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SUMMARY RESPONSE TO SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS (SEARS)

The following provides a summary of the relevant sections of the report which directly addresses the SEARs requirements relating to *Traffic and Transport* as outlined in NSW Planning and Environment letter to the Department of Education dated 11/05/2018.

SEARs TRAFFIC AND TRANSPORT REQUIREMENTS (SSD 9274)	
Requirements	Pertinent sections of report for reference
Accurate details of the current daily and peak hour vehicle, existing and future public transport networks and pedestrian and cycle movement provided on the road network located adjacent to the proposed development	Sections 5 and 6
Details of estimated total daily and peak hour trips generated by the proposal, including vehicle, public transport, pedestrian and bicycle trips based on surveys of the existing and similar schools within the local area	Section 6.1 (The majority of traffic generated by schools, associated with staff journeys to and from work and student pick-ups and drop-offs, predominantly coincides with the starting and finishing periods of the school. Thus, the assessment of traffic impacts is limited to peak school hour periods.)
The adequacy of existing public transport or any future public transport infrastructure within the vicinity of the site, pedestrian and bicycle networks and associated infrastructure to meet the likely future demand of the proposed development	Sections 5.4, 5.5, 5.6 and 6.2.3
Measures to integrate the development with the existing/future public transport network	Section 7

The impact of trips generated by the development on nearby intersections (including but not limited to both roundabout intersections of Gilbert Road and Ridgescrop Drive), with consideration of the cumulative impacts from other approved developments in the vicinity, and the need/associated funding for, and details of, upgrades or road improvement works, if required (Traffic modelling is to be undertaken using SIDRA network modelling for current and future years)	Sections 5 and 6
The identification of infrastructure required to ameliorate any impacts on traffic efficiency and road safety impacts associated with the proposed development, including details on improvements required to affected intersections, additional school bus routes along bus capable roads (i.e. minimum 3.5m wide travel lanes), additional bus stops or bus bays	Section 6.2.1
Details of travel demand management measures to minimise the impact on general traffic and bus operations, including details of a location-specific sustainable travel plan (Green Travel Plan and specific Workplace travel plan) and the provision of facilities to increase the non-car mode share for travel to and from the site	Section 7
The proposed walking and cycling access arrangements and connections to public transport services	Sections 5.4, 5.5 and 5.6

The proposed access arrangements, including car and bus pick-up/drop-off facilities, and measures to mitigate any associated traffic impacts and impacts on public transport, pedestrian and bicycle networks, including pedestrian crossings and refuges and speed control devices and zones	Sections 4, 5 and 6
Details of any traffic management measures to ensure the safe and efficient operation of student pick-up/drop-off	Section 8
Proposed bicycle parking provision, including end of trip facilities, in secure, convenient, accessible areas close to main entries incorporating lighting and passive surveillance	Section 4.2.2
Proposed number of on-site car parking spaces for teaching staff and visitors and corresponding compliance with existing parking codes and justification for the level of car parking provided on-site	Section 4.2.1
An assessment of the cumulative on-street parking impacts of cars and bus pick-up/drop-off, staff parking and any other parking demands associated with the development	Sections 4.2.1, 6.2.2 and 8
an assessment of road and pedestrian safety adjacent to the proposed development and the details of required road safety measures and personal safety in line with CPTED	Section 5
emergency vehicle access, service vehicle access, delivery and loading arrangements and estimated service vehicle movements (including vehicle type and the likely arrival and departure times)	Section 4.1.1

The preparation of a draft Construction Traffic Management Plan to demonstrate the proposed management of the impact in relation to construction traffic addressing the following:

- assessment of cumulative impacts associated with other construction activities (if any);
- an assessment of road safety at key intersection and locations subject to heavy vehicle construction traffic movements and high pedestrian activity;
- details of construction program detailing the anticipated construction duration and highlighting significant and milestone stages and events during the construction process;
- details of anticipated peak hour and daily construction vehicle movements to and from the site;
- details of on-site car parking and access arrangements of construction vehicles, construction workers to and from the site, emergency vehicles and service vehicle; and
- Details of temporary cycling and pedestrian access during construction;

A draft Construction Traffic Management Plan has been prepared in Section 9 of this report, with the specific subsection addressing each of the dot points listed below:

Dot Point 1 - 9.1

Dot Point 2 - 9.6 and 9.7

Dot Point 3 - 9.2

Dot Point 4 - 9.6

Dot Point 5 - 9.5

Dot Point 6 - 9.3

1. **INTRODUCTION**

This Practice has been engaged by Fulton Trotter Architects to prepare a traffic and transport impact assessment to accompany a Development Application ('DA') lodged with the Department of Planning and Environment ('DPE') and the Roads and Maritime Services, in accordance with Clause 13 of the State Environmental Planning Policy for *Educational Establishments and Child Care Facilities* 2017 (SEPP 2017).

The subject proposal involves alterations and additions to Samuel Gilbert Public School, located at the north-western corner of Gilbert Road and Ridgescrop Drive, Castle Hill ('Subject Site'), to accommodate an increase in school population from 780 to 1,000 students between K – Year 6.

The purpose of this report is to assess and document the likely traffic and parking impacts resulting from the proposed development and to recommend, where appropriate treatments to ameliorate any such impacts. This assessment is provided in response to DPE's Secretary Environmental Assessment Requirements (SEARs) under the *Traffic and Accessibility* section, applicable to the subject development, which is considered to be a State Significant Development (SSD 9274). In this regard, this report undertakes assessment of the following:

- The existing road network conditions within the vicinity of the site including traffic volumes and general traffic safety;
- Identify traffic likely to be generated by the proposal;
- Assess the ability of the surrounding public road network to accommodate additional traffic movements;
- The existing sustainable transport infrastructure including pedestrian, cycle, bus, train and ferry travel modes within the vicinity of the site;
- The likely additional demands on surrounding pedestrian, cycle, bus, train and ferry infrastructure as a result of the proposal and the ability of existing infrastructure to accommodate additional demand;
- Initiatives to encourage more sustainable forms of travel, intended to reduce the impact of general traffic on the surrounding road network to be detailed within a Green Travel Plan;
- The accessibility to and from the site from the frontage roads under existing and projected conditions;
- The suitability and safety of the internal circulation, manoeuvring, queuing and parking arrangements as relevant to the site and local conditions; and
- Preliminary assessment of the traffic and transport impacts during construction and the primary items to be incorporated into a Construction Traffic & Pedestrian Management Plan.

Reference has been made to the following documents throughout this report:

- The Australian Standard for *Parking Facilities Part 1: Off-Street Car Parking* (AS2890.1-2004);
- The Australian Standard for *Parking Facilities Part 6: Off-Street People for People with Disabilities* (AS2890.6-2009); and
- The Hills Shire Council's *The Hills Development Control Plan 2012* (DCP 2012).

This report should be read in conjunction with the architectural plans prepared by Fulton Trotter Architects, copies of which are submitted under separate cover.

2. SITE DETAILS

2.1 Site Location

The subject site under consideration, is located the north-western corner of Gilbert Road and Ridgecrop Drive, Castle Hill. This location is shown in the context of its surrounding road network and local land use in **Figures 1 and 2** overleaf.

2.2 Site Description

The site provides a property description of Lot 1 within Deposited Plan 719671 Ridgecrop Drive, Castle Hill. The site forms an irregularly shaped parcel of land providing frontages to Ridgecrop Drive, Gilbert Road and Excalibur Avenue of approximately 303m, 133m and 109m respectively. The total site area is in the order of approximately 8.3ha.

2.3 Existing Uses

The site currently accommodates Samuel Gilbert Public School campus, which is a primary school catering to students from Kindergarten to Year 6. The current hours of operation of the primary school is between 8:30am to 3:00pm. The school campus currently accommodates a number of buildings, providing learning and administration facilities in conjunction with on-site student recreation, play and sporting areas.

