Inner Sydney High School, Surry Hills, Green Travel Plan Final

Prepared for Positive Traffic/Department of Education
19-527

PREPARED BY HIGH RANGE ANALYTICS PTY LTD

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Inner Sydney High School, Surry Hills – GTP Final

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1.0 Introduction

Positive Traffic on behalf of the NSW Department of Education commissioned High Range Analytics Pty Ltd (HRA) to prepare a Green Travel Plan (GTP) for Inner Sydney High School, that is located at 244 Cleveland Street, Surry Hills.

This report provides a GTP, with the following chapters:

- existing conditions around the site in Chapter 2
- describes future conditions around the site in Chapter 3
- describes the proposal in Chapter 4
- formulates targets and summarises aspects of the transport investigation in Chapter 5
- the green travel plan is described in Chapter 6
- evaluating transit services in the school catchment is in Appendix A
- accessibility analysis is in Appendix B.

This GTP was based on a draft GTP prepared in October 2017 at the time of the planning submission for the proposed Inner Sydney High School.

The GTP seeks to address the following conditions of consent:

D1 Green Travel Plan

A Green Travel Plan (GTP), must be prepared by a suitably qualified traffic consultant in consultation with Council and (Sydney Coordination Office) Transport for NSW, to promote the use of active and sustainable transport modes. The GTP must be submitted to the satisfaction of the Secretary prior to occupation and address, but not limited to, the following:

a) Objectives and mode share targets (i.e., site and land use specific, measurable and achievable and timeframes for implementation) to define the direction and purpose of the GTP;
b) Address misalignment of the mode share target for the number of students being dropped off at the school by car, with car passenger mode share in the Transport and Accessibility Impact Assessment Report and accessibility;
c) Specific tools and actions to help achieve objectives and mode share targets;
d) Measures to promote and support the implementation of the plan, including financial and human resource requirements, roles and responsibilities for relevant employees involved in the implementation of the GTP; and
e) Details regarding the methodology and monitoring/review program to measure effectiveness of the objectives and mode share targets of the GTP, including frequency of monitoring and the requirement for travel surveys to identify travel behaviours of students and staff to and from school at appropriate times throughout the academic year.

The GTP (as revised from time to time) must be implemented by the Applicant, or person/s authorised to, for the life of the development.

This GTP updates the Draft GTP to:

- Address conditions listed above
- Reflect further details of the Inner Sydney High School, including:
  - The opening year
  - Student population ramp-up profile
  - School catchment definition
- Examines the catchment's accessibility to and from the school
- Provides further detail and updated information that is relevant to the plan
- Addresses comments received from TfNSW (Sydney Co-ordination Office)
- Addresses feedback from client.

2.0 Existing Conditions

2.1 Site location

The subject site is located in the north-west corner of the intersection of Cleveland Street and Chalmers Street in Surry Hills. The broader context of the site is shown in Figure 1 below.

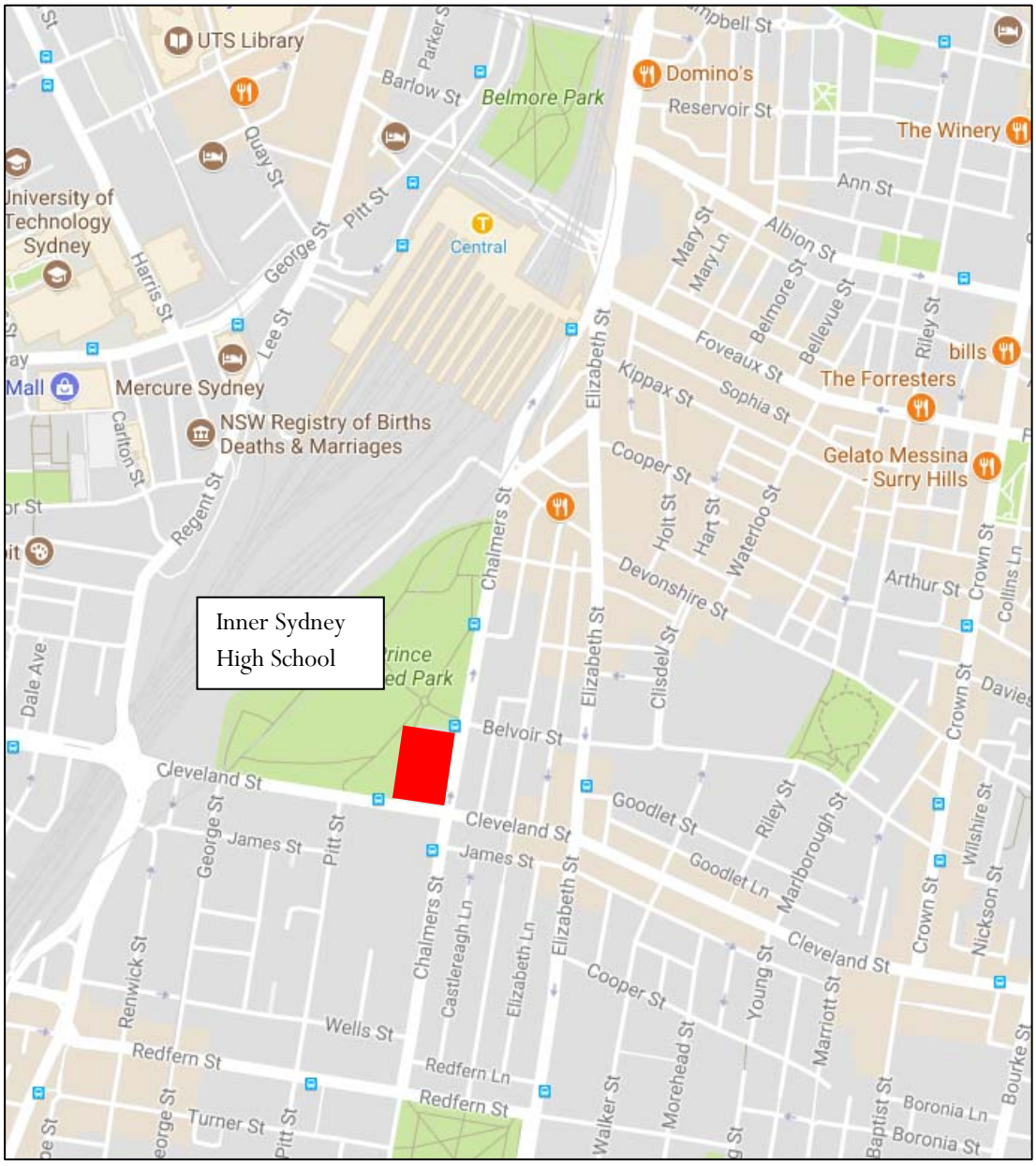

FIGURE 1 – INNER SYDNEY HIGH SCHOOL LOCATION

The site is located in an area served by a high-density transit network, which covers a broad range of areas of inner and middle Sydney, with good rail access to parts of outer Sydney. This transit network is currently being upgraded and there are active plans for its further improvement and extension.

In addition to the existing and future improved transit network, the site's location, at the southern end of Sydney's Central Business District (CBD), places it within easy reach of a number of academic, educational,

sporting and cultural facilities, which would provide enrichment opportunities for students. Examples of these include:

- The local universities with their teaching and sporting resources: UTS on and around Broadway, Sydney University at the western end of Cleveland Street, and UNSW, a short bus/light rail ride away to the south east
- The Australian Museum on College Street
- Dixon Library on Macquarie Street
- NSW Parliament on Macquarie Street
- Town Hall and other performance spaces, such as Belvoir Street Theatre, Seymour Centre, Angel Place Recital Hall and the Sydney Opera House.

These facilities can be reached on foot or by transit from the Inner Sydney High School.

The area around the site has experienced rapid urban change over the past fifty years, with the movement of resident populations back into the inner-city suburbs (such as Surry Hills, Paddington, and the CBD) being a marked trend of the past twenty or so years, as these areas have de-industrialised. This provides a densely populated catchment for Inner Sydney High School.

2.2 Recent use of the site

The subject site recently accommodated the Cleveland Street Intensive English High School which included some 360 students and 40 staff, accommodated in five interconnected buildings constructed since 1867. The total gross floor area of the site is approximately 7,072 m^2. The new school is currently under construction, with details provided in Chapter 4.

The site provided a small car park with access via a 3.0m wide entry/exit driveway from Cleveland Street.

2.3 Road network

The key roads around the site are discussed below.

Cleveland Street runs along the southern frontage of the site and connects City Road at the west with areas to the east of South Dowling Street/ANZAC Parade. It is the first reasonably direct east-west road south of Park Street in the city, and as such it carries substantial volumes of traffic. It intersects with a number of north-south roads.

Chalmers Street, which runs along the eastern frontage of the site, is a one-way northbound road from Redfern to Central, where it merges with Elizabeth Street.

Elizabeth Street, is a one-way southbound road (south of Foveaux Street), approximately 170m east of the site and parallel with Chalmers Street, which connects the northern part of the CBD with Bourke Street at Waterloo.

Chalmers Street and Elizabeth Street form a one-way pair, with outbound bus routes using Elizabeth Street and inbound[1] buses using Chalmers Street.

Approximately 350m west of the site is the intersection of Cleveland Street and Regent Street, which provides a major north-south movement function south of Cleveland Street, and, north of Cleveland Street, Regent and Abercrombie Street form a one-way pair (Regent Street is southbound and Abercrombie Street is northbound). It forms a part of a road alignment along the western side of the CBD, through Ultimo and Pyrmont, linking to ANZAC Bridge and to the Western Distributor, into the CBD or across the eastern harbour crossings.

[1] Inbound and outbound used here denote: into the CBD and out of the CBD respectively.

In addition to these major roads, local streets south and east of the site, as well as to the west of Regent Street, provide good pedestrian permeability and good levels of pedestrian amenity (see Section 2.6 below). Streets such as Pitt Street and George Street, south of Cleveland Street, provide good quality pedestrian conditions, with lower levels of vehicular traffic, supporting facilities and provide an attractive alternative for pedestrians to the use of busier roads. Similar conditions are found elsewhere around the site.

2.4 Transit

2.4.1 Rail

The site is within walking distance of both Central Station (approximately 420m via Chalmers Street) and Redfern Station (approximately 780m via Redfern Street, Pitt Street).

The rail services on offer at these two locations provide very broad coverage of the Sydney metropolitan area. Almost all rail services in Sydney call at Central Station and Redfern is similar, with the exception of the Airport Rail Line, which does not call at Redfern Station.

Also, there are bus connections between Inner Sydney High School and both Redfern and Central Stations (see next section).

2.4.2 Buses

Chalmers and Elizabeth Street support major bus corridors from the south and south east. In addition, routes 352 and 355 run along Cleveland Street, providing an 'inner cross regional' function, linking between Marrickville Metro and Bondi Junction.

Buses currently operating along Chalmers Street/Elizabeth Street are listed below with indicative frequencies[2] during school start and finish times:

- **Route 305** – this was Mascot to Railway Square, this terminates at Redfern
- **Route 308** – Marrickville to Central Eddy Ave via Chalmers Street and Elizabeth Street (3 per hour outbound in the morning and 3 to 4 per hour in the afternoon 4 per hour inbound in the morning and 2 to 4 per hour in the afternoon)
- **Route 309** – Banksmeadow to Central Railway Square (5 to 6 per hour inbound and outbound in the morning 6 per hour outbound and inbound in the afternoon)
- **Route 310X** – Banksmeadow to Central Railway Square (6 per hour inbound in the morning 5 per hour outbound in the afternoon after 4pm), inbound this operates express from Green Square to Devonshire Street, outbound it operates express from Elizabeth Street at Devonshire Street to Green Square
- **Route 343** – Kingsford to Chatswood (6 to 12 per hour outbound in the morning and 6 to 12 in the afternoon, 13 to 22 per hour inbound in the morning and 12 to 13 per hour in the afternoon)
- **Route 372** – Coogee to Central Railway Square (6 to 8 per hour outbound in the morning and 4 to 5 per hour in the afternoon, 4 to 6 per hour inbound in the morning and 5 per hour inbound in the afternoon)

[2] Indicative frequencies are generally the number of services past the site in the morning from 7am to 8am and from 8am to 9am and in the afternoon from 3pm to 4pm and from 4pm to 5pm. Here, inbound means to the north (into the CBD) and outbound means to the south (out of the CBD). The information on the bus network is taken from timetables current as at August 2019 from https://transportnsw.info/routes/bus. Note all of this information is subject to change without notice and with the forthcoming opening of the CBD & South East LRT there are likely to be major amendments to a number of these services, especially those in the LRT's corridor; these amendments may then require further adjustment as the market develops and responds to LRT and modified bus networks in this part of Sydney. This information is provided in this section to characterise transit around the site.

- **Route 393** – Little Bay to Central Railway Square via Maroubra and Kingsford (3 to 4 per hour outbound in the morning and 5 to 10 per hour in the afternoon, 2 to 9 per hour inbound in the morning and 4 to 10 per hour in the afternoon)
- **Route X93** – Little Bay to Central Railway Square – an express with closest set down to site at Chalmers Street and Devonshire St and closest boarding at Elizabeth Street and Devonshire Street (5 outbound per hour from 4pm and 3 to 5 per hour inbound in the morning)
- **Route 395** – Maroubra Beach to Central Railway Square (2 per hour outbound in the morning and 3 to 4 per hour in the afternoon, 3 to 4 per hour inbound in the morning and 2 per hour in the afternoon)
- **Route M20** – Botany to Gore Hill (5 to 6 per hour outbound in the morning and 5 per hour in the afternoon, 7 to 8 per hour inbound in the morning and 5 to 6 per hour in the afternoon)
- **Route M50** – Coogee to Drummoyne (5 per hour outbound in the morning and afternoon, 6 per hour inbound in the morning and 4 to 6 per hour in the afternoon).

These services are accessed from a bus stop on Chalmers Street (adjacent to the Inner Sydney High School bus stop #201015) for northbound and from a bus stop on Elizabeth Street (approximately 250m walk from the Inner Sydney High School bus stop #201082) for southbound. The services provide a reasonably broad coverage of the district around the school. During school start and finish times there is a bus roughly every two minutes in each direction along the north south corridor (Chalmers Street and Elizabeth Street).

Cleveland Street bus services:

- **Route 352** – Marrickville to Bondi Junction via Cleveland Street, Crown Street and Oxford Street (2 to 3 services an hour each way)
- **Route 355** – Marrickville to Bondi Junction via Erskineville, Alexandria and Redfern then Cleveland Street, Lang Road, Oxford Street (2 to 3 services per hour each way).

Adjacent to Central Station, at Eddy Avenue and at Railway Square, additional extensive bus networks can be accessed. These nodes are approximately 700m from the site, but can be accessed by combining a short journey on an inbound service on Chalmers Street and a walk, and vice versa in the other direction (on Elizabeth Street).

In addition, bus operators provide a set of school bus services in the general area (e.g., Cleveland Street High from Chalmers Street at Central Station).

2.4.3 Light rail

Light rail services operate between Central Station and Dulwich Hill, and can be accessed from Central Station. A number of bus services operating along Chalmers Street and Elizabeth Street connect to Railway Square via Eddy Avenue, making a connection to this existing light rail service.

2.5 Bicycles

The following figure provides a summary of the bicycle network in the general area around Inner Sydney High School.

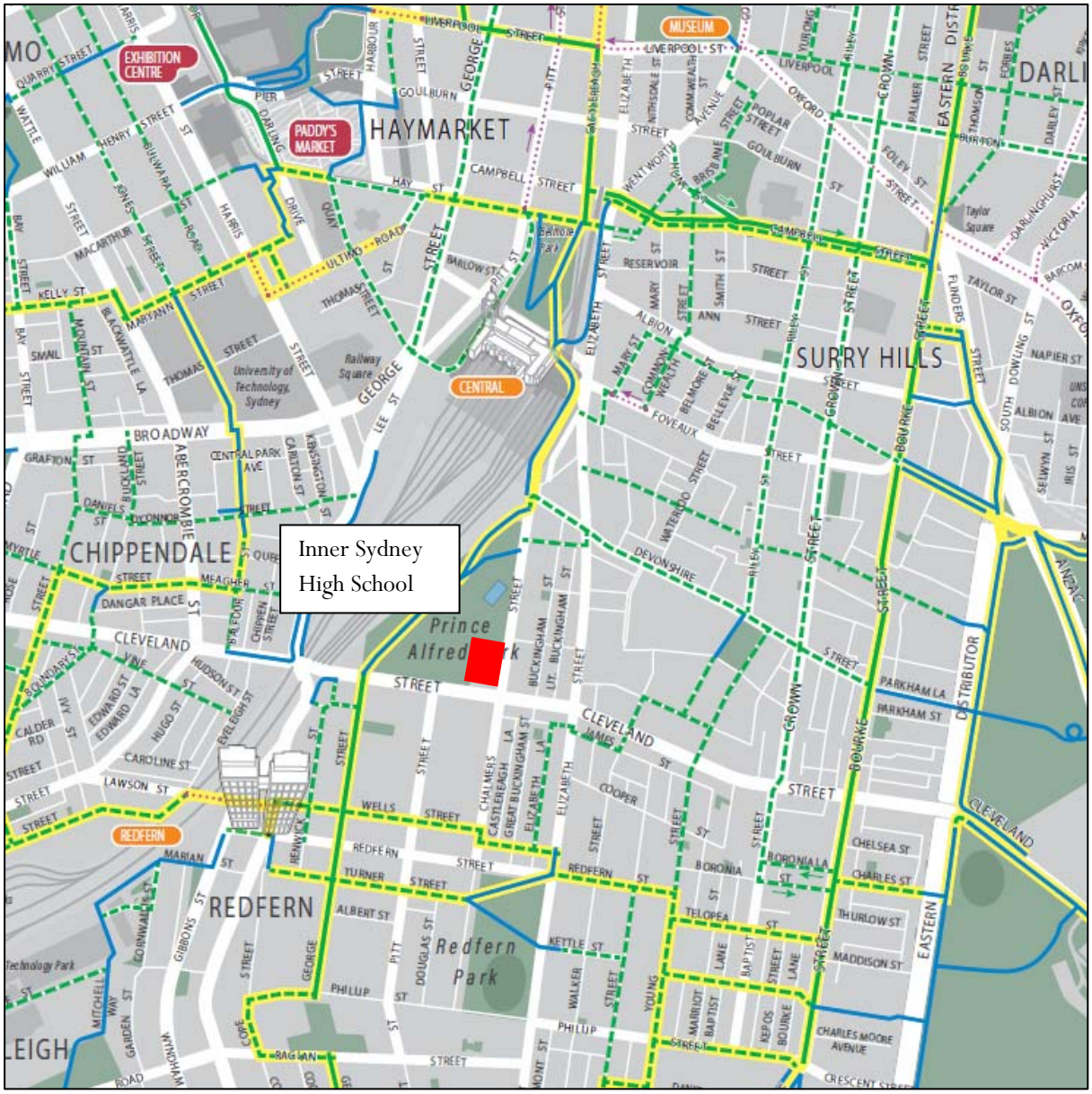

FIGURE 2 – EXISTING BICYCLE FACILITIES WITH KEY BELOW (ACCESSED FROM HTTPS://WWW.CITYOFSYDNEY.NSW.GOV.AU/EXPLORE/GETTING-AROUND/CYCLING/SYDNEY-CYCLING-MAP)

Site inspections in September 2017 and August 2019 of the bicycle facilities indicated a high standard of connectivity around the school environs, with links through parks (such as Prince Alfred Park and Redfern Park) that align with on-street links.

