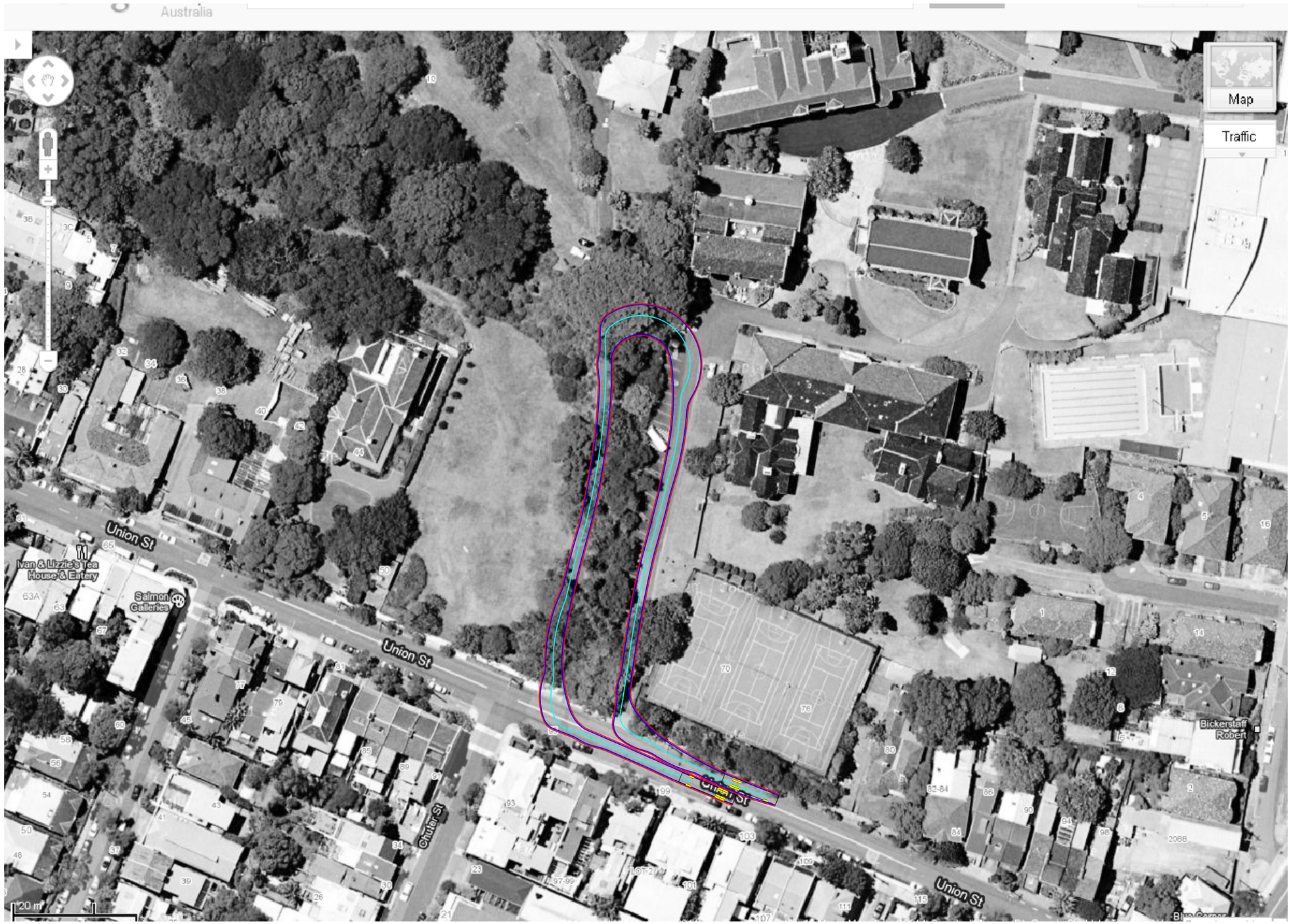
Appendix F Graythwaite On Site Bus Facility Analysis

14.5m STANDARD BUS TURN PATH - OPTION 1

GRAYTHWAITE HOUSE (SHORE SCHOOL)



Scale: 1:1000@A3

Halcrow