The existing on-site development is serviced by an at-grade passenger vehicle parking area containing 26 staff spaces and a turnaround area for delivery vehicles. Vehicular connectivity between the on-site parking provision and the adjoining public road (Ridgecrop Drive) is facilitated by a combined entry/exit driveway at the centre of the south-western property boundary.

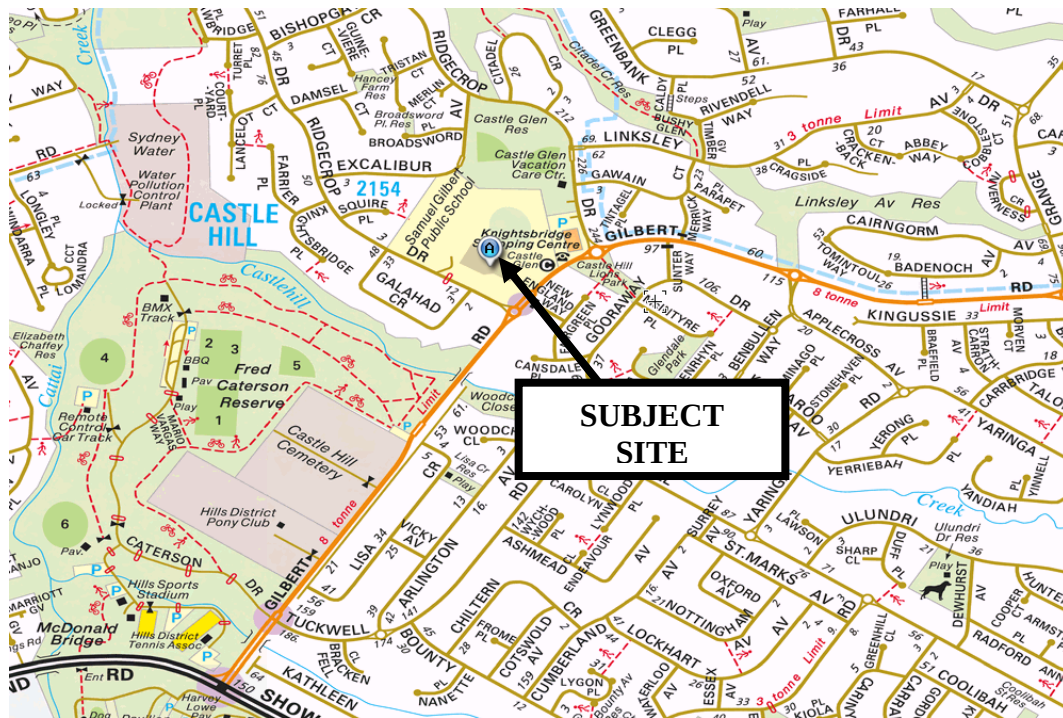
Our observations have indicated that parents/guardians use the public on-street parallel parking spaces within Ridgecrop Drive and Gilbert Road to pick-up/drop-off children. Further, the shopping centre car park to the east of the site and the public car park servicing the recreational sporting field to be north of the site have also been observed to accommodate the pick-up/drop-off children by parents/guardians. This car park has a pedestrian link to the subject site via the school oval.

2.4 Surrounding Uses

The subject site is surrounded by the following mix of land-uses:

- Low density residential development adjoins the site to the immediate west and south;
- Strip retail development (Knightsbridge Shopping Centre) and a child care centre fronting Ridgecrop Drive is located to the immediate east of the subject site; and
- A recreational sports field is adjoins the site to the immediate north.

FIGURE 1
SITE LOCATION – ROAD NETWORK CONTEXT



Source: www.street-directory.com.au (Accessed 23/08/18)

FIGURE 2
SITE LOCATION – LOCAL LAND USE CONTEXT



Source: Six Maps (Accessed 28/08/18)

3. PROPOSED DEVELOPMENT

3.1 Built Form/School Demographic Changes

The subject proposal seeks consent for the following building works:

- Construction of two (2) new buildings over three (3) levels, separated by a covered outdoor learning area (COLA) within the south-eastern corner of the site, which is proposed to provide the following new facilities:
 - A new library
 - A new office and administration room for staff
 - New classrooms & internal learning environments
 - A new hall and OOSH area
 - Other general amenities
- Refurbishment of the existing Block A & E buildings to accommodate new classrooms.

No modifications are proposed to the existing off-street parking provisions and vehicular and pedestrian access arrangements.

The DA works are anticipated to facilitate an increase in the school population from 780 to 1000 students (between K – Year 6) and from 45 to 58 staff.

4. ACCESS & PARKING CONSIDERATIONS

4.1 Access Arrangements

4.1.1 Vehicular Access

The school is currently serviced by an off-street car park within the south-western corner of the site, which provides connectivity to Ridgescrop Drive via an existing 5m wide driveway, located to the immediate west of the wombat crossing within Ridgescrop Drive, approximately central to the southern site frontage.

It is also noted that emergency vehicles and service vehicles currently use the existing driveway mentioned above to access the site. It is understood that the site currently accommodates up to one (1) service vehicle a day, which generally occurs outside of the peak starting and finishing times of the school.

The existing vehicular driveway arrangements for passenger, service and emergency vehicles and the number of service vehicle movements to and from the site are to remain unaltered as part of the subject proposal.

4.1.2 Pedestrian Access

The school campus is currently provided with the following formalised pedestrian access points as follows:

- A gated entrance providing a pedestrian link to the northern Ridgescrop Drive footpath, which is adjacent to a signposted indented student pick-up/drop-off bay; and
- Two separate pedestrian gates providing a pedestrian link to the eastern Gilbert Road footpath.

4.2 Parking Provision

The existing off-street parking area which is to remain unchanged, provides 26 formal passenger vehicle parking spaces, dedicated primarily to staff. Recent observations of this parking area have identified some informal parking within this area and some vacancies in the formal parking spaces. In any case, the number of parked vehicles within this off-street parking area was observed to be slightly higher than the formal parking provision.

With regards to visitor parking, it is noted that the shopping centre car park and the public reserve car park to the north and east of the site respectively, is currently used by parents/guardians of children and general visitors associated with the school. It is understood following discussions with Council that the school sports oval and the recreational reserve, adjoining the site to the north are proposed to be provided with new off-street public parking areas in the future, which are available for use by parents/guardians to pick-up/drop-off their children to and from the school.

4.2.1 Car Parking

The Hills Shire Council provides locally sensitive parking requirements within Part C Section 1 of *The Hills Development Control Plan 2012* (DCP 2012) for educational establishments as follows:

1 space per employee, plus 1 car parking space per 8 Year 12 students, plus 1 car parking space per 30 students enrolled for visitors and/or parent parking

Based on a proposed future student and employee population of 1,000 students (no Year 12's, being a primary school) and 58 staff, a total of 92 car parking spaces comprising 58 staff and 34 visitor spaces are required to be provided in accordance with Council's DCP.

Whilst the current on-site parking provision represents a shortfall with respect to Council's numerical parking requirements, the surrounding public off-street parking facilities associated with the adjoining land uses including the future provision of new off-street car parking areas associated with the school sports oval and adjoining recreational reserve, is expected to assist with servicing the additional parking demand generated by the proposed expansion of the school.

Further, this Practice notes that one of the conditions of the SEARs issued by the DPE in relation to *Transport and Accessibility* is the provision of a Green Travel Plan (GTP) as part of the DA to promote more sustainable forms of travel that reduces reliance on private car. In response to this requirement, this Practice has prepared a GTP within Section 7 of this report, intended to ensure that the transport infrastructure, services and policies within and outside the site are tailored to the future site users, being coordinated to achieve sustainable outcomes aimed at minimising traffic and parking impacts within the surrounding road network.