The bicycle path along George Street is a good example of the high-quality facilities available in the area around the subject site. It is on-street with segregation from vehicular traffic within a traffic calmed environment with high amenity. This route connects with east-west links, including quiet streets, such as Stirling Street and Short Street, as well as with busier streets such as Redfern Street. At Cleveland Street, this route connects into Prince Alfred Park, which provides an off-street connection to the subject site.

The bicycle network around the site also has a high level of regulatory and way-finding signage.

The existing bicycle network in the general area around Inner Sydney High School is considered to be of high utility.

2.6 Pedestrians

The site is located in an existing pedestrian network with full width footpaths provided in both Chalmers Street and Cleveland Street.

The signalised intersection of Chalmers Street and Cleveland Street, immediately adjacent to the school, provides signal-controlled pedestrian facilities on all approaches. Other signal-controlled intersections around the site include pedestrian facilities, including:

- Cleveland Street and Pitt Street
- Cleveland Street and George Street
- Cleveland Street and Regent Street
- Cleveland Street and Walker and Wilton streets
- Cleveland Street and Marlborough Street
- Redfern Street and Chalmers Street
- Redfern Street and Pitt Street
- Redfern Street and George Street

There are also signal-controlled pedestrian crossings at:

- Chalmers Street near Devonshire Street
- Chalmers Street south of Eddy Avenue.

As with bicycle facilities, generally pedestrian conditions around the site are considered to be of a high standard in terms[3] of:

- Amenity – there is extensive traffic calming, considerable effort has been invested in the quality of the urban design in the public realm, many of the links have a canopy for shade provided by trees and there is generally a medium to high degree of activation and passive surveillance during the day
- Pedestrian facilities, especially crossings, are located on desire lines
- Grades, especially to the south of the subject site, are modest, making walking comfortable and easy
- There are parks and pocket parks (e.g., Reconciliation Park at the corner of James Street and George Street) that are integrated into the pedestrian network, increasing amenity
- The surface of the footpaths is generally of a high standard and there is a minimal level of footpath clutter

[3] These comments are based on a site visit, focussing on the areas south of the site, east of the site and either side of Cleveland Street west to City Road.

- There is extensive traffic management which seeks to reduce traffic speeds and intrusion; this includes measures such as selected closures, one-way arrangements, speed humps and threshold treatments and managed on-street parking
- Pedestrian permeability of the network is reasonable, although the rail corridor has limited crossing points.

These pedestrian conditions are attractive for people to walk to Inner Sydney High School and would encourage walking as a mode between the school and the two rail stations (Central Station and Redfern Station).

2.7 Journey to work

2.7.1 Journey to Work – 2011 Census

The Census of Population and Housing, conducted by the Australian Bureau of Statistics (ABS), collects information about commuters' mode of travel to work. This information is processed to small areas, called travel zones, by TfNSW. The most recent journey to work dataset available from TfNSW is from the 2011 Census. This information is useful to gauge the relative accessibility of a small area by different modes.

The figure below shows Inner Sydney High School in the context of surrounding travel zones. Travel zones 200, 201, 209, 210, 211 and 212 were selected for analysis as being the closest adjacent zones to the site being within 800 metres of the site.

Journey to work information for selected travel zones is summarised in the following tables, the first for workers who reside in these zones and the second for workers who work in these zones.

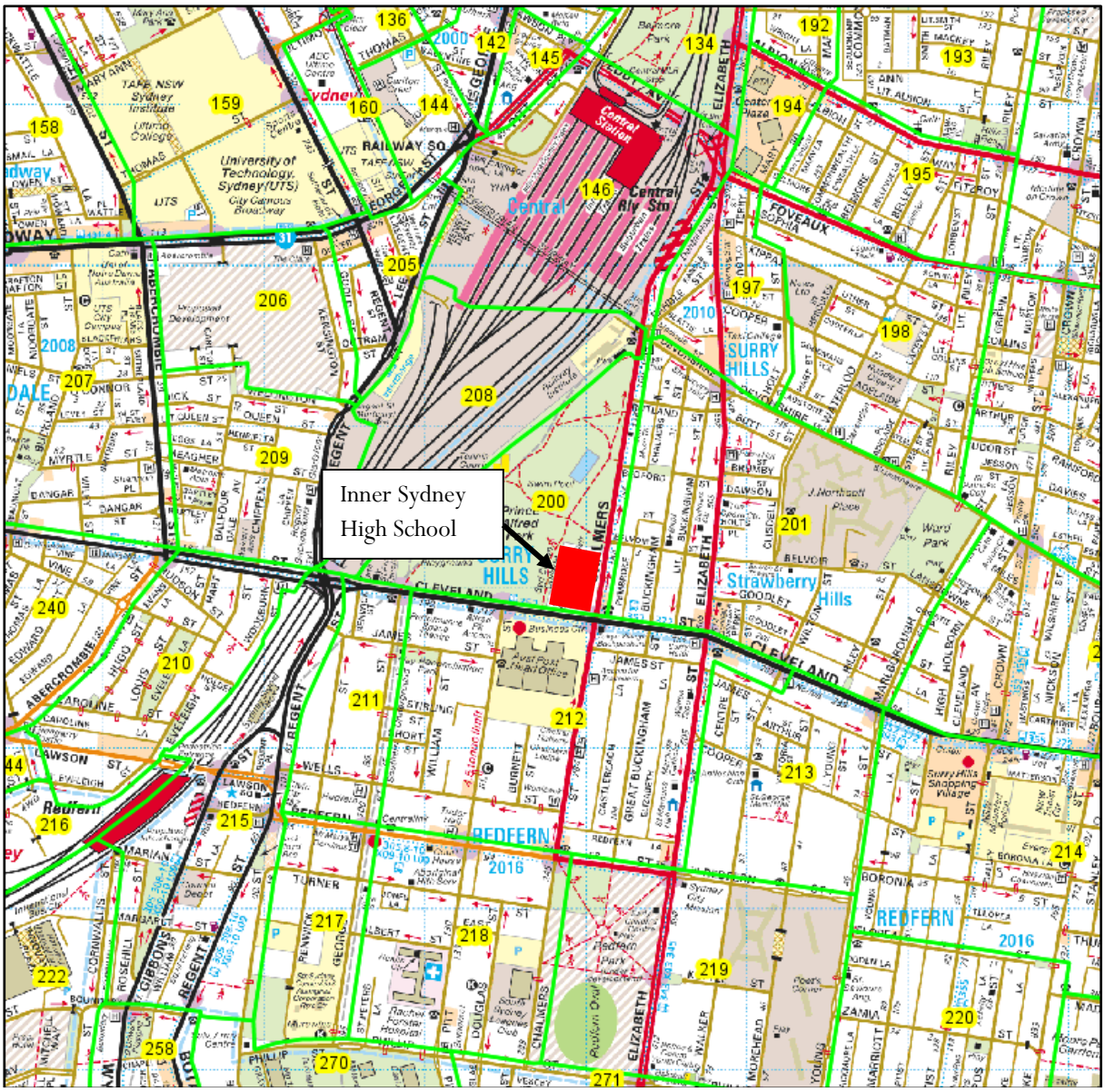

FIGURE 3 – TRAVEL ZONES AROUND SITE, 2011 GEOGRAPHY (SOURCE: TFNSW SHAPEFILE)

TABLE 1 – JOURNEY TO WORK FOR RESIDENT WORKERS TRAVELLING FROM TRAVEL ZONES AROUND SITE, 2011 (COUNT & % OF THOSE WHO TRAVELLED)

Travel Zone	Train	Bus	Tram/ Ferry	Vehicle driver	Vehicle passenger	Other Mode	Walked Only	Worked at Home /Did not go to work	Mode not stated	Total
200	0	0	0	0	0	0	3	0	0	3
201	359	181	7	247	27	61	367	121	12	1382
209	61	58	0	61	0	27	82	36	0	325
210	142	17	0	105	6	27	94	48	8	447
211	199	41	3	82	12	36	118	53	0	544
212	275	164	5	266	37	96	322	172	17	1354
Total	**1036**	**461**	**15**	**761**	**82**	**247**	**986**	**430**	**37**	**4055**

Mode shares of those who travelled to work on census day…

Travel Zone	Train	Bus	Tram/ Ferry	Vehicle driver	Vehicle passenger	Other Mode	Walked Only
200	0%	0%	0%	0%	0%	0%	100%
201	29%	14%	1%	20%	2%	5%	29%
209	21%	20%	0%	21%	0%	9%	28%
210	36%	4%	0%	27%	2%	7%	24%
211	41%	8%	1%	17%	2%	7%	24%
212	24%	14%	0%	23%	3%	8%	28%
Total	**29%**	**13%**	**0%**	**21%**	**2%**	**7%**	**27%**

Source: 2011 JTW_Table12_V1, TfNSW

The above information indicates there were just over 4,000 resident workers in the zones around the site (with few residents in the travel zone containing the site[4]). This area has a very high proportion of commuters who walk to work, at 27%. Public transport (train and bus) is the key method of travel to work.

TABLE 2 – JOURNEY TO WORK FOR WORKERS TRAVELLING TO TRAVEL ZONES AROUND SITE, 2011 (COUNT & % OF THOSE WHO TRAVELLED)

Travel Zone	Train	Bus	Tram/ Ferry	Vehicle driver	Vehicle passenger	Other Mode	Walked Only	Worked at Home /Did not go to work	Mode not stated	Total
200	49	20	0	62	0	0	10	21	0	162
201	1034	292	15	771	96	117	288	293	45	2951
209	245	99	0	313	26	41	90	68	13	895
210	116	15	0	165	9	12	34	50	6	407
211	197	34	0	208	19	16	45	93	4	616
212	788	158	5	773	62	83	185	239	26	2319
Total	**2429**	**618**	**20**	**2292**	**212**	**269**	**652**	**764**	**94**	**7350**

Mode shares of those who travelled to work on census day…

Travel Zone	Train	Bus	Tram/ Ferry	Vehicle driver	Vehicle passenger	Other Mode	Walked Only
200	35%	14%	0%	44%	0%	0%	7%
201	40%	11%	1%	30%	4%	4%	11%
209	30%	12%	0%	38%	3%	5%	11%
210	33%	4%	0%	47%	3%	3%	10%
211	38%	7%	0%	40%	4%	3%	9%
212	38%	8%	0%	38%	3%	4%	9%

[4] For cells with small numbers, such as travel zone 200, a process of randomisation is applied by ABS to assist to preserve confidentiality and protect privacy of respondents: a reported frequency of 3 could mean an actual frequency of 0, 1, 2, 3 or 4.

Total	**37%**	**10%**	**0%**	**35%**	**3%**	**4%**	**10%**

Source: 2011 JTW_Table13_V1, TfNSW

For people working in the zones around the subject site, transit is the key mode of travel. Of note, given that there are substantially more jobs (approximately 7,350 jobs) compared with resident workers (approximately 4,055 resident workers) implying the need for a large proportion of workers to travel into the area, the proportion who walked to work, at 10%, is considered high.

For the zones around the subject site, approximately 23% of resident workers used car to travel to work and approximately 39% of people who worked in these zones used car to travel to work. By way of comparison, car mode shares for Sydney as a whole in the 2011 Census was 68% and for Sydney – City and Inner South 36%.

2.7.2 Journey to Work – 2016 Census

Journey to work information for the 2016 Census was obtained from ABS (currently this is not available from TfNSW[5]) to provide a review of more recent commuter travel behaviour around the site. There are some differences in the spatial extent of the data, definitions and processing steps between ABS and TfNSW. Nonetheless the analysis presented below is considered useful and important in order to understand how commuters travelled from and to the area around the site in 2016.

Travel by commuters who reside in the area around the site is summarised in the table below.

TABLE 3 – JOURNEY TO WORK FOR RESIDENT WORKERS TRAVELLING FROM STATISTICAL AREA 1S[6] (SA1) AROUND SITE, 2016 (COUNT & % OF THOSE WHO TRAVELLED)

Public Transport	Active	Vehicle	Other	Total
1528	938	682	17	3165
48%	30%	22%	1%	100%

Source: ABS, TablebuilderPro, Place of enumeration, 2016

In comparison with 2011 mode shares reported in Table 1, the mode shares in Table 3 for 2016 indicate that:

- Public transport had increased its share from 42% to 48%
- Vehicle's share decreased from 23% to 22%.

Generally, public transport has become a more important mode for people living around the site for their commute.

TABLE 4 – JOURNEY TO WORK FOR WORKERS TRAVELLING TO DESTINATION ZONES[7] (DZN POW) AROUND SITE, 2016 (COUNT & % OF THOSE WHO TRAVELLED)

Public Transport	Active	Vehicle	Other	Total
4186	961	2346	35	7528
56%	13%	31%	0%	100%

Source: ABS, TablebuilderPro, Place of work, 2016

In comparison with 2011 mode shares reported in Table 2 above, the mode shares in Table 4 for 2016 indicate that:

- Public transport had increased its share from 47% to 56%
- Vehicle's share decreased from 38% to 31%.

[5] Refer to https://opendataforum.transport.nsw.gov.au/t/journey-to-work-jtw-2016/1470/17

[6] SA1s covered by data in the table are: 1133633, 1133608, 113536, 113537, 1133607,1133606, 1133635, 1133515, 1133524, 1133601, 1133526, 1133543, 1133544, 1133534, 1133533, 1133536, 1133537

[7] DZNs covered by data in the table are: 113350002, 113361224, 113361225, 113351263, 113361262, 11335161

This data also indicates that journey to work vehicle travel for people who work in the area around the site has declined in absolute terms from2,504 to 2,346, which implies that not only did non-car modes 'win' all the growth in commuter travel between 2011 and 2016, but that non-car modes also 'won' trips from existing vehicle-based commuters.

Even with the differences between the two data sets' spatial extent, definitions and processing, the above change in mode shares away from vehicle to public transport and active modes is substantial and indicates that the area around the site is becoming less dependent on the private car for commuter travel.

2.7.3 Summary

For travel zones around the subject site, commuters tend to rely on transit and walking as their mode of travel, and recent trends indicate this is increasing.

2.8 Local land use

Based on Census information and sophisticated demographic models, TfNSW produces projections of population and employment for small areas (which are the travel zones described in the previous section). This information was extracted for the zones around the site, to provide a demographic baseline for this area, which is in Table 5.

TABLE 5 – POPULATION AND EMPLOYMENT IN TRAVEL ZONES AROUND SITE, 2011 AND 2016 (COUNT)

Travel Zone	ERP 2011	ERP 2016	Jobs 2011	Jobs 2016
200	0	8	190	160
201	3,156	3,314	3,499	4,111
209	660	887	1,052	1,418
210	816	1,053	480	685
211	907	884	694	658
212	2,087	2,260	2,770	2,872
Total	**7,625**	**8,407**	**8,685**	**9,904**

Note: ERP is estimated resident population; Source: TfNSW 2016v1.51 small area land use

In summary, there are approximately 8,400 residents and 10,000 jobs within approximately 800m of Inner Sydney High School.

Projections of population and employment are presented in Chapter 3.

The land around Inner Sydney High School is in a mix of uses, with residential and employment land, as well as open space, such as the adjoining Prince Alfred Park.

3.0 Future Conditions

3.1 Land use projections

Small area land use projections over the next twenty years produced by TfNSW for the local area surrounding the site are summarised in the two tables below.

