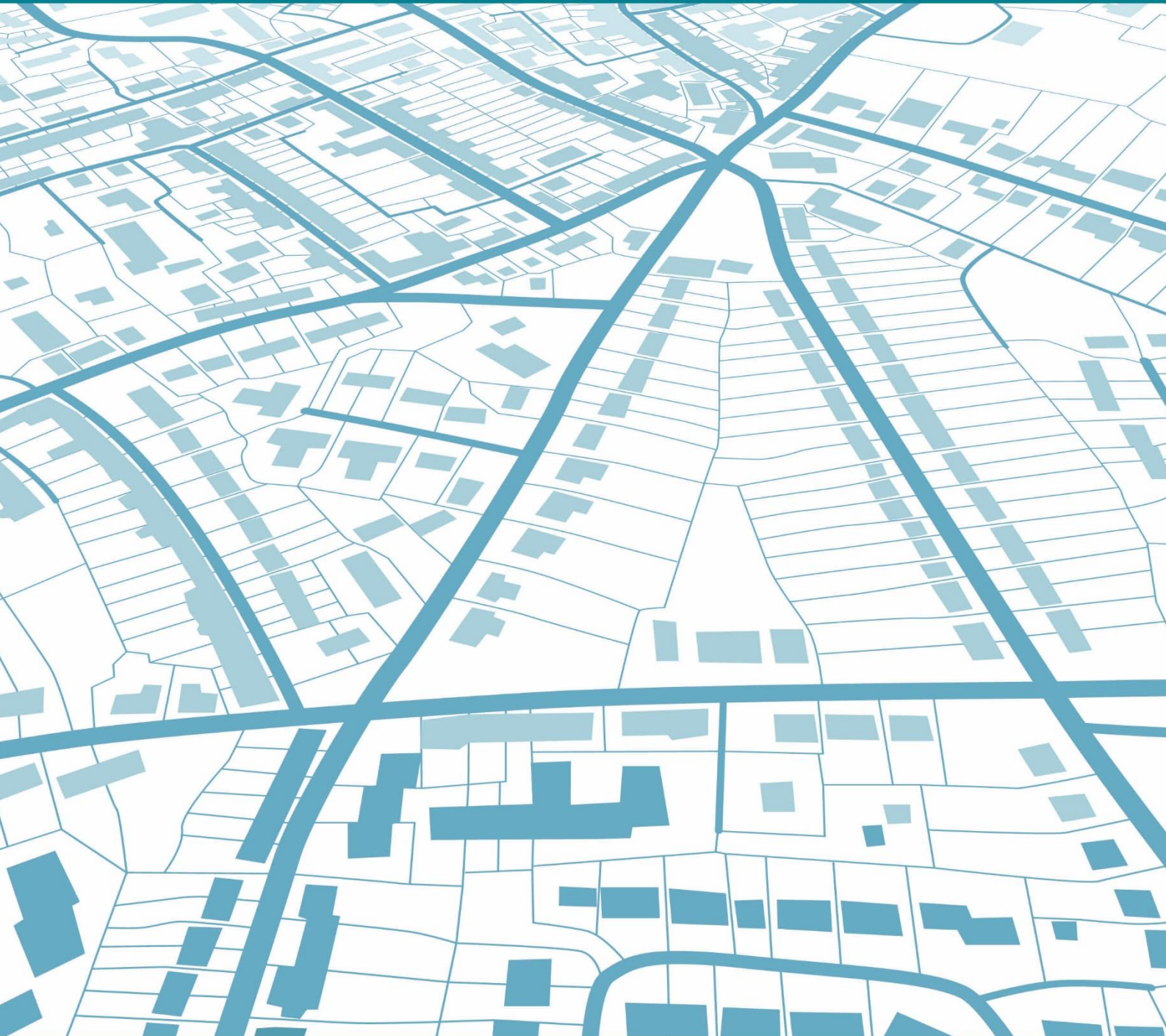




Kent Road Public School, Marsfield Proposed School Expansion

Traffic and Transport Impact Assessment

Ref: 17238

Date: November 2018

Issue: H

Table of Contents

1.0	INTRODUCTION	4
2.0	PROPOSED DEVELOPMENT	10
2.1	Site, Context, and Existing Use	10
2.2	Proposed Development	11
3.0	ROAD NETWORK, TRAFFIC CONDITIONS & TRANSPORT	12
3.1	Road Network.....	12
3.2	Traffic Controls	13
3.3	Traffic Conditions	13
3.4	Transport Services	15
3.5	Pedestrian and Cycle	16
3.6	Future Transport Services	18
4.0	TRAVEL PLANNING	20
4.1	Parking Demand.....	20
4.2	Travel Mode	20
5.0	PARKING	22
5.1	Car Parking	22
5.2	Bicycle Parking.....	22
6.0	TRAFFIC IMPLICATIONS.....	24
6.1	Traffic Generation.....	24
6.2	Traffic Impact.....	27
6.3	Sustainable Transport Impact.....	28
6.4	Crime Prevention through Environmental Design (CPTED)	29
6.5	Set Down and Pick-up.....	30
7.0	PARKING AND ACCESS, INTERNAL CIRCULATION AND SERVICING.....	34
7.1	Parking and Access.....	34
7.2	Internal Circulation	34
7.3	Servicing	34
7.4	Emergency Vehicles.....	35
8.0	CONSTRUCTION TRAFFIC MANAGEMENT PLAN.....	36

8.1	Construction Process	36
8.2	Spoil Management	37
8.3	Construction Vehicle Route	37
8.4	Construction related Vehicle Movements	37
8.5	Bus Movements.....	38
8.6	Pedestrian Movements.....	38
8.7	Cyclist Movements	38
8.8	Works Zone/Road Closure	38
8.9	Cranage and Materials Handling	38
8.10	Site Induction.....	39
8.11	Traffic Control Plans	39
8.12	Road Serviceability.....	39
8.13	Cumulative Impacts	39
8.14	Emergency Vehicle Access.....	40
9.0	GREEN TRAVEL PLAN.....	41
9.1	Objectives	41
9.2	Process	42
9.3	Management Team	42
9.4	Existing Travel Circumstance	42
9.5	Targets	43
9.6	Supplementary Transport Programs	44
9.7	Monitoring & Management of Travel Plan	45
9.8	Monitoring Milestones	46
9.9	Evaluation of Targets	47
10.0	CONSULTATION PROCESS.....	49
11.0	CONCLUSION	50

List of Figures

Figure 1	Location
Figure 2	Site
Figure 3	Road Network
Figure 4	Traffic Control
Figure 5	Modelled Network
Figure 6	Truck Routes

List of Appendices

Appendix A	Architectural Plans
Appendix B	Traffic Survey Results
Appendix C	SIDRA Model Results
Appendix D	Proposed Intersection Upgrades and ECRL Bus Routes
Appendix E	City of Ryde Bicycle Strategy 2014
Appendix F	Parking Survey Results
Appendix G	Turning Path Assessment
Appendix H	Transport Access Guide
Appendix I	Consultation Process

1.0 Introduction

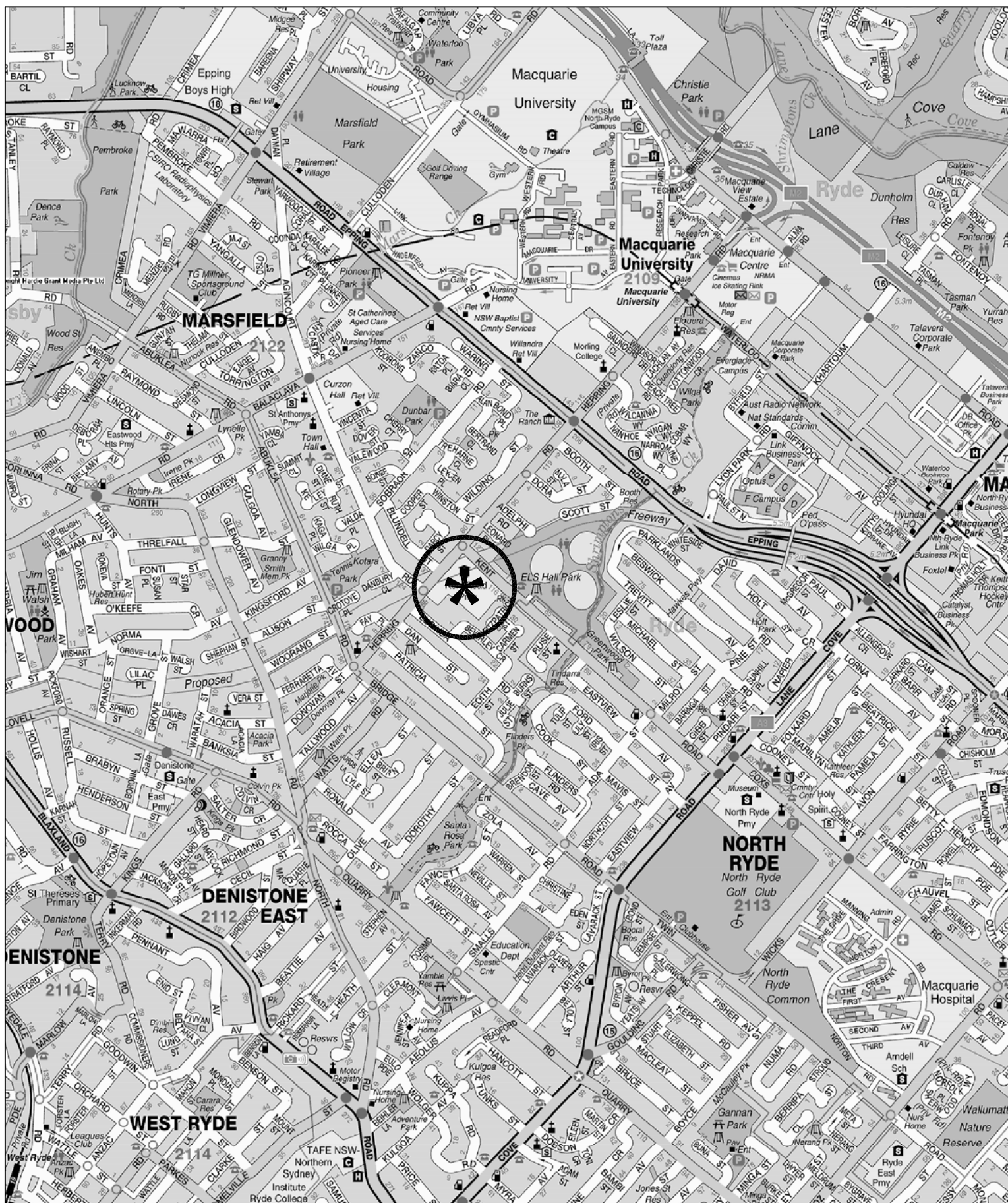
This report has been prepared to accompany a State Significant Development Application (SSDA) to the Department of Planning and Environment for the proposed redevelopment of the Kent Road Public School located at the corner of Herring Road and Kent Road in Marsfield (Figure 1).

Kent Road Public School ('School') has an existing educational facility on the campus which has a current enrolment capacity of 750 students (Kindergarten to Year 6). The existing school classrooms, administration, amenities as well as the multi-purpose hall are spread across the site together with demountable buildings currently established throughout the campus accommodating classroom needs. There are also opening playing fields located on the north and eastern parts and a tennis court which is located centrally within the campus.

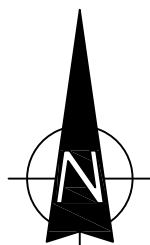
It is proposed to redevelop the School to increase its enrolment capacity from 750 to 1,000 students. In association with this objective are the construction of new permanent buildings to accommodate 34 home bases, canteen and an administration and staff ,facilities. Upon completion of construction, all demountables will be removed.

In response to a request to provide the Secretary's Environmental Assessment Requirements (SEARs), the Department of Planning and Environment has issued a comprehensive list of the SEARs.

Matters in relation to Condition 7. Transport and Accessibility and the associated report sections are provided in the following table:



LEGEND



LOCATION

FIG 1

No.	SEARS Details	Section
1	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 3.3, 3.4, 3.5, 3.6, 4.2 and 6.1
2	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	Sections 4.2 and 6.1
3	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 6.3 and 6.4
4	Measures to integrate the development with the existing/future public transport network	Section 9.0
5	The impact of trips generated by the development on nearby intersections, including the key intersections: Kent Road/Herring Road, Herring Road/Epping Road, Kent Road/Lane Cove Road, and Herring Road/Agincourt Road (traffic modelling is to be undertaken using SIDRA network modelling for current and future years)	Sections 3.3 and 6.2
6	Consideration of the cumulative impacts from other approved developments in the vicinity, and the need for, and details of, upgrades of road improvement works, if required	Section 6.2
7	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 the affected intersections, additional school bus routes along bus capable roads (i.e., minimum 3.5m wide travel lanes), additional bus stops or bus bays	Sections 6.2 and 6.3
8	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 and the provision of facilities to increase the non-car mode share for travel to and from the site	Section 9.0
9	The future pedestrian and cyclist desire lines, the proposed walking and cycling access arrangements consistent with City of Ryde Bicycle Strategy and connections to public transport services	Sections 3.5 and 9.0
10	The proposed access arrangements, including car and bus,	Sections 2.2,

No.	SEARS Details	Section
	pick-up and drop-off facilities including consideration of internal pick-up and drop-off zones, 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	3.5 and 9.0
11	A review of road geometry, along Herring Road, Kent Road and any other roads used for pick-up and drop-off, with consideration of the existing and future on-street parking environment and bus movements	Sections 2.2 and 6.5
12	Proposed bicycle parking provision, including the end of trip facilities, in secure, convenient, accessible areas close to main entries incorporating lighting and passive surveillance	Section 5.2
13	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 5.1
14	An assessment of the cumulative on-street parking impacts of cars and bus pick-up and drop-off, staff parking and any other parking demands associated with the development	Sections 4.1, 6.1 and 6.5
15	An assessment of road and pedestrian safety adjacent to the proposed development which considers children crossing Herring Road and Kent Road to access the School and the details of required road safety measures and personal safety in line with CPTED	Section 6.4
16	Emergency vehicle access, service vehicle access, delivery, and loading arrangements and estimated service vehicle movements (including swept path analysis of largest vehicle, vehicle type and the likely arrival and departure times)	Sections 7.3 and 7.4
17	The preparation of a preliminary Construction Traffic and Pedestrian 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	Section 8.0

No.	SEARS Details	Section
	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.	