4.2.2 Bicycle Parking

Part C Section 1 of DCP 2007 specify that schools are required to be provided with the following minimum bicycle parking provision:

1 space per 5 pupils over year 4

It is understood that around 286 out of the 1,000 primary school students are currently or anticipated to be in Years 5 and 6. Based on these student numbers, the primary school is required to be supported by a minimum bicycle parking provision of up to 58 spaces.

The subject proposal involves the provision of 30 double sided bicycle racks on site, designed in accordance with AS2890.3-2015, which is capable of accommodating up to 60 bicycles. Compliance with Council's bicycle parking requirements is therefore readily achieved.

Recent observations have indicated that bicycle trips to and from the site associated with staff, students and general visitors was found to be currently negligible. However, as outlined within the Green Travel Plan (GTP) in Section 7 of this report, there is an expectation that parents, students and staff travel characteristics/behaviour are encouraged to change, as alternative forms of transport to private vehicle usage are contemplated and actioned. The proposed bicycle parking provision is expected to also assist with facilitating greater bicycle trips, consistent with this GTP objective.

5. EXTERNAL TRAFFIC CONDITIONS

5.1 Surrounding Road Network

The following provides a road network immediately adjoining of the school site, which are expected to be most affected by the additional traffic generated by the proposed development:

Gilbert Road performs a collector road function under the care and control of The Hills Shire Council. In this regard, it provides an east/west connection between the Showground Road in the east (in the vicinity of the future Showground Railway Station) and Old Northern Road in the west, forming T-junctions with both under traffic signal control.

Gilbert Road forms a 12m wide carriageway accommodating one through lane of traffic in each direction in conjunction with a parking lane adjoining both sides of the road. It intersects with Ridgecrop Drive adjacent to the southern corner of the site under a single lane roundabout. A pedestrian footpath is also provided along both sides of Gilbert Road, with a midblock signalised crossing facilitating pedestrian connectivity between the footpaths, approximately 20m to the northeast of this roundabout intersection. An 8t load limit applies for Gilbert Road.

Ridgecrop Drive performs a local access function under the care and control of The Hills Shire Council. It forms a circulating loop, forming two T-junctions with Gilbert Road, adjacent to the corner of the school site and the corner of the adjoining shopping centre development, under roundabout control.

Ridgecrop Drive also provides a 12m wide pavement servicing one through lane of traffic in each direction in conjunction with parallel parking along both kerb alignments. Approximately 152m north-west of its roundabout intersection with Gilbert Road (along the south-western school frontage), a wombat crossing is provided which provides a pedestrian link across Ridgecrop Drive connecting with footpaths along both sides of the road. To the immediate east of the wombat crossing, there is an existing indented bus bay, with 'Bus-Zone'/'No-Stopping' parking restrictions applying along both sides of Ridgecrop Drive for the extent of the bus bay length.

Traffic flow within all of the abovementioned roads is governed by a sign posted speed limit of 50km/hr, with 40km/h school zone speed restrictions applying between 8:00am – 9:30am and 2:30pm – 4:00pm during school days.

5.2 Existing Traffic Volumes

In order to obtain an indication of the existing performance of the adjoining public road network immediately adjacent to the site, peak hour morning and afternoon weekday traffic surveys were undertaken at both Ridgecrop Drive junctions with Gilbert Road. These surveys were undertaken on 19th and 28th of May 2018 between 7:00am – 9:00am and 2:00pm – 4:00pm to coincide with the starting and finishing periods of the primary school. **Figure 3** overleaf illustrates the surveyed peak hour (7.45am – 8.45am and 3.00pm – 4.00pm) traffic flows at the surveyed intersections, whilst full details are available upon request.

It is noted that there are some minor net gains and losses between intersections associated with private development access locations, parking / unparking manoeuvres and differing survey days.

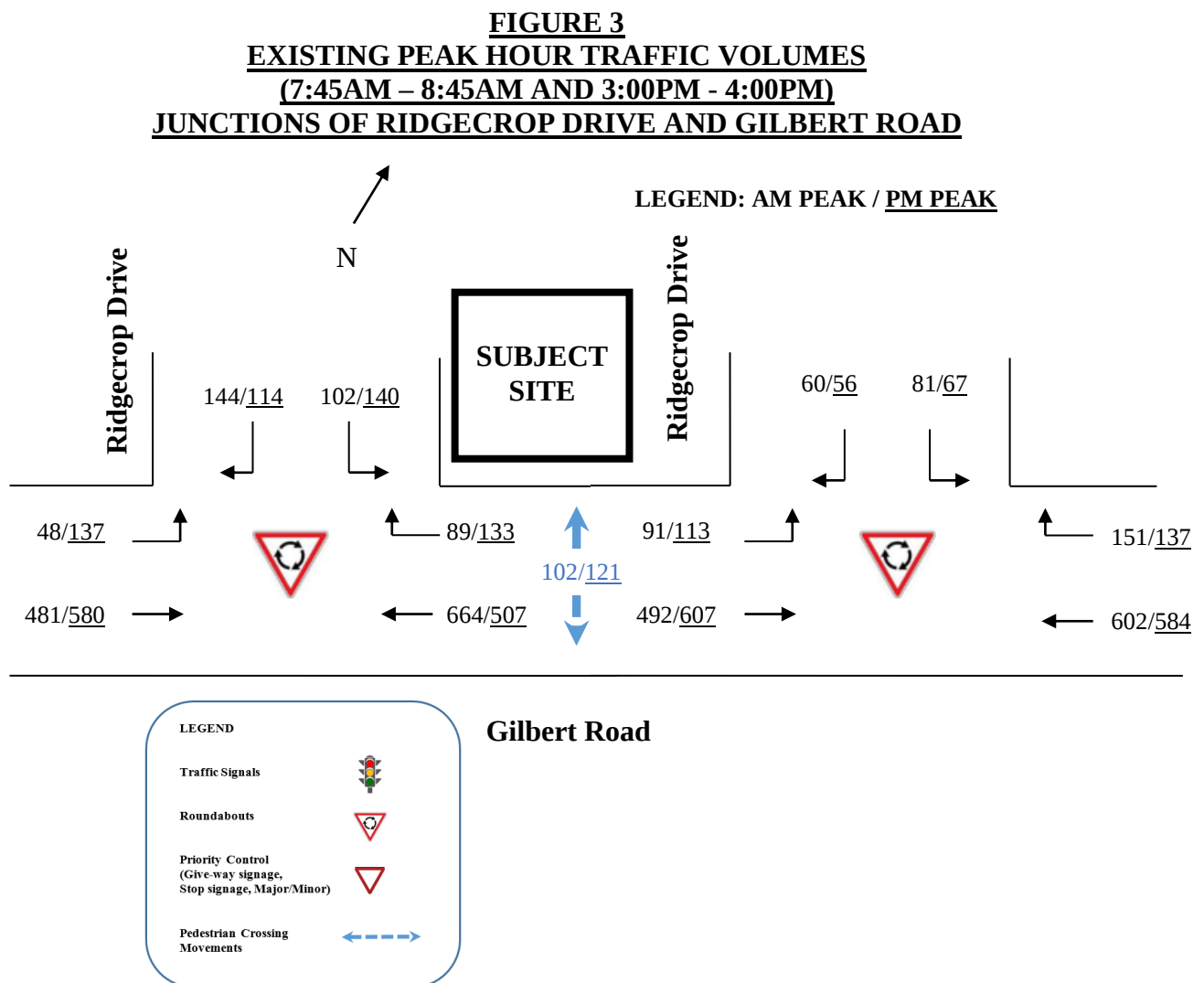


Figure 3 indicates the following:

- Gilbert Road accommodates bidirectional traffic flows of between 1,200 – 1,400 vehicles per hour during peak periods;
- Through traffic flows within Gilbert Road is identified to be tidal with westbound movements dominating during the morning peak and eastbound movements dominating during the afternoon peak;
- Ridgescrop Drive accommodates two-way traffic demands in the order of between 150 – 300 vehicles per hour during peak periods; and
- The signalised pedestrian crossing to the immediate north of the southernmost junction of Gilbert Road and Ridgescrop Drive.