TABLE 6 – PROJECTED POPULATION IN TRAVEL ZONES AROUND SITE, 2016 TO 2036 (COUNT)

Travel Zone	ERP 2016	ERP 2021	ERP 2026	ERP 2031	ERP 2036
200	8	8	8	8	9
201	3314	3455	3493	3516	3534
209	887	899	912	929	946
210	1053	1215	1314	1458	1645
211	884	933	936	953	976
212	2260	2363	2391	2420	2453
Total	**8407**	**8874**	**9053**	**9284**	**9563**

Note: ERP is estimated resident population Source: TfNSW 2016v1.51 small area land use projections

TABLE 7 – PROJECTED EMPLOYMENT IN TRAVEL ZONES AROUND SITE, 2016 TO 2036 (COUNT)

Travel Zone	Jobs 2016	Jobs 2021	Jobs 2026	Jobs 2031	Jobs 2036
200	160	184	190	200	209
201	4111	4391	4674	4976	5268
209	1418	1433	1369	1413	1438
210	685	781	1640	2290	3106
211	658	745	988	1042	1098
212	2872	3054	3178	3336	3484
Total	**9904**	**10589**	**12039**	**13257**	**14604**

Source: TfNSW 2016v1.51 small area land use projections

Over the next twenty years, these projections indicate modest population growth of approximately 14% in total, and strong employment growth of around 50% in total, in the environs of the site. These projections of employment and population show similar overall growth over twenty years to the earlier series summarised in the 2017 Draft GTP for the Inner Sydney High School.

3.2 Transit

3.2.1 Light Rail

The new CBD & South East Light Rail is currently under construction and is due for completion in 2019 or 2020[8]. Its services will operate between Circular Quay and Randwick and between Circular Quay and Kensington and Kingsford, via Central Station. Its alignment is to the east of the site and is shown in the figure below.

[8] Testing of the alignment with rolling stock has been in progress for a number of months, and once this is completed satisfactorily, services would be expected commence soon after. Opening is expected to be staged, with the first stage between Circular Quay and Randwick likely to open prior to Christmas 2019 and the second stage to Kensington and Kingsford likely to open around March 2020. There will be several stages of bus network adjustments around the opening of the LRT

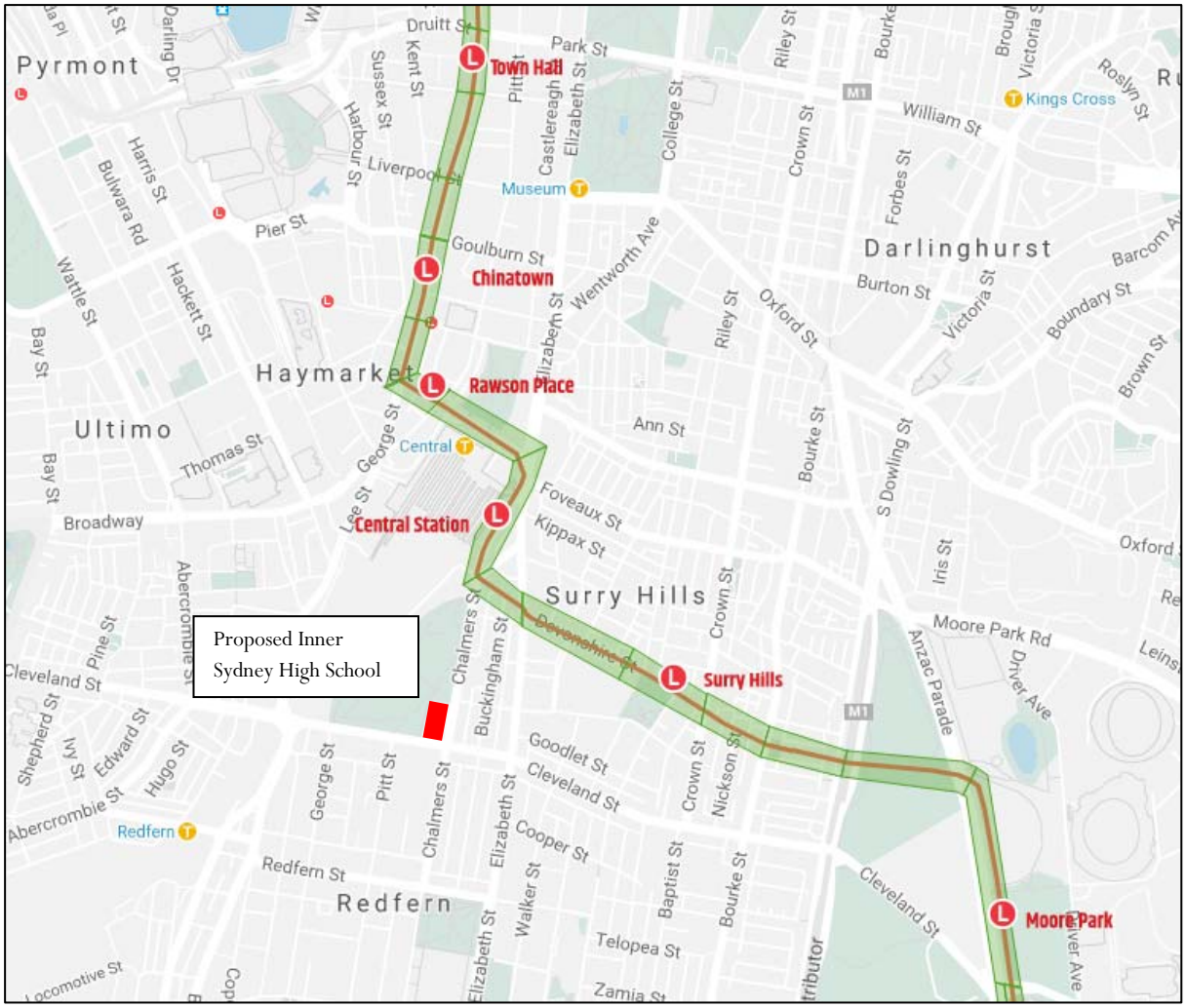

FIGURE 4 – LIGHT RAIL ALIGNMENT (SOURCE: HTTPS://SYDNEYLIGHTRAIL.TRANSPORT.NSW.GOV.AU/MAP)

The Central Chalmers Street LRT stop is located some 500m walk north along Chalmers Street from the site, whilst the Surry Hills stop is approximately 600m walk along Belvoir Street, generally east from the site, and entails a grade for part of the walk.

3.2.2 Ongoing rail development

In addition to ongoing improvements to rail services, such as additional rolling stock, upgrades to stations and additional capacity, such as duplications, third tracks and crossovers, very large rail projects are in the pipeline.

Since the 2017 Draft GTP was prepared, Sydney Metro has opened in the north west, connecting the Rouse Hill area, through Norwest Business Park, Castle Hill, Macquarie University and Macquarie Park to Chatswood, with heavy rail connections at Epping and Chatswood. While still in its early ramp-up stage (as at October 2019), indications are that it has had a substantial beneficial impact on travel in that part of Sydney. It also demonstrates that these major projects are not simply lines on a map.

The Sydney Metro City & South West is a project currently under construction to provide substantial increases in passenger capacity and service levels, with the alignment running from Rouse Hill to Bankstown via the CBD – as mentioned above, the section from Rouse Hill to Chatswood is complete and in operation. In the broader area

around the subject site this Metro will provide an additional station at Waterloo, as well as serving Central Station. The project's indicative timeline has completion by 2024[9].

The Sydney Metro West project is in planning and would provide additional capacity between the CBD and Parramatta. This would reinforce the accessibility of the general area around the site[10].

These projects would all contribute to an improvement in transit accessibility for the CBD and for the area around Central Station, including the subject site. They are also likely to reduce overall car dependence in their broader corridors, further transitioning Sydney to a 'transit city'.

3.2.3 Bus networks and services

Bus networks are amended and service levels adjusted as part of normal bus network operation, under operators' contracts with TfNSW. It is expected that the forthcoming opening of the CBD and South East Light Rail line will result in the adjustment of a number of bus services in the area around the subject site.

Discussion with TfNSW indicated that in broad terms the bus route changes would be:

- Stage 1 – opening from Circular Quay to Randwick would result in reduced bus services from the City to University of NSW.
- Stage 2 – opening from Circular Quay to Kensington and Kingsford would result in reduced bus service from the City along ANZAC Parade corridor, possibly a month or two after the opening of Stage 2.

Based on experience elsewhere in Sydney, HRA considers it is likely that a further adjustment to bus services/networks would occur around the end of 2020, to better tailor bus resources to reflect the market and operational conditions that emerge as the LRT system 'beds in'. This further set of amendments might be restricted to minor frequency change son a small number of routes to a more substantial network change.

Further, as the general area's population increases, and if this leads to additional bus patronage, bus service levels would be expected to increase over time, subject to other transport network developments.

3.2.4 School transport arrangements

It is worth noting that the NSW Government operates a School Student Transport Scheme which provides free travel to and from school on public transport, if the students meet certain eligibility criteria in terms of the distance from their home to school[11]. Generally, if students live close to their school, they do not qualify for free travel to and from school under the scheme. However, they can obtain a School Term Bus Pass which provides bus travel at a discounted price for the whole school term.

3.3 Cycle path missing links

A recent announcement[12] by the NSW Government and Sydney City Council identified four 'missing links' in the CBD cycle network that would be constructed. These were:

- Between Bank St and Miller St at Pyrmont
- At the western end of Liverpool St in the City
- Chalmers St between Prince Alfred Park and Cooper St, Surry Hills – this is particularly useful, connecting cycleways within the CBD with Inner Sydney High School

[9] https://www.sydneymetro.info/citysouthwest/project-overview
[10] https://www.sydneymetro.info/west/project-overview
[11] For high school students the criteria are: straight line distance from home address to is more than 2km; the walking distance from home to school is 2.9 km or further. Refer to: https://apps.transport.nsw.gov.au/ssts/#/whoIsEligible#scrollTarget3
[12] https://www.abc.net.au/news/2019-08-29/moore-constance-announce-sydney-bike-paths/11459678

- Lawson St, Redfern, across the rail corridor, between Eveleigh St and Gibbons St

4.0 Proposed Development

4.1 Proposal description

The following project description is from the SSD report for Inner Sydney High School and provides a summary of the key elements of the project:

The NSW Department of Education (DoE) is preparing a State Significant Development Application (SSD 16_7610) for the development of a new 'Inner Sydney High School' (ISHS) located at the corner of Cleveland Street and Chalmers Street, Surry Hills (the 'site'), identified as 244 Cleveland Street, Surry Hills.

The new ISHS is proposed to accommodate up to 1,200 students to take enrolment pressure off surrounding high schools exceeding student capacity, and accommodate future population growth within the City of Sydney local government area. The high school will contain high quality learning, collaborative learning spaces and associated facilities.

Specifically, this proposal seeks development consent for the following works at the site:

- *Internal reconfiguration and refurbishment of the existing heritage listed buildings on the site to create:*
    - *Collaborative learning hubs with a combination of enclosed and open spaces;*
    - *Amenities and support areas; and*
    - *Workplaces and lounge spaces for teachers and administrative staff.*
- *Construction of a 13-storeys plus roof level and basement (approximately 56.5m from park level), multi-purpose school building, containing:*
    - *Collaborative learning hubs with a combination of enclosed and open spaces;*
    - *Library;*
    - *Staff workplaces;*
    - *Student canteen;*
    - *Indoor gymnasium and other indoor recreation and performance spaces;*
    - *Ancillary outdoor learning and recreational areas.*
- *Associated site landscaping and public domain improvements; and*
- *114 bicycle parking spaces*
- *Augmentation and construction of ancillary infrastructure and utilities as required.*

We understand that Inner Sydney High School would commence operation in a staged manner over several years, as student numbers increase[13]. This staging is now expected to take the following form:

- 2020 – school commences with approximately 180 students in Year 7
- 2021 – school has Year 7 and Year 8 – both years of approximately 200 students each
- … school adds a new Year 7 cohort each year
- 2025 – school has Years 7 to 12, each of approximately 200 students, with approximately 1,200 students in total.

The proposed school would have core operating hours, with additional activities occurring before school and after school. The extent and timing of these activities would be determined[14] by the school on an ongoing basis. As an indication we were provided with information in 2017 by the Department of Education in relation to before and after school activities at an existing inner Sydney high school:

[13] This is based on discussions with representatives of the Education Department held on 30 July 2019 at the office of Root Partnership

[14] In Years 11 and 12 classes before and after school are generally required to provide a broad range of subject choices, and this would vary as student preferences for different subjects is likely to change over time.

- Years 7 to 10
    - approximately 10 per cent of students attend before school for sport and music
    - less after school – down to 2 per cent of students
- Years 11 to 12
    - early morning classes, sport and music each morning, about 20 per cent of students;
    - in the afternoon classes, about 20 per cent of students, three afternoons per week till around 4.30pm.

4.2 School catchment

The following figure indicates the school's catchment edged in purple and lightly shaded.

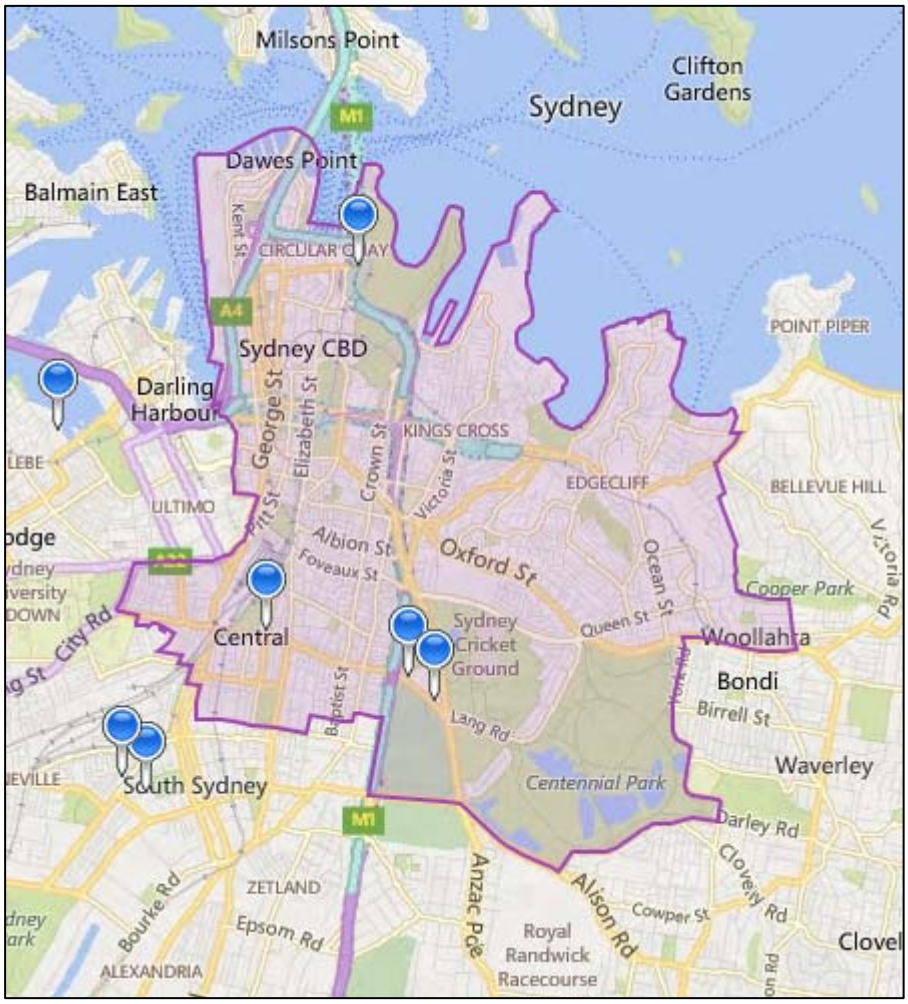

FIGURE 5 – INNER SYDNEY HIGH SCHOOL CATCHMENT AREA (SOURCE: HTTPS://AMSWEBAPPS.DET.NSW.EDU.AU/AMSWEBAPPS/EGIS/ISHS_CATCHMENT.PHP)

Our understanding is that from 2020, the NSW Department of Education is seeking to more rigidly manage out-of-area school enrolments. This is expected to result in higher proportions of students at government schools living 'in-area', with this proportion progressively increasing from 2020 at most government schools, as school-year cohorts move through the school over time.

In addition to the school catchment definition above, we were provided with a list of residential postcodes of students enrolled in Year 7 2020 at Inner Sydney High School. These postcodes are tabulated below.

TABLE 8 – RESIDENTIAL POSTCODE OF STUDENTS ENROLLED IN YEAR 7 2020 INNER SYDNEY HIGH SCHOOL

Postcode [1]	Suburb [1]	Proportion [2]
2000	Dawes Point	0.0%
2000	Haymarket	14.4%
2000	Millers Point	0.5%
2000	Sydney	15.5%
2000	The Rocks (nil enrolments 2020)	4.0%
2008	Chippendale	6.5%
2010	Darlinghurst	4.3%
2010	Surry Hills	10.2%
2011	Elizabeth Bay	2.3%
2011	Potts Point	2.4%
2011	Rushcutters Bay	0.0%
2011	Woolloomooloo	5.6%
2016	Redfern	15.3%
2021	Centennial Park	2.3%
2021	Paddington	8.4%
2025	Woollahra	3.5%
2027	Darling Point	1.2%
2027	Edgecliff	1.4%
2028	Double Bay	2.3%

Source: (1) Inner Sydney High School; (2) proportion is based on 2016 Census analysis of state suburb for students attending government secondary school, from ABS TableBuilder (counting persons place of enumeration); note that the suburbs of Moore Park and Barangaroo fall within the school's catchment but have no enrolments for 2020 and had no students attending government secondary schools in the 2016 Census; The Rocks has no enrolments in 2020, but did have students attending government secondary schools in the 2016 Census, and hence has been included above.

The proportion column is drawn from the 2016 Census (secondary students attending Government schools) within the school catchment. This has been used as opposed to using actual enrolments for privacy reasons and also to capture a broader spread of longer term enrolments as the school population ramps up to full capacity on 2025.

Further investigation of transport conditions in the school catchment are discussed in the next chapter.

5.0 GTP Objectives and Mode Share Target Formulation

5.1 General

This chapter sets out objectives for the GTP and then formulates mode share targets.

As part of target formulation an accessibility analysis was prepared, which apart from supporting these targets setting identified some interesting aspects of transport services within the school's catchment. These findings are summarised in this chapter.

There is also further discussion of opportunities to:

- spread peak demand and a summary of how these can assist to reduce the impact of the development on transport services.
- analysis of the applicability of the School Student Transport Scheme (SSTS) to Inner Sydney High School's catchment.

5.2 Objectives

The key objectives of this GTP are to:

- reduce reliance on the car within the school community by encouraging walking, cycling and use of transit
- raise awareness of travel alternatives to ensure that, as a far as practical, students, staff and visitors make the most of the wealth of transport options available at this site
- reduce overall vehicle trips for journeys to and from the site
- reduce impacts on transport networks and services by seeking to spread peak demands over time.

5.3 Mode Share Target Formulation

Mode share targets were formulated in two stages:

- The first examines car mode share
- The second develops ranges of likely mode shares for the individual non-car modes.

5.3.1 Car mode share target

When considering setting targets for travel to Inner Sydney High School it is useful considering how students currently travel to and from high schools in inner Sydney. Mode choice surveys at other high schools in inner Sydney reported by Positive Traffic in *Proposed Inner Sydney High School, 244 Cleveland Street, Surry Hills – Transport and Accessibility Impact Assessment Report*, June 2017, are summarised below.

TABLE 9 – SYDNEY SECONDARY COLLEGE LEICHHARDT CAMPUS – MODE SHARE SURVEY SUMMARY

	Train	Self Drive	Car drop off	Motor cycle	Bus	Walk	Bicycle	Ferry	Light rail	Other
To school										
Students	5%	0%	9%	0%	42%	30%	3%	0%	10%	1%
Staff	0%	85%	0%	4%	4%	8%	0%	0%	0%	0%
From school										
Students	6%	0%	4%	0%	46%	30%	1%	0%	12%	1%
Staff	0%	85%	0%	4%	4%	8%	0%	0%	0%	0%

Source: Positive Traffic

TABLE 10 – JJ CAHILL MEMORIAL HIGH SCHOOL, MASCOT – MODE SHARE SURVEY SUMMARY

	Train	Self Drive	Car drop off	Motor cycle	Bus	Walk	Bicycle	Ferry	Light rail	Other
To school										
Students	3%	0%	25%	0%	21%	50%	1%	0%	0%	0%
Staff	6%	0%	16%	0%	26%	52%	0%	0%	0%	0%
From school										
Students	3%	0%	17%	0%	24%	55%	1%	0%	0%	3%
Staff	6%	0%	13%	0%	25%	50%	0%	0%	0%	6%

Source: Positive Traffic

TABLE 11 – SOUTH SYDNEY HIGH SCHOOL, MAROUBRA – MODE SHARE SURVEY SUMMARY

	Train	Self Drive	Car drop off	Motor cycle	Bus	Walk	Bicycle	Ferry	Light rail	Other
To school										
Students/ Staff	0%	10%	29%	2%	32%	24%	2%	0%	2%	0%
From school										
Students/ Staff	1%	9%	17%	2%	40%	28%	1%	0%	2%	0%

Source: Positive Traffic

The surveys identify a number of features of travel to and from high schools in inner Sydney:

- Car pick-up of students (at the end of the school day) tends to be less important than car drop-off of students at the start of the school day
- Car is a substantially more important mode for the schools at Mascot and Maroubra than for Sydney Secondary College at Leichhardt
- For students, walking and public transport (in these cases, it is bus in particular) are the dominant modes of transport
- Cycling is not a popular method of travel to and from school, despite its high level of accessibility in an urban setting.

Given the following conditions prevail at the subject site, namely:

- a high degree of public transport accessibility, including direct access to the heavy rail network,
- reasonable to good pedestrian and cycle conditions,
- dense local residential population,
- restrictions on car access,

it is expected that travel choices in terms of car use for students could be similar to, and perhaps lower than, those at the Sydney Secondary College, Leichhardt Campus. By way of comparison, using journey to work information as an indicator, the car driver commuter mode shares for the area around Inner Sydney High School and around Sydney Secondary College Leichhardt Campus in 2016 were:

- 27% car driver around Inner Sydney High School

- 73% car driver around Sydney Secondary College Leichhardt Campus[15].

This comparison indicates that car accessibility to Inner Sydney High School is substantially less than Sydney Secondary College Leichhardt Campus. As a result of this it is considered reasonable to reduce the car mode share to Inner Sydney High School below that at Sydney Secondary College Leichhardt Campus.

Therefore, a mode share target for students travelling to school by car of 5% and from school by car of 3% is considered appropriate to aim for in the first two years of school operation[16].

Beyond that timeframe (say, five years after opening), should there be background changes such as:

- ongoing improvements to transit accessibility in the area around the school, including the 'bedding in' of bus network amendments resulting from opening of the CBD & South East Light Rail
- extension of the network of cycle facilities around the school
- ongoing growth of the population close to the school

then, a review of these targets would be appropriate.

5.3.2 Non-car mode share targets

For travel to school by non-car modes, establishing targets was considered useful to provide a benchmark against which outcomes can be compared. This would provide a starting point for diagnostic action should the outcomes not meet expectations.

5.3.2.1 School catchment evaluation of non-car modes

Non-car modes within the school's catchment were reviewed to evaluate the available transport choices to/from the school (refer to Appendix A). The focus of this review is the availability of transit services and options (buses, trains and light rail), from 12 sub-areas of the catchment. Walking and cycling are considered in the immediate school environs.

The purpose of the catchment evaluation is to set out to try to identify available choices and if there are any substantial gaps in transit coverage of the catchment. However, the findings of this work suggest that the catchment is well covered by transit services, with the forthcoming CBD & South East light Rail providing additional travel choices. The following points provide a summary of this work:

- Most parts of the school's catchment are currently covered by several transit options.
- CBD & South East Light Rail would provide additional alternatives from parts of the catchment, especially from parts of the CBD and for journeys which might come into the CBD to access the heavy rail network. The LRT would take students to the school at Central Station Chalmers Street stop or the

[15] These mode shares are based on 2016 JTW counting persons at Place of Work using only those commuters who travelled on Census Day for mode16, for the following ABS state transport destination zones:

- Inner Sydney High School – DZNs: 113350002, 113361224, 113361225, 113351263, 113361262, and 11335161
- Sydney Secondary College Leichhardt Campus – DZNs: 113882675, 113882676, 113882677, 113882679, and 113882680

[16] The conditions of consent listed in Chapter 1 indicate a concern regarding an apparent inconsistency between the mode share target listed here of 5% by car for the journey to school and the proportion used in *Proposed Inner Sydney High School, 244 Cleveland Street, Surry Hills – Transport and Accessibility Impact Assessment Report*, June 2017, of some 12.5% of students arriving at the school as car passengers. The Positive Traffic work is aimed at assessing impacts of the development and assessing whether these impacts could be accommodated; whereas the GTP is setting targets for mode share to car that the development, during its operation, will seek to achieve. As such, the difference in mode shares between the impact analysis and the GTP is to be expected. It is also worth noting that until recently the school's catchment was not known – which meant assessing traffic generation was more difficult (a larger southern catchment would have made it more likely that the school would be on the route to work for more families, perhaps boosting the use of car).

Surry Hills Stop on Devonshire Street, which is a similar distance to the school as Central Station. It is expected that some students (and their parents) may choose to use LRT to the Surry Hills stop (on Devonshire Street), whilst others may prefer to walk along Chalmers Street from Central Chalmers Street stop.

- The Oxford Street corridor has two particularly relevant bus routes that provide relatively direct bus services to Inner Sydney High School from parts of the catchment. These are:
    - Rt 352 along Oxford Street from Bondi Junction, via Crown Street and Cleveland Street
    - Rt 355 along Oxford Street from Bondi Junction, via Moore Park Road, Lang Road and Cleveland Street
- Rail services on the Eastern Suburbs Railway (primarily from Bondi Junction, Edgecliff and Kings Cross stations) provides a short travel time, independent of traffic congestion, and high frequency to Central Station, with a walk along Chalmers Street to Inner Sydney High School.
- Woolloomooloo and Potts Point – especially the northern part away from Kings Cross Station has areas with poor direct access to rail due to the grades. Bus rt 311 provides several options to access Inner Sydney High School from this area.
- There is a small residential pocket north of Bondi Junction (on the hill down to Cooper Park) which is very steep. This suggests that the morning trip to school could have a different structure to the journey home in the afternoon, so that students can walk down hill in the morning (to a bus to Edgecliff Station) and afternoon (a walk down from Bondi Junction Station).
- The bus services in parts of the catchment are likely to be amended to take account of the CBD & South East Light Rail which is opening in the near future; this needs to be kept in mind when considering travel options (refer to Section 3.2.3 for a discussion of potential changes).

The coverage of the catchment by transit is considered to be comprehensive.

5.3.2.2 Accessibility analysis of the school's catchment

An analysis of non-car mode accessibility within the school's catchment was undertaken to provide an indication of which modes provided better accessibility from different parts of the catchment. This was undertaken in order to establish likely underlying mode shares for non-car modes. This work is described in further detail in Appendix B. In brief, the analysis investigated the following non-car modes that are available to access Inner Sydney High School:

- Rail
- CSELR Light Rail
- Bus
- Bus access to rail
- Walk
- Cycle

The analysis examined travel from the whole catchment, disaggregated into small areas (zones) using ABS Statistical Area Level 1 (SA1s) to develop two measures of accessibility:

- Door to door travel time
- Door to door generalised cost, taking account of the various legs of journeys (e.g., walk to bus stop or train station, walk from bus stop or train station to Inner Sydney High School applying perceived cost penalty weights to relevant trip components).

Based on an initial analysis, cycle had particularly high accessibility[17]. Cycle's mode share was constrained to about 7% of non-car travel and the accessibility analysis re-run. A reference case and a sensitivity test were prepared to provide an indicative range of underlying accessibility by mode.

The results of the constrained accessibility analysis are summarised in the following table based on travel time, and on generalised cost for the reference case and for a sensitivity test (which reduced some of the penalty weight elements used in generalised cost formulation for transit journeys). The percentages represent the proportion of the population of secondary school students attending government schools in zones within the catchment which have the indicated mode as the most accessible, in terms of travel time or generalised cost.

Table 12 – Reference case constrained mode share estimates, for travel time and for generalised cost

Mode	Reference Case – accessibility measure using minimum travel time (constrained cycling)	Reference Case – accessibility measure using minimum generalised cost (constrained cycling)	Sensitivity Test – accessibility measure using minimum generalised cost
Rail	35%	32%	34%
LRT	18%	4%	18%
Bus	22%	17%	22%
Bus Rail	2%	2%	2%
Cycle	7%	7%	7%
Walk	16%	38%	17%
Total	**100%**	**100%**	**100%**

This analysis also provided some indicative estimates of proportions of travellers to Inner Sydney High School using particular bus and bus-rail services. For reference purposes, these are in Table B.5 in Appendix B.

5.3.2.3 Non-car mode share targets

Guided by the accessibility analysis we have developed a range of underlying non-car mode shares. These are based on:

- Constrained reference case generalised cost
- Constrained sensitivity test generalise cost
- Some adjustments to take account of some uncertainties (e.g., settling in the LRT, uptake of cycling, potential provision of school special bus route(s)).

These measures and ranges are tabulated below, along with mode share targets for non-car modes.

Table 13 – Accessibility measures, likely range of mode share and non-car mode share targets

Mode	Reference Case – accessibility measure using minimum generalised cost (constrained cycling)	Sensitivity Test – accessibility measure using minimum generalised cost	Likely ranges of mode shares	Mode share targets for non-car mode travel
Rail	32%	34%	30% to 34%	33%

[17] In an urban setting cycling generally has very good accessibility, not just for school travel, due to its door to door nature and its average speed, which is similar to that of bus services in an inner-city road network with limited bus priority. However, as indicated in tables 9, 10 and 11 above, surveys of other high schools in inner Sydney indicate relatively low cycle use (around 1% to 3%); in these settings cycling would also be expected to have high accessibility.

LRT	4%	18%	4% to 10%	6%
Bus	17%	22%	17% to 20%	19%
Bus Rail	2%	2%	2% to 3%	3%
Cycle	7%	7%	5% to 12%	8%
Walk	38%	17%	20% to 35%	31%
Total	**100%**	**100%**		**100%**

Aggregating these to transit mode (rail, LRT, bus and bus rail) and active mode (walk and cycle) provides the following targets:

- For transit mode share range: 53% to 67%; target: 61% of non-car mode share
- For active mode share range: 25% to 47%; target: 39% of non-car mode share.

5.3.3 Summary of Mode Share Targets

The following table summarises the mode share targets as a percentage of all travel (non-car mode share targets from Table 13 above have been re-weighted to reflect the inclusion of car).

Table 14 – Mode share targets

Mode	Mode share targets – travel to school	Mode share targets – travel from school
Rail	31%	32%
LRT	6%	6%
Bus	18%	18%
Bus Rail	3%	3%
Cycle	8%	8%
Walk	29%	30%
Car	5%	3%
Total	**100%**	**100%**

5.4 Findings of the accessibility analysis

In addition to underlying the development of non-car mode share targets, the accessibility analysis of the catchment also highlighted a number of features of the catchment's transit system which are of interest. These are summarised here:

- The potential of cycle in the catchment is substantial. The analysis of cycling accessibility focused on areas within close proximity to good quality segregated facilities and on-road facilities on low traffic volume streets, looking for continuous paths to Inner Sydney High School/Prince Alfred Park; it was also restricted largely to the City of Sydney area, without extending into Woollahra Council's area, partly reflecting the additional distance to Woollahra's area, but also a lack of physically segregated cycle facilities.
- Rt 343 from the northern and southern side of the CBD provided relatively poor accessibility; however, if there are students living in the CBD close to its bus stops or to the east of its bus stops (e.g., further form the LRT alignment), it could attract a small number of patrons. In terms of the overall capacity of

this service, any such additional patronage generated by the Inner Sydney High School on this route is likely to be modest.

- Rt 311 similarly provides poor accessibility, but it does provide a no-change trip to Inner Sydney High School. This poor accessibility is due to a combination of a circuitous route and its closest bus stop to the school is at Eddy Ave. We have analysed several options that could improve the attractiveness of this route – these will be provided to TfNSW for consideration separately to this report.
- Rt 352 from Bondi Junction, along Oxford St, Crown St and Cleveland St to Inner Sydney High School is particularly attractive along its corridor, largely due to direct access to the school, with its closest bus stop pair to Inner Sydney High School almost outside the school on Cleveland Street.
- The inclusion of a new high school in inner Sydney has the effect of 'splitting' catchments of existing schools, which is expected to reduce the overall distance of travel generated by Inner Sydney High School, should there be no other changes to the number of schools or their roles.

5.5 Peak Spreading

The spreading of peak transport demands in time is one way in which a development can reduce the impact of its generated transport demand on the transport network. Peak spreading can result from a number of different factors, providing different transport benefits:

- Extended schedule of activities at Inner Sydney High School, flattens the demand peak, reducing system size, and
- Use of local facilities by Inner Sydney High School staff and students, which extends the time they spend in the local area. This effectively promotes trip chaining – where the journey from school gets 'connected' to a short trip to a local activity (such as walking to a performance at Belvoir St Theatre); which would reduce the number of distinct home-based trips.

Due to these benefits, identifying features of a development and its environs that could contribute to peak spreading and 'enmeshment' with local activity is a key part of many transport studies. It was a point which TfNSW emphasised in discussion and in their comments.

To explain the concept in more detail, an overall indicative time profile of transport demands is shown in the chart below, which is taken from a household travel survey of the broader Sydney area. Schools tend to generate their morning peak transport demands (Pt A in the chart below) in the system's morning commuter peak (Pt B in the chart below). In the afternoon, peak school transport demands (Pt C in the chart below) tend to occur prior to the commuter peak (Pt D in the chart below).