In addition to the above, the assessment also has regard for the additional RMS comments and the SEARs requirements outlined below.

No.	SEARS Details	Section
1	Daily and peak traffic movements likely to be generated by the proposed development including the impact on nearby intersections and the need/associated funding for upgrading or road improvement works (if required). The key intersections to be examined/modelled include: - Kent Road/Herring Road, - Herring Road/ Epping Road, - Kent Road/Lane Cove Road, and - Herring Road/Agincourt Road.	Sections 3.3, 4.2, 6.1 and 6.2
2	Details of the proposed accesses and the parking provisions associated with the proposed development including compliance with the requirements of the relevant Australian Standards (i.e., turn paths, sight distance requirements, aisle widths, etc.).	Sections 7 and Appendix G
3	Proposed number of car parking spaces and compliance with the appropriate parking codes.	Sections 5.1 and 7
4	Details of service vehicle movements (including vehicle type and likely arrival and departure times).	Section 7.3
5	Roads and Maritime requires the EA report to assess the implications of the proposed development for non-car travel modes (including public transport use, walking, and cycling); the potential for implementing a location-specific sustainable travel plan (e.g.; Green Travel Plan, 'Travelsmart' or other travel behaviour change initiative); and the provision of facilities to increase the non-car mode share for travel to and from the site. This will entail an assessment of the accessibility of the development site by public transport.	Sections 3.3 and 6.2
6	To ensure that the above requirements are fully addressed; Roads and Maritime requests that a Traffic Management and Accessibility Plan (TMAP) be undertaken for the proposed redevelop the existing Kent Road Public School to properly ascertain the cumulative regional traffic impacts associated with development. The TMAP process provides an	Section 6.2

No.	SEARS Details	Section
	opportunity to identify a package of traffic and transport infrastructure measures required to support future development. Regional and local intersection and road improvements, vehicular access options for adjoining sites, public transport needs, the timing and cost of infrastructure works and the identification of funding responsibilities associated with the development should be identified.	
7	Roads and Maritime requires an assessment of the likely toxicity levels of loads transported on arterial and local roads to/from the site and, consequently, the preparation of an incident management strategy for crashes involving such loads, if relevant.	Section 8.16
8	Roads and Maritime will require in due course the provision of a traffic management plan for all demolition/construction activities, detailing vehicle routes, a number of trucks, hours of operation, access arrangements and traffic control measures.	Section 8

The report has also been prepared to address the additional comments from City of Ryde's Response to the Request for SEARs for Kent Road Public School Redevelopment, 126 Kent Road, Marsfield (SSD 9344). Council's comments and the associated report sections are provided in the following table:

No.	SEARS Details	Section
1	Existing parking utilisation surveys on streets within 400m radius of the site on a typical weekday between 8 am and 9.30am and 2.30pm and 4 pm.	Section 4.1
2	To investigate a one-way internal road option to provide on-site pick-up/drop-off facilities	Section 6.5
3	Compliance with the parking requirements contained in the City of Ryde DCP 9.3 Parking Controls	Section 5.1
4	Reduction of existing car parking spaces for TAFE due to the proposed school buildings and proposed location of reallocated TAFE car parking spaces	Not applicable
5	Include swept path diagrams of a largest vehicle showing forward in and forward out movements	Appendix G

The purpose of this report is to:

Transport and Traffic Planning Associates

- ❖ describe the site, the existing School and the proposed redevelopment scheme
- ❖ describe the existing road network and traffic conditions
- ❖ assess the existing mode distribution
- ❖ assess the existing parking arrangements
- ❖ assess the adequacy of the existing set down and pick-up arrangement
- ❖ assess the potential traffic implications due to the increased student enrolment and staff increases
- ❖ assess the suitability of the proposed visitor/disabled parking, vehicle access, internal circulation, and servicing arrangements
- ❖ assess the adequacy of potential construction traffic implications
- ❖ recommend, as necessary, appropriate traffic management measures to mitigate any potential traffic issues

2.0 Proposed Development

2.1 Site, Context, and Existing Use

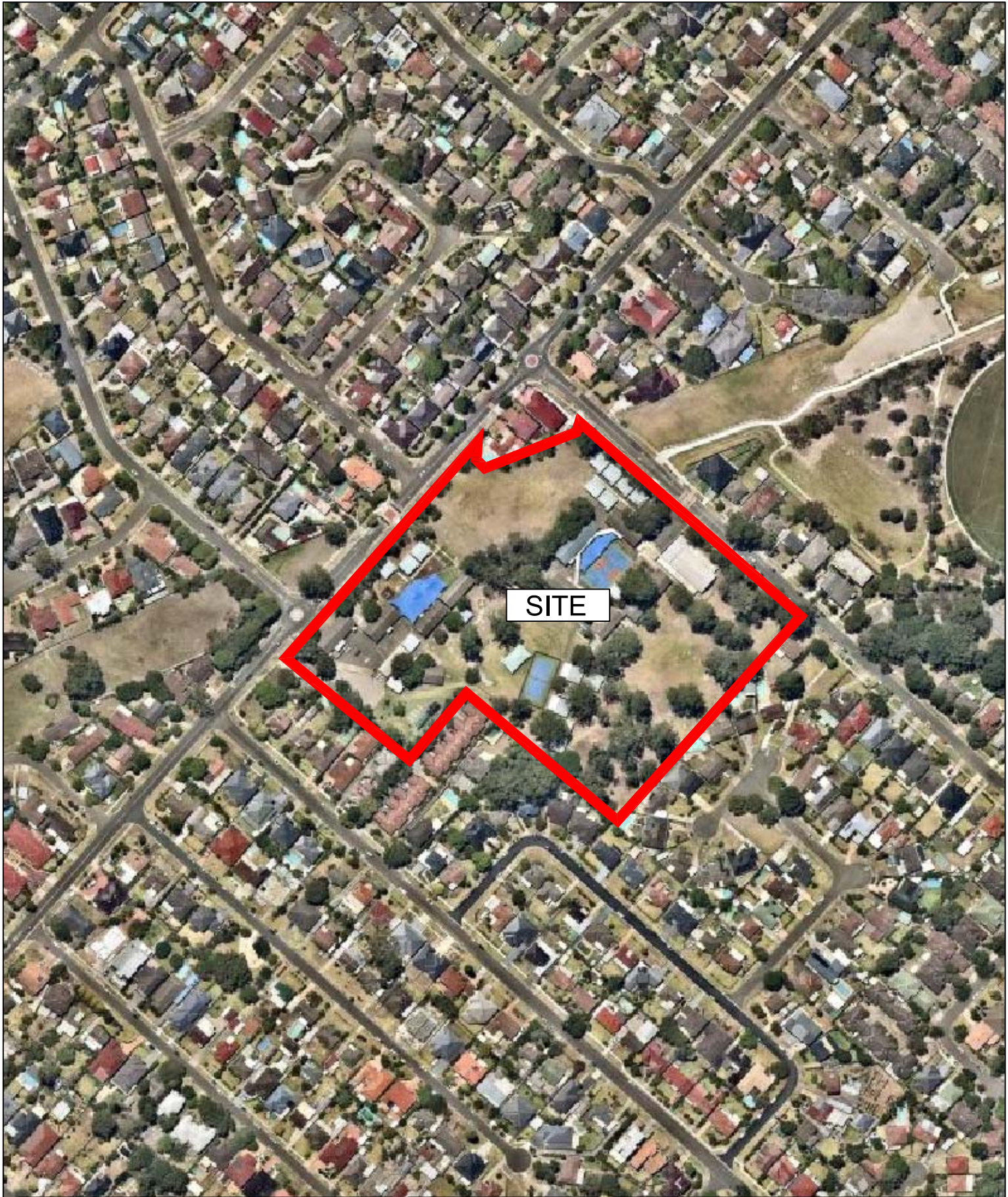
The School site (Figure 2) comprising 8 lots at 126 Kent Road, Marsfield occupies a large landholding bounded by Kent Road to the east and Herring Road to the west and is burdened by a road widening and alignment easement which runs in a generally east-west orientation along the northern part of the site.

The site is located in a predominantly low-density residential precinct while surrounding notable land uses include:

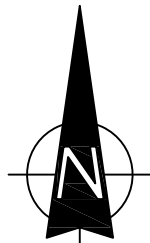
- ❖ the ELS Hall Park and Ryde Community Sports Centre just to the east
- ❖ the vast Macquarie University campus just to the north-east along Herring Road
- ❖ the Macquarie Business Park just to the north
- ❖ the North Ryde Golf Club further to the east

The existing School on the site has a current enrolment of 750 students and 58 full-time equivalent (FTE) staff. The existing administration and amenities buildings, as well as the multi-purpose hall, are generally concentrated on the eastern part fronting Kent Road while there are groups of demountable buildings currently established throughout the campus to accommodate the School's overall classroom needs. There is also open play space located on the north and eastern parts as well as a tennis court which is located centrally within the campus.

Student accesses (by foot) to/from the School campus are provided on the frontages, one at Kent Street and two at Herring Road. The School has a dedicated set down/pick-up area (SD/PU) along the Kent Road frontage capable of accommodating some 8 cars (47m) as well as the bus stops along Kent Road and Herring Road.



LEGEND



SITE

FIG 2

The staff car park on Kent Road will be relocated to the existing unformed car park at the western end of the site which is accessed off Herring Road with a boom gate control.

2.2 Proposed Development

The proposal is for current student enrolment capacity to be increased from 750 to 1,000 students with commensurate FTE staffing increase from 58 to approximately 75. It is proposed to redevelop the School to increase its enrolment capacity from 750 to 1,000 students. The School also proposes to remove the existing demountable buildings and redevelop the site to construct new permanent buildings to accommodate 34 home bases, canteen and administration and staff facilities.

The existing SD/PU arrangements along Kent Road will be extended to provide a minimum of 10 spaces by converting the existing unrestricted parking along Kent Road to No Parking zone during school days. A new at-grade car park to be provided as early works (under a separate approval pathway), will maintain the existing car parking spaces as well as the temporary loading bay.

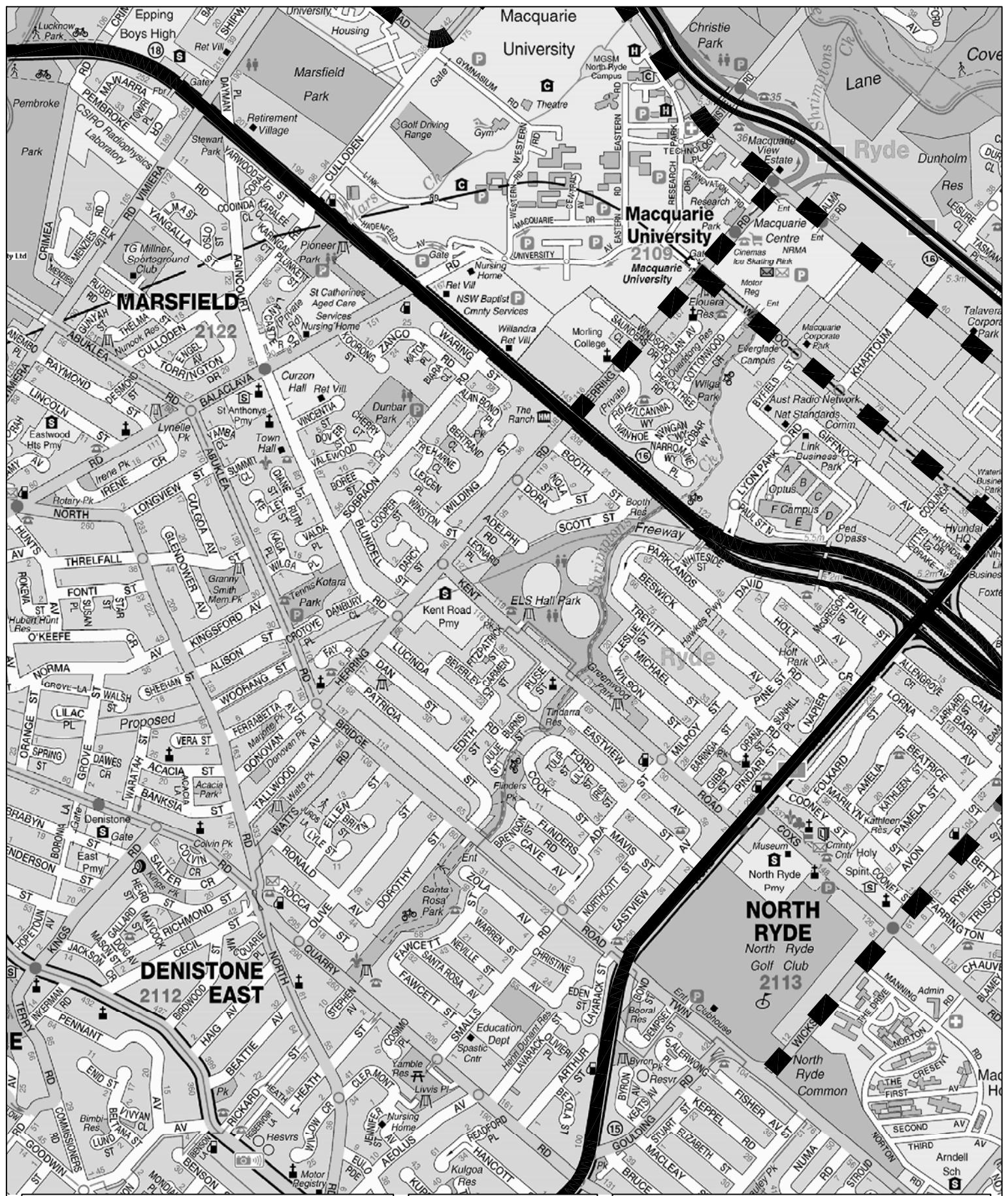
Details of the proposed redevelopment outcome are shown in the plans prepared by Gardner Wetherill Architects and Butler & Co Architects and are reproduced in part in Appendix A.