In addition to the above, it is noted from our observations that heavy vehicle movements, primarily associated with buses, within the abovementioned intersections were found to be negligible (between 0 – 1% of the total peak hour flows reflected in **Figure 3**) during the survey periods, which is reflective of the predominantly residential character of the surrounding land use and general local (non-arterial) functional order of the surrounding road hierarchy as well as the light traffic flow thoroughfare within Gilbert Road (i.e. Gilbert Road is signposted with a vehicle weight restriction of 8t).

5.3 Existing Road Network Operations

In order to objectively assess the existing efficiency of the surveyed intersection during peak school traffic periods, a SIDRA analysis has been undertaken. SIDRA is a computerised traffic arrangement program which, when volume and geometrical configurations of a network of intersections are imputed, provides an objective assessment of the operation efficiency under varying types of control (i.e. signs, signal and roundabouts). Key indicators of SIDRA include level of service where results are placed on a continuum from A to F, with A providing the greatest intersection efficiency and therefore being the most desirable by the Roads and Maritime Services.

SIDRA uses detailed analytical traffic models coupled with an iterative approximation method to provide estimates of the abovementioned key indicators of capacity and performance statistics. Other key indicators provided by SIDRA are average vehicle delay, the number of stops per hour and the degree of saturation. Degree of saturation is the ratio of the arrival rate of vehicles to the capacity of the approach. Degree of saturation is a useful and professionally accepted measure of intersection performance.

SIDRA provides analysis of the operating conditions that can be compared to the performance criteria set out in **Table 1** (being the RMS NSW method of calculation of Level of Service).

TABLE 1		
LEVELS OF SERVICE CRITERIA FOR INTERSECTION		
Level of Service	Average Delay per Vehicle (secs/veh)	Expected Delay
SIGNALISED INTERSECTIONS AND ROUNDABOUTS		
A	Less than 14	Little or no delay
B	15 to 28	Minimal delay and spare capacity
C	29 to 42	Satisfactory delays with spare capacity
D	43 to 56	Satisfactory by near capacity
E	57 to 70	At capacity, incidents will cause excessive delays
F	> 70	Extreme delay, unsatisfactory
GIVE WAY & STOP SIGNS		
A	Less than 14	Good
B	15 to 28	Acceptable delays and spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Near capacity
E	57 to 70	At capacity and requires other control mode
F	> 70	Unsatisfactory and requires other control mode

The existing conditions have been modelled utilising the peak hour traffic volumes presented within **Figure 3**. **Table 2** provides a summary of the SIDRA output data whilst full details are available upon request.

TABLE 2 SIDRA OUTPUT – EXISTING WEEKDAY PEAK HOUR INTERSECTION PERFORMANCE		
Intersection	AM	PM
Gilbert Road & Ridgescrop Drive (southernmost junction)		
Delay	9.0	42.8
Degree of Saturation	0.79	1.05
Level of Service	A	D
Gilbert Road & Ridgescrop Drive (northernmost junction)		
Delay	8.7	8.7
Degree of Saturation	0.55	0.55
Level of Service	A	A

The level of service (LoS) presented within **Table 2** above reflects the intersection approach with the highest delay in accordance with Clause 4.2.2 of Roads and Maritime Services' (RMS) *Guide to Traffic Generating Developments* for roundabout and priority controlled intersections.

Table 2 indicates that the surveyed intersections generally operate with a level of service 'A' during peak school starting and finishing periods representing good conditions, with the exception of the southernmost intersection of Gilbert Road and Ridgescrop Drive during the afternoon peak period, which is assessed to provide a level of service 'D'. A level of service 'D' represents satisfactory operational performance, with capacity to accommodate additional traffic demand, based on RMS classifications.

The abovementioned SIDRA output is generally consistent with numerous inspections undertaken by staff of this Practice of the surrounding road network immediately adjacent to the site in recent times. It is also noted from our observations that the influx of traffic demand associated with the school is concentrated over a 15 – 30 minute window. As such, any inconvenience on other motorists, caused by this school traffic was observed to be generally a temporary event.

5.4 Pedestrian Infrastructure and Volumes

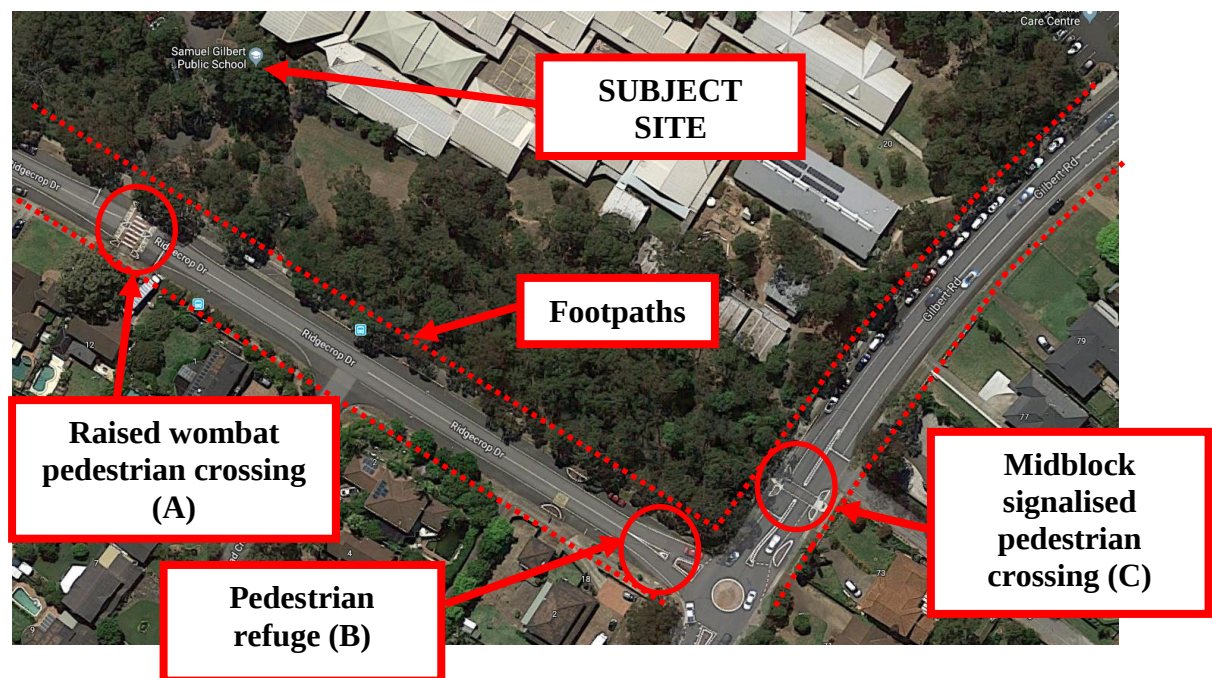
Pedestrians are supported with the following infrastructure in the vicinity of the subject site:

- Footpaths are provided along both sides of Gilbert Road and Ridgescrop Drive;
- A midblock pedestrian crossing is provided within Gilbert Road approximately 20m to the north of its southernmost roundabout junction with Ridgescrop Drive;

- A pedestrian refuge is provided within the splitter island of the western approach of the southernmost junction of Gilbert Road and Ridgescrop Drive; and
- A raised wombat pedestrian crossing is provided across Ridgescrop Drive, approximately 50m west of its easternmost junction with Galahad Crescent.

The abovementioned existing pedestrian infrastructure are graphically depicted in **Figure 4** below.

FIGURE 4
PUBLIC PEDESTRIAN INFRASTRUCTURE
IMMEDIATE ADJACENT TO THE SUBJECT SITE



Surveys of the pedestrian crossing movements over the crossing facilities denoted as A, B and C in **Figure 4** were undertaken by staff of this Practice in conjunction with the previously presented vehicle volume surveys during school start and finish periods on the 28th of May and 31st of July, 2018. **Table 3** provides a summary of the existing pedestrian crossing movements whilst full details are available upon request.

TABLE 3 PEDESTRIAN MOVEMENTS COINCIDING WITH START AND FINISH PERIODS OF THE SCHOOL						
Crossing Facility	AM (Peds/Hr)			PM (Peds/Hr)		
	Adults	Children	Total	Adults	Children	Total
Raised wombat crossing (A)	21	30	51	19	22	42
Pedestrian refuge within splitter island (B)	33	41	74	40	41	81
Midblock pedestrian crossing (C)	47	55	102	57	64	121
Total	101	126	227	116	127	244

It is noted from **Table 3** that the pedestrian activity across Ridgescrop Drive during peak school start and finish periods is much higher within the refuge (B) than the formal wombat crossing (A). The Roads and Maritime Services' supplement to AS1742.10-2009 (Version 2.4) specify the following with regards to the provision of a pedestrian (zebra) crossing primarily servicing a school site:

Reduced Warrant for sites used predominantly by children and by aged or impaired pedestrians.

If the crossing is used predominantly by school children, is not suitable site for a Children's Crossing and in two counts of one hour duration immediately before and after school hours:-

- (a) $P \geq 30$
AND
(b) $V \geq 200$

A pedestrian (Zebra) crossing may be installed.

Based on the above guidelines, the surveyed pedestrian traffic within the refuge across Ridgescrop Drive presented within **Table 3**, meets the warrant for consideration to be given to the implementation of a formal pedestrian crossing within that section of the public road to better service pedestrian movements associated with the school, in a safe and efficient manner. Such a recommended measure is subject to further assessment by Council's traffic committee.

In addition to the above, it is noted that none of the abovementioned pedestrian crossings are supervised by a qualified traffic warden, although the formal wombat crossing (A) has been observed to be controlled by what appears to be a teacher/staff from the school. However, from our observations, this teacher/staff is not provided with the appropriate equipment required under WH&S and Australian Standard regulations (e.g. high visibility vest, 'Stop/Go' bat, etc.) to safely supervise this crossing. This issue is subject to further investigation by Council and school.

5.5 Parking Arrangements and Conditions

The following provides a summary of the existing on-street public parking facilities in the immediate vicinity of the site:

- Gilbert Road for the length of the eastern property boundary provides unrestricted parallel parking along the western side of the road adjacent to the school and 'No-Stopping School Days' parking restrictions along the eastern side of the road between 8:00am – 9:00am and 2:30pm – 3:30pm;
- Gilbert Road between its southernmost junction with Ridgescrop Drive and its service road approximately 250m to the south of this junction, generally provides unrestricted parallel parking along both sides of the road; and

- Ridgescrop Drive generally accommodates unrestricted parallel parking along both sides of the road, with the exception of a bus zone and an indented 'Kiss and Ride' facility signposted 'No-Stopping School Days' between 8:00am – 9:00am, along the northern side of the road adjacent to the southern property boundary.

Recent observations have found that whilst on-street parking are somewhat notable during peak starting and finishing times of the school, primarily associated with parents/guardians dropping-off/picking up their children and some staff parking, the on-street parking demand outside of these peak periods have been observed to be considerably lower. It is further understood following discussions with Council's Road Safety Officer that student pick-up/drop-off activity within the indented 'Kiss and Ride' facility during peak school start/finish periods, have in recent history resulted in queuing extending onto the eastbound Ridgescrop Drive carriageway, which has caused impedance on the through traffic flow. Such conditions have drawn complaints from affected residents to Council, which is understood to have led to the 'shutdown' of the indented 'Kiss and Ride' bay during the afternoon peak period coinciding with the finishing time of the school, as a means to minimise congestion and improve the efficiency of through traffic flow within Ridgescrop Drive, immediately adjacent to the site.

Despite the implementation of the abovementioned measure, recent inspections have indicated that the facility is still being used in the afternoon peak period for student pick-up/drop-off processes, although the queues generated were observed to be wholly contained within the 'Kiss and Ride' bay, with no spill over onto the through traffic flow. In any case, it is further understood that discussions between Council and the Deputy Principal of the school are currently on-going with a view to also 'shutdown' the use of the indented 'Kiss and Ride' bay for the morning peak period, coinciding with the starting time of the school.

5.6 Public Transport (Public Bus & School Bus)

The closest bus stops are located along both sides of Ridgescrop Drive, approximately central to the southern property alignment. Further, bus stops are provided along both sides of Gilbert Road, approximately 50m to the north of the site, in the immediate vicinity of Knightsbridge Shopping Centre. These bus stops service the following public and school bus routes within close walking distance to the site:

Public Services

Hillbus operates the following services:

- Route 603 – Operates between Parramatta and Rouse Hill via Glenhaven; and
- Route 652X – Operates between Wynyard and Knightsbridge.

Based on the latest timetables obtained from Transport for NSW website, Route 603 provides two (2) services during the morning peak school start period (7.45am – 8.45am) and one (1) service during the afternoon peak school finish period (3.00pm – 4.00pm), with such services operating on 15 – 30 minute frequencies. Route 652X provides one (1) service during these peak school periods.

School Services

Following recent consultation with bus operators and the school, it is understood that two (2) buses currently service the school coinciding with its starting and finishing times, as follows:

- Route 2550 – Operates between Samuel Gilbert Public School and Castle Hill; and
- Route 3610 – Operates between Samuel Gilbert Public School and Old Northern Road after Glenhaven Road.

From recent inspections, these buses were observed to be underutilised, with only a limited number of students (approximately 30 students) using these services.

The staggering of the abovementioned bus services is such that at no time were buses observed to queue back out of the sign posted zones such that no unreasonable impedance on adjoining through traffic flow occurred.

6. **PROJECTED TRAFFIC CONDITIONS**

6.1 **Traffic Generation and Trip Assignment**

The subject development is projected to generate additional traffic demand to and from the site associated with the increase in school population from 780 to 1,000 students and from 45 to 58 staff. In order to estimate this additional traffic generating potential, the following factors and assumptions are considered:

Students

- Based on the surveyed data concerned with journeys to and from the school adopted by students presented in the previous section of this report, the following outcomes can be derived, with respect to the non-car forms of travel:
 - Walk Trips: **Table 3** indicated that the existing pedestrian facilities were surveyed to generate up to 127 walk trips by children, which is approximately 16% of the total current student population.
 - Bus Trips: Approximately 30 students were observed to use buses to travel, which is representative of approximately 4% of the total current student population.
- Based on the surveyed adult and children pedestrian movements reflected in **Table 3**, a sibling rate of approximately 1 adult to 1.25 children can be derived (101 adults/126 children). In this regard, each private parent vehicle is assumed to transport 1.2 students to and from the site (1/sibling rate).
- Assuming that the school demographics presented in the above two (2) dot points do not alter, following the expansion of the school, the increase of 220 students is estimated to generate the following additional traffic:
 - Walk Trips: 36 additional pedestrian movements (220 x 16%).
 - Bus Trips: The existing school buses can be expected to accommodate nine (9) additional students (220 x 4%).
 - Private Vehicle Trips: The subject development is anticipated to generate an additional 148 trips to and from the site (220 x 80%/1.2), which is assumed to be evenly split between inbound and outbound trips.

Staff

- It is understood from discussions with school staff that employees primarily travel to and from site by private vehicles. In this regard, assuming each of the 13 staff travel to and from the site independently by private vehicle, up to 13 inbound movements can be expected for the morning peak period and 13 outbound trips can be expected for the afternoon peak period.

Table 4 overleaf provides a summary of the traffic generating ability of the subject based on the above discussion.

TABLE 4 SUMMARY OF ADDITIONAL PRIVATE VEHICLE TRIPS ASSOCIATED WITH THE SUBJECT PROPOSAL						
	AM PEAK			PM PEAK		
	Parent Vehicles	Staff Vehicles	Total	Parent Vehicles	Staff Vehicles	Total
Inbound	74	13	87	74	0	74
Outbound	74	0	74	74	13	87
Total	148	13	161	148	13	161

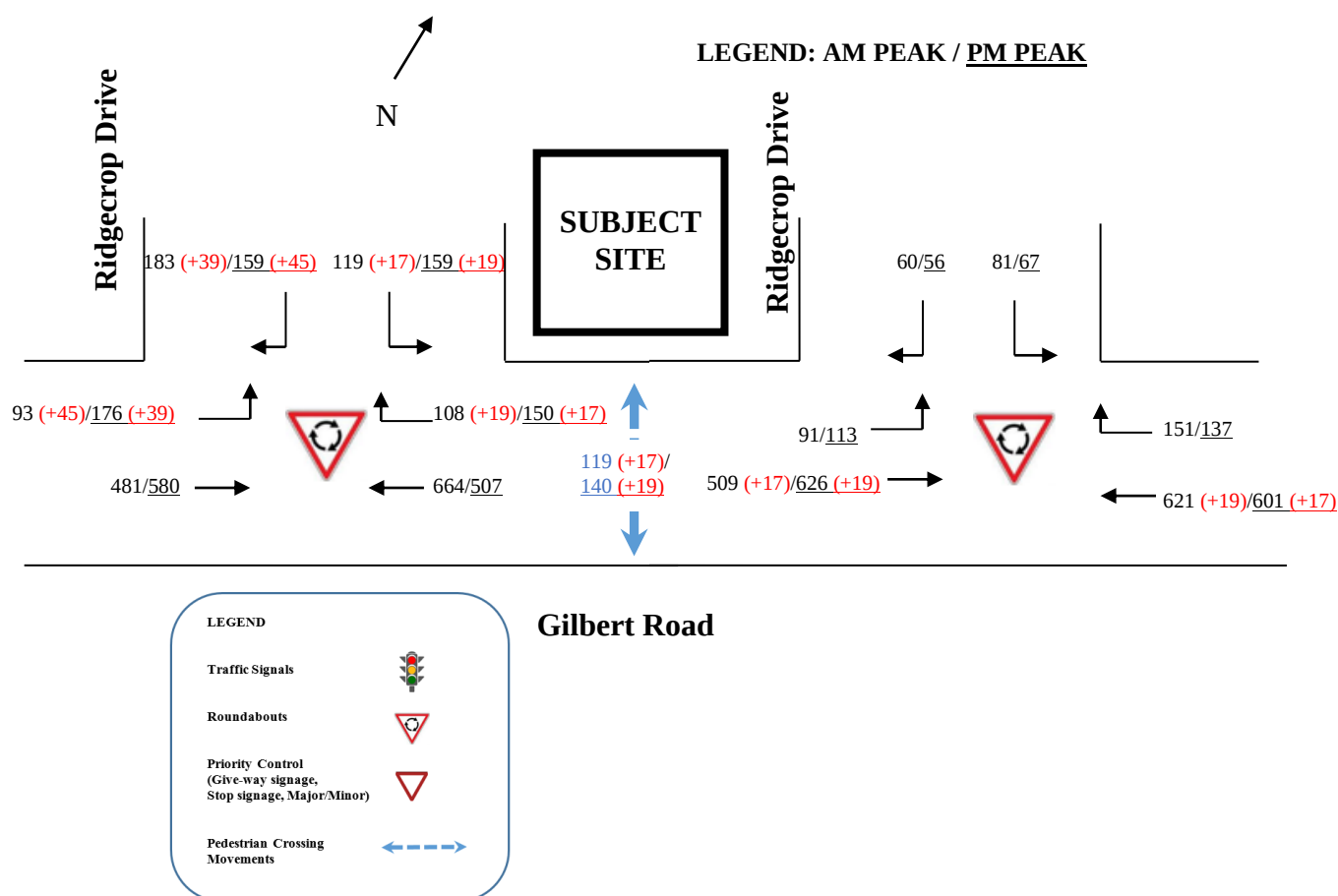
In order to gauge the impact of the traffic projected to be generated by the proposal, it is necessary to determine the impact on surrounding route and intersection efficiency. The objective of this section is to distribute the traffic generated by the proposed development along the major approach routes before it dissipates throughout the general road network.

It is rarely possible to precisely forecast the route that motorists will elect to utilise. Perceived traffic safety, traffic efficiency and individual preferences are all variables that will influence the traffic route selected by motorists. Nevertheless, it is common to assume that trips to the subject site will be distributed in accordance with existing traffic patterns and alterations currently observed in the surrounding road network.

With regards to the above, the post-development traffic volumes diagrammatically presented in **Figure 5** overleaf incorporates the additional traffic (in red) generated by the proposed development, which have been assigned, based on the existing surrounding traffic distributions illustrated within **Figure 3**.

Further, up to 25% of the total additional traffic is assumed to originate from the northwest via Ridgescrop Drive with the remaining 75% originating from the southeast via Gilbert Road.

FIGURE 5
PROJECTED WEEKDAY PEAK HOUR TRAFFIC VOLUMES
(7:45AM – 8:45AM AND 3:00PM - 4:00PM)
JUNCTIONS OF RIDGECROP DRIVE AND GILBERT ROAD



6.2 Projected Traffic Impacts

6.2.1 Intersection Network Performance

Utilising the projected traffic volumes presented within **Figure 5** associated with the school population increase, the surveyed intersections of Gilbert Road and Samuel Gilbert Drive have been remodelled using SIDRA to determine the post-development impact on traffic safety and efficiency due to the altered traffic characteristics. A summary of the most pertinent results are indicated within **Table 5** overleaf whilst full details are available if required.

Table 5 overleaf indicates that the modelled intersection level of service is projected to predominantly remain unaltered with the additional traffic generated by the subject proposal, with the exception of the southernmost Gilbert Road junction with Ridgescrop Drive, which is anticipated to reduce from a level of service 'D' to 'E' during the afternoon peak school finish period. Such a level service indicates that the intersection is projected to operate at capacity. Recent enquiries made with Council have indicated that the projected intensification of the site use does not warrant the provision of additional road infrastructure.

It is worthwhile noting that the population increase associated with subject proposal is expected to occur incrementally (i.e. staged) over time in the future. As such, by the time the school reaches its ultimate student population of 1,000 students and 58 staff, it is anticipated that the sustainable travel initiatives detailed within the Green Travel Plan (GTP) provided in the subsequent section of this report, should be implemented to assist with reducing private vehicle usage and therefore traffic impacts on the adjoining road network.

TABLE 5 SIDRA NETWORK MODELLING ANALYSIS PROJECTED PEAK HOUR INTERSECTION PERFORMANCE				
Intersection	Existing Conditions		Projected Conditions	
	AM Peak	PM Peak	AM Peak	PM Peak
Gilbert Road & Ridgescrop Drive (southernmost junction)				
Delay	9.0	42.4	10.3	69.5
Degree of Saturation	0.79	1.05	0.86	1.11
Level of Service	A	D	A	E
Gilbert Road & Ridgescrop Drive (northernmost junction)				
Delay	8.7	8.7	8.8	10.2
Degree of Saturation	0.55	0.55	0.56	0.17
Level of Service	A	A	A	A

6.2.2 Set-down / Pick-Up Activity and Staff Parking Considerations

It has been previously presented that the proposed development is forecasted to generate a short term parking requirement of an additional 74 vehicles associated with student pick-ups/drop-offs and 13 vehicles corresponding to long term staff parking. Whilst, this projected increase in short and long-term parking demand is expected result in greater on-street parking, the proposed future expansion of the shopping centre parking area is expected to alleviate some of the future impact on the on-street parking facilities.

Further, it is recommended that consideration be given by the school to implement an Operational Traffic & Pedestrian Management Plan (OTPMP), prepared in the Section 8 of this report to govern the use of the on and off-site parking areas during peak school starting and finishing periods. The purpose of an OTPMP is to govern the implementation of the proposed altered parking arrangements and also to improve the safety and efficiency with which students are set-down / picked-up by private vehicles. The OTPMP addresses issues which are considered vital to the safety of school students as well as to the sound site and public road management as they relate to traffic and pedestrian safety. The OTPMP should also be used in conjunction with the GTP to minimise parking impacts on the surrounding road network.

6.2.3 Public Transport

The additional students projected to use buses is not of sufficient size to have any measurable impact to the existing public transport services.

7. GREEN TRAVEL PLAN (GTP)

7.1 Introduction

Transport is an unavoidable factor in modern society and a major contributor to emissions in Australia. However, the effects of transport associated with new developments can be managed through the implementation of travel plans, which provide an opportunity to reduce harmful greenhouse gases. In conjunction with striving to provide more efficient environmental outcomes, providing a range of travel choices with a focus on walking, cycling and public transport will result in major public health advantages to the Samuel Gilbert Public School and the surrounding precinct.

This Green Travel Plan (GTP) is intended to assist with ensuring that the transport infrastructure, services and policies within and outside the site are tailored to the future site users, being coordinated to achieve sustainable outcomes.

7.2 Green Travel Plan Definition

This Green Travel Plan provides a series of measures aimed at promoting and encouraging sustainable travel and reducing reliance on the private car. The aim of the Plan is to achieve travel behaviour change through raising awareness of alternatives to private motor vehicle use. The development of a site based Plan focuses on providing information, offering incentives and mode specific actions to optimise the use of sustainable travel (public transport, cycling and walking).

This Green Travel Plan specifically examines how future site users can travel to and from the site and what can be done to replace single occupancy motor vehicle trips with sustainable trips. As a trip generator, the site can enhance the choices available to residents in a way that promotes health, safety and environmentally sustainable outcomes.

The potential to change site based travel is affected by several factors including car parking provision, the provision of car share schemes, site user interest in changing, the provision of support for change and the availability of various forms of public transport in the immediate vicinity.

7.3 Green Travel Plan Benefits and Objectives

This Green Travel Plan provides a wide range of benefits to residents, the community and the environment including:

- Decreasing greenhouse gas emissions;
- Promoting the subject site and surrounding area as an innovative and environmentally aware location;
- Improving health and fitness of site users through increased cycling and walking activity;
- Improving site user moral and social interaction;

- Reducing traffic congestion and car parking problems;
- Fostering a sense of community; and
- Reducing general living expenses.

The main objectives of this Green Travel Plan are to:

- Reduce vehicle kilometres travelled (VKT) to and from the subject site, particularly single occupancy vehicle trips;
- Increase site user use of sustainable transport modes (walking, cycling and public transport);
- Ensure that site users are informed on the opportunities and benefits of using sustainable transport; and
- Promote the subject site and area as an innovative and environmentally aware location.

7.4 Mode Shift Initiatives

The close proximity of the site to a wide range of sustainable transport options (e.g. buses and walk trips) should be better capitalised to minimise dependence on private motor vehicles.

The following sub-sections provide a summary of these measures to promote sustainable transport for the subject development. The measures are to be in place from the initial occupancy of the development as people will establish lasting habits from this time.

7.4.1 Promote Cycling (for staff)

- Display cycling maps and fact sheets on the benefits of cycling to staff through school noticeboards, flyers, emails and other forms of communication;
- Encourage surrounding bicycle groups to advertise cycle skills training and bicycle maintenance workshops within school noticeboards; and
- Promote events such as Ride to Work Day, Bike Week etc. to encourage greater cycling trips.

7.4.2 Promote Walking (for staff and students)

- Display walking maps and fact sheets on the benefits of walking cycling to staff through school noticeboards, flyers, emails and other forms of communication; and

- Promote programs with incentives that encourage staff and students to walk to and from the school (e.g. walk to school competition with reward for top performers, etc.).

7.4.3 Promote Public Transport (for staff and students)

- Display route maps and timetables of bus routes with stops within 10 minutes walking distance of the site through school noticeboards, flyers, emails and other forms of communication.
- Provision of Opal cards for all new and existing students and staff.

7.4.4 Promote Car Pooling (for staff and students)

- Display a fact sheet on the benefits of carpooling on the benefits of walking cycling to staff through school noticeboards, flyers, emails and other forms of communication; and
- Promote programs with incentives that encourage staff and students to car pool (e.g. Travel cost reimbursements for car pooled staff).

7.5 Monitoring

A Green Travel Plan is a dynamic document which will change over time depending on the environment and circumstances of the subject development. Accordingly, monitoring, evaluating and reviewing the Plan is important as it will guide ongoing efforts to reduce vehicle kilometres travelled and encourage the use of sustainable transport.

Monitoring and evaluation is an ongoing process which involves fine tuning. There is no standard methodology for the monitoring of a Green Travel Plan however, generally speaking, students and staff should be regularly surveyed as to their travel behaviour to ascertain the areas in which the Travel Plan is successful and those which require altered or improved initiatives.

It is important to understand people's reasons for travelling the way they do, any barriers to changing their behaviour and their propensity to change. This will enable the most effective initiatives to be identified, and conversely less effective initiatives to be modified or replaced to ensure the best outcomes are achieved.

It will be necessary to provide feedback to students and staff to ensure that they can see the benefits of sustainable transport. It is proposed that this occur through the provision of survey results within the school community noticeboards and other communication channels.

8. INTERNAL OPERATIONAL TRAFFIC & PEDESTRIAN MANAGEMENT PLAN

In order to ensure safe and efficient school operations during peak start and finish periods, it is recommended that an Operational Traffic & Pedestrian Management Plan (OTPMP) be implemented. The following subsections of this report provide a summary of the key strategies which should be incorporated within the Plan, the requirement for which could be reasonably imposed by Council as a condition of Development Consent.

8.1 Operational Traffic & Pedestrian Management

8.1.1 General Items

- A Management & Safety Committee is to be established to implement the operational traffic and pedestrian management measures incorporated within this Plan and to develop further guidelines in order to ensure that on-site and off-site vehicular and pedestrian safety is maximised.

The Committee shall comprise the school principal or his / her senior representative, a parent's representative as well as an independent traffic consultant to provide initial assistance in the implementation of the Plan and subsequent periodic guidance in ongoing review of the Plan.

- The Management & Safety Committee shall ensure that the procedures contained within the OPTM are put in place with respect to: on and off-site traffic and pedestrian management and safety issues.
- The Committee shall put in place measures which should ensure parent / guardian compliance with the Plan. These should take the form of specific instructions via student newsletters and indications that such instructions are to be observed as may be applicable to any private property and could therefore form part of the initial enrolment procedures.
- The Plan should also be subject to periodic review by the school (in consultation with Council for endorsement), to ensure that road safety issues as they relate to the public roads close the school, are appropriately documented and implemented in accordance with sound traffic engineering and road safety practices.

8.1.2 Internal Staff Parking

- Staff parking is to occur within the designated internal parking area on site.
- Staff who wish to utilise the site parking facilities are to arrive prior to 8.00am and exit after 3.30pm on school days to minimise the interaction of this vehicle movements with the peak student set-down / pick-up periods during school start and finish periods.

9. CONSTRUCTION ISSUES

9.1 Introductory Statement

This Section of the report constitutes a preliminary Construction Traffic Management Plan (CTMP) addressing the traffic access and safety issues associated with construction works relating to the proposed development in response to DPE's SEARs comments under the *Traffic and Accessibility* section (SSD 9274). There is currently no construction activity observed in the immediate vicinity of the site associated with adjoining land uses. In this regard, the assessment contained in this draft CTMP is limited to the school site only.

CTMPs are generally prepared at Construction Certificate stage following the commissioning of a builder thereby allowing a greater appreciation of the likely construction methodology and therefore the required traffic management measures to be implemented.

The terms of the initiatives contained within the following subsections of this report are therefore somewhat generic and some modifications may be needed by or on behalf of the successful builder / civil contractor at Construction Certificate stage depending on their feasibility taking into consideration all project requirements.

9.2 Proposed Works and Traffic Management

The construction works are likely to be undertaken over a number of separate construction stages/phases to be confirmed with the future successful builder / civil contractor to be appointed.

It is noted that the scale of the buildings on site is such that there may be a requirement for construction vehicle activity to be accommodated within the adjoining public road network, which would necessitate a works zone to be implemented. The implementation of any proposed works zones will also necessitate an application being submitted to Council for a Works Permit, including the provision of appropriate application fees and charges.

All areas of demolition / construction during the various stages including the construction compounds are to be fenced such that there will be no unreasonable interaction between the construction activities and the surrounding public roads.

Any potential occupation of the public roadway, associated with the provision of works zones may require the preparation of traffic control plan/s (TCP) to be prepared by the relevant contractor and submitted to Council for approval, prior to such works being undertaken. Any traffic control management measures detailed within such plan(s) to be implemented are to be sensitive to the surrounding land uses. Further, all traffic management measures included within the plan/s are to be certified on the drawings as being in accordance with AS1742.3 and the Roads & Maritime Services' *Traffic Control at Work Sites* manual.

9.3 Safe Ingress and Egress of Construction Traffic

During all stages of demolition / construction, all construction vehicles will enter and exit the site and/or works zone in a forward direction via an existing / proposed driveway. Reversing manoeuvres to and from the site will be prohibited, unless specific approval is granted by The Hills Shire Council.

Site access and egress manoeuvres may be controlled by appropriately qualified traffic controllers to ensure that all such movements are undertaken in a safe and efficient manner. Traffic controllers are not to stop traffic on the public street to allow construction vehicles to enter or leave the site. They must wait until a suitable gap in traffic flow allows them to assist construction vehicles to enter or exit the site. The Roads Act does not give any special treatment for trucks leaving a construction site – the vehicles already on the road have right of way.

The timing of access / egress by construction traffic will be sensitive to the surrounding land uses and traffic flow demands. In this regard, construction vehicle ingress and egress movements are to be minimised where possible during road network and school peak periods (7.00am – 9.30am and 2.30pm – 6.00pm).

With regards to pedestrian and cycling access during construction, this is to be confirmed with the future successful builder / civil contractor to be appointed.

9.4 Construction Vehicle Transport Routes

The frontage roads provide good connectivity to surrounding regional and arterial routes servicing the Sydney metropolitan area thereby indicating that construction vehicles are able to access and depart the site creating very little disturbance to surrounding local road traffic flow. The multiple directional traffic lanes of the approach and departure routes are such that heavy vehicle manoeuvring is able to occur without any unreasonable encroachment on opposing travel lanes, kerbs and / or parking lanes. None of the abovementioned roads are light thoroughfares or are restricted by load limits.

9.5 Parking Control

Construction worker / tradesperson vehicles, construction vehicles and emergency vehicles are expected to be parked within the off-street parking area at the south-western corner of the site, accessible via the existing access driveway.

In order to minimise the demand for parking associated with construction workers and thus the impact of the works on surrounding precinct amenity and parking provision, it is recommended that construction workers / tradespersons be encouraged to do either of the following when travelling to the site:

- Utilise public transport to the site (the site is well serviced by bus routes); and / or
- Car pool with other construction workers.

The above transport options are to be made available to site workers and as such form part of any site induction process. Details of induction scheduling and procedures are contained within the Occupational Health & Safety, Safe Work Method Statement and Induction Record Forms prepared by others are submitted as part of the Construction Certificate application.

9.6 Construction Traffic Generation

Construction materials are to be transported to and from the site and /or works zone by vehicles up to and including Heavy Rigid Vehicles (HRVs). It is understood based on the experience of this Practice that the traffic generation associated with construction activities are likely to be less than the development at full operation. As such, the potential construction traffic generated can be accommodated without any unreasonable impacts on adjoining road network (i.e. the most affected road network intersections due to construction vehicle traffic activity is expected to be Gilbert Road junctions with Ridgescrop Drive). During periods of more heavy construction vehicle generation (i.e. a concrete pour), drivers are to be instructed by radio when to arrive at the site to ensure that there is no vehicle queuing or parking within the adjoining road network. This is to be strictly adhered to.

9.7 Traffic Impact

The recent traffic investigations of the adjoining road network and the analysis contained within previous sections of this report have indicated that motorists are provided with a reasonable level of service within the immediately adjoining public road network. It is therefore considered that the limited traffic generation associated with the construction activities can be accommodated without any unreasonable impacts on adjoining vehicle movements considering the previously mentioned maximum hourly traffic generation. Notwithstanding this, it has accordingly been recommended that construction vehicle movements to and from the site be avoided where possible during road network peak periods (7.00am – 9.30am and 2.30pm – 6.00pm).

9.8 Impacts on Pedestrians

It has previously been presented that all internal construction zones are to be fenced to prevent pedestrian access. Pedestrians are to be protected from dust and debris by full perimeter scaffolding around the staged construction compounds, combined with chain wire mesh and shade cloth.

Qualified traffic controllers are to assist all site access movements during vehicular ingress and egress. In addition, the reduction and / or elimination vehicular movements during peak commuter periods (when pedestrian movements within the adjoining road network are at their greatest) will limit the impact of the construction works on pedestrian accessibility and safety.

10. CONCLUSIONS

This report details our assessment of the traffic, access and safety considerations associated with proposed alterations and additions to Samuel Gilbert Public School, located at Lot 1 in DP 719671, Ridgescrop Drive, Castle Hill. Having regard to the contents of this report, the following conclusions are now made:

- The application is expected to result in an increase in the school population from 780 to 1,000 students and from 45 to 58 staff;
- The existing access arrangements and off-street car parking provision are proposed to remain unaltered as part of the subject proposal;
- The surrounding road network (intersections of Gilbert Road and Ridgescrop Drive) is assessed to currently operate with a predominantly good level of service 'A' during peak school start/finish periods, with the exception of the southernmost junction, which is assessed to operate with a level of service 'D' during the afternoon peak period coinciding with the finishing time of the school. A level of service still represents satisfactory operations based on RMS guidelines;
- The school has been projected to generate an additional 171 peak hour vehicle trips to and from the site during school start and finish periods;
- The remodelled SIDRA output generally indicates no changes to the existing level of service due to the additional traffic generated by the subject proposal, with the exception of the southernmost junction of Gilbert Road and Ridgescrop Drive, which is expected to reduce from its current level of service 'D' to 'E', signifying that the intersection is at capacity; and
- Implementation of an OTPM in conjunction with the GTP is anticipated to assist with ensuring that the additional traffic generating potential of the proposed school expansion will not result in any unreasonable impacts on the surrounding road network and improve the overall efficiency & safety of the internal roads servicing the school during peak school start and finish periods.

Based on the contents contained within this report, there are no parking and traffic related issues associated with the proposed development which would prevent this Practice from recommending the proposal for approval by the Department of Planning and Environment.