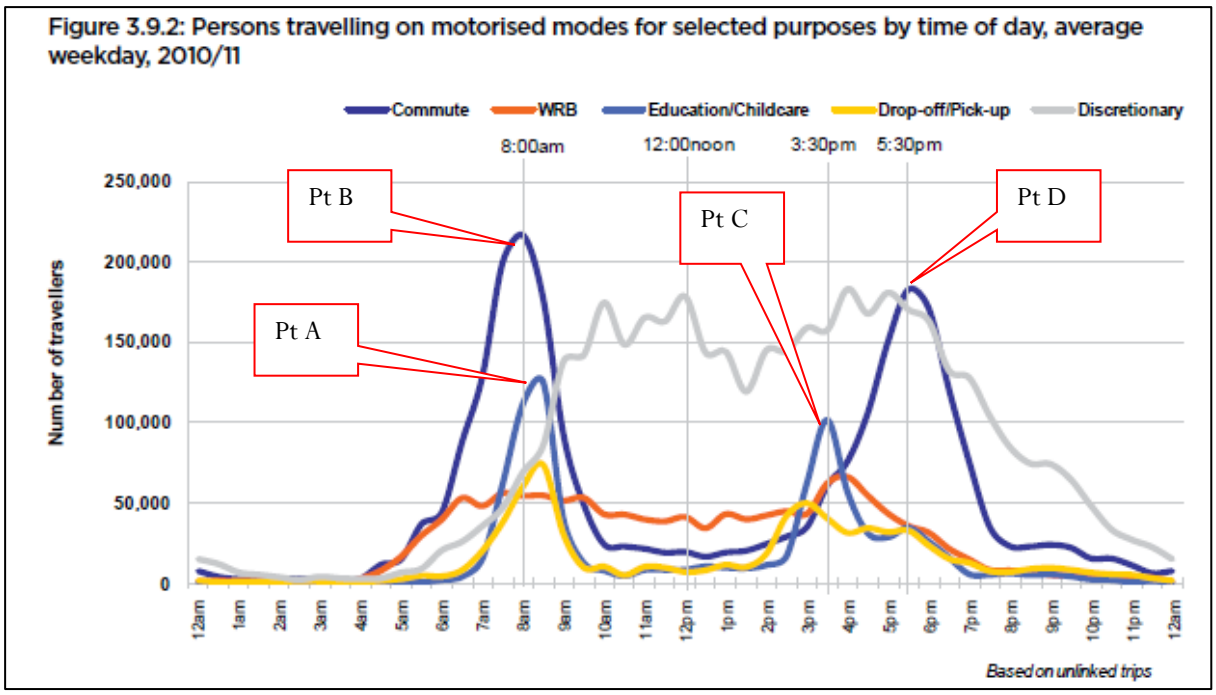

Chart 1 – Facsimile of HTS Analysis with annotations by HRA (source: Figure 3.9.2, pg 26, 2010/11 Household Travel Survey, Summary Report 2012 Release, Bureau of Transport Statistics, TfNSW)

From this discussion and the shape of demand profiles in the above chart, peak spreading of school demand has the potential to reduce impacts of its demand in the local area, by reducing peaks at Pt A and at Pt C. It also suggests that, if a substantial amount of demand generated by the school shifts later in the afternoon, then it has the potential to coincide with the commuter peak and potentially increasing total peak demand (depending on the setting, including the supply response of the transport system, such as higher bus service levels in the afternoon commuter peak). Nonetheless, promotion of activities which could contribute to peak spreading is potentially beneficial.

Around Inner Sydney High School there are opportunities to promote peak spreading. Many of these would be more appropriate for older students and for staff. These are:

- The before and after school activities inherent in high schools as listed in Section 4.1 above.
- Activity opportunities in the local area, including some listed in Section 2.1, including cultural, recreational and educational opportunities:
    - The local universities with their teaching and sporting resources: UTS on and around Broadway, Sydney University at the western end of Cleveland Street, and UNSW, a short bus/light rail ride away to the south east
    - The Australian Museum on College Street
    - Dixon Library on Macquarie Street
    - NSW Parliament on Macquarie Street
    - Town Hall and other performance spaces, such as Belvoir Street Theatre, Seymour Centre, Angel Place Recital Hall and the Sydney Opera House.
- A number of active and passive recreation opportunities in the area, which were highlighted by TfNSW, including:

- The use of Prince Alfred Park Pool[18] – located between Inner Sydney High School and Central Station – for a swim or use tennis courts[19] or basketball courts in the park
- National Centre of Indigenous Excellence's Gym & Swim facilities[20] – located at 180 George Street Redfern (about 900m from Inner Sydney High School, south east of Redfern Station)
- Other gyms and yoga studios in the area
- For staff on the way to school (or possibly on the way home), call at one of the cafes in the area (e.g., along Devonshire St, Elizabeth St, in the Redfern area, or Prince Alfred Park Pool) to do some marking or lesson planning over a coffee or breakfast, before a pleasant, short walk to school.

Many of these activities would encourage a degree of peak spreading. Over time it is expected that the school community would become aware of the myriad activities in close proximity to the school. Highlighting these opportunities would hasten the process.

It is not proposed to set targets for peak spreading, but its promotion would be encouraged.

5.6 School Student Transport Subsidy (SSTS) scheme

As noted previously, for secondary school students, the key eligibility criteria for this are that their home address is more than:

- 2km from the school, as a direct line
- a 2.9km walk from the school.

Depending on topography and road network configuration, a 2.9km walk generally puts students outside the 2km direct distance. Comparison of these distances for the Inner Sydney High School's catchment indicates that living beyond the 2km direct distance, and hence, qualifying for SSTS applies to most of the catchment. There is, however, a small pocket in the Paddington area[21] where our initial estimate of the 2.9km walk distance is within the 2km direct distance, which would qualify students whose home address is in this pocket for SSTS, even though they would be less than 2km from Inner Sydney High School as the crow flies. Staff administering SSTS should be alerted to this situation and use their standard tools to make a determination of eligibility.

Further analysis of the approximate percentage of students that would be eligible for SSTS (based on 2016 Census information about the distribution of students attending government secondary schools) was just under 50%.

[18] https://www.princealfred.org/facilities/aquatic-facilities?gclid=EAIaIQobChMI2Jyq8Yq75QIV2BePCh3UYQUzEAAYASAAEgLo-fD_BwE
[19] https://www.citycommunitytennis.com.au/
[20] https://ncie.org.au/gym-swim/
[21] In the Begg Lane, Flinton St, Olive St and Ormond St area.

6.0 Green Travel Plan

6.1 General

The above sections have collated information about existing and likely future travel and transport conditions around the subject site.

This analysis has indicated:

- good levels of public transport accessibility, across bus, rail and light rail
- free public transport available to students who meet requirements relating to distance between school and home
- an increasing resident population within the area around the site
- good pedestrian facilities within a reasonably permeable network
- bicycle facilities within an expanding network
- restricted on-street car parking availability.

The design includes:

- restricted on-site car parking
- on-site bicycle parking for students, staff and visitors

The key issues that emerge from this analysis are:

- Ensuring that site users are aware of travel choices available to them
- That there is a process to monitor travel behaviour and identify issues, as they arise, and work to resolve them.

6.2 Objectives

The key objectives of this GTP, as stated in Chapter 5, are to:

- reduce reliance on the car within the school community by encouraging walking, cycling and use of transit
- raise awareness of travel alternatives to ensure that, as a far as practical, students, staff and visitors make the most of the wealth of transport options available at this site
- reduce overall vehicle trips for journeys to and from the site
- reduce impacts on transport networks and services by seeking to spread peak demands over time.

6.3 Targets

In summary the targets set in the previous chapter for this GTP are tabulated below.

Table 15 – Mode share targets

Mode	Mode share targets – travel to school	Mode share targets – travel from school
Rail	31%	32%
LRT	6%	6%
Bus	18%	18%
Bus Rail	3%	3%

Cycle	8%	8%
Walk	29%	30%
Car	5%	3%
Total	**100%**	**100%**

6.4 Actions

6.4.1 Information about available travel choices

Given the very high level of public transport accessibility within the environs of the site, the availability of free student travel to and from school through the NSW Government's School Student Transport Scheme, the generally good pedestrian conditions and bicycle network, it is considered that the key action of the Green Travel Plan must be to ensure that all students and staff are aware of their travel choices.

Even with the improved availability of travel information, including real-time apps, and interactive multi-modal travel planners, there is still a need to make site users aware of the specific services and infrastructure available and their relative benefits to themselves and more generally to society and the environment. This would be through several mechanisms:

- Transport Access Guide to be prepared and made available on the school website and/or via a non-public facing intranet system available to students (such as Google Classroom or similar). The Transport Access Guide would provide specifics about rail, bus, light rail, pedestrian links and bicycle facilities available. It would also provide links to sources of information about travel choices, including various Apps and journey planners.
- A printed copy of the Transport Access Guide would be provided to all new and potential students and staff on their orientation day and or first day at school.
- There may be space within the Personal Development, Health and Physical Education (PDHPE) syllabus to spend part of a lesson on availability of transport options, tying this into material relating to the importance of physical activity.[22]
- The Transport Access Guide would also outline activities and opportunities in the local area which staff and students of the school could consider as part of encouraging spreading of transport demand generated by Inner Sydney High School.
- The Transport Access Guide would need to be updated on a regular basis as services and networks are amended. It could also be updated to reflect targets and results of surveys. These are opportunities to further promote the Transport Access Guide.

6.4.2 Make provision for bicycles

Provision of bicycle parking on-site and trip-end facilities forms part of the scheme design.

The level of provision of bicycle parking has been assessed by Positive Traffic[23] and found to be adequate. The proposal would provide 114 bicycle spaces onsite accommodating a bicycle mode share of approximately 20% for staff and 7.5% for students at ultimate school population.

6.4.3 Monitor transit coverage of school catchment

[22] How this material is presented to students and whether it forms part of a PDHPE lesson is something that the school executive and staff would need to consider in the context of departmental guidelines and their responsibilities more generally to cover the syllabus.

[23] *Proposed Inner Sydney High School, 244 Cleveland Street, Surry Hills – Transport and Accessibility Impact Assessment Report*, June 2017

The footprint of the school's catchment is examined in Chapter 4 and 5 with further details in Appendices A and B. In any case, this footprint may vary over time as demography changes. As such, there is a need to monitor the school catchment to ensure that there is adequate transit coverage.

Given the density of the transit network, this situation is considered unlikely, but should it emerge, there is scope for the school to request specific school bus services to fill gaps. Any service adjustment, including the addition of school services, would, under current arrangements, require the concurrence of TfNSW.

6.4.4 Restrict car parking availability

Restricted on-site parking and limited parking in surrounding areas is likely to discourage older students and staff from driving their own vehicles to school. Given the proposed student ramp-up profile described in Section 4.1, this is unlikely to emerge as an issue prior to the first school year cohort reaching Year 11 in 2024, when most students would have reached the age when they may obtain a provisional driver's licence.

While there are some unrestricted or part restricted on-street car parking spaces in the general area which could be used by staff or older students as the school reaches ultimate capacity, this small supply, when compared with, for example, the number of workers in the general area (approx. 9,000 to 10,000), is relatively modest. It is unlikely that restricting the use of these on-street spaces would make a material difference to the travel behaviour of the users of Inner Sydney High School.

Nonetheless, it is expected that over time, the supply of unrestricted spaces in the general area would be reduced by Council, subject to the various factors they weigh when considering regulation of on-street car parking.

6.4.5 Monitor peak demand

The proposed high school would have capacity for approximately 1,200 students. The temporal pattern of student arrival and departure at the site would place additional load on transit services and footpath facilities in the vicinity of the subject site. The following points are relevant to the management of peak demand:

- The Department of Education has provided advice in relation to before and after school activities which would be expected to occur at the site, as at most other high schools in NSW (refer to Section 4.1). These activities have considerable scope to spread arrival and departure profiles of demand over longer periods of time, thereby reducing peak loadings. Further discussion of peak spreading is in Section 5.5, which indicates that the area around Inner Sydney High School has excellent potential to encourage peak spreading.
- In addition, the proposal incorporates a forecourt immediately inside the entrance, which would increase pedestrian circulation and storage space (within the site) at peak times.
- The proposal has a number of learning spaces in a high rise building, with lift being the predominant access/egress mode for those spaces. This would tend to 'meter' the unloading of the site, spreading peak demands.
- Peak demand should be monitored and if issues arise, consideration should be given to strategies to manage peak loads, improving the effective width of the relevant footways by rationalising clutter[24] and potentially consider opening an access to Prince Alfred Park during the afternoon peak,
- The ramp-up of the school's student population, outlined in Section 4.1, provides the opportunity to monitor the increase in peak loads over time. This is a feature of the school's operation that should be communicated to transport operators.

[24] Effective footway widths around the subject site are reasonable, with limited clutter. On the Chalmers Street frontage heading to Cleveland Street there is a traffic signal controller (grey box) which reduces effective width to some 2.4m for a length of less than half a meter. In the overall scheme of things, this is minor.

6.4.6 Monitor transit capacity

The school is unlikely to place an appreciable load on rail services or on rail station capacity by virtue of its relatively small-scale when compared with the overall use of Central Station.

Impacts on the CBD & South East Light Rail are also likely to be limited as a result of the light rail line serving a relatively small part of the school's catchment. Also, in the afternoon, the walk to the Central Chalmers Street stop is likely to result in a dispersed pattern of arrivals of students at the stop, minimising the risk of overloading of the stop and services due to Inner Sydney High School alone.

It is considered that the main potential for transit overloading would be on bus and this is more likely to occur in the afternoon. It is likely that students will be heading in a number of different directions, and therefore would be accessing four bus stops (one on Chalmers Street, one on Elizabeth Street, and the two on Cleveland Street). This would diffuse the loading and the high service levels at the Chalmers Street and Elizabeth Street stops (a service approximately every two minutes), would reduce the potential for build-up of students at these stops.

In addition to contractual mechanisms in place between TfNSW and the bus region contract operators to ensure that adequate capacity is available on bus services, there is a need to ensure that the capacity of scheduled bus services will be adequate to deal with peak loadings, especially at the end of the school day. As noted previously, whilst there are factors which tend to dampen the end of day school peak, this is an area which should be monitored.

The proposed ramp-up of the school's student numbers over a period of several years is likely to assist to identify – for the school community, TfNSW and the bus contract operator(s) – potential capacity issues and afford time to plan measures to reduce this impact, if they arise. These mitigation measures could include:

- Provision of additional capacity, including short running route variants, school specials or marginally increasing frequency on selected routes.
- Students who are catching a bus to Central Station to subsequently catch a train, could be encouraged to walk to the station along Chalmers Street, as opposed to taking a bus.

6.5 Plan mechanics

For the GTP to be effective there is a need to:

Implement the plan

In order to achieve the objectives of the GTP and its target mode share, there needs to be strong support from the school and the school community. We recommend that a senior member of staff be given carriage of the promotion, implementation and monitoring of the Plan.

Resources should be provided to develop and maintain a comprehensive Transport Access Guide.

As the proposal is a school environment, there is an opportunity for a group of students who are interested in sustainability issues and associated policy, to participate in actions, such as updating elements of the Transport Access Guide, and being involved in organising promotional events, such as Walk Safely to School Day and National Ride2School Day.

Monitor priority areas and progress of the plan

This would involve on-going monitoring of transit capacity and transit coverage of the school's catchment. This would generally be the result of parents raising concerns with the school, and the school keeping a log of the concerns and providing this information to TfNSW/Bus Contract Operator.

Periodically (every year) surveying the school population to estimate mode shares for the journey to school and the journey from school and comparing this against the mode share target. The annual survey should consider the following:

- Cover all staff and students
- All analysis and reporting should be anonymous
- Student year should be recorded as part of the survey, its analysis and reporting, as this is likely to have some impact on mode choice
- Single day snapshot survey, capturing how students and staff arrived at school and how they intend to depart, using web-based methods (undertaken by school administration staff)
- The survey should be conducted during a 'normal' time of the school year: it should avoid the start and end of year, as well as August (HSC trial exams), but should be generally consistent from year to year (to avoid seasonal factors introducing additional variance in comparisons of surveys over the years). It is suggested that sometime during Term 2, perhaps in mid-May (depending on the timing of likely excursions etc); unusual events should be avoided (e.g., wet weather, train strikes, parliamentary elections, etc;).

If GTP targets are not being met, then diagnostic actions would be required. The starting point for this would be undertaking additional analysis of how and why students travel the way they do. The use of small focus groups would be a good place to start, to explore reasons for car-based travel and possibly areas of concern in the transit network. This may assist to identify why use of car is higher than expected, such as timing of before and after school activities, transit reliability, the need to carry books and equipment, and so forth. Such social research should include students, parents and caregivers, and staff in order to capture a wide range of perspectives on travel choices. In conjunction with feedback from the school community, this information could provide evidence to engage with TfNSW about the need for specific measures, such as bus service adjustments, or signal controlled pedestrian crossings at critical points in the road network, or some other practical measures.

Identify impediments to meeting the plan's mode share targets

On-going feedback from the school community in relation to concerns about relevant transport infrastructure and services and, where appropriate, relaying this to the appropriate agency[25].

Update the plan for relevance and focus

As transit services change and new parts of the bicycle network open, there is a need to update the Transport Access Guide.

As travel behaviour changes more generally, there is a need to consider modifications to the GTP to ensure it retains relevance. This type of review would be appropriate at intervals of five years.

6.6 GTP Summary

[25] This is generally done by schools on a business as usual basis.

6.6.1 Key roles

Travel Plan Champion

This would be school Principal/delegate, with preference for the Principal to fill this role for the first two years, as the school settles in, and then in years 5 and 6 (2024 and 2025) as the school reaches full capacity.

Travel Plan Co-ordinator

Appointed by Inner Sydney High School/Department of Education

Preference for this person to be a member of the school's staff (frequently and regularly on-site) with an active interest in sustainability issues and transport

Role:

- Organise Transport Plan Co-ordination Committee meetings, including preparation of agenda items and minutes (with administration staff support)
- Act as a focal point for:
    - Feedback from school community regarding issues such as capacity, reliability, etc;
    - Feedback from transport providers, TfNSW and Council
    - Ideas on promotion of active transport from the school community as well as from external parties (e.g., groups promoting relevant campaigns, such as Ride 2 School, and government agencies such as Department of Health)
    - Information about forthcoming changes to transport services and or infrastructure from TfNSW, or Council
- Develop a working relationship (establish through the Transport Plan Co-ordination Committee) with TfNSW, Council, transport providers to facilitate issue definition and process to resolve
- Arrange conduct of travel survey and collation of results (the survey would be prepared and administered by school administration support staff).

6.6.2 Administration mechanism

A committee, with representatives from the school, school community, education, transport regulator/funder and Council, would provide a useful mechanism to administer the GTP. It is described below:

Travel Plan Co-ordination Committee

Constituted by:

- Principal/Travel Plan Champion
- Travel Plan Co-ordinator
- Representatives from:
    - Education
    - Council
    - TfNSW (as transport regulator and funder of service providers, as well as roles in road safety and operation, via their subsidiary organisation, RMS)
    - P & C

Role is to focus on implementation of the GTP, including:

- on-going monitoring

- acting as a clearinghouse for ideas on further ideas and opportunities to promote sustainable transport
- connection with changing and emerging government policies and strategies
- in addition to these ongoing actions, the committee would also be responsible for re-examining the applicability and appropriateness of the GTP and its targets. In the event that the operation of schools changed markedly, for example, due to technology, or there was some other paradigm shift in education of transport, then re-consideration of the GTP would make sense, and the Transport Plan Co-ordination Committee would be appropriate to oversee this change.

Suggested meeting schedule:

- Prior to commencement of school year
- After the conduct and reporting of the annual travel survey (suggested this was held in May, so meeting to review would be possibly in June)
- If required, as a result of anomalous travel survey results, a further meeting to review any diagnostic actions
- As required in advance of major changes (e.g., Metro opening, or temporary works associated with local developments that might impact transport services or networks)
- If Principal/Travel Plan Champion considers it necessary.

It may be that for the first 2 or 3 years of school operation, this committee might need to meet twice a year (prior to commencement of school year and after the annual travel survey). By year 4 or 5, additional meetings may be necessary (as indicated above), as the fuller school would place additional loads on the transport system, and the operation of the committee a useful and focussed way to address emerging issues.

6.6.3 GTP actions summary

The following table draws together actions outlined in the GTP and specifies operational features of these actions.

Table 16 – GTP actions summary

Information about travel choices	*Owner*	*Timeframe*	*Indicative resourcing*
Prepare transport access guide: To include information about local activities	ISHS/DoE		Budget estimate $6k to $12k Travel Plan Co-ordinator
Consider inclusion of travel choices into PDHPE (or other appropriate subject) to highlight travel choices and physical activity	ISHS/DoE		Staff time to identify specific subject/Year to deliver Staff time to prepare and deliver material
Update transport access guide	ISHS/DoE	When there are major changes to transport operations around the school – try to keep to no more than one per year	
Provision for bicycle parking			
Initial provision	DoE	With completion of development	Included as part of ISHS development
Monitor suitability of capacity for bicycle parking as the school reaches full capacity	ISHS/DoE	To provide additional bicycle parking, should initial provision prove to be insufficient	Cost element unknown Staff time through the Travel Plan Co-ordination Committee

Information about travel choices	*Owner*	*Timeframe*	*Indicative resourcing*
Monitor transit coverage of school catchment			
Trap issues raised by school community – use Transport Plan Co-ordination Committee as the mechanism for this, as well as direct, ongoing contact with TfNSW officers, as required	ISHS/Travel Plan Co-ordinator	Ongoing	Staff time to trap issues/ Travel Plan Co-ordination Committee's time and Travel Plan Co-ordinator's time flag/resolve issues
Monitor transit capacity			
Trap issues raised by school community, as well as from bus operator and TfNSW. Action required would depend on nature of issue – use Transport Plan Co-ordination Committee as the mechanism for this, as well as direct, ongoing contact with TfNSW officers, as required	ISHS/Travel Plan Co-ordinator	Ongoing – likely to become more of a focus as the school reaches capacity, or there are major changes in the distribution of students in the catchment	Staff time to trap issues/ Travel Plan Co-ordination Committee's time and Travel Plan Co-ordinator's time flag/resolve issues
Restrict car parking availability			
On-site car parking – this is restricted in the design of ISHS	DoE	With completion of development	Included as part of ISHS development
On-street car parking – there is a limited supply of unrestricted car parking on-street in the surrounding area If a review of mode share outcomes indicates an issue with driving, especially when the first school year cohort reaches Year 11 (2024), then need to engage with Council – the Transport Plan Co-ordination Committee would be the appropriate forum to address this.	ISHS/DoE	Ongoing monitoring – especially from 2024 onward	Staff time through Travel Plan Co-ordination Committee to identify this as a potential issue and encourage Council to address it
Monitor plan progress			
Conduct an annual travel survey of school students and staff to determine their mode of travel to and from school. The survey would be administered via internet, using a simple and standard wording and format. Survey analysis would be undertaken by school administrative staff and results reported to Transport Co-ordination Committee. Anomalous results would trigger a diagnostic process. This process will become more critical as the school fills up, after 2022.	ISHS/Travel Plan Co-ordinator	Annual	Staff time: Travel Plan Co-ordinator to prepare survey Administrative staff to administer the survey & analyse it Travel Plan Co-ordination Committee time to review results
Diagnostic process would be triggered if the results of the survey were poor. In the first two or three years of operation this process could be reasonably simple	ISHS/DoE	Triggered by adverse survey result	Definition of scope would vary with type and scale of issues identified by the survey

6.7 GTP Communications

Department of Education is developing the Communications Strategy for Inner Sydney High School. The specific elements of communication identified in the GTP are summarised below.

GTP

Once finalised, this document should be made available on the school's website

Transport access guide

Purpose is to identify transport options for Inner Sydney High School and to identify local activities around the school.

This would be available:

- on the school website or internally facing intranet
- provided to students and staff as part of site orientation

The transport access guide would be updated regularly.

Feedback

- Feedback regarding transport issues (e.g., lack of capacity, lack of coverage) would be received from the school community and trapped by the Travel Plan Co-ordinator
- Feedback from transport operators/TfNSW in relation to students use of services would also be trapped by the Travel Plan Co-ordinator
- These issues would be addressed through the Travel Plan Co-ordination Committee, or directly with transport providers/TfNSW if they are more pressing.

Appendix A – Evaluation of catchment coverage

A.1 Introduction

This appendix contains a high-level analysis of Inner Sydney High School's catchment (shown in the figure below) and its coverage, primarily by transit. The analysis works around the catchment, generally in a clockwise direction, examining 12 smaller areas and identifying potential options to use transit services to access the school. The forthcoming opening of the CBD & South East Light Rail will provide additional options, which are mentioned in the material below. Note that until that LRT service is operating these options will not be available and when it is introduced there will be a re-working of the bus networks in the general area, with some services referenced below possibly being amended or deleted.

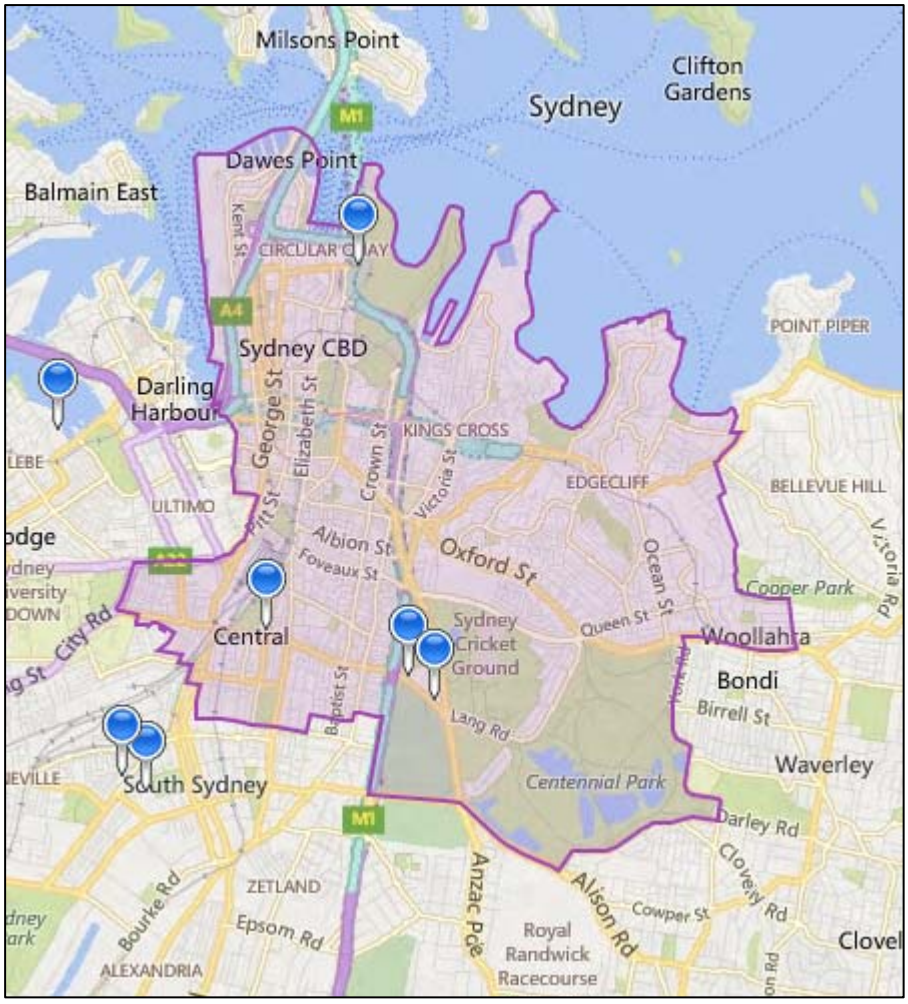

FIGURE 6 – INNER SYDNEY HIGH SCHOOL CATCHMENT AREA (SOURCE: HTTPS://AMSWEBAPPS.DET.NSW.EDU.AU/AMSWEBAPPS/EGIS/ISHS_CATCHMENT.PHP)

A.2 Catchment sub-areas

A.2.1 South of Inner Sydney High School

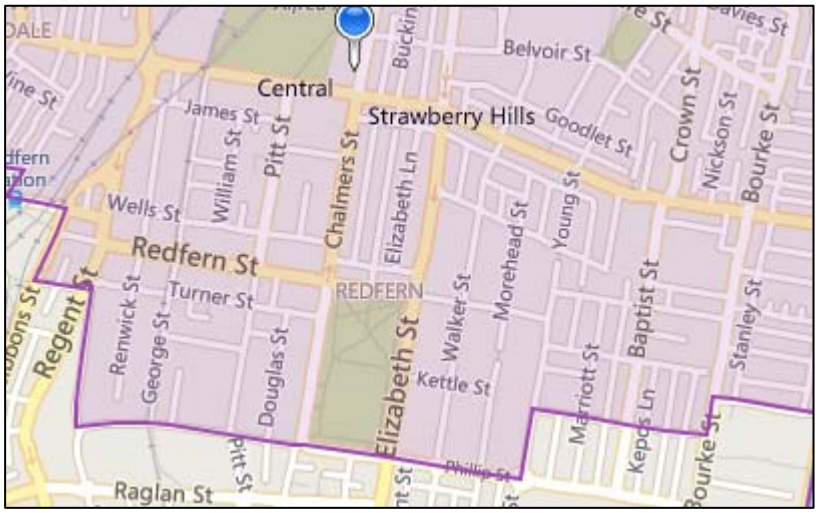

FIGURE 7 – INNER SYDNEY HIGH SCHOOL PART CATCHMENT AREA – SOUTH OF SCHOOL

Access from this area would be available by:

- Walking and cycling (depending on competence),
- By bus along Chalmers Street and Elizabeth Street (e.g., rt 343),
- By bus along Cleveland Street (e.g., rt 352 and 355),
- By bus along Redfern Street and Chalmers/Elizabeth Street (e.g., rt 308, 309).

A.2.2 South west of Inner Sydney High School

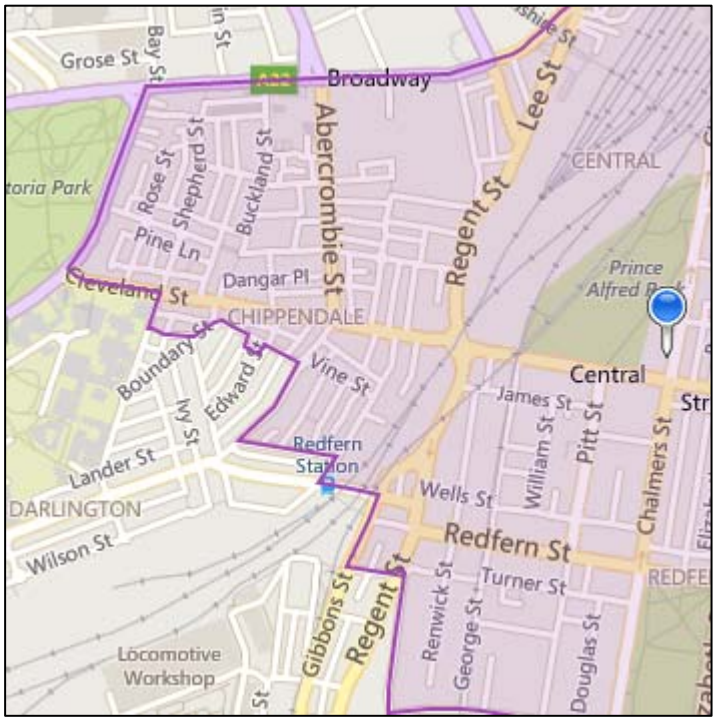

FIGURE 8 – INNER SYDNEY HIGH SCHOOL PART CATCHMENT AREA – SOUTH WEST OF SCHOOL

Access from this area would be available by:

- Walking and cycling (depending on distance and competence),
- By bus along Cleveland Street (e.g., rt 352) – the pedestrian network from the residential areas north and south of Cleveland Street west of the rail line is generally of a good standard, with limited traffic intrusion, except for Abercrombie Street and Cleveland Street itself,
- A less attractive journey would be via high frequency bus corridors along City Road and Broadway to Railway Square/Eddy Avenue and then walk along Chalmers Street (or take a bus along Elizabeth Street) to Inner Sydney High School.

A 2.3 Westside of the CBD

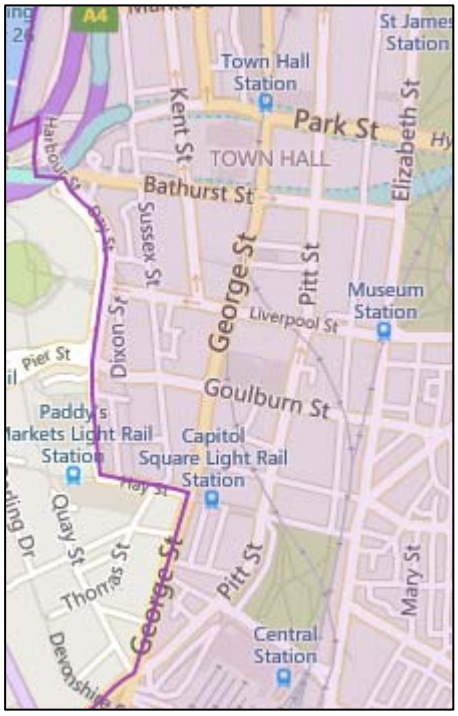

FIGURE 9 – INNER SYDNEY HIGH SCHOOL PART CATCHMENT AREA – WESTSIDE OF THE CBD

Access from this area would be available by:

- Walking to Elizabeth Street to board a bus south toward Inner Sydney High School,
- From further north, walk to Town Hall Station or Museum Station and take a train to Central and walk along Chalmers Street to Inner Sydney High School,
- From the Dixon Street area, a walk to the existing Light Rail for a two-stop journey to central Station and then a walk to Inner Sydney High School,
- When CBD & South East Light Rail opens, walk to George Street and catch a service at either Town Hall, China Town or Haymarket stops to Devonshire Street or Central and then walk to Inner Sydney High School.

A 2.4 Northwest corner of the CBD

FIGURE 10 – INNER SYDNEY HIGH SCHOOL PART CATCHMENT AREA – NORTHWEST CORNER OF THE CBD

Access from this area would be available by:

- From the southern part, walk to Town Hall and catch a train to Central Station and walk to Inner Sydney High School along Chalmers Street,
- East of George Street, use Martin Place Station for journey to Central Station and walk to Inner Sydney High School along Chalmers Street,
- From further north, walk to Wynyard Station for journey to Central Station and walk to Inner Sydney High School along Chalmers Street (the walk from Millers Point along Kent Street has good amenity) and Wynyard Station has quite good accessibility from the wider street network, including the recently built link on the west side toward Barangaroo,
- There is a high frequency bus corridor (selected Inner West services) in town on Castlereagh and Elizabeth Street (to/from Martin Place) that provide access to Railway Square/Eddy Avenue, with a walk along Chalmers Street to Inner West High School,

- When CBD & South East Light Rail opens, walk to George Street and catch a service at either Bridge Street, Wynyard, QVB or Town Hall stops to Devonshire Street or Central and then walk to Inner Sydney High School.

A 2.5 Northern part of the CBD

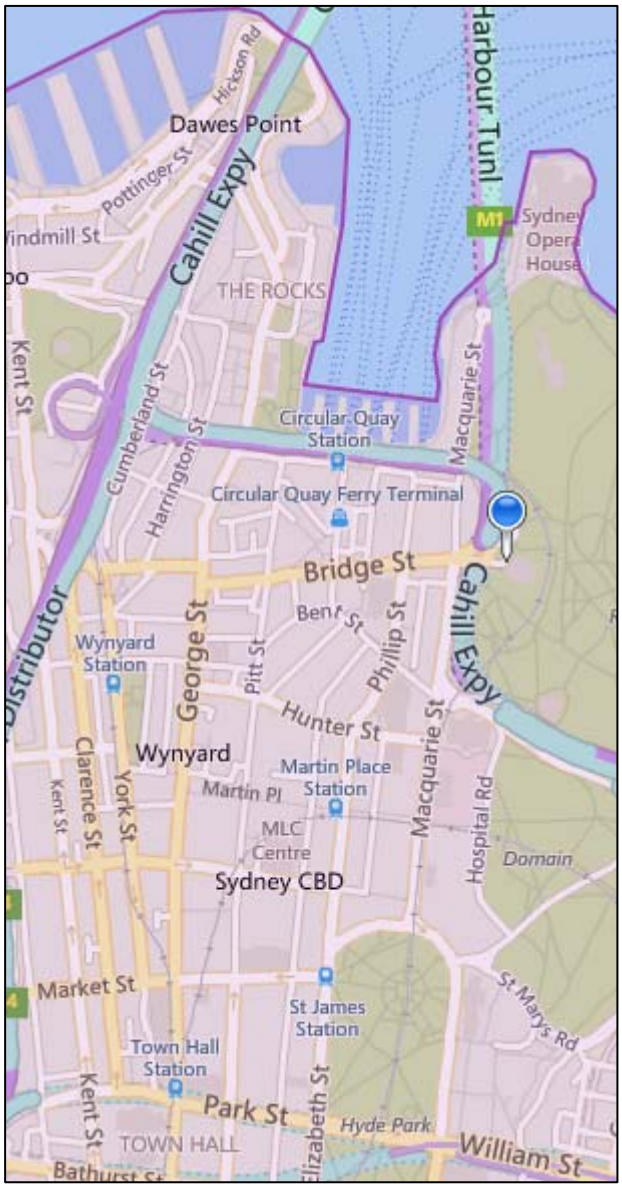

FIGURE 11 – INNER SYDNEY HIGH SCHOOL PART CATCHMENT AREA – NORTHERN PART OF THE CBD

Access from this area would be available by:

- Train from Wynyard, Circular Quay, Martin Place or St James to Central Station to then walk along Chalmers Street to Inner Sydney High School,
- For the walk west up William Street there are buses (e.g., rt 324 and rt 325) that run close to Museum Station and then catch a train to Central Station to then walk along Chalmers Street to Inner Sydney High School,
- When CBD & South East Light Rail opens, walk to Circular Quay or Bridge Street and catch a service to Devonshire Street or Central and then walk to Inner Sydney High School.

A 2.6 Woolloomooloo and Potts Point area

FIGURE 12 – INNER SYDNEY HIGH SCHOOL PART CATCHMENT AREA – WOOLLOOMOOLOO AND POTTS POINT

Access from this area would be available by:

- Walk to Kings Cross Station and train to Central Station to then walk along Chalmers Street to Inner Sydney High School,
- Walk up William Street to Museum Station and train to Central Station to then walk along Chalmers Street to Inner Sydney High School,
- Walk to William Street to catch a bus (e.g., rt 324 and rt 325) that runs close to Museum Station and then catch a train to Central Station to then walk along Chalmers Street to Inner Sydney High School,
- Walk to William Street to catch a bus (e.g., rt 324 and rt 325) that runs close to Town Hall Station and then catch a light rail to Devonshire Street or Central and then walk to Inner Sydney High School,
- Catch rt 311, which runs along Cowper Wharf Road, Wilde Street and Macleay Street to either:

- Kings Cross Station for a train to Central Station to then walk along Chalmers Street to Inner Sydney High School or,
- Town Hall for a train to Central Station to then walk along Chalmers Street to Inner Sydney High School or,
- Elizabeth Street near Eddy Avenue to then walk along Chalmers Street to Inner Sydney High School.

A 2.7 Darling Point and Double Bay

FIGURE 13 – INNER SYDNEY HIGH SCHOOL PART CATCHMENT AREA – DOUBLE BAY AND DARLING POINT

Access from this area would be available by:

- Walk to Edgecliff Station and catch a train to Central Station to then walk along Chalmers Street to Inner Sydney High School,
- Catch a bus along New South Head Road to either Edgecliff Station, or into Town Hall or Museum Station, and then train to Central Station to then walk along Chalmers Street to Inner Sydney High School,
- When CBD & South East Light Rail opens, catch a service from Town Hall (instead of a train) to Devonshire Street or Central and then walk to Inner Sydney High School.

A 2.8 Woollahra, Double Bay and Bondi Junction

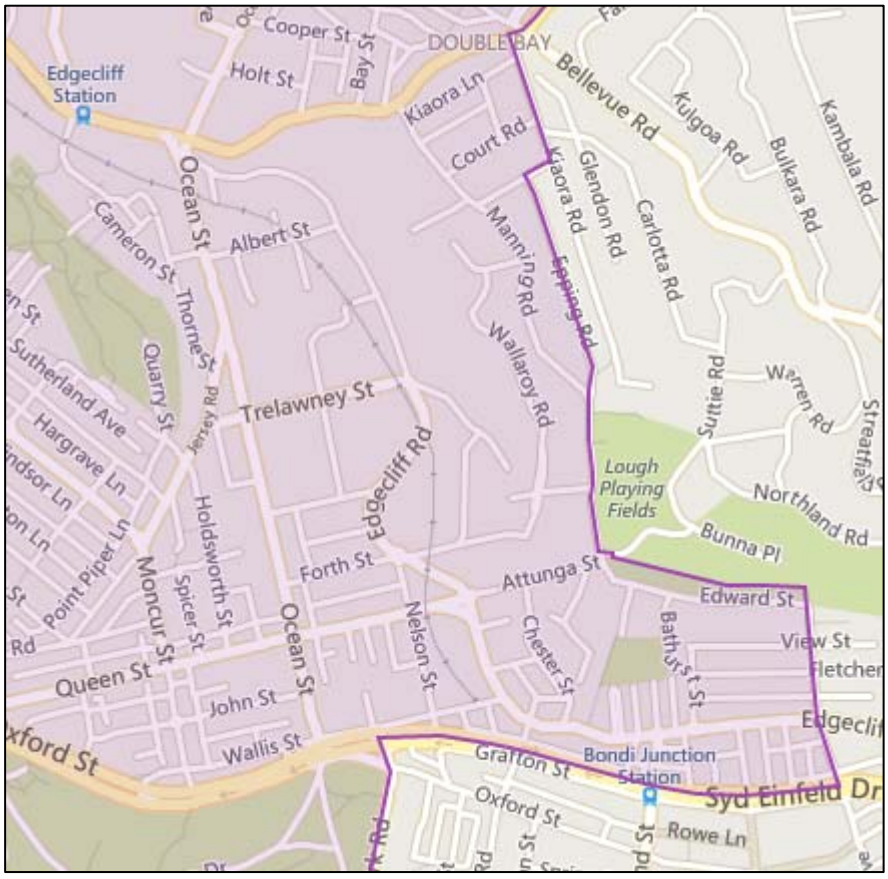

FIGURE 14 – INNER SYDNEY HIGH SCHOOL PART CATCHMENT AREA – WOOLLAHRA, DOUBLE BAY AND BONDI JUNCTION

Access from this area would be available by:

- Walk to Bondi Junction or to Edgecliff Station to catch a train to Central Station to then walk along Chalmers Street to Inner Sydney High School,
- Walk to Bondi Junction Station and catch bus rt 352 or rt 355 direct to Inner Sydney High School
- From the Queen Street / Ocean Street area, walk to Oxford Street to catch the bus rt 352 or rt 355 for direct service to Inner Sydney High School, stopping on Cleveland Street near the site for rt 352 and on Elizabeth Street near the site for rt 355,
- There are bus routes on Ocean Street connecting Bondi Junction Station and Edgecliff Station (e.g., rt 200, 328) which provide an alternative to walking to the stations, and then take a train to Central Station and walk to Inner Sydney High School,
- Access from the small pocket north of Bondi Junction (down towards Cooper Park) to Bondi Junction is hampered by steep grades – an option is to walk to Manning Road and catch rt 327 (low frequency) to Edgecliff Station and then take a train to Central Station to walk along Chalmers Street to Inner Sydney High School; in the afternoon an option is to catch either rt 352 or 355 directly from Inner Sydney High School to Bondi Junction and then walk down the hill.

A 2.9 Around Centennial Park

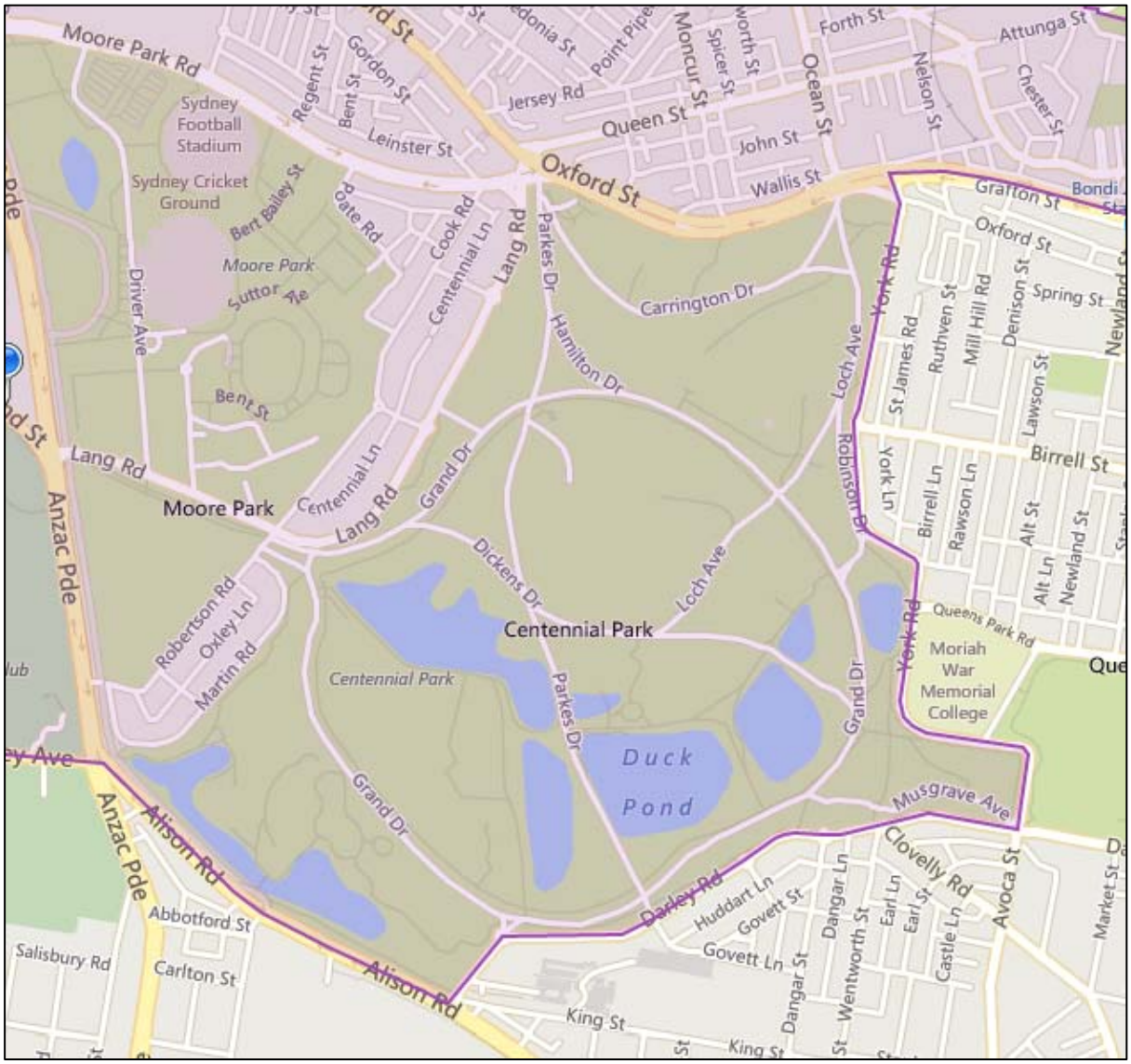

FIGURE 15 – INNER SYDNEY HIGH SCHOOL PART CATCHMENT AREA – CENTENNIAL PARK AREA

Our interpretation of the catchment definition is that this boundary runs along the centreline of York Road, Darley Road and Alison Road. Therefore, there are no residential dwellings in this part of the catchment, with dwellings on the other side of York Road, Darley Road and Alison Road falling into the catchments of other schools.

On the western side of Centennial Park (around Lang Road), access from this area would be available by:

- From the northern part of this area, walk to Oxford Street and catch bus rt 352 to Inner Sydney High School,
- Along Lang Road/Cook Road, walk to Cook Road and catch rt 355 to Inner Sydney High School,
- From southern pocket around the Martins Road area, walk to Lang Road to catch rt 355 to Inner Sydney High School,
- When CBD & South East Light Rail opens, walk to ANZAC Parade north of Lang Road and catch light rail from Moore Park stop to Strawberry Hills stop and then walk to Inner Sydney High School.

A 2.10 Paddington and Darlinghurst

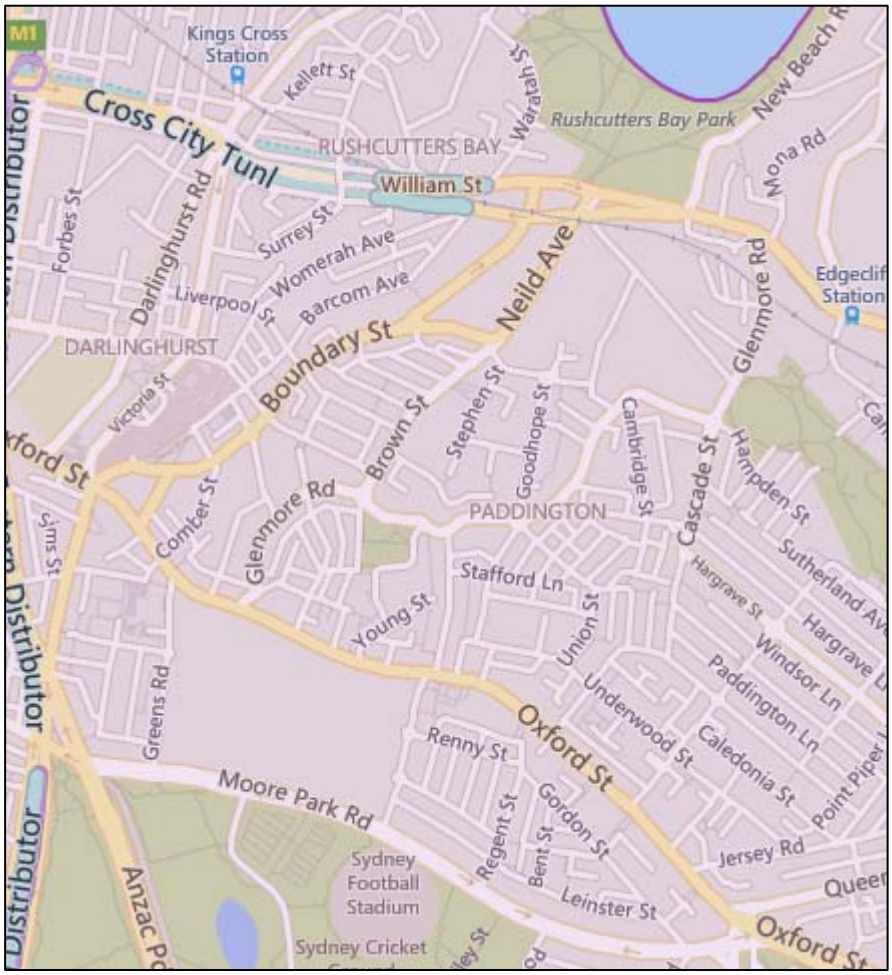

FIGURE 16 – INNER SYDNEY HIGH SCHOOL PART CATCHMENT AREA – PADDINGTON AND DARLINGHURST

Access from this area would be available by:

- Walk to Kings Cross Station and then catch train to Central and walk to Inner Sydney High School along Chalmers Street (when the CBD & South East Light Rail opens, consider changing from bus at Town Hall to take a light rail to Devonshire Street or Central and then walk to Inner Sydney High School),
- Walk to buses along William Street toward either Museum Station or Town Hall Station and then catch train to Central and walk to Inner Sydney High School,
- Walk to buses along Oxford Street – rt 352 runs along Oxford Street from Bondi Junction Station to Crown Street and then to Inner Sydney High School; rt 355 runs along Oxford Street from Bondi Junction Station to Moore Park Road and Cook Road, and then to Inner Sydney High School,
- From the western part of the above figure, catch the rt 311 along Victoria Street to Elizabeth Street and Eddy Avenue and then walk along Chalmers Street to Inner Sydney High School,
- From the south western part of the above figure, around Greens Road (west of Victoria Barracks), walking to ANZAC Parade to catch a bus to Eddy Avenue and then walk along Chalmers Street to Inner Sydney High School is an alternative to walking to Oxford Street and catching a bus to town and then a train.

A 2.11 East Sydney and Surry Hills

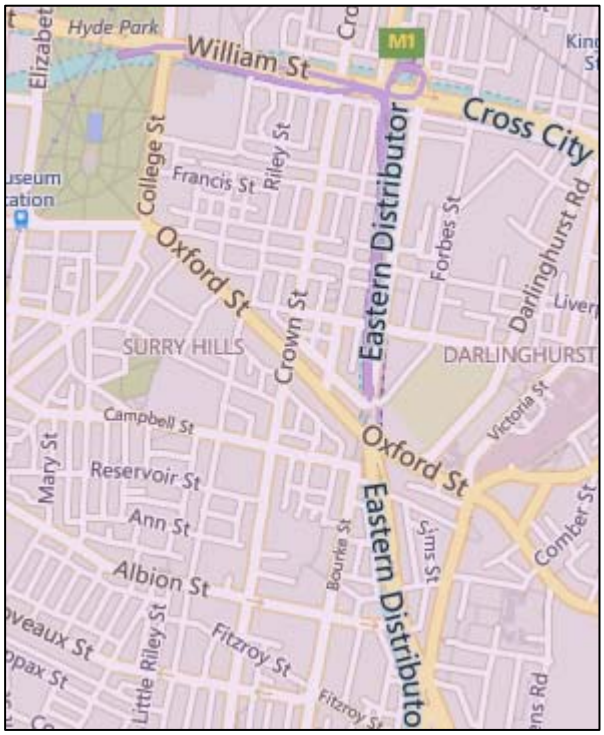

FIGURE 17 – INNER SYDNEY HIGH SCHOOL PART CATCHMENT AREA – EAST SYDNEY AND SURRY HILLS

Access from this area would be available by:

- Walk to William Street to catch bus into Museum or Town Hall Station and take train to Central Station and walk to Inner Sydney High School along Chalmers Street,
- Walk to Oxford Street (at the eastern part of the above figure) catch the rt 352 directly to Inner Sydney High School,
- Walk to Crown Street from the eastern/southern part of the above figure and catch the rt 352 direct to Inner Sydney High School,
- Walk to Museum Station and take train to Central Station and walk to Inner Sydney High School along Chalmers Street,
- From south western part of the above figure, walk directly to Inner Sydney High School.

A 2.12 Strawberry Hills

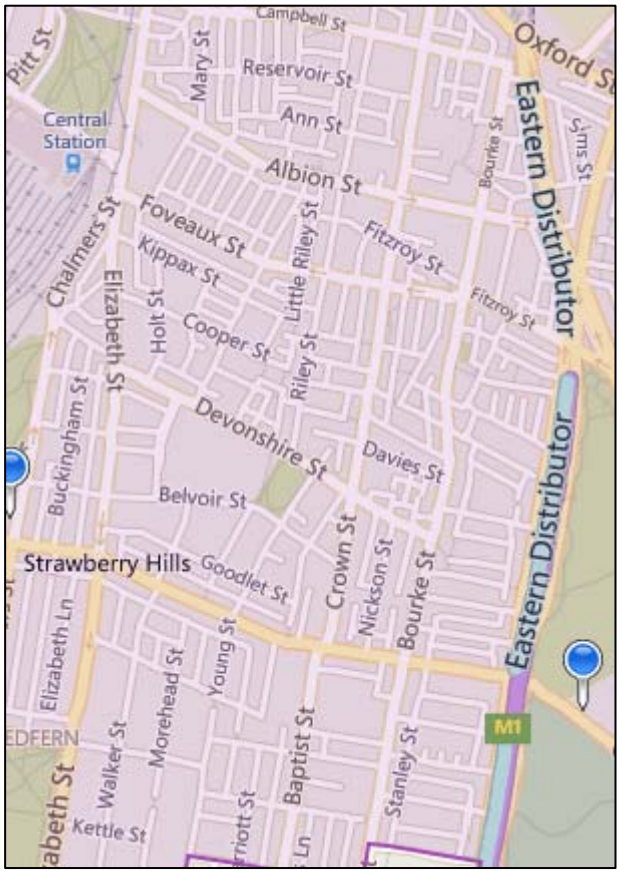

FIGURE 18 – INNER SYDNEY HIGH SCHOOL PART CATCHMENT AREA – STRAWBERRY HILLS

The above figure has some overlaps with previous areas within the catchment. Access from this area would be available by:

- Walking directly to Inner Sydney High School,
- Walking to Cleveland Street and catching rt 352 or rt 355 bus direct to Inner Sydney High School,
- Walking to Crown Street and catching rt 352 bus direct to Inner Sydney High School,
- Walk to Foveaux Street and catch a bus down to Eddy Avenue and then walk to Inner Sydney High School via Chalmers Street.

Appendix B – Catchment accessibility analysis

B.1 General

After discussion with TfNSW, an accessibility analysis was prepared for the school's catchment to assist to formulate mode share targets for non-car modes. The general approach adopted was:

- Disaggregate the school catchment into small areas or zones, for which we used the Census Statistical Area Level 1 units (SA1) from the 2016 census – there are 271 of these zones;
- Measure out indicative walk distances from the centroid of these zones to the nearest transport service(s) that was/were considered prospective for travel to Inner Sydney High School;
- Analyse service timetables to identify service frequencies and travel times by the service to the node nearest to Inner Sydney High School;
- Measure the egress distance from that node to Inner Sydney High School.

The purpose of this is to provide an indication of the 'underlying' mode shares for travel to Inner Sydney High School from within the catchment. The morning period was used for the analysis.

B.2 Population weights

The population weights for the analysis, to reflect the distribution of students within the school's catchment, used the number of Secondary Government School students in each of the SA1s with Inner Sydney High School's catchment. This information is from the 2016 Census and is used to provide a broader spread of likely student home locations, than using detailed address information from students enrolled in Inner Sydney High School for 2020 (which we have not requested for privacy reasons). The other feature of the Census data is that the Australian Bureau of Statistics (ABS) follows rigorous procedures in order to maintain confidentiality of the data.

B.3 Modes and transport services

The modes and transport facilities/services used in this analysis were:

- Rail – this involved measuring walk access[26] from the centroid of the zones close to each station; stations in the catchment were:
  - Bondi Junction
  - Edgecliff
  - Kings Cross
  - Martin Place
  - Central
  - Circular Quay
  - St James
  - Museum
  - Wynyard
  - Town Hall
- CSELR Light Rail – this also involved measuring walk access distance from the centroid of the zones close to each LRT Stop; stops in the catchment were:
  - Circular Quay
  - Bridge St
  - Wynyard
  - QVB

[26] All walk distances were measured off a street plan, following the road network and in some places taking available 'short cuts' through parks. They provide an approximation of likely walk distances

- Town Hall
- Chinatown
- Rawson Place
- Central Chalmers St

- Bus – direct bus routes analysed were:
  - Rt 311 from Woolloomooloo to Eddy Avenue
  - Rt 343 from the northern end of the City to Elizabeth St north of Cleveland St
  - Rt 352 from Bondi Junction to Cleveland St opposite Inner Sydney High School via Oxford St, Crown St and Cleveland St
  - Rt 352 (eastbound) from City Rd to Cleveland St outside Inner Sydney High School
  - Rt 355 from Bondi Junction to Elizabeth St south of Cleveland St, via Cook and Lang Rd
- Bus access to rail – routes analysed were:
  - Rt 327 from Double Bay (Manning Rd area) to Edgecliff, along New South Head Rd
  - Rt 200 from Woollahra to Edgecliff via Ocean St
  - Rt 324 from Double Bay (near William St) to Edgecliff, along New South Head Rd
  - Rt 324 from Darling Pt/White City to Town Hall via New South Head Rd/William St/Park St
- Walk – for areas close to Inner Sydney High School, the walk distance to the school was measured.
- Cycle – for areas close to good quality cycle ways (i.e., segregated facilities in busy areas), the cycle distance to Inner Sydney High School was measured. This relied on:
  - Bourke St cycle way:
    - the northern part of the catchment used this to access Campbell St, Castlereagh St and Belmore Park and along the east side of Central Station to Prince Alfred Park and Inner Sydney High School
    - the southern part of the catchment used this to access Telopea St (on-road in lower traffic road), Redfern St, Wells St, George St to Prince Alfred Park and Inner Sydney High School
  - Kent St cycle way:
    - From City along Kent St to Liverpool St and Castlereagh St and then as for northern part of Bourke St
  - South of Inner Sydney High School in the Redfern area:
    - Use Wells and Turner Streets to access George St and then to Prince Alfred Park and Inner Sydney High School
  - Western catchment along Cleveland St:
    - Use of on-road facilities on Myrtle, Daniels/O'Connor to access Balfour St and use the facility along Cleveland St to reach Prince Alfred Park and ISHS
    - Use of Sheppard, Boundary and Vie to Access Myrtle and Balfour, as above
  - To the east of Inner Sydney High School:
    - Use of Cook Rd and Lang Rd to access link through Moore Park Gold Course to path on eastside of Eastern Distributor (path is an off-road facility, within the golf course), use of bridge over Eastern Distributor/South Dowling St to link up to Zamia St, and then to Inner Sydney High School as per described for southern part of Bourke St catchment
    - Use of Moore Park Rd to access Bourke St and Campbell St, to reach Inner Sydney High School as per description northern part of Bourke St cycle way

It should be noted that:

- Only zones close to these alignments were included in the cycle catchment.
- Some of these routes that we have used are relatively circuitous.

- Zones close to Inner Sydney High School (less than 650m walking distance), were excluded from cycle.

The above modes would capture the bulk of non-car accessibility within the catchment. While other modes are available, for example kiss and ride at rail stations, because for some trips it offers better accessibility to rail than direct walk or bus to rail, they can be considered to improve the attractiveness of rail.

The bus routes used in the analysis above have not relied on routes which are likely to be immediately adjusted as part of the LRT opening and initial planned operations. Some of them may be adjusted once the CSLER LRT has ramped-up and 'settled' into the network and service patterns of the CBD.

B.4 Accessibility measures

Two measures of accessibility were used:

- Total travel time of the journey from home zone to Inner Sydney High School, including walk access, wait times, in-vehicle times, walk egress times
- Overall generalised cost of the trip calculated by applying weights and penalty values to various components of the trip, in order to better reflect user-perceived costs of alternatives[27]

The elements of these costs are tabulated below, with some brief comments.

Table B.1 – Summary of parameters and data used in generalised cost formulation by mode

Mode and parameter	**Reference case**
Rail	
Access/egress penalty weight	1.5
Wait time	2 mins
In-vehicle time	As per timetable
Walk speed	1.2 m/s
LRT	
Access/egress penalty weight	1.5
Wait time	1.5 mins
In-vehicle time	Based on EIS service specification
Walk speed	1.2m/s
Bus	
Access/egress penalty weight	1.5
Wait time	2 mins
In-vehicle time	As per timetable
Walk speed	1.2m/s

[27] These are generally consistent with values suggested in guides such as TfNSW's Principles and Guidelines for Economic Appraisal of Transport Investment and Initiatives - Economic Appraisal Guidelines (Mar 2016) – see pp 247 & 248

Bus Access to Rail	
Access/egress penalty weight	1.5
Wait time	2 mins
In-vehicle time	As per timetable for bus and for rail
Walk speed	1.2m/s
Interchange time	1 min
Interchange time penalty weight	1.5
Interchange pure penalty	3 mins
Walk	
Walk speed	1.2 m/s
Cycle	
Cycle speed	2.22 m/s (8km/hr)

The walk speed and cycle speed has been reduced from more typical values to reflect road crossing delays, hills and other factors which may reduce average speeds. Wait times used are relatively low and reflect regular travellers using the services, and timing their travel based on experience. Fares were not included in the analysis.

The parameters in the above table are based on typical urban behavioural parameters for mode choice; however, as the travellers are school students, we have run a sensitivity test with lower values of the penalty weight for access, egress and intermodal interchange, as well as a lower pure penalty for intermodal interchange, to reflect that younger people may value different components of their journey differently to adults.

Factors other than accessibility also inform mode choices. These other factors include, among others: perceptions of safety and personal security; potential to link trips with other family or household members; convenience, associated with carrying equipment or books; cycling skill levels; etc.

B.5 Analysis

A reference case was run which identified:

- the mode with the minimum travel time to Inner Sydney High School and
- the mode with the minimum generalised cost to Inner Sydney High School.

This identified indicative mode share[28] estimates.

Table B.2 – Reference case unconstrained mode share estimates, for travel time and for generalised cost

Mode	Based on Minimum Travel Time	Based on Minimum Generalised Cost
Rail	27%	21%
LRT	9%	1%
Bus	14%	11%

[28] It is unlikely that all demand would use the fastest option available; however, estimating a stated choice model, perhaps a nested logit model, is beyond the scope of this study, and potentially not feasible.

Bus Rail	2%	2%
Cycle	37%	42%
Walk	11%	23%
Total	**100%**	**100%**

The mode share to cycle reflects its very good accessibility in urban conditions, even though this analysis restricted cycles to high quality routes, even where this led to circuitous paths. However, it is unlikely that anywhere near this proportion of students would consider using cycle as a mode for a range of reasons (e.g., cost of equipment, comfort, safety, etc;); surveys of mode of travel reported for three other high schools in inner Sydney indicate mode shares to bicycle of between 1% and 3%. We have therefore calculated mode shares with about one-fifth of the cycle demand retained as cycle and the other four-fifths reallocated across the next best mode for each zone.

This adjustment resulted in the following estimates of mode shares.

Table B.3 – Reference case constrained mode share estimates, for travel time and for generalised cost

Mode	Based on Minimum Travel Time	Based on Minimum Generalised Cost
Rail	35%	32%
LRT	18%	4%
Bus	22%	17%
Bus Rail	2%	2%
Cycle	7%	7%
Walk	16%	38%
Total	**100%**	**100%**

It should be noted that as the distribution of students within the catchment varies, these mode share estimates would also be expected to vary, even if transport conditions did not change.

A sensitivity test was run with different parameters for generalised cost formulation – essentially reducing the penalty elements of generalized cost to reflect less sensitivity of students to these elements of cost. The amended parameters were:

- Access/egress penalty weight reduced to 1.1 for transit modes (rail, LRT, bus, bus-rail)
- Interchange penalty weight reduced to 1.1 and interchange pure penalty reduced to 1 min for bus-rail

The results of this analysis are tabulated below for generalised cost (the un-weighted travel times do not change in this test, and hence have not been re-reported)).

Table B.4 – Sensitivity test mode share estimates for unconstrained and constrained case, for generalised cost

Mode	Minimum of Generalised Cost, unconstrained	Based on Minimum Generalised Cost, constrained
Rail	26%	34%
LRT	9%	18%
Bus	13%	22%

Bus Rail	2%	2%
Cycle	38%	7%
Walk	12%	17%
Total	**100%**	**100%**

An indication of the level of use for individual routes can be gained from looking at the relative shares of the travel market by each of the non-car services included in the analysis.

The following table provides an estimate of shares by different service types included in the assessment for the Reference Case.

Table B.5 – Reference Case service share estimates for constrained case, for travel time and for generalised cost

Mode/Service	Based on Minimum Travel Time	Based on minimum Generalised Cost
Rail	35%	32%
LRT	18%	4%
Rt 311	0%	0%
Rt 352	14%	12%
Rt 352 EB	6%	3%
Rt 355	2%	2%
BR Manning Rd [E]	1%	1%
BR NSH [E]	0%	0%
BR Ocean [E]	1%	1%
BR NSH [T]	0%	0%
Cycle	7%	7%
Walk	16%	38%
Total	**100%**	**100%**

Note [E] means to Edgecliff Station and [T] means bus access to Town Hall Station

B.5.1 Notes of specific findings

Below are some notes and findings that came out of the preparation of the accessibility analysis:

- Rt 311 does not attract student demand in this analysis – it was configured to provide a direct service from Woolloomooloo to Eddy Ave and a walk to Inner Sydney High School from Eddy Ave. Due to long journey time combined with walk from Eddy Ave it has poorer accessibility than other modes (e.g., walk to rail at Kings Cross). After discussion with Inner Sydney High School and with TfNSW, a separate analysis was prepared that sought to address this using either:
    - Route amendments to rt 311 for selected trips in the morning and afternoon peak periods. This would see morning rt 311 services staying on Elizabeth Street, turning right to Cleveland and right to Chalmers St to terminate at the bus stop adjacent to Inner Sydney High School on Chalmers St. In the afternoon selected services would commence outside Inner Sydney High School and travel via Chalmers St to Elizabeth St and the current route to Woolloomooloo.

- A school special from Woolloomooloo direct to Inner Sydney High School in the morning and the reverse in the afternoon.

- Rt 343 does not carry students – this service runs through the northern CBD. The accessibility analysis indicates that rail or LRT provides the best transit accessibility to Inner Sydney High School in this part of the CBD. This partly reflects the granularity of the zoning system used in the analysis; if a student was to live close to (or to the east of) one of the CBD bus stops served by rt 343, then it is likely they would use this service.
- LRT – there are some risks associated with the inclusion of LRT in this analysis due to its status (under test). After it opens and has 'settled' into the transport network (this 'settling' process would be likely to be complete toward the end of a typical 18-month ramp-up period), there will be a better understanding of the practical accessibility it would provide. For example, it may be that outbound travel times in the morning peak will be lower than envisaged, making it more attractive.