3.0 Road Network, Traffic Conditions & Transport

3.1 Road Network

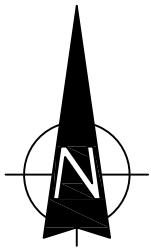
The existing road network serving the site (Figure 3) comprises:

- ❖ *M2 Motorway* – a privately operated arterial route which extends between North Ryde and Seven Hills. On-load ramps (westbound) are provided from Lane Cove Road and Talavera Road/Herring Road and has three lanes in each direction and sign posted speed limit of 100km/h in the vicinity of Herring Road on/off loading ramps.
- ❖ *Epping Road* – a State Road and a primary east-west arterial route linking between Lane Cove and Epping. It has three lanes in each direction in the vicinity of the site and a posted speed limit of 70 km/h.
- ❖ *Lane Cove Road* – a State Road and a primary north-south arterial route extending between Mona Vale and Hurstville. It has three lanes in each direction in the vicinity of the site and a speed limit of 70 km/h.
- ❖ the series of collector road routes serving Marsfield and Macquarie Park precincts including North Road, Herring Road, Balaclava Road, and Bridge Road as well as the minor collector system of Agincourt Road, Abuklea Road, and Kent Road
- ❖ the series of local road system servicing the site including Donovan Street, Woorang Street, and Blundell Street
- ❖ Kent Road and Herring Road near the site frontages are generally straight and some 8.5m wide.



LEGEND

- ARTERIAL**
- SUB-ARTERIAL**
- COLLECTOR**



ROAD NETWORK

FIG 3

3.2 Traffic Controls

The existing traffic controls which serve the site (Figure 4) include:

- ❖ the traffic signals along Lane Cove Road, including the intersections with Kent Road, Coxs Road, and Bridge Road
- ❖ the traffic signals along Herring Road at the Epping Road, Waterloo Road and M2 on/off ramps intersections
- ❖ the roundabout controls along Herring Road at the Kent Road, Agincourt Road, Bridge Street, and Dora Street intersections
- ❖ the 50 km/h speed restrictions along Herring Road and Kent Road and the School Zone speed restrictions during school hours
- ❖ the full-time NO STANDING and CLEARWAY restrictions along the Lane Cove Road route
- ❖ the School Period Kiss & Ride restriction along Kent Road
- ❖ the marked foot crossings on Kent Road and Herring Road near the School access points

3.3 Traffic Conditions

An indication of traffic conditions in the vicinity of the precinct is provided by data published by RMS and surveys undertaken as part of this study.

The data published by RMS is expressed in terms of Annual Average Daily Traffic (AADT), and details are provided in the following:

	AADT
Lane Cove Road, south of Twin Road	55,669

As required by the SEARs, turning movement volumes at the following intersections are surveyed during a typical weekday school peak periods for the purpose of this assessment (Appendix B):

Kent Road and Herring Road
Herring Road and Agincourt Road
Epping Road and Herring Road
Lane Cove Road and Kent Road

The peak hour and daily traffic volumes (by applying a peak-to-daily ratio of 8% for arterial roads and 10% for local roads to the peak hour traffic volumes) in the vicinity of the site are provided in the following:

	Peak Hour	Daily
Kent Road, southeast of Herring Road	377	3,770
Herring Road, southwest of Kent Road	1,011	10,110
Agincourt Road, northwest of Herring Road	378	3,780
Epping Road, southeast of Epping Road	3,750	46,875
Lane Cove Road, northeast of Kent Road	4,124	51,550

A review of the traffic data shows that the peak hours along Epping Road and Herring Road occur between 7.30am and 8.30am and between 4.30pm and 5.30pm during AM and PM peak periods respectively.

Noting the proposed operating hours of the School, the School's peak hours occur during the following school peak periods and are used for the traffic impact assessment:

AM Peak: 7:45am-8:45am
PM Peak: 3pm-4pm

The existing operating circumstances during the School's peak hours of the above intersections are assessed using lane-based network traffic modelling program SIDRA 8.0 and an extract of the modelled traffic network is provided in Figure 5. Details of the SIDRA model results are provided in Appendix C and summarised in the following while a guide to interpreting SIDRA results is also provided overleaf.

Criteria for Interpreting Results of SIDRA Analysis

1. Level of Service (LOS)

LOS	Traffic Signals and Roundabouts	Give Way and Stop Signs
'A'	Good	Good
'B'	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
'C'	Satisfactory	Satisfactory but accident study required
'D'	Operating near capacity	Near capacity and Accident Study required
'E'	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity and requires other control mode
'F'	Unsatisfactory and requires additional capacity	Unsatisfactory and requires other control mode

2. Average Vehicle Delay (AVD)

The AVD provides a measure of the operational performance of an intersection as indicated on the table below, which relates AVD to LOS. The AVD's listed in the table should be taken as a guide only as longer delays could be tolerated in some locations (ie inner city conditions) and on some roads (ie minor side street intersecting with a major arterial route).

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabouts	Give Way and Stop Signs
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity and requires other control mode

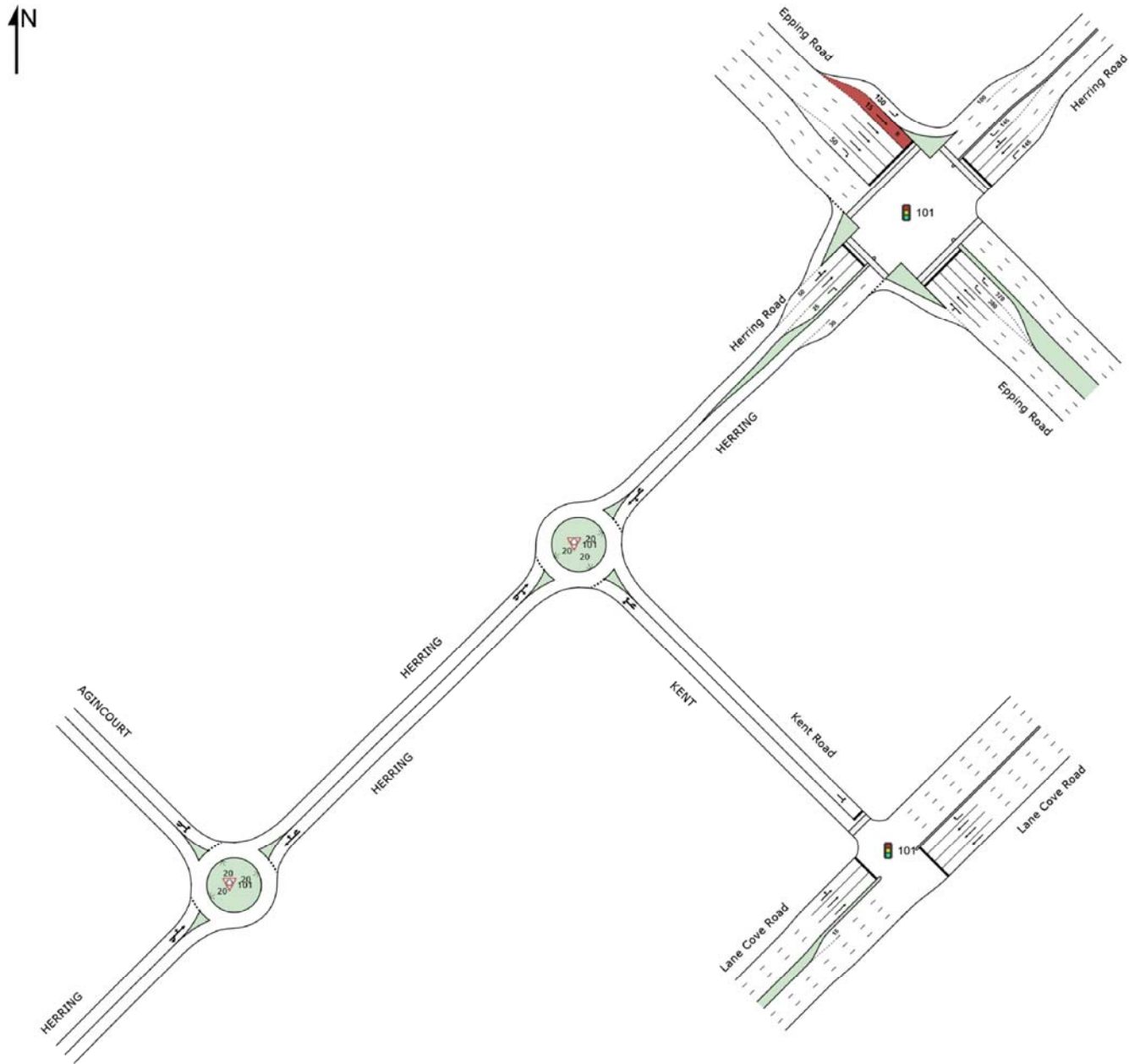
3. Degree of Saturation (DS)

The DS is another measure of the operational performance of individual intersections.

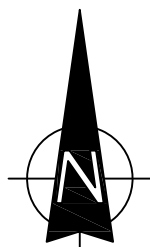
For intersections controlled by **traffic signals**¹ both queue length and delay increase rapidly as DS approaches 1, and it is usual to attempt to keep DS to less than 0.9. Values of DS in the order of 0.7 generally represent satisfactory intersection operation. When DS exceeds 0.9 queues can be anticipated.

For intersections controlled by a **roundabout or GIVE WAY or STOP signs**, satisfactory intersection operation is indicated by a DS of 0.8 or less.

¹ the values of DS for intersections under traffic signal control are only valid for cycle length of 120 secs



LEGEND



**MODELLED
NETWORK**

FIG 5

	AM			PM		
	AVD	LOS	DS	AVD	LOS	DS
Kent/Herring	6.2s	A	0.58	6.2s	A	0.49
Herring/Agincourt	5.5s	A	0.51	5.6s	A	0.49
Epping/Herring	79.7s	F	1.09	52.2s	D	0.96
Lane Cove/Kent	19.0s	B	0.83	13.1s	A	0.77

It is apparent, based on the above assessment outcome, that the local traffic network which serves the School currently operates quite satisfactorily and it is also evident that whilst the road system is dominated by the arterial traffic flows on Epping and Lane Cove Roads the local and collector system is operating with good levels of service. And this is due in part to the efficient SCATs operation which dynamically assigns green-phase to the peak travel directions.

Noting that the intersection of Epping Road/Herring Road is operating at LOS F during the AM peak hour, parents/carers/staff arriving from the north-west region would naturally utilise Vimiera Road/Culloden Road/Agincourt Road to access Herring Road/Kent Road. Similarly, they will utilise the same routes on departure to avoid the congestion at the Epping Road/Herring Road intersection.

3.4 Transport Services

Marsfield benefits from direct connectivity with the comprehensive and integrated rail and bus transport services provided in the Macquarie Park and North Ryde area. These services offer connections to a number of urban centres. Sydney Buses is the dominant operator with services operating through Macquarie Park via the bus interchange provided at the Macquarie Shopping Centre complemented by a concentration of routes serving the nearby commercial precinct and education facilities.

The site is near several high-frequency bus routes serviced by Sydney Buses, Metrobus, Forest Coach Lines, Transdev, Macquarie Centre, Biz Park Shuttle, Busways and Hillsbus, the majority of which travel along Waterloo Road.

Rail

Macquarie University Railway Station is also located approximately 1.2km north east of the School and is within a 15-minute walk. The station is serviced by the T1 North Shore line. Commuters travelling from the west can connect to the T1 line at Parramatta. South and south-west commuters can change at Townhall for services to Macquarie University which would take under 35 minutes.

The Macquarie Bus Interchange which is only some 180m from the Macquarie University Railway Station offers connecting bus services to and from the School.

The station provides frequent train services to the wider Sydney rail network.

Bus

The nearest bus stops providing access to the School campus are located at Kent Road and Herring Road just in front of the School.

The School is currently well serviced by the 286, 297, 507 and 518 as well as 286, 288 and 297 prepay bus services along Herring Road and Kent Road respectively, to/from the Macquarie Centre via the main bus interchange which is only some 180m from the Macquarie University Railway Station. From this interchange connecting services to areas as far as Hurstville and Parramatta are readily available.

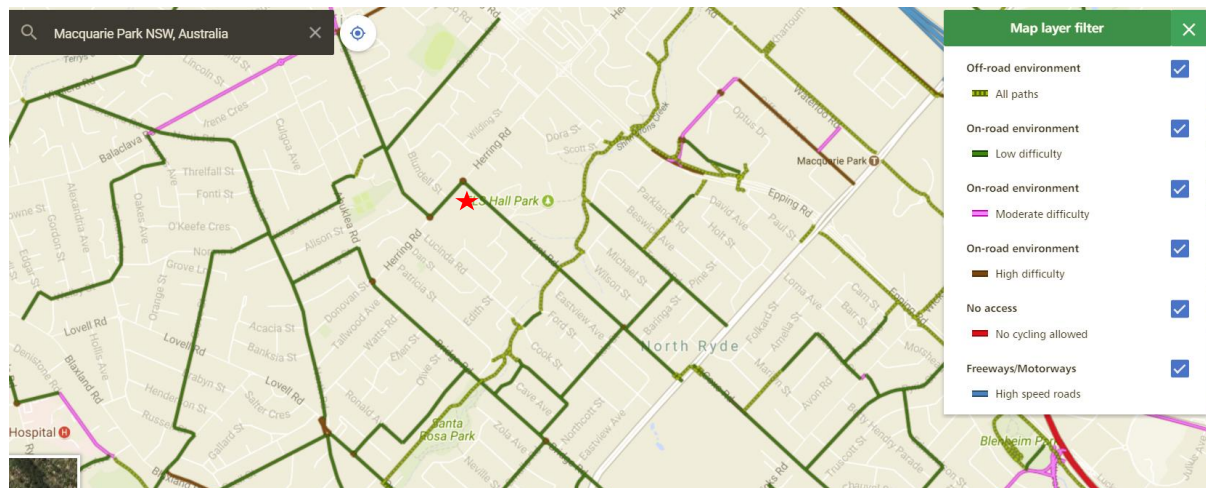
There is a total of 6 bus routes which connect the Macquarie area with Lidcombe, Burwood, Parramatta, Sydney Olympic Wharf, Chatswood, North Ryde, Strathfield Station, as well as the Sydney CBD.

3.5 Pedestrian and Cycle

The locality, being situated within close proximity of tertiary institution and Macquarie Shopping Centre, is afforded with adequate footpaths and connections to land uses and public transport interchange. Controlled pedestrian crossing facilities exist at the signalised intersections of Lane Cove and Kent Roads while pedestrian refuse islands are provided at the Herring Road roundabouts, and there are marked pedestrian crossings at Herring Road near Blundell Street and Kent Road just in front of the School.

The road network in the vicinity of the School forms a part of the Sydney Cycleways and City of Ryde bicycle network. In particular, Kent Road and Herring Road are classed as shared (on-road) cycleways while a dedicated cycleway crosses Kent Road connecting to Macquarie Centre and further afield via Waterloo Road.

Details of this are depicted on the extracted diagram as follows:



The Kent Road and Herring Road cycleways form two of the major regional routes stated in the City of Ryde Bicycle Strategy 2014:

- ❖ Epping to Lane Cove (RR08) via Pembroke Road, Agincourt Road, Herring Road, Kent Road, Coss Road, Cressy Road and Magdala Road.
- ❖ Parramatta to Macquarie (Eastwood to Macquarie Park Active Transport Link (RR12) via Terry Road, Hillview Road, Railway underpass, Rowe Street, Blaxland Road, Edgar Street, Welby Street, County Road corridor, Woorang Street, County Road corridor (Kotara Park), Herring Road, Kent Road, ELS Hall Park paths and Shrimptons Creek Path.

The Council's Bicycle Strategy is provided in Appendix D.

3.6 Future Transport Services

In line with the facilitation of the North West Rail Link works it has been anticipated that the Epping-Chatswood Rail Line (ECRL) will be subject to a 6-8 month long temporary closure and this is envisaged to occur between late 2018 and the first half of 2019. To accommodate the additional demand on existing bus services during this time and following the reopening of the ECRL, RMS has committed to Bus Priority Infrastructure Program¹ which is aimed at improving the reliability and efficiency of existing and future bus services while easing congestion and improving traffic flow for all road users in the area.

It is anticipated that these works would be delivered in the following stages:

Stage 1

During the ECRL closure, a Temporary Transport Plan will be implemented to replace the rail line with additional buses while the planned road and intersection upgrades support the existing buses and improve traffic flow in the area. A number of high-frequency bus services will operate between the Macquarie Park railway stations (including the University Railway Station) and the following stations:

- ❖ Beecroft Station
- ❖ Epping Station
- ❖ Eastwood Station
- ❖ Chatswood Station
- ❖ St Leonards Station

In addition to the above, Stage 1 works will also include adjustments to lanes, medians, traffic islands, traffic lights, footpaths, drainage, utilities, and road pavements. The planned upgrade works are to occur at:

- ❖ the intersection of Herring Road and Epping Road

¹ Macquarie Park Bus Priority and Capacity Improvement Project, AECOM 2017

- ❖ Herring Road (between Waterloo Road and Epping Road)
- ❖ the intersection of Waterloo Road and Herring Road
- ❖ Waterloo Road (between Herring Road and entry to Macquarie Centre)
- ❖ the intersection of Waterloo Road and Lane Cove Road
- ❖ Lane Cove Road (between Waterloo Road and Epping Road)
- ❖ the intersection of Lane Cove Road and Epping Road
- ❖ Lane Cove Road (between Lorna Avenue and Allengrove Crescent)

Stage 2

Once the Sydney Metro opens (and the ECRL reopened) the remainder of the road and intersection upgrades would be carried out. These works would provide long-term improvements and ongoing support for two key corridors, i.e., Parramatta to Macquarie Park via Carlingford and Epping, and Hurstville to Macquarie Park via Burwood. The works will also benefit other bus services operating in the area and provide important upgrades to the road network to reduce congestion and improve access for all road users.

Details of the relevant intersection upgrades and ECRL replacement Bus Service routes are provided in Appendix E.

4.0 Travel Planning

4.1 Parking Demand

There is a total of 32 on-site car parking spaces available in the School campus and a dedicated set down/pick-up area for 8 cars along the Kent Road frontage.

As required by the SEARs, the existing on-street parking circumstances in an area covering up to 400m in radii of the School has been surveyed to identify the occupancy levels of these spaces during the peak school set down/pick-up periods. Similarly, details of the survey are provided in Appendix E while its outcome summarised as follows:

	Capacity	Minimum Vacancy Level	
		AM	PM
Herring Road	6	0	(20)
Kent Road	53	30	28
Lucinda Road	43	17	12
Beverley Crescent	44	20	16
Carmen Street	19	16	16
Fitzpatrick Street	24	11	12
Total	189 spaces	94 spaces	64 spaces

Based on the above, at the busiest AM and PM peaks, there will be at least 94 and 64 spaces available in the surrounding streets respectively. These represent spare capacities of 35-49%. Therefore, it is apparent that there is ample on-street parking available in the convenient vicinity of the School site.

4.2 Travel Mode

An indication of the School's existing mode of travel, i.e., by car, foot or public and active transport is provided by the surveys undertaken as part of this assessment. Details of the survey outcome (Appendix F) which involved collecting reasonable student samples across the morning and afternoon peaks reveal the following distribution:

		Mode Share			
		Kent Road Public School		North Ryde Public School	
		AM	PM	AM	PM
Car (Set Down/Pick-up)					
	1 Passenger	12%	10%	18%	8%
	2 Passenger	16%	18%	26%	17%
	3 Passenger	7%	6%	9%	12%
Total Patronage arriving by Car		35%	34%	55%	37%
Bus (School/public)		27%	5%	8%	5%
Walking		37%	59%	35%	62%
Cycling		2%	2%	3%	3%

The results indicate that most of the students walk to these schools. It is apparent that students are also reliant on set down/pick-up movements by private vehicles. It was observed during the surveys that majority of the set down/pick-up activities occur at the dedicated area along the Kent Road frontage, and there is also a proportion whose parents park their vehicles in the vicinity and walk them to and from the School.

Of particular note is a relatively low bus usage given the high-frequency bus servicing the School. In addition, a very low number of students cycle to/from these schools. This should be considered when developing programs to promote public transport and cycling.

The well-established footpaths, cycleways and public transport network in Marsfield and Macquarie Park present valuable opportunity to manage/reduce private vehicle usage.

5.0 Parking

5.1 Car Parking

The new at-grade parking area will maintain the existing car parking provision of 32 car spaces. Such provision is in accordance with the NSW Department of Education's requirement to promote sustainable development and to minimise parking on-site. In line with the above, the proposed development targets to provide minimal on-site car parking spaces, by retaining the current number of parking spaces within the school.

The above provision is also adequate and appropriate given the development is supported by a range of sustainable transport initiatives including improved access to public bus services and integration with the precinct-wide pedestrian and cycleway network.

A separate upgrade to the on-site car parking area for staff in the western area of the school has been undertaken as part of the Exempt Development under the Education SEPP.

In summary, the provision of 32 car parking spaces for staff remains sufficient with the additional parking demand being accommodated within the on-street parking spaces, consistent with the existing arrangement. It is apparent based on the surveyed outcome that there are ample on-street parking spaces in the convenient vicinity of the School site.

5.2 Bicycle Parking

Given that Herring Road and Kent Road are both classed as shared cycleways and that the wider cycle network is interconnected to the School's frontage roads, opportunities exist for the School to incorporate bicycle parking facilities for students and staff members.

Currently, there are 16 spaces being used for bicycle and scooter parking. The early works proposal will provide an additional 44 bicycle spaces. This equates to a total of 60 bicycle parking spaces, which are located on the western side of the Hall.

The bicycle parking would be designed in accordance with AS 2890.3 Parking facilities – Bicycle Parking Facilities. The bicycle parking is secure, convenient and located with easy access from Kent Road - the site's main entry. This location is in accordance with Safer by Design and Crime Prevention Through Environmental Design (CPTED) principles, including appropriate motion activated lighting.

1 shower/change cubicle is provided for staff in the administration block.

6.0 Traffic Implications

6.1 Traffic Generation

The traffic circumstances at many existing schools in the Metropolitan Area are heavily influenced by the travel mode and set down/pick-up characteristics. In addition to the typical mode of walking to schools (with/without parental escort) the setting down and picking up of school students are generally comprised of a combination of reliance on the:

- ❖ availability of dedicated SD/PU areas
- ❖ availability of on-street parking surrounding the School
- ❖ availability and accessibility to school buses

It is noteworthy that no student will be of driving age at this School (i.e., Year 1 to Year 6).

The existing traffic generation for set down/pick-up activities of the School are indicated by the travel mode survey which was undertaken as part of this study:

Existing Use	Mode Share		Trip Generation ²	
	AM	PM	AM	PM ³
Car (Set Down/Pick-up)				
1 Passenger	12%	10%	180	128
2 Passenger	16%	18%	120	116
3 Passenger	7%	6%	36	26
Total	35%	34%	336	270

Based on the current enrollment of 750 students, the traffic generation derived from the survey outcome indicates the following peak hour rates:

² Two-way traffic

³ With 15% of students participating in after-school extra-curricular activities

- ❖ AM Peak: 0.45 vtpd per student
- ❖ PM Peak: 0.36 vtpd per student

It is noted that the above vehicle 'trip generation' includes both those who are reliant on the dedicated SD/PU facility as well as the surrounding on-street parking.

The projected traffic generation outcome for set down/pick-up activities, on this basis, is estimated as follows:

Future Use	Mode Share		Trip Generation	
	AM	PM	AM	PM
Car (Set Down/Pick-up)				
1 Passenger	12%	10%	240	170
2 Passenger	16%	18%	160	154
3 Passenger	7%	6%	46	34
Total	35%	34%	446	358

A comparison of the existing and projected circumstances indicates a net increase in traffic as follows:

	Existing		Proposed		Net Increase	
	AM	PM	AM	PM	AM	PM
Car (Set Down/Pick-up)	336	270	446	358	110	88

Whilst it is expected that most staff members arrive and depart outside of the School's peak hours, it has been conservatively assumed that 50% of the School's staff traffic movements would occur during the School's peak hours.

Having regard for the above the existing and expanded School would indicate the following traffic generation outcome during the School's peak periods:

	Existing		Proposed		Net Increase	
	AM	PM	AM	PM	AM	PM
Car (Students)	336	270	446	358	110	88
Car (Staff)	29	29	38	38	9	9
Total	365	299	484	396	119	97

The directional distributions for the student's set down/pick-up, and staff related vehicle movements are provided as follows:

	Student		Staff	
AM Peak	50% IN	50% OUT	100% IN	0% OUT
PM Peak	50% IN	50% OUT	0% IN	100% OUT

On this basis, the ultimate traffic generation outcome resulting from the proposed expansion is indicated as follows:

Existing

AM Peak	197 IN	168 OUT
PM Peak	135 IN	164 OUT

Proposed

AM Peak	261 IN	223 OUT
PM Peak	179 IN	217 OUT

It is apparent that the proposal will result in the following net additional traffic during the School's peak periods:

AM Peak	64 IN	55 OUT
PM Peak	44 IN	53 OUT

The projected peak hour and daily traffic volumes (by applying a peak-to-daily ratio of 8% for arterial roads and 10% for local roads to the peak hour traffic volumes) in the vicinity of the site are provided in the following:

	Peak Hour	Daily
Kent Road, southeast of Herring Road	433	4,330
Herring Road, southwest of Kent Road	1,034	10,340
Agincourt Road, northwest of Herring Road	385	3,850
Epping Road, east of Herring Road	3,762	47,025
Lane Cove Road, northeast of Kent Road	4,143	51,788

The number of students which is expected to use public transport and walk to/from schools is as follows:

	Mode Share		Existing		Proposed		Net Increase	
	AM	PM	AM	PM	AM	PM	AM	PM
Bus (School/public)	27%	5%	203	32	270	43	67	11
Walking	37%	59%	278	376	370	502	92	126
Cycling	2%	2%	15	13	20	17	5	4
Total	66%	66%	496	421	660	562	164	141

6.2 Traffic Impact

To assess the potential traffic implications resulting from the School's redevelopment, the local road network which serves the School has been assessed using a lane-based traffic modelling program SIDRA 8.0.

Details of the modelling results which reveal the existing and post-development outcome are provided in Appendix C and summarised in the following:

	AM			PM		
	AVD	LOS	DS	AVD	LOS	DS
Existing						
Kent/Herring	6.2s	A	0.58	6.2s	A	0.49
Herring/Agincourt	5.5s	A	0.51	5.6s	A	0.49
Epping/Herring	79.7s	F	1.09	52.2s	D	0.96
Lane Cove/Kent	19.0s	B	0.83	13.1s	A	0.77
Post-development						
Kent/Herring	6.2s	A	0.58	6.5s	A	0.60
Herring/Agincourt	5.6s	A	0.54	5.6s	A	0.50
Epping/Herring	86.4s	F	1.13	53.0s	D	0.97
Lane Cove/Kent	20.3s	B	0.83	15.0s	B	0.79

Based on the above it is assessed that the additional traffic resulting from the proposal will retain the existing network's prevailing levels of service and will only have very minor implications on the network operation.

The AECOM study⁴ forecasted total traffic volumes of 6,425 and 6,814 at the intersection of Epping Road/Herring Road during the AM and PM peak hours respectively in the Year 2021.

The proposed School represents only a very minor proportion of these projections (i.e., no more than 0.7%). It is also relevant that the School's AM peak hour only has a 45-minute overlap with the network AM peak hour while the PM peak hour does not coincide with the network PM peak.

In light of the scale of the School's redevelopment and given that the Sydney Metro and Bus Priority Infrastructure Program will change the ways of where people live and work and how they travel, it is proposed that a Traffic Management and Accessibility Plan (TMAP) should be completed as part of an update of a larger study such as the Macquarie Park Traffic Study⁵.

6.3 Sustainable Transport Impact

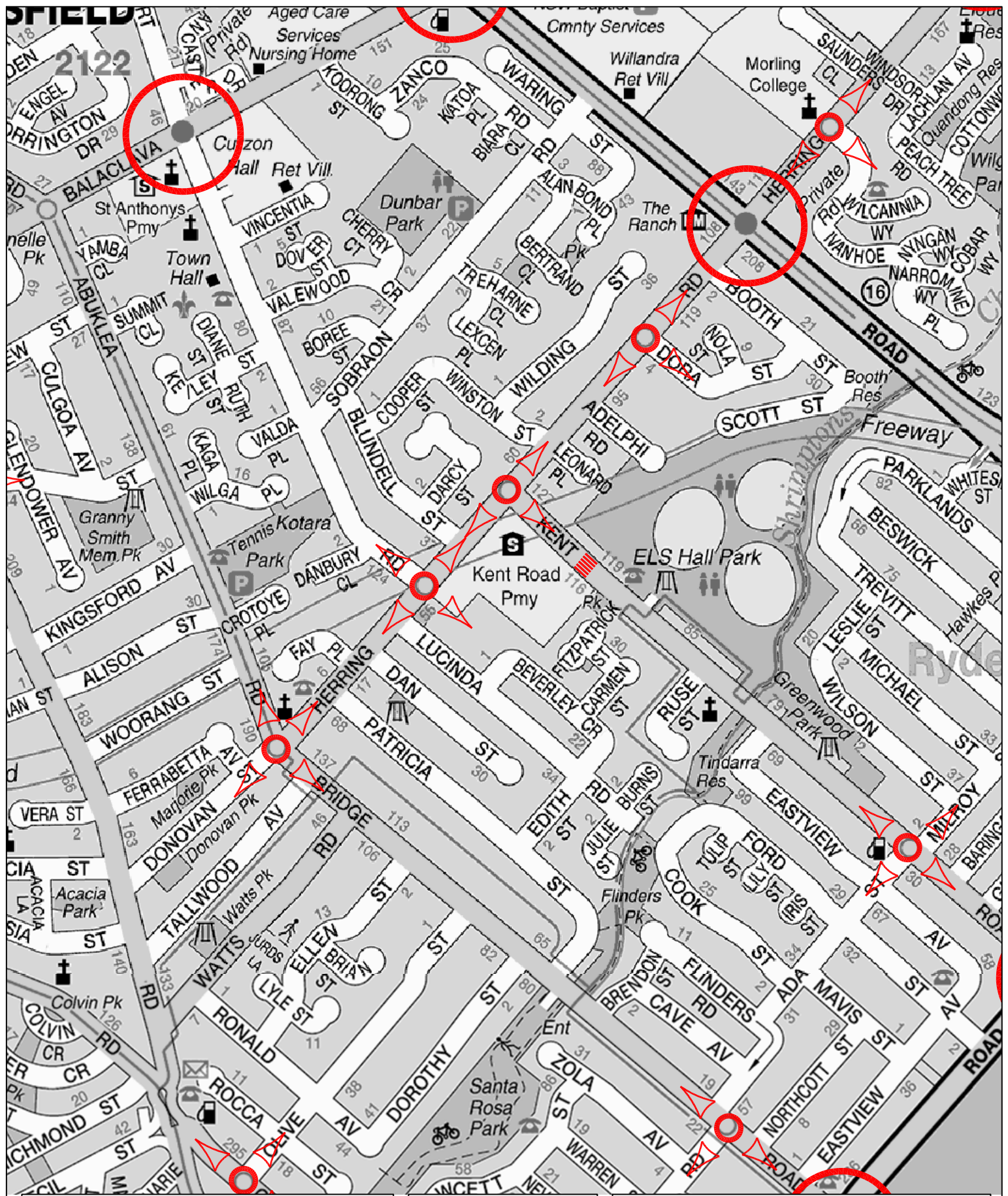
The expected number of students that would travel by bus can be easily accommodated within the remaining capacity, and the existing/proposed public transport system is adequate to meet the likely future demand of the proposed School. The School would liaise with TfNSW and transport operators to address any issues or gaps in the network identified by student/parent/carer/staff.

The School Student Transport Scheme (SSTS) provides eligible school students with free or subsidised travel from home to school. The scheme includes:

- ❖ Free travel to and from home and school on the approved train, bus, ferry, and light rail services during the school term.

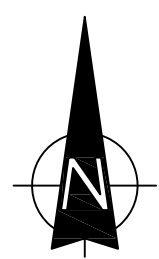
⁴ Macquarie Park Bus Priority and Capacity Improvement Project, AECOM 2017

⁵ Macquarie Park Traffic Study – Final Report, Traffix and Bitzios Consulting 2007



LEGEND

-  TRAFFIC SIGNAL CONTROL
-  ROUNDABOUT
-  RESTRICTED TURNING MOVEMENT



**TRAFFIC
CONTROLS**

FIG 4

- ❖ Discounted travel on buses between home and school with a School term bus pass.

Students with a disability who are unable to travel to and from school under the School Student Transport Scheme may be eligible for assistance under the Department of Education Assisted School Travel Program.

6.4 Crime Prevention through Environmental Design (CPTED)

There are four main principles of CPTED – natural surveillance, access control, territorial reinforcement and space management. The principles of CPTED can help create a safe and secure environment and assist in minimising the incidence of crime and contribute to perceptions of increased safety internal and external to the School site. The existing School has generally considered the CPTED principles, namely:

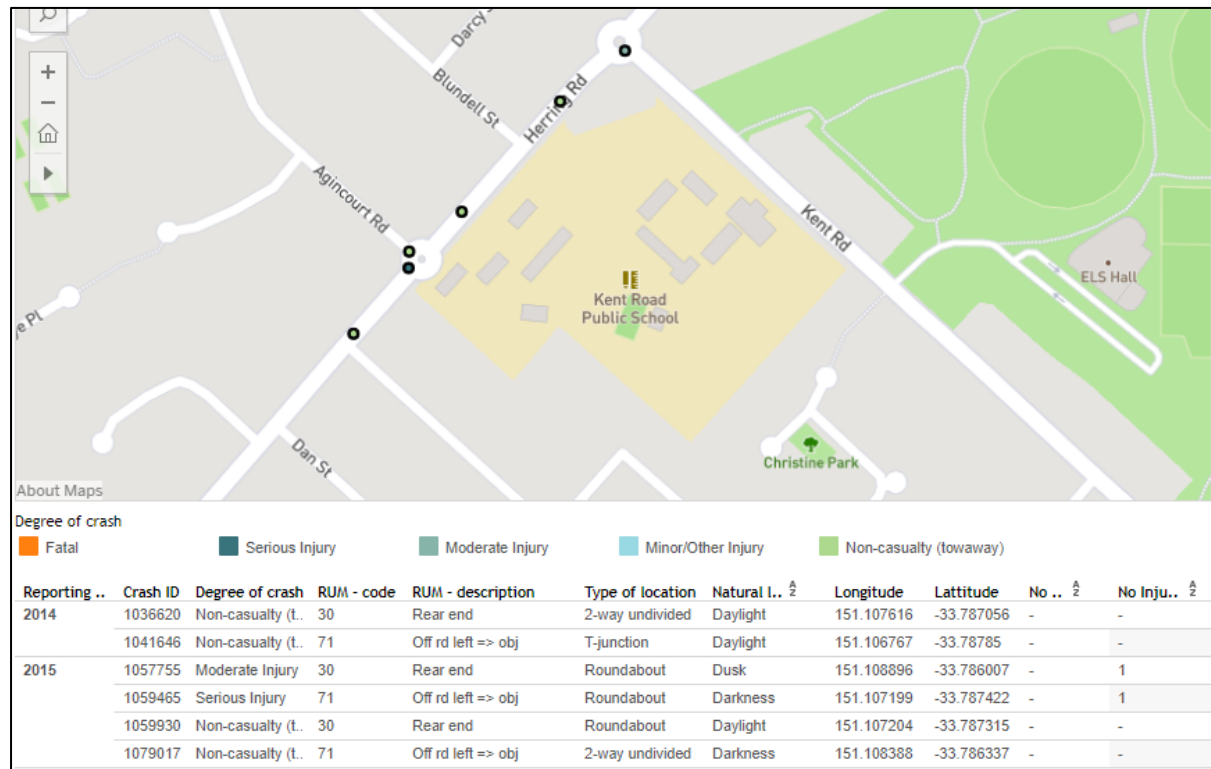
- ❖ Pedestrian crossings of adjacent public streets are clearly marked by signage, pavement treatment, and kerb treatment.
- ❖ Pedestrian pathways on school property are separated from vehicular routes by kerbing and landscaping.
- ❖ Pedestrian pathways on and in the vicinity of the School property are easily monitored and are in good condition.
- ❖ Signs direct approaching vehicles and pedestrians to appropriate entries to the School property.
- ❖ Pedestrian entries are secured during school hours.

The site currently has 40km/h School Zones along Herring Road and Kent Road to safeguard students travelling to and from the School, and minimise the risk and potential severity of a crash by reducing vehicle speed and increase motorist awareness via signs, dragon's teeth pavement markings and flashing lights.

The School Zones operate from 8.00 to 9.30am and from 2.30 to 4.00pm. The existing pedestrian network and infrastructure are adequate to meet the likely future demand of the proposed School.

Crash data for roads around the School has been obtained from TfNSW Centre for

Road Safety – Crash and Casualty statistics LGA view. The data relates to the five-year period to August 2018.



During this period, 6 crashes were recorded in the vicinity of the School. The reported crashes do not include any fatalities, with no pedestrian related. The data indicates that there are no significant pedestrian hazards/risks at Kent Road and Herring Road.

It is noted that the walk/cycle provisions in this area are quite extensive in part due to the need to accommodate the anticipated Epping-Chatswood Rail Line temporary closure.

On this basis, the existing bicycle network and infrastructure are quite adequate to meet the likely future demand of the proposed School.

6.5 Set Down and Pick-up

It was observed during the surveys that the set down/pick-up provision of 8 spaces along the Kent Road frontage operated satisfactorily during the morning peak, however, this facility intermittently overflowed during the afternoon peak. It was also observed that some set down/pick-up movements occur at Herring Road just to the

south of the Kent Road/Herring Road roundabout intersection. Upon further examination it was noted that Herring Road between the roundabout and Blundell Street is presently unrestricted and as such this movement is not illegal, albeit that the existing road line marking only provides a southerly lane width of some 4m.

The preceding analyses project a potential peak traffic generation of some 446 vehicle trips per hour. These movements include the drop-off/set down activities which are reliant on the available on-street parking as is normal for primary schools. The traffic generation would also include any traffic generating activities associated with the School's ancillary traffic activities, e.g., the occasional visitation movements. It is expected that the staff would arrive before and after the School's peak hours.

It is therefore inappropriate to suggest that the School should provide a dedicated set down/pick-up facility capable of accommodating all of the above movements and as such appropriate apportionment based on empirical evidence should be applied in this context to identify a more realistic makeup of the actual set down/pick-up demand.

It is apparent that the School will be subject to a maximum demand at the dedicated set down/pick-up facility of 446 vtpd two-way or some 223 vehicles (one-way). If it is conservatively assumed that a typical SD/PU movement has a duration of 150s (including 30s vehicle changeover), then the existing kerb side provision of 8 spaces would equate to a servicing capacity of up to 192 vehicles

Based on the above assessment it is apparent that the School's SD/PU facility will not be adequate to meet the anticipated set down/pick-up demand.

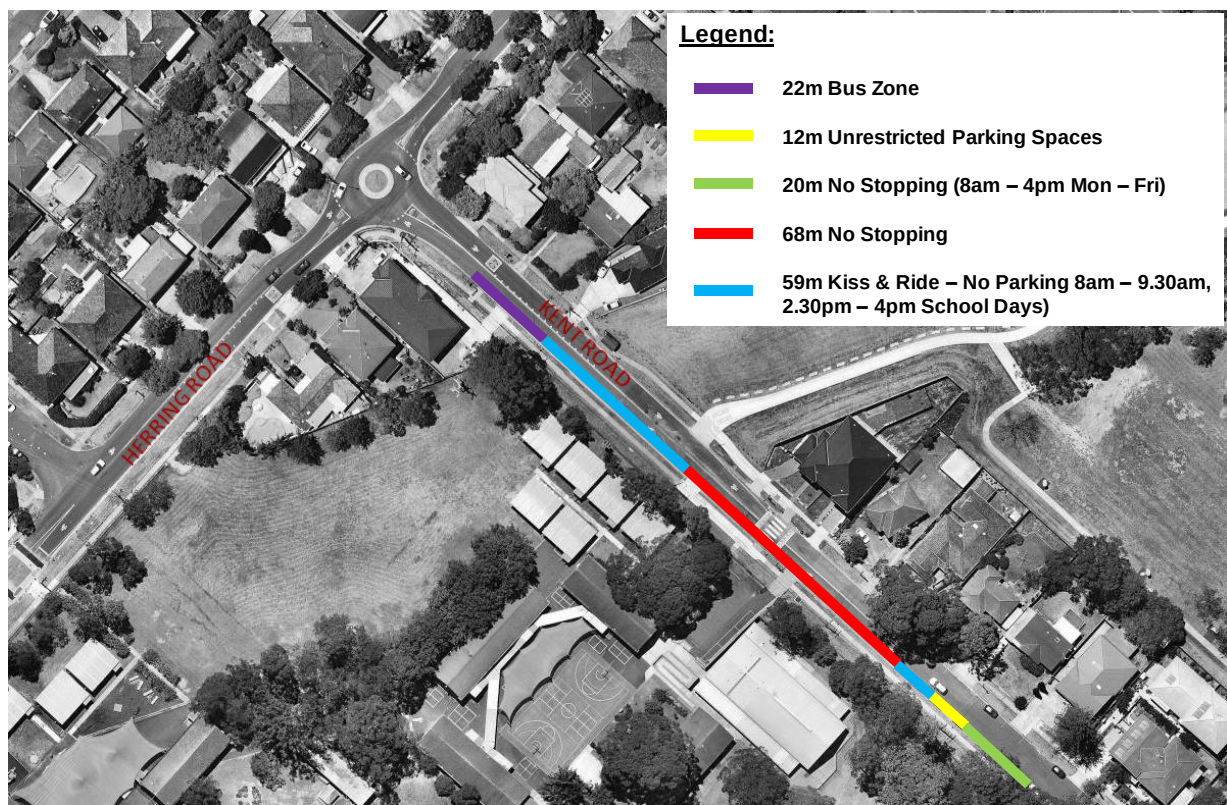
In order to meet the anticipated future, set down/pick-up peak demand it is recommended that 12m of the existing 24m unrestricted parking spaces along the southern side of Kent Road are sign-posted as a formal set down/pick-up facility. The proposed SD/PU of 10 spaces can accommodate up to 240 vehicles.

The existing and proposed set down/pick-up arrangements are shown in the figure overleaf.

The existing set down/pick-up arrangement



Proposed set down/pick-up arrangement



The need for internal drop-off is not considered necessary in this context given that:

- ❖ the additional demand is only minor
- ❖ the existing SD/PU is operating quite satisfactorily
- ❖ internalising the SD/PU would introduce unnecessary vehicle movements in the School which would increase safety hazard for pedestrians (student)
- ❖ internalising the SD/PU is not consistent with the CPTED principles.

7.0 Parking and Access, Internal Circulation and Servicing

7.1 Parking and Access

The proposed vehicle access arrangements for the School will involve:

- ❖ deletion of the existing Kent Road driveway south of the pedestrian crossing
- ❖ provision of a new driveway at Kent Road north of the pedestrian crossing to provide access for disabled parking and service vehicle spaces
- ❖ retaining the existing Herring Road access with boom gate control

The new Kent Road access has been designed to accord with the AS2890 design criteria and located where appropriate sight distances are available.

7.2 Internal Circulation

Aisle width, driveway width, car parking dimensions for the new Kent Road access and the car parking layout has been designed to be in compliant with the relevant AS2890 design requirements.

7.3 Servicing

Service vehicle movements associated with the School's operation are as follows:

- ❖ Electrical contractors
- ❖ Hydraulic services
- ❖ Building maintenance contractors
- ❖ Caterers/Food suppliers to the canteen
- ❖ Coffee machine providers
- ❖ Water cooler providers
- ❖ Indoor plant hire/ maintenance

Transport and Traffic Planning Associates

- ❖ Project managers
- ❖ Sales representatives.

All garbage collection and loading activities related to deliveries, courier activity, maintenance, etc. will occur at the new loading bay accessed via the Kent Road driveway. These activities, which are undertaken by privately contracted service providers who will arrive and depart outside of peak hours to minimise disruption to the peak traffic circumstances.

Occasional parking needs of service personnel and small service vehicles can be satisfied by the School's available car parking spaces.

Details of a turning assessment indicating a satisfactory provision for the largest service vehicle, i.e., a 6.4m small rigid vehicle are provided in Appendix G.

It is expected that there will be an average 1-2 deliveries per day with no more than 5 vehicles per day.

7.4 Emergency Vehicles

The fire and rescue NSW and ambulance can access the School at all times via the accesses along Kent Road and Herring Road. Emergency protocols for the proposed School would include a requirement for the on-site staff to assist with emergency access from these roads. Any vehicles impeding the emergency vehicle access should be cleared, and any planned vehicle movements should be suspended.

8.0 Construction Traffic Management Plan

Construction is due to commence in early 2019 and will complete in late 2020.

8.1 Construction Process

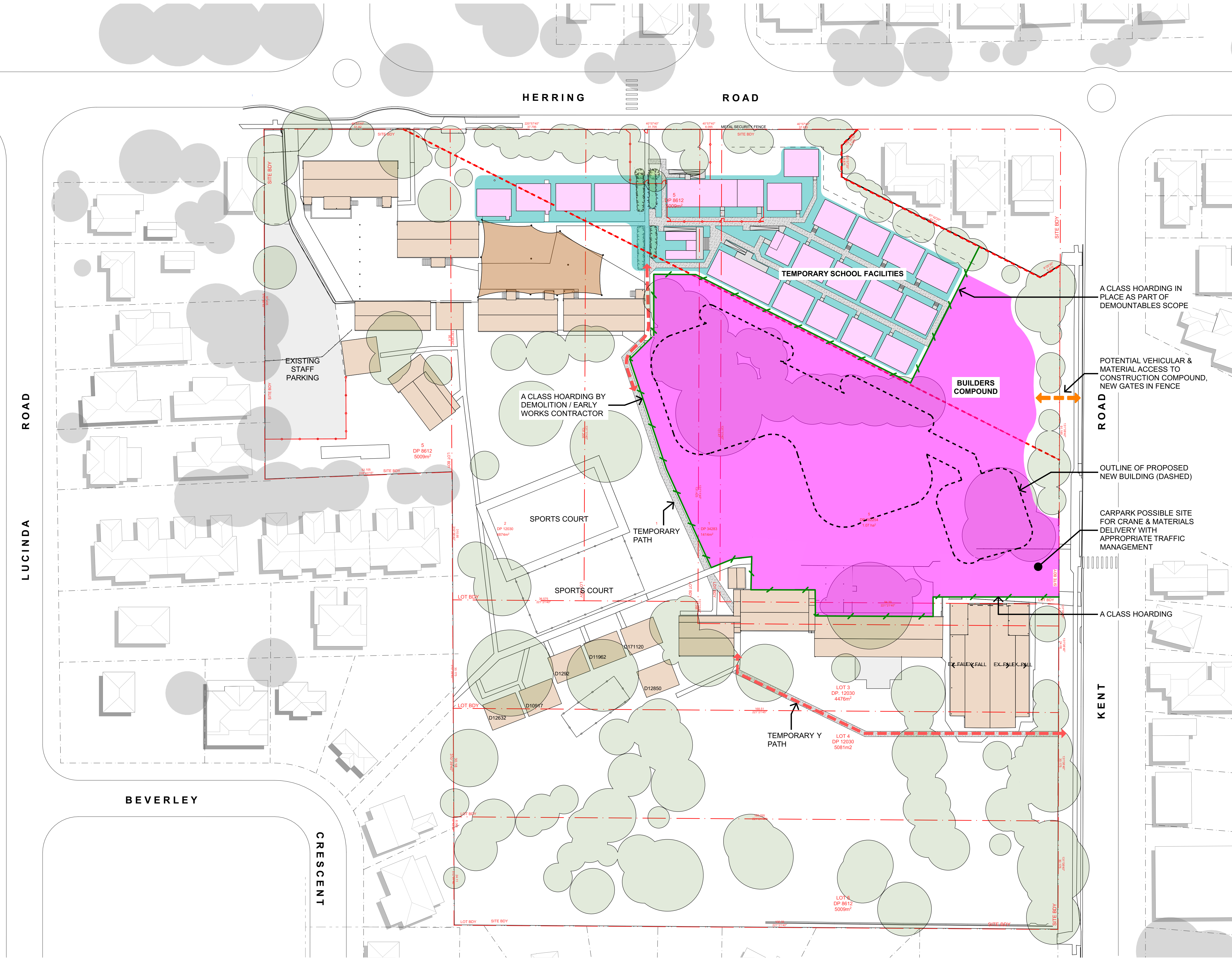
Construction traffic access provision for the main contract works will occur via the existing car park off Kent Road and a new construction access point off Kent Road to the construction zone on the RMS land. The works will involve:

- ❖ up to 8.8m medium rigid trucks, i.e., mobile concrete pump, Hymix concrete mixer during the concrete pumping phases
- ❖ up to 19m semi-trailers for the deliveries of construction materials including crane structures and structural steel for the roof
- ❖ up to 12.5m heavy rigid trucks for the transport of construction waste materials.

There will be no on-site parking for construction workers. Based on the parking demand survey, there will be at least 64 spaces available in the surrounding streets during the busiest peak period. While there are some surplus on-street parking spaces in the convenient vicinity of the School site, all workers will be encouraged to use public transport to access the site given the site's proximity to high-frequency public transport services or to car pool wherever possible.

A tool drop-off and storage facility will be provided within site. This would allow tradespeople to drop-off and store their tools and machinery, allowing them to use public transport to travel to/ from the site on a daily basis.

A Transport Access Guide (TAG) which has previously been established for the School and will be provided to all workers during site induction to demonstrate alternative modes of transport available (Appendix H). The TAG will be updated as required if there are any route changes by TfNSW.



- LEGEND**
- EXISTING PERMANENT BUILDING
 - EXISTING DEMOUNTABLE BUILDING
 - NEW AND EXISTING TEMPORARY SCHOOL DEMOUNTABLES
 - NEW AND EXISTING TEMPORARY SCHOOL DEMOUNTABLE ZONE NOT PART OF SSDA
 - EXISTING PATH
 - TEMPORARY PATH
 - A CLASS HOARDING / FENCE
 - POTENTIAL SCHOOL PEDESTRAIN TRAVEL PATHS
 - BUILDERS COMPOUND/ EXTENT OF WORKS FOR SSDA
 - POTENTIAL CONSTRUCTION COMPOUND ACCESS
 - RMS ROAD RESERVE BOUNDARY
 - SECURITY FENCE AND GATES

A CLASS HOARDING IN PLACE AS PART OF DEMOUNTABLES SCOPE

POTENTIAL VEHICULAR & MATERIAL ACCESS TO CONSTRUCTION COMPOUND, NEW GATES IN FENCE

OUTLINE OF PROPOSED NEW BUILDING (DASHED)

CARPARK POSSIBLE SITE FOR CRANE & MATERIALS DELIVERY WITH APPROPRIATE TRAFFIC MANAGEMENT

A CLASS HOARDING

A		12/08/2018		ISSUED FOR CONSULTANT INFORMATION	
No	Initial	DATE	REVISION	DETAILS	

Workers will also be informed of with appropriate tool/ equipment drop-off and storage arrangements made within site sheds and amenities provided on site.

8.2 Spoil Management

It is proposed to minimise the need for removal of spoil from the site by endeavouring to balance cut and fill to create the ground platform. Truck shaker grids and wheel wash stations shall be positioned at all entry/exit points. Machine operated street sweepers will be utilised whenever spoil is tracked onto local or state roads, and at the direction of Council.

8.3 Construction Vehicle Route

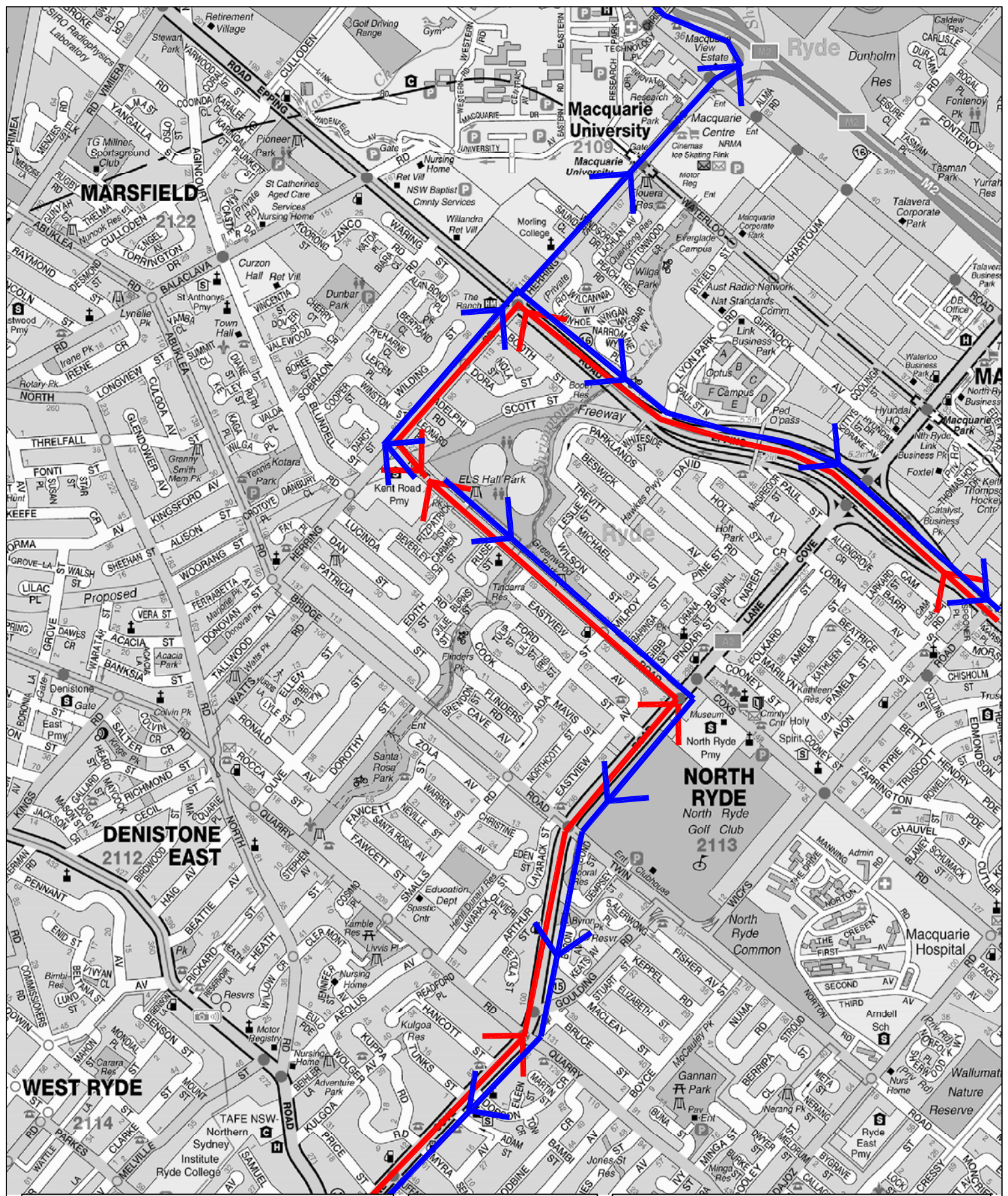
Truck movements associated with the proposed works will approach and depart the site via the sub-arterial and arterial route illustrated in Figure 6. Details of the routes shall form part of the contract and distributed to all drivers.

8.4 Construction related Vehicle Movements

An average of 2 trucks per day is expected, with a maximum of 8 trucks per day during peak construction (16 movements per day). The heavy vehicle movements are likely to be spread through the day. However, in the worst-case assessment, it has been assumed that 25%, or 2 vehicles (4 two-way vehicle movements), would occur during the peak hour.

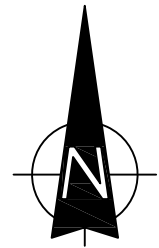
Queuing or marshalling of construction vehicles will not be permitted on the road network and call-up procedures must be put in place to manage arrivals.

Workers typically begin and end their workday outside of network peak periods (i.e., 6.30am – 3.30pm) and as such is unlikely to adversely impact the surrounding road network.



LEGEND

-  ARRIVAL
-  DEPARTURE



**TRUCK
ROUTES**

FIG 5

8.5 Bus Movements

The movements of buses/pedestrians and construction vehicles/workers in the surroundings of the work sites shall be closely monitored by RMS accredited Traffic Controllers. Under all circumstances, the movements of buses shall have the right of way over construction vehicles to maintain the efficiency of bus services in the local road network.

8.6 Pedestrian Movements

Pedestrian movements will remain on Kent Road separated from the site by through the provision of Class A hoarding/ fencing along the perimeter of the site and B class hoarding within the site where applicable.

Based on the crash data, there are no significant pedestrian hazards/risks at Kent Road and Herring Road. However, to maintain the safety of pedestrians, RMS accredited traffic controllers will be present at the site access to manage pedestrian movements when construction vehicles are entering the site.

8.7 Cyclist Movements

During the construction period, cyclist movements adjacent to the School along Kent Road and Herring Road will remain unaffected.

8.8 Works Zone/Road Closure

It is not anticipated that the proposed works would require the establishment of a Works Zone or road closure. If required, the costs and application processes for the required permits are to be borne by the contractor.

8.9 Cranage and Materials Handling

Mobile cranes will be used to lift materials to/from trucks standing in the site compound while all delivered materials will be stored in designated secured facilities within the bounds of the site.

Given that all craneage and materials handling will be carried out within the site and will not occupy any part of State Roads/Council's roads or footpaths, a separate permit (by Council) will not be required.

8.10 Site Induction

All workers and visitors employed on the site by the appointed contractor (including sub-contractors) will be required to undergo a formal 'site induction' process and all the inductions will be performed specific to each trade according to Workcover OH & S requirements.

The induction will include details of approved access routes to and from the construction site for site staff and delivery vehicles, parking arrangements, as well as standard environmental, WHS, driver protocols and emergency procedures. The agreed work hours must be included as part of this induction.

8.11 Traffic Control Plans

Any required Traffic Control Plans will be prepared by the Builder's appointed Traffic Control Contractor and submitted to the Council for approval.

8.12 Road Serviceability

The contractor shall be responsible in ensuring that the roads and footpaths along Herring Road and Kent Road remain in a serviceable state during the course of the construction. Under the direction of Council, the contractor will make good any roadside facilities affected by the construction works, being footpaths, road pavement, etc. to the Council's satisfaction, at no cost to Council.

8.13 Cumulative Impacts

In addition to the Sydney Metro Northwest works which will occur between the latter half of 2018 and middle of 2019, there are currently 3 known construction sites within a catchment of some 1.5km of the site.

The School works will only involve some 2 vehicles (4 movements) per hour and with the primary approach and departure routes being Kent Road and Herring Road, there will not be any perceptible construction vehicle traffic impact.

The contractor will also ensure where practical that construction vehicle movements occur outside of the peak hours.

Based on the above, it is not expected the concurrently undertaken works will have any undue impact on the existing and future traffic congestion within the Marsfield – Macquarie Park area.

8.14 Emergency Vehicle Access

Emergency protocols on the site would include a requirement for an accredited traffic controller to assist with emergency access, and as such, access to the School by emergency vehicles will not be affected.

Liaison will be maintained with the police and emergency services agencies throughout the construction period and a site contact will be made available for out-of-hours emergencies and access.

9.0 Green Travel Plan

Transport is a necessary part of life which has effects that can be managed. There is a current major focus on improving transport services as well as cycling facilities and provisions for pedestrians in major priority precincts. As well as delivering better environmental outcomes, providing a range of travel choices with a focus on walking, cycling, and public transport will have major public health benefits and will ensure a prosperous urban and economic outcome for cities.

9.1 Objectives

A Travel Plan (TP) is a package of measures aimed at promoting and encouraging sustainable travel and reducing reliance on private vehicle usage, and is prepared with an ambition to over a progressive period:

- ❖ reduce dependence on private cars
- ❖ improve pedestrian and cycling facilities
- ❖ promote public transport and car sharing
- ❖ reduce congestion in the local area.

Travel Plans have proven to be a successful way of changing travel behaviour for school developments throughout Australia and overseas. A Travel Plan is a way in which a development manages the transport needs of parents, carers, school community members, staff and visitors. The plan aims to reduce the environmental impact of travel to and from a given site and in association with its operation. In essence, the plans encourage a more efficient use of motor vehicles as well as alternatives to single occupant car usage.

There is anticipated to be a significant shift in the future travel patterns to/from and within the local and regional area, associated with the PLR and Sydney Metro projects. The frequency, capacity and nature of metro services will transform the areas along the proposed Sydney Metro route, with high-density residential developments either

in planning and under construction. Large commercial entities are also continuing to be drawn to the area.

9.2 Process

The preparation of a TP is a considered process which occurs under the leadership and guidance of an established TP Coordinator and involves the following:

- ❖ securing ownership via the establishment of a TP Coordinator
- ❖ providing a clear context of existing transport circumstances via site audit
- ❖ developing and implementing a travel plan via identification of contextual incentive schemes and the establishment of mode share targets
- ❖ monitoring the effectiveness of the plan via a formal evaluation process, i.e., travel surveys, etc.

9.3 Management Team

A TP Coordinator for the development will be nominated by the School Infrastructure NSW (SINSW)'s representative prior to occupation and this coordinator will have responsibility for developing, implementing and monitoring the effectiveness of the TP. The coordinator will be appointed when the occupation commences.

9.4 Existing Travel Circumstance

The Australian Bureau of Statistics (ABS) 2016 Census of Population and Housing – Place of Residence by Method of Travel (NSW) data provides the most robust indication of existing staff travel patterns for the Macquarie Park – Marsfield localities.

A summary of the current mode shares for students (based on the mode share survey) and staff (based on ABS) are shown as follows:

	Students (Average)	Staff
Train/Bus	15%	26%
Walk	33%	3%
Car Driver	-	64%
Car Passenger	50%	4%
Bicycle	-	1%
Other (Motorcycle, Taxi, Car Share)	2%	2%

9.5 Targets

Assessment of the transport circumstances for the School indicate the following desirable Mode Share targets.

	Students (Average)	Staff
Train/Bus	30%	50%
Walk	40%	5%
Car Driver	-	35%
Car Passenger	25%	2%
Bicycle	5%	5%
Other (Motorcycle, Taxi, Car Share)	-	3%

Surveys undertaken within 3 months of completion of the redevelopment of the School will be able to assess whether these targets have been met. While these targets have been set, and a range of measures have been provided in the travel plan to persuade staff and visitors to participate in sustainable travel, it is not possible to guarantee that these modal split targets will be achieved.

The measures proposed within the TP will be taken up by the staff/visitors as a matter of free choice, and this mode choice is beyond the control of the TP Coordinator. The survey results will, however, indicate the more popular measures which can then be focused upon in future updated TPs.

9.6 Supplementary Transport Programs

Once the new buildings are occupied the TP Coordinator may implement a number of initiatives to further enhance the effectiveness of the travel plan. Having regard for the School's operating nature, it is recommended that the following initiatives are considered and incorporated into the travel plan:

Increase walking, running and cycling to work and other destinations by staff

Common and effective measures that are event based including a Ride to Work/School Day raises awareness amongst teachers, parents, students and visitors alike. Likewise, the following initiatives prove to be highly effective amongst staff and potentially students:

- ❖ Pedometer-based walking program
- ❖ Walk/Bike buddy scheme
- ❖ Provision of the end of trip facilities such as shower and change cubicle

Convenience and Increase staff and visitor awareness and knowledge of available transport options

New pamphlets and leaflets detailing these programs incorporating the readily available TAG can be distributed to all who need to travel to and from the School. They should also be provided with an induction package for new staff and incorporates the TAG while ongoing initiatives may be circulated in the form of email newsletters.

Other initiatives may include:

- ❖ Provide interactive timetables on-site to promote public transport usage.
- ❖ Allow for access to umbrellas and ponchos in case of wet weather.
- ❖ Provision of good quality, accurate and useful directional signage to promote walking and cycling.
- ❖ Provide real-time information on public transport arrival/departure times with information screens/monitors.

Incentive Scheme for Staff Members

For staff members, additional incentive programs may be established by SINSW to encourage the uptake of active transport. This can be delivered in the form of:

- ❖ Active carpooling program (with the benefit of knowledge of staff members' place of residence) with guaranteed ride share and car parking space within the School's compound
- ❖ Implementation of a ride share system, which could include encouraging staff to participate in a peak-hour car-pooling club to drive to a nearby station (with higher train frequencies) or common work location during the peak hours. This may be coordinated by the formally appointed Travel Coordinator.

9.7 Monitoring & Management of Travel Plan

It will be important to monitor the TP to ensure that travel mode targets are met, and the maximum benefits are being gained.

A TP Coordinator for the School will be appointed to ensure the successful development, implementation and monitoring of the effectiveness of the TP. The TP Coordinator will be appointed prior to the operation once the redevelopment is complete.

Travel surveys can be undertaken where the main focus will be to establish parents'/carers'/school community members', staff's and visitors' travel patterns including the mode share of trips to and from the School. This information will also help inform TPs for subsequent changes and upgrading.

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

It will also be necessary to provide feedback to parents, carers, school community

members, staff and visitors to ensure that they can see the benefits of sustainable transport.

There are several key elements to the development and implementation of a successful TP. These include:

Communications – Good communications are an essential part of the TP. It will be necessary to explain the reason for adopting the plan, promote the benefits available and provide information about the alternatives to reliance on private car travel.

Commitment – TPs involve changing established habits and providing the impetus for parents, carers, school community members, staff and visitors for new developments to choose a travel mode other than private car use. To achieve co-operation, it is essential to promote positively the wider objectives and benefits of the Plan. This commitment includes the provision of the necessary resources to implement the Plan, beginning with the introduction of encouragement for changing travel modes upon operation.

Consensus – It will be necessary to obtain broad support for the introduction of the TP.

Once the TP has been adopted, it will be essential to maintain interest in the scheme and any new initiative in the Plan will need to be publicised and marketed. Accordingly, it is proposed to produce a half-yearly leaflet for parents, carers, school community members, staff and visitors to inform them of sustainable travel initiatives.

9.8 Monitoring Milestones

Monitoring of the plan will be an essential process in consolidating the travel patterns and publicising the positive outcomes of the plan.

It is therefore proposed that within 3 months of occupation of the new facilities, a travel survey will be conducted. The results of the travel survey will indicate the desirable

travel mode outcome. In this way, the Coordinator will be able to examine the success of the TP and make appropriate recommendations.

9.9 Evaluation of Targets

It is therefore proposed that within 3 months of substantial occupation, a travel survey will be conducted. A travel questionnaire (example below) can be conducted with parents, carers, school community members, staff and visitors.

The first study provides a baseline for travel planning while subsequent travel surveys would be reported annually to SINSW to inform any weakness or strength in the current travel plan. Based on the review the travel plan should be refined to reflect changing circumstances.

Sample Survey

1. What is the postcode of your place of residence? _____
2. How do you travel to school?
 - a) Walk/run
 - b) Bicycle
 - c) Bus
 - d) Train
 - e) Combination of bus and train
 - f) Drive a car
 - g) A passenger in a car
 - h) Others _____
3. What time do you usually leave and arrive at school in the morning?

4. What time do you usually leave and arrive home in the afternoon? _____
5. Do you use your car for school trips during the day?
 - a) Yes
 - b) No
6. To facilitate walk/cycle groups and/or carpooling may we share your contact details with a colleague that live/work near you?

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- a) Yes – walking group (Email: _____)
- b) Yes – cycling group (Email: _____)
- c) Yes – carpool driver (Email: _____)
- d) Yes – carpool passenger (Email: _____)

Whilst these targets have been set and though limited parking supply is available, and a range of measures have been provided in the travel plan to persuade parents, carers, school community members, staff and visitors to participate in sustainable travel, it is not possible to guarantee that these modal split targets will be achieved.

10.0 Consultation Process

As requested by SEARs, the approach and high-level assessment outcome were submitted to the following relevant planning authorities.

Authorities	Representative	Date
TfNSW	Ken Ho	Wednesday, 29 th August 2018
	Lee Farrell	Monday, 3 rd September 2018
RMS	Aleksander Tancevski	Wednesday, 29 th August 2018
	Rachel Nicholson	Monday, 3 rd September 2018
	Amin Ahsanul	Friday, 14 th September 2018
City of Ryde	Kelly Yoon	Wednesday, 29 th August 2018
		Monday, 3 rd September 2018

Details of the correspondence are provided in Appendix I.

11.0 Conclusion

The proposal involves an SSDA which seeks approval to redevelop Kent Road Public School and increase its existing enrolment capacity from 750 to 1,000 students.

Assessment of the proposal has established that:

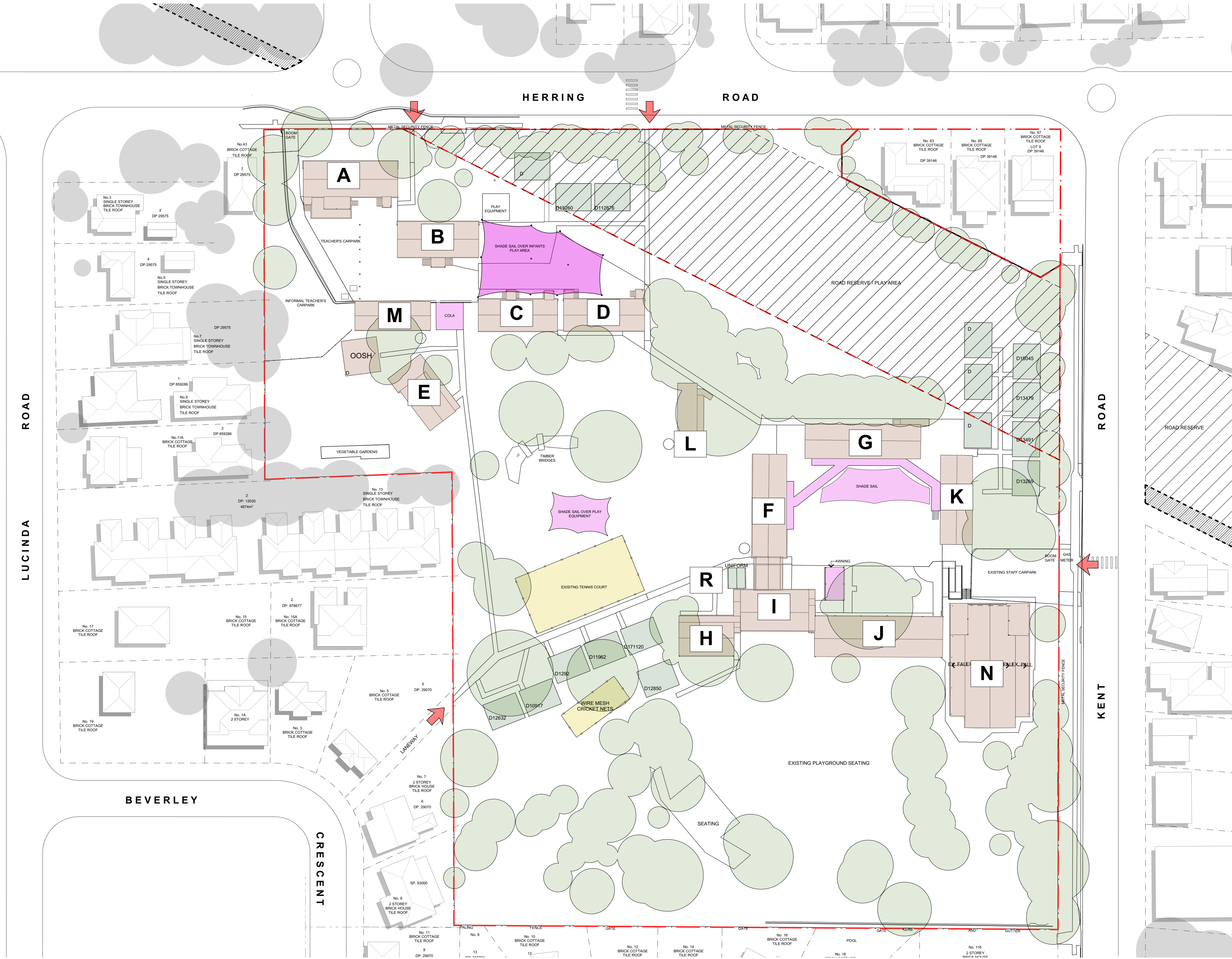
- ❖ the existing local road network adjacent to the School operates with a good level of service
- ❖ the School is ideally located with excellent connectivity to ready transport services which are subject to further upgrade in 2019
- ❖ the existing pedestrian and cycle provisions are satisfactory and the School will provide an additional 44 bicycle parking spaces as part of the redevelopment scheme
- ❖ the projected traffic generation resulting from the expansion will have no adverse implications on the adjacent road network (maintain the existing network levels of service)
- ❖ the existing set down/pick-up provision operates satisfactorily although it exceeds capacity during the PM peak
- ❖ the School will benefit from an additional 2 set down/pick-up bays to accommodate the anticipated future demand, and these can be provided by providing 2 additional set down/pick-up spaces along Kent Road frontage
- ❖ the on-street parking spaces recorded in the School's vicinity indicate ample spare capacities to accommodate the additional demand
- ❖ the new at-grade carpark which maintains the existing number of existing car parking spaces of 32 for staff is adequate and appropriate for the proposed development

Transport and Traffic Planning Associates

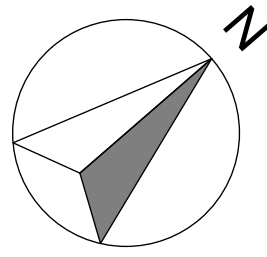
- ❖ the provisions made for vehicle access, internal circulation and servicing will be appropriate to the relevant AS2890.1 design requirements and the development needs
- ❖ the planning and management of construction vehicles will have regard for the anticipated peak traffic operations in the vicinity of the School and accord with the Council requirements
- ❖ the TP will serve to educate teaching staff, visitors, parents and students of the available public transport options to and from the School.

Appendix A

Architectural Plans



- LEGEND**
- EXISTING PERMANENT BUILDING
 - EXISTING DEMOUNTABLE
 - EXISTING COLA AND SHADE SAILS
 - EXISTING TREES
 - ROAD RESERVE - NO BUILDING
 - EXISTING CYCLEWAY
 - A** BLOCK REFERENCES





- LEGEND**
- EXISTING BUILDINGS - RETAINED AND / OR ADAPTED
 - NEW BUILDINGS
 - EXISTING COLA AND SHADE SAIL
 - HARDBAVING / RAMPS
 - EXISTING TREES
 - PROPOSED TREES
 - ROAD RESERVE - NO BUILDING
 - EXISTING CYCLEWAY

GARDNER WETHERILL ASSOCIATES

T (02) 9929 6777
F (02) 9929 3999
E design@gardnerwetherill.com.au
A.C.N. 104 476 833

LEVEL 2 Suite 2.01
460 Pacific Highway
St Leonards 2065

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Butler & Co Architects

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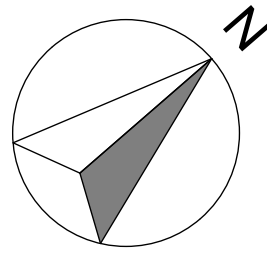


Kent Road Public School Development
Herring Road MARSFIELD NSW 2122



School Infrastructure NSW
259 George Street SYDNEY NSW 2000

No	Initial	DATE	REVISION DETAILS
A	CM	10/09/2018	ISSUED FOR CLIENT REVIEW
B	CM	11/09/2018	ISSUED FOR CLIENT REVIEW
C	CM	12/09/2018	ISSUED FOR CONSULTANT INFORMATION



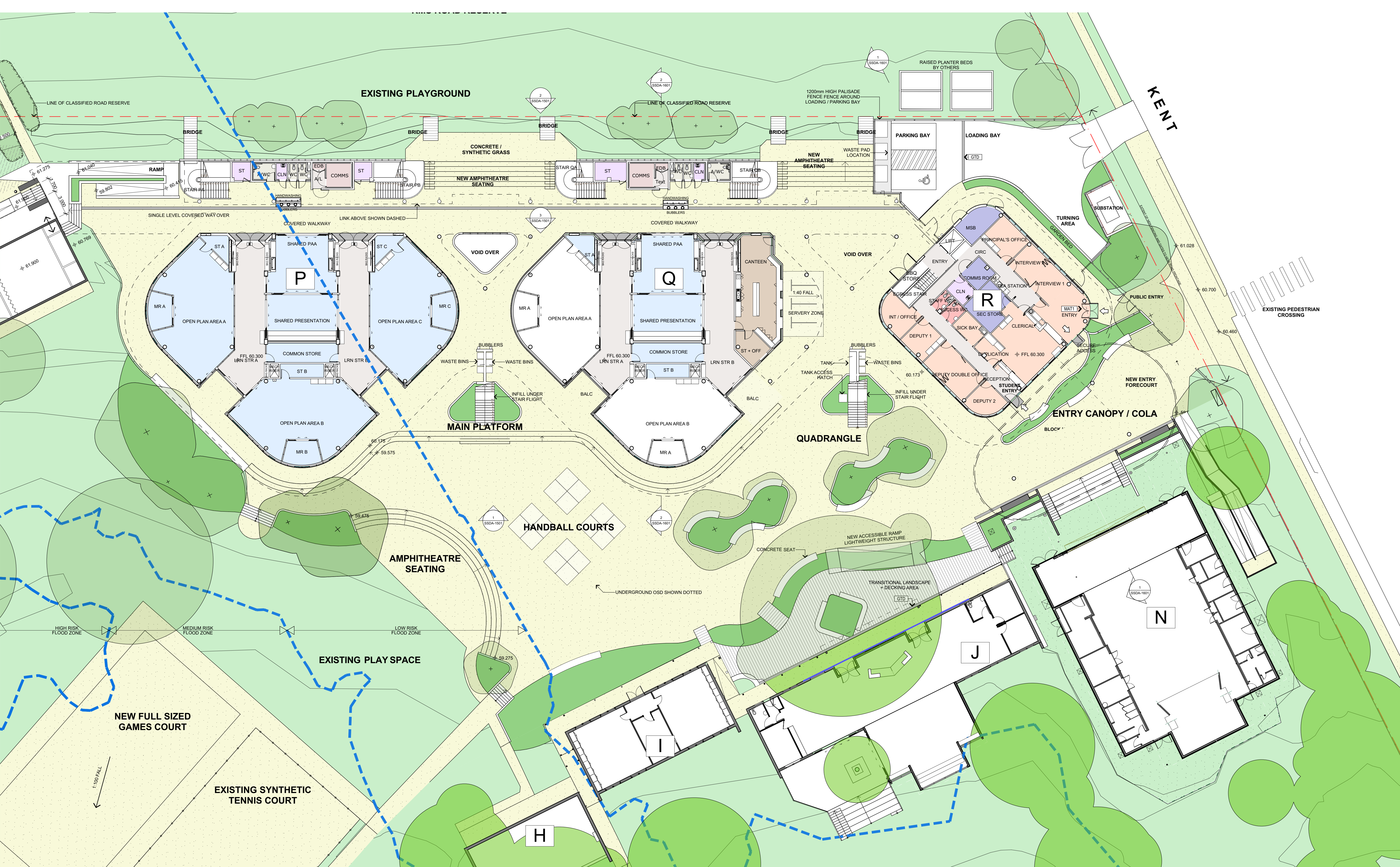
1:500 @ ORIGINAL SIZE
0 10 20 30 50m

Proposed Site Plan

PROJECT No
17058
DRAWING No
SSDA-0400

SCALE
1:500 @A1
REVISION
C

DRAWING NAME



GARDNER WETHERILL
ASSOCIATES

T (02) 9929 6777
F (02) 9929 3999
E design@gardnerwetherill.com.au
A.C.N. 104 476 833

LEVEL 2 Suite 2.01
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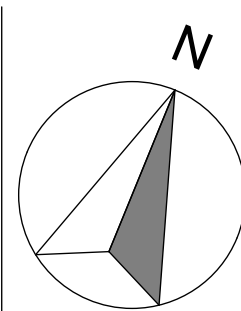


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Herring Road MARSFIELD NSW 2122



School Infrastructure NSW
259 George Street SYDNEY NSW 2000

A	Rev	Date	Issued For Client Review
1	1	10/03/2018	ISSUED FOR CONSULTANT INFORMATION
2	1	10/03/2018	ISSUED FOR CONSULTANT INFORMATION
3	1	10/03/2018	ISSUED FOR CONSULTANT INFORMATION



1:200 @ ORIGINAL SIZE
0 2 6 12 20m

Ground Floor Plan

PROJECT No
17058
DRAWING No
SSDA-1200

SCALE
1:200 @A1
REVISION
B