This may involve Martens explaining the report design implications and then reviewing plans and specifications produced to see how they have incorporated the report findings.

Subsurface Conditions – Geo-environmental Issues

Your report generally does not relate to any findings, conclusions, or recommendations about the potential for hazardous or contaminated materials existing at the site unless specifically required to do so as part of Martens' proposal for works.

Specific sampling guidelines and specialist equipment, techniques and personnel are typically used to perform geo-environmental or site contamination assessments. Contamination can create major health, safety and environmental risks. If you have no information about the potential for your site to be contaminated or create an environmental hazard, you are advised to contact Martens for information relating to such matters.

Responsibility

Geo-environmental reporting relies on interpretation of factual information based on professional judgment and opinion and has an inherent level of uncertainty attached to it and is typically far less exact than the design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded.

To help prevent this problem, a number of clauses have been developed for use in contracts, reports and other documents. Responsibility clauses do not transfer appropriate liabilities from Martens to other parties but are included to identify where Martens' responsibilities begin and end. Their use is intended to help all parties involved to recognise their individual responsibilities. Read all documents from Martens closely and do not hesitate to ask any questions you may have.

Site Inspections

Martens will always be pleased to provide engineering inspection services for aspects of work to which this report relates. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site. Martens is familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to a project, from design to construction.

Soil Data

Explanation of Terms (1 of 3)

Definitions

In engineering terms, soil includes every type of uncemented or partially cemented inorganic or organic material found in the ground. In practice, if the material does not exhibit any visible rock properties and can be remoulded or disintegrated by hand in its field condition or in water, it is described as a soil. Other materials are described using rock description terms.

The methods of description and classification of soils and rocks used in this report are typically based on Australian Standard 1726 and the Unified Soil Classification System (USCS) – refer Soil Data Explanation of Terms (2 of 3). In general, descriptions cover the following properties: strength or density, colour, moisture, structure, soil or rock type and inclusions.

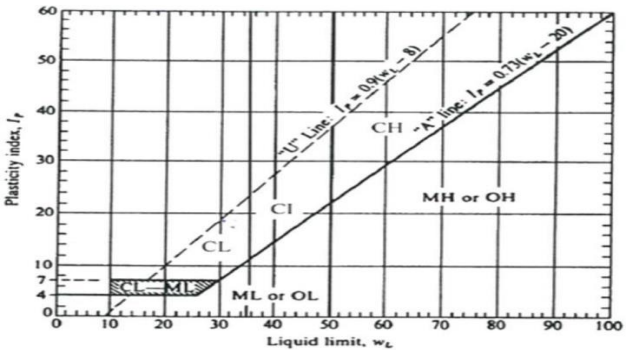
Particle Size

Soil types are described according to the predominating particle size, qualified by the grading of other particles present (e.g. sandy CLAY). Unless otherwise stated, particle size is described in accordance with the following table.

Division	Subdivision		Particle Size (mm)
Oversized	BOULDERS		>200
	COBBLES		63 to 200
Coarse Grained Soil	GRAVEL	Coarse	19 to 63
		Medium	6.7 to 19
		Fine	2.36 to 6.7
	SAND	Coarse	0.6 to 2.36
		Medium	0.21 to 0.6
		Fine	0.075 to 0.21
Fine Grained Soil	SILT		0.002 to 0.075
	CLAY		< 0.002

Plasticity Properties

Plasticity properties of cohesive soils can be assessed in the field by tactile properties or by laboratory procedures.



Soil Moisture Condition

Coarse Grained (Granular) Soil:

Dry (D):	Looks and feels dry. Cemented soils are hard, friable or powdery. Uncemented soils run freely through fingers.
Moist (M):	Feels cool and damp and is darkened in colour. Particles tend to cohere.
Wet (W):	As for moist but with free water forming on hands when handled.

Fine Grained (Cohesive) Soil:

Moist, dry of plastic limit[1] (w < PL):	Looks and feels dry. Hard, friable or powdery.
Moist, near plastic limit (w ≈ PL):	Can be moulded, feels cool and damp, is darkened in colour, at a moisture content approximately equal to the PL.
Moist, wet of plastic limit (w > PL):	Usually weakened and free water forms on hands when handled.
Wet, near liquid limit[2] (w ≈ LL)	
Wet, wet of liquid limit (w > LL)	

[1] Plastic Limit (PL): Moisture content at which soil becomes too dry to be in a plastic condition.

[2] Liquid Limit (LL): Moisture content at which soil passes from plastic to liquid state.

Consistency of Cohesive Soils

Cohesive soils refer to predominantly clay materials.
(Note: consistency is affected by soil moisture condition at time of measurement)

Term	C_u (kPa)	Field Guide
Very Soft (VS)	≤12	A finger can be pushed well into the soil with little effort. Sample exudes between fingers when squeezed in fist.
Soft (S)	>12 and ≤25	A finger can be pushed into the soil to about 25mm depth. Easily moulded by light finger pressures.
Firm (F)	>25 and ≤50	The soil can be indented about 5mm with the thumb, but not penetrated. Can be moulded by strong figure pressure.
Stiff (St)	>50 and ≤100	The surface of the soil can be indented with the thumb, but not penetrated. Cannot be moulded by fingers.
Very Stiff (VSt)	>100 and ≤200	The surface of the soil can be marked, but not indented with thumb pressure. Difficult to cut with a knife. Thumbnail can readily indent.
Hard (H)	> 200	The surface of the soil can only be marked with the thumbnail. Brittle. Tends to break into fragments.
Friable (Fr)	-	Crumbles or powders when scraped by thumbnail. Can easily be crumbled or broken into small pieces by hand.

Density of Granular Soils

Non-cohesive soils are classified on the basis of relative density, generally from standard penetration test (SPT) or Dutch cone penetrometer test (CPT) results as below:

Relative Density	%	**SPT 'N' Value*** (blows/300mm)	CPT Cone Value (q_c MPa)
Very loose	≤15	< 5	< 2
Loose	>15 and ≤35	5 - 10	2 - 5
Medium dense	>35 and ≤65	10 - 30	5 - 15
Dense	>65 and ≤85	30 - 50	15 - 25
Very dense	> 85	> 50	> 25

* Values may be subject to corrections for overburden pressures and equipment type and influenced by soil moisture condition at time of measurement.

Minor Components

Minor components in soils may be present and readily detectable, but have little bearing on general geotechnical classification. Terms include:

Description of components	Proportion of component in:					
	coarse grained soil				fine grained soil	
	% Fines	Terminology	% Accessory coarse fraction	Terminology	% Sand/ gravel	Terminology
Minor	≤5	Trace clay / silt, as applicable	≤15	Trace sand / gravel, as applicable	≤15	Trace sand / gravel, as applicable
	>5,≤12	With clay / silt, as applicable	>15,≤30	With sand / gravel, as applicable	>5,≤30	With sand / gravel, as applicable
Secondary	>12	Prefix soil name as 'silty' or 'clayey', as applicable	>30	Prefix soil name as 'sandy' or 'gravelly', as applicable	>30	Prefix soil name as 'sandy' or 'gravelly', as applicable

Soil Data

Explanation of Terms (2 of 3)

Symbols for Soils and Other

SOILS


COBBLES/BOULDERS


GRAVEL (GP or GW)


Silty GRAVEL (GM)


Clayey GRAVEL (GC)


SAND (SP or SW)


Silty SAND (SM)


Clayey SAND (SC)


SILT (ML or MH)


ORGANIC SILT or CLAY (OH or OL)


CLAY (CL, CI or CH)


Silty CLAY


Sandy CLAY


PEAT (Pt)


Gravelly CLAY

OTHER


FILL


TALUS


ASPHALT


CONCRETE


TOPSOIL

Unified Soil Classification Scheme (USCS)

FIELD IDENTIFICATION PROCEDURES (Excluding particles larger than 63 mm and basing fractions on estimated mass)					USCS	Primary Name
COARSE GRAINED SOILS More than 65 % of material less than 63 mm is larger than 0.075 mm	(A 0.075 mm particle is about the smallest particle visible to the naked eye)	GRAVELS More than half of coarse fraction is larger than 2.36 mm.	GRAVEL and GRAVEL-SAND Mixtures (≤ 5% fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes; not enough fines to bind coarse grains; no dry strength	GW	GRAVEL
				Predominantly one size or a range of sizes with some intermediate sizes missing; not enough fines to bind coarse grains; no dry strength	GP	GRAVEL
			GRAVEL-SILT and GRAVEL-SAND-SILT mixtures (≥12% fines) [1]	With excess non-plastic fines (for identification procedures see ML below); zero to medium dry strength; may also contain sand	GM	Silty GRAVEL
				With excess plastic fines (for identification procedures see CL below); medium to high dry strength; may also contain sand	GC	Clayey GRAVEL
		SANDS More than half of coarse fraction is smaller than 2.36 mm	SAND and GRAVEL-SAND mixtures (≤5% fines)	Wide range in grain sizes and substantial amounts of all intermediate sizes; not enough fines to bind coarse grains; no dry strength.	SW	SAND
				Predominantly one size or a range of sizes with some intermediate sizes missing; not enough fines to bind coarse grains; no dry strength	SP	SAND
			SAND-SILT and SAND-CLAY mixtures (≥12% fines) [1]	With excess non-plastic fines (for identification procedures see ML below); zero to medium dry strength;	SM	Silty SAND
				With excess plastic fines (for identification procedures see CL below); medium to high dry strength	SC	Clayey SAND
FINE GRAINED SOILS More than 35 % of material less than 63 mm is smaller than 0.075 mm		IDENTIFICATION PROCEDURES ON FRACTIONS < 0.2 MM				
		DRY STRENGTH (Crushing Characteristics)	DILATANCY	TOUGHNESS	DESCRIPTION	USCS	Primary Name
		None to Low	Quick to Slow	Low	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or silt with low plasticity [2]	ML	SILT [3]
		Medium to High	None to Slow	Medium	Inorganic clays of low to medium plasticity, gravely clays, sandy clays, silty clays, lean clays	CL (or CI[4])	CLAY
		Low to Medium	Slow	Low	Organic slits and organic silty clays of low plasticity	OL	Organic SILT or CLAY
		Low to Medium	None to Slow	Low to Medium	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	MH	SILT [3]
		High to Very High	None	High	Inorganic clays of high plasticity, fat clays	CH	CLAY
		Medium to High	None to Very Slow	Low to Medium	Organic clays of medium to high plasticity, organic silt of high plasticity	OH	Organic SILT or CLAY
HIGHLY ORGANIC SOILS		Readily identified by colour, odour, spongy feel and frequently by fibrous texture				Pt	PEAT

Notes:

1. Between 5% and 12% - dual classification, e.g. GP-GM.
2. Low Plasticity Clay – Liquid Limit W_L ≤35%; Medium Plasticity Clay – Liquid limit W_L >35%, ≤50%; High Plasticity Clay - Liquid limit W_L > 50%.
3. Low Plasticity Silt – Liquid Limit W_L ≤50%; High Plasticity Silt - Liquid limit W_L > 50%.
4. CI may be adopted for clay of medium plasticity to distinguish from clay of low plasticity.

Soil Data

Explanation of Terms (3 of 3)

Soil Agricultural Classification Scheme

In some situations, such as where soils are to be used for effluent disposal purposes, soils are often more appropriately classified in terms of traditional agricultural classification schemes. Where a Martens report provides agricultural classifications, these are undertaken in accordance with descriptions by Northcote, K.H. (1979) *The factual key for the recognition of Australian Soils*, Rellim Technical Publications, NSW, p 26 - 28.

Symbol	Field Texture Grade	Behaviour of moist bolus	Ribbon length	Clay content (%)
S	Sand	Coherence nil to very slight; cannot be moulded; single grains adhere to fingers	0 mm	< 5
LS	Loamy sand	Slight coherence; discolours fingers with dark organic stain	6.35 mm	5
CLS	Clayey sand	Slight coherence; sticky when wet; many sand grains stick to fingers; discolours fingers with clay stain	6.35mm - 1.3cm	5 - 10
SL	Sandy loam	Bolus just coherent but very sandy to touch; dominant sand grains are of medium size and are readily visible	1.3 - 2.5	10 - 15
FSL	Fine sandy loam	Bolus coherent; fine sand can be felt and heard	1.3 - 2.5	10 - 20
SCL$^-$	Light sandy clay loam	Bolus strongly coherent but sandy to touch, sand grains dominantly medium size and easily visible	2.0	15 - 20
L	Loam	Bolus coherent and rather spongy; smooth feel when manipulated but no obvious sandiness or silkiness; may be somewhat greasy to the touch if much organic matter present	2.5	25
Lfsy	Loam, fine sandy	Bolus coherent and slightly spongy; fine sand can be felt and heard when manipulated	2.5	25
SiL	Silt loam	Coherent bolus, very smooth to silky when manipulated	2.5	25 + > 25 silt
SCL	Sandy clay loam	Strongly coherent bolus sandy to touch; medium size sand grains visible in a finer matrix	2.5 - 3.8	20 - 30
CL	Clay loam	Coherent plastic bolus; smooth to manipulate	3.8 - 5.0	30 - 35
SiCL	Silty clay loam	Coherent smooth bolus; plastic and silky to touch	3.8 - 5.0	30- 35 + > 25 silt
FSCL	Fine sandy clay loam	Coherent bolus; fine sand can be felt and heard	3.8 - 5.0	30 - 35
SC	Sandy clay	Plastic bolus; fine to medium sized sands can be seen, felt or heard in a clayey matrix	5.0 - 7.5	35 - 40
SiC	Silty clay	Plastic bolus; smooth and silky	5.0 - 7.5	35 - 40 + > 25 silt
LC	Light clay	Plastic bolus; smooth to touch; slight resistance to shearing	5.0 - 7.5	35 - 40
LMC	Light medium clay	Plastic bolus; smooth to touch, slightly greater resistance to shearing than LC	7.5	40 - 45
MC	Medium clay	Smooth plastic bolus, handles like plasticine and can be moulded into rods without fracture, some resistance to shearing	> 7.5	45 - 55
HC	Heavy clay	Smooth plastic bolus; handles like stiff plasticine; can be moulded into rods without fracture; firm resistance to shearing	> 7.5	> 50

Rock Data

Explanation of Terms (1 of 2)

Symbols for Rock

SEDIMENTARY ROCK


BRECCIA


CONGLOMERATE


CONGLOMERATIC SANDSTONE


SANDSTONE/QUARTZITE


SILTSTONE


MUDSTONE/CLAYSTONE


SHALE


COAL


LIMESTONE


LITHIC TUFF

IGNEOUS ROCK


GRANITE


DOLERITE/BASALT

METAMORPHIC ROCK


SLATE, PHYLLITE, SCHIST


GNEISS


METASANDSTONE


METASILTSTONE


METAMUDSTONE

Definitions

Descriptive terms used for Rock by Martens are based on AS1726 and encompass rock substance, defects and mass.

Rock Material	The intact rock that is bounded by defects.
Rock Defect	Discontinuity, fracture, break or void in the material or minerals across which there is little or no tensile strength.
Rock Structure	The nature and configuration of the different defects within the rock mass and their relationship to each other.
Rock Mass	The entirety of the system formed by all of the rock material and all of the defects that are present.

Degree of Weathering

Rock weathering is defined as the degree of decline in rock structure and grain property and can be determined in the field.

Term	Symbol	Definition
Residual soil[1]	RS	Material is weathered to such an extent that it has soil properties. Mass structure, material texture, and fabric of original rock are no longer visible, but the soil has not been significantly transported.
Extremely weathered[1]	XW	Material is weathered to such an extent that it has soil properties - i.e. it can be remoulded and can be classified according to the Unified Classification System. Mass structure and material texture and fabric of original rock are still visible.
Highly weathered[2]	HW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the original colour of the 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[2]	MW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the rock is not recognisable. Rock strength shows little or no change 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	Rock substance unaffected by weathering. No sign of decomposition of individual materials or colour changes.

Notes:
1 RS and EW material is described using soil descriptive terms.
2. The term "Distinctly Weathered" (DW) may be used to cover the range of substance weathering between EW and SW

Rock Strength

Rock strength is defined by the Point Load Strength Index (I_s 50) and refers to the strength of the rock substance in the direction normal to the loading. The test procedure is described by the International Society of Rock Mechanics.

Term (Strength)	I_s (50) MPa	Uniaxial Compressive Strength MPa	Field Guide	Symbol
Very low	>0.03 ≤0.1	0.6 – 2	May be crumbled in the hand. Sandstone is 'sugary' and friable.	VL
Low	>0.1 ≤0.3	2 – 6	Core 150mm long x 50mm diameter may be broken by hand and easily scored with a knife. Sharp edges of core may be friable and break during handling.	L
Medium	>0.3 ≤1.0	6 – 20	Core 150mm long x 50mm diameter can be broken by hand with considerable difficulty. Readily scored with a knife.	M
High	>1 ≤3	20 – 60	Core 150mm long x 50mm diameter cannot be broken by unaided hands, can be slightly scratched or scored with a knife. Breaks with single blow from pick.	H
Very high	>3 ≤10	60 – 200	Core 150mm long x 50mm diameter, broken readily with hand held hammer. Cannot be scratched with knife. Breaks after more than one pick strike.	VH
Extremely high	>10	>200	A piece of core 150mm long x 50mm diameter is difficult to break with hand held hammer. Rings when struck with a hammer.	EH

Rock Data

Explanation of Terms (2 of 2)

Degree of Fracturing

This classification applies to diamond drill cores and refers to the spacing of all types of natural fractures along which the core is discontinuous. These include bedding plane partings, joints and other rock defects, but exclude fractures such as drilling breaks (DB) or handling breaks (HB).

Term	Description
Fragmented	The core is comprised primarily of fragments of length less than 20 mm, and mostly of width less than core diameter.
Highly fractured	Core lengths are generally less than 20 mm to 40 mm with occasional fragments.
Fractured	Core lengths are mainly 30 mm to 100 mm with occasional shorter and longer sections.
Slightly fractured	Core lengths are generally 300 mm to 1000 mm, with occasional longer sections and sections of 100 mm to 300 mm.
Unbroken	The core does not contain any fractures.

Rock Core Recovery

TCR = Total Core Recovery

$$= \frac{\text{Length of core recovered}}{\text{Length of core run}} \times 100\,\%$$

SCR = Solid Core Recovery

$$= \frac{\sum \text{Length of cylindrical core recovered}}{\text{Length of core run}} \times 100\,\%$$

RQD = Rock Quality Designation

$$= \frac{\sum \text{Axial lengths of core} > 100\text{ mm long}}{\text{Length of core run}} \times 100\,\%$$

Rock Strength Tests

- ▼ Point load strength Index (Is50) - axial test (MPa)
- ▶ Point load strength Index (Is50) - diametral test (MPa)
- ● Uniaxial compressive strength (UCS) (MPa)

Defect Type Abbreviations and Descriptions

Defect Type (with inclination given)

BP	Bedding plane parting
FL	Foliation
CL	Cleavage
JT	Joint
FC	Fracture
SZ/SS	Sheared zone/ seam (Fault)
CZ/CS	Crushed zone/ seam
DZ/DS	Decomposed zone/ seam
FZ	Fractured Zone
IS	Infilled seam
VN	Vein
CO	Contact
HB	Handling break
DB	Drilling break

Planarity

Pl	Planar
Cu	Curved
Un	Undulating
St	Stepped
Ir	Irregular
Dis	Discontinuous

Roughness

Pol	Polished
Sl	Slickensided
Sm	Smooth
Ro	Rough
VR	Very rough

Thickness

Zone	> 100 mm
Seam	> 2 mm < 100 mm
Plane	< 2 mm

Coating or Filling

Cn	Clean
Sn	Stain
Ct	Coating
Vnr	Veneer
Fe	Iron Oxide
X	Carbonaceous
Qz	Quartzite
MU	Unidentified mineral

Inclination

Inclination of defect is measured from perpendicular to and down the core axis.
Direction of defect is measured clockwise (looking down core) from magnetic north.

Test, Drill and Excavation Methods

Explanation of Terms (1 of 3)

Sampling

Sampling is carried out during drilling or excavation to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling or excavation provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples may be taken by pushing a thin-walled sampling tube, e.g. U_{50} (50 mm internal diameter thin walled tube), into soils and withdrawing a soil sample 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. Other sampling methods may be used. Details of the type and method of sampling are given in the report.

Drilling / Excavation Methods

The following is a brief summary of drilling and excavation methods currently adopted by the Company and some comments on their use and application.

Hand Excavation - in some situations, excavation using hand tools, such as mattock and spade, may be required due to limited site access or shallow soil profiles.

Hand Auger - the hole is advanced by pushing and rotating either a sand or clay auger, generally 75-100 mm in diameter, into the ground. The penetration depth is usually limited to the length of the auger pole; however extender pieces can be added to lengthen this.

Test Pits - these are excavated with a backhoe or a tracked excavator, allowing close examination of the in-situ soils and, if it is safe to descend into the pit, collection of bulk disturbed samples. The depth of penetration is limited to about 3 m for a backhoe and up to 6 m for an excavator. A potential disadvantage is the disturbance caused by the excavation.

Large Diameter Auger (e.g. Pengo) - the hole is advanced by a rotating plate or short spiral auger, generally 300 mm or larger in diameter. The cuttings are returned to the surface at intervals (generally of 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 sampling.

Continuous Sample Drilling (Push Tube) - the hole is advanced by pushing a 50 - 100 mm diameter socket into the ground and withdrawing it at intervals to extrude the sample. This is the most reliable method of drilling in soils, since moisture content is unchanged and soil structure, strength *etc.* is only marginally affected.

Continuous Spiral Flight Augers - the hole 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 in sands above the water table. Samples are returned to the surface or, or may be collected after withdrawal of the auger flights, but they are very disturbed and may be contaminated. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively lower reliability, due to remoulding, contamination or softening of samples by ground water.

Non-core Rotary Drilling - the hole is advanced by a rotary bit, with water 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 'feel' and rate of penetration.

Rotary Mud Drilling - similar to rotary drilling, but using drilling mud as a circulating fluid. The mud tends to mask the cuttings and reliable identification is again only possible from separate intact sampling (eg. from SPT).

Continuous Core Drilling - a continuous core sample is obtained using a diamond tipped core barrel of usually 50 mm internal diameter. Provided full core recovery is achieved (not always possible in very weak or fractured rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation.

In-situ Testing and Interpretation

Cone Penetrometer Testing (CPT)

Cone penetrometer testing (sometimes referred to as Dutch Cone) described in this report has been carried out using an electrical friction cone penetrometer.

The test is described in AS 1289.6.5.1-1999 (R2013). In the test, a 35 mm diameter rod with a cone tipped end is pushed continuously into the soil, the reaction being provided by a specially designed truck or rig which is fitted with an hydraulic ram system.

Measurements are made of the end bearing resistance on the cone and the friction resistance on a separate 130 mm long sleeve, immediately behind the cone. Transducers in the tip of the assembly are connected by electrical wires passing through the push rod centre to an amplifier and recorder unit mounted on the control truck. As penetration occurs (at a rate of approximately 20 mm per second) the information is output on continuous chart recorders. The plotted results given in this report have been traced from the original records. The information provided on the charts comprises:

(i) Cone resistance (q_c) - the actual end bearing force divided by the cross sectional area of the cone, expressed in MPa.

(ii) Sleeve friction (q_f) - the frictional force of the sleeve divided by the surface area, expressed in kPa.

(iii) Friction ratio - the ratio of sleeve friction to cone resistance, expressed in percent.

There are two scales available for measurement of cone resistance. The lower (A) scale (0 - 5 MPa) is used in very soft soils where increased sensitivity is required and is shown in the graphs as a dotted line. The main (B) scale (0 - 50 MPa) is less sensitive and is shown as a full line.

The ratios of the sleeve resistance to cone resistance will vary with the type of soil encountered, with higher relative friction in clays than in sands. Friction ratios of 1 % - 2 % are commonly encountered in sands and very soft clays rising to 4 % - 10 % in stiff clays.

In sands, the relationship between cone resistance and SPT value is commonly in the range:

$$q_c \text{ (MPa)} = (0.4 \text{ to } 0.6)\ N \text{ (blows/300 mm)}$$

In clays, the relationship between undrained shear strength and cone resistance is commonly in the range:

$$q_c = (12 \text{ to } 18)\ C_u$$

Interpretation of CPT values can also be made to allow estimation of modulus or compressibility values to allow calculation of foundation settlements.

Inferred stratification as shown on the attached reports is assessed from the cone and friction traces and from experience and information from nearby boreholes *etc.* This information is presented for general guidance, but must be regarded as being to some extent interpretive. The test method provides a continuous profile of engineering properties, and where precise information on soil classification is required, direct drilling and sampling may be preferable.

Standard Penetration Testing (SPT)

Standard penetration tests are used mainly in non-cohesive soils, but occasionally also in cohesive soils as a means of determining density or strength and also of obtaining a relatively undisturbed sample.

The test procedure is described in AS 1289.6.3.1-2004. 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 penetration depth increments and the 'N' value is taken as the number of blows for the last two 150 mm depth increments (300 mm total penetration). 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:

(i) Where full 450 mm penetration is obtained with successive blow counts for each 150 mm of say 4, 6 and 7 blows:

as 4, 6, 7
N = 13

(ii) Where the test is discontinued, short of full penetration, say after 15 blows for the first 150mm and 30 blows for the next 40mm

as 15, 30/40 mm.

The results of the tests can be related empirically to the engineering properties of the soil. Occasionally, the test method is used to obtain samples in 50 mm diameter thin walled sample tubes in clays. In such circumstances, the test results are shown on the borehole logs in brackets.

Dynamic Cone (Hand) Penetrometers

Hand penetrometer tests are carried out by driving a rod into the ground with a falling weight hammer and measuring the blows for successive 150mm increments of penetration. Normally, there is a depth limitation of 1.2m but this may be extended in certain conditions by the use of extension rods. Two relatively similar tests are used.

Perth sand penetrometer (PSP) - a 16 mm diameter flat ended rod is driven with a 9 kg hammer, dropping 600 mm. The test, described in AS 1289.6.3.3-1997 (R2013), was developed for testing the density of sands (originating in Perth) and is mainly used in granular soils and filling.

Cone penetrometer (DCP) - sometimes known as the Scala Penetrometer, a 16 mm rod with a 20 mm diameter cone end is driven with a 9 kg hammer dropping 510 mm. The test, described in AS 1289.6.3.2-1997 (R2013), was developed initially for pavement sub-grade investigations, with correlations of the test results with California Bearing Ratio published by various Road Authorities.

Pocket Penetrometers

The pocket (hand) penetrometer (PP) is typically a light weight spring hand operated device with a stainless steel loading piston, used to estimate unconfined compressive strength, q_u, (UCS in kPa) of a fine grained soil in field conditions. In use, the free end of the piston is pressed into the soil at a uniform penetration rate until a line, engraved near the piston tip, reaches the soil surface level. The reading is taken from a gradation scale, which is attached to the piston via a built-in spring mechanism and calibrated to kilograms per square centimetre (kPa) UCS. The UCS measurements are used to evaluate consistency of the soil in the field moisture condition. The results may be used to assess the undrained shear strength, C_u, of fine grained soil using the approximate relationship:

$$q_u = 2 \times C_u.$$

It should be noted that accuracy of the results may be influenced by condition variations at selected test surfaces. Also, the readings obtained from the PP test are based on a small area of penetration and could give misleading results. They should not replace laboratory test results. The use of the results from this test is typically limited to an assessment of consistency of the soil in the field and not used directly for design of foundations.

Test Pit / Borehole Logs

Test pit / borehole log(s) presented herein are an engineering and / or geological interpretation of the subsurface conditions. Their reliability will depend to some extent on frequency of sampling and methods of excavation / drilling. Ideally, continuous undisturbed sampling or excavation / 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 test pit / borehole logs 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 test pits / boreholes, the frequency of sampling and the possibility of other than 'straight line' variation between the test pits / boreholes.

Laboratory Testing

Laboratory testing is carried out in accordance with AS 1289 Methods of Testing Soil for Engineering Purposes. Details of the test procedure used are given on the individual report forms.

Ground Water

Where ground water levels are measured in boreholes, there are several potential problems:

- In low permeability soils, ground water although present, may enter the hole slowly, or perhaps not at all during the time it 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 prior weather changes. They may not be the same at the time of construction as are indicated in the report.
- The use of water or mud as a drilling fluid will mask any ground water inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water observations 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.

Test, Drill and Excavation Methods

Explanation of Terms (3 of 3)

DRILLING / EXCAVATION METHOD

HA	Hand Auger	RD	Rotary Blade or Drag Bit	NQ	Diamond Core - 47 mm
AD/V	Auger Drilling with V-bit	RT	Rotary Tricone bit	NMLC	Diamond Core – 51.9 mm
AD/T	Auger Drilling with TC-Bit	RAB	Rotary Air Blast	HQ	Diamond Core – 63.5 mm
AS	Auger Screwing	RC	Reverse Circulation	HMLC	Diamond Core – 63.5 mm
HSA	Hollow Stem Auger	CT	Cable Tool Rig	DT	Diatube Coring
S	Excavated by Hand Spade	PT	Push Tube	NDD	Non-destructive digging
BH	Tractor Mounted Backhoe	PC	Percussion	PQ	Diamond Core - 83 mm
JET	Jetting	E	Tracked Hydraulic Excavator	X	Existing Excavation

SUPPORT

Nil	No support	S	Shotcrete	RB	Rock Bolt
C	Casing	Sh	Shoring	SN	Soil Nail
WB	Wash bore with Blade or Bailer	WR	Wash bore with Roller	T	Timbering

WATER

▽ Water level at date shown

▷ Water inflow

◁ Partial water loss

◀ Complete water loss

GROUNDWATER NOT OBSERVED (NO)	The observation of groundwater, whether present or not, was not possible due to drilling water, surface seepage or cave in of the borehole/test pit.
GROUNDWATER NOT ENCOUNTERED (NX)	The borehole/test pit was dry soon after excavation. However, groundwater could be present in less permeable strata. Inflow may have been observed had the borehole/test pit been left open for a longer period.

PENETRATION / EXCAVATION RESISTANCE

L	Low resistance: Rapid penetration possible with little effort from the equipment used.
M	Medium resistance: Excavation possible at an acceptable rate with moderate effort from the equipment used.
H	High resistance: Further penetration possible at slow rate & requires significant effort equipment.
R	Refusal/ Practical Refusal. No further progress possible without risk of damage/ unacceptable wear to digging implement / machine.

These assessments are subjective and dependent on many factors, including equipment power, weight, condition of excavation or drilling tools, and operator experience.

SAMPLING

D	Small disturbed sample	W	Water Sample	C	Core sample
B	Bulk disturbed sample	G	Gas Sample	CONC	Concrete Core

U63 Thin walled tube sample - number indicates nominal undisturbed sample diameter in millimetres

TESTING

SPT	Standard Penetration Test to AS1289.6.3.1-2004
4,7,11	4,7,11 = Blows per 150mm.
N=18	'N' = Recorded blows per 300mm penetration following 150mm seating
DCP	Dynamic Cone Penetration test to AS1289.6.3.2-1997. 'n' = Recorded blows per 150mm penetration
Notes:	
RW	Penetration occurred under rod weight only
HW	Penetration occurred under hammer and rod weight only
20/100mm	Where practical refusal or hammer double bouncing occurred, blows and penetration for that interval are reported (e.g. 20 blows for 100 mm penetration)

CPT	Static cone penetration test
CPTu	CPT with pore pressure (u) measurement
PP	Pocket penetrometer test expressed as instrument reading (kPa)
FP	Field permeability test over section noted
VS	Field vane shear test expressed as uncorrected shear strength (sv = peak value, sr = residual value)
PM	Pressuremeter test over section noted
PID	Photoionisation Detector reading in ppm
WPT	Water pressure tests

SOIL DESCRIPTION

Density		Consistency		Moisture	
VL	Very loose	VS	Very soft	D	Dry
L	Loose	S	Soft	M	Moist
MD	Medium dense	F	Firm	W	Wet
D	Dense	St	Stiff	Wp	Plastic limit
VD	Very dense	VSt	Very stiff	Wl	Liquid limit
		H	Hard		

ROCK DESCRIPTION

Strength		Weathering	
VL	Very low	EW	Extremely weathered
L	Low	HW	Highly weathered
M	Medium	MW	Moderately weathered
H	High	SW	Slightly weathered
VH	Very high	FR	Fresh
EH	Extremely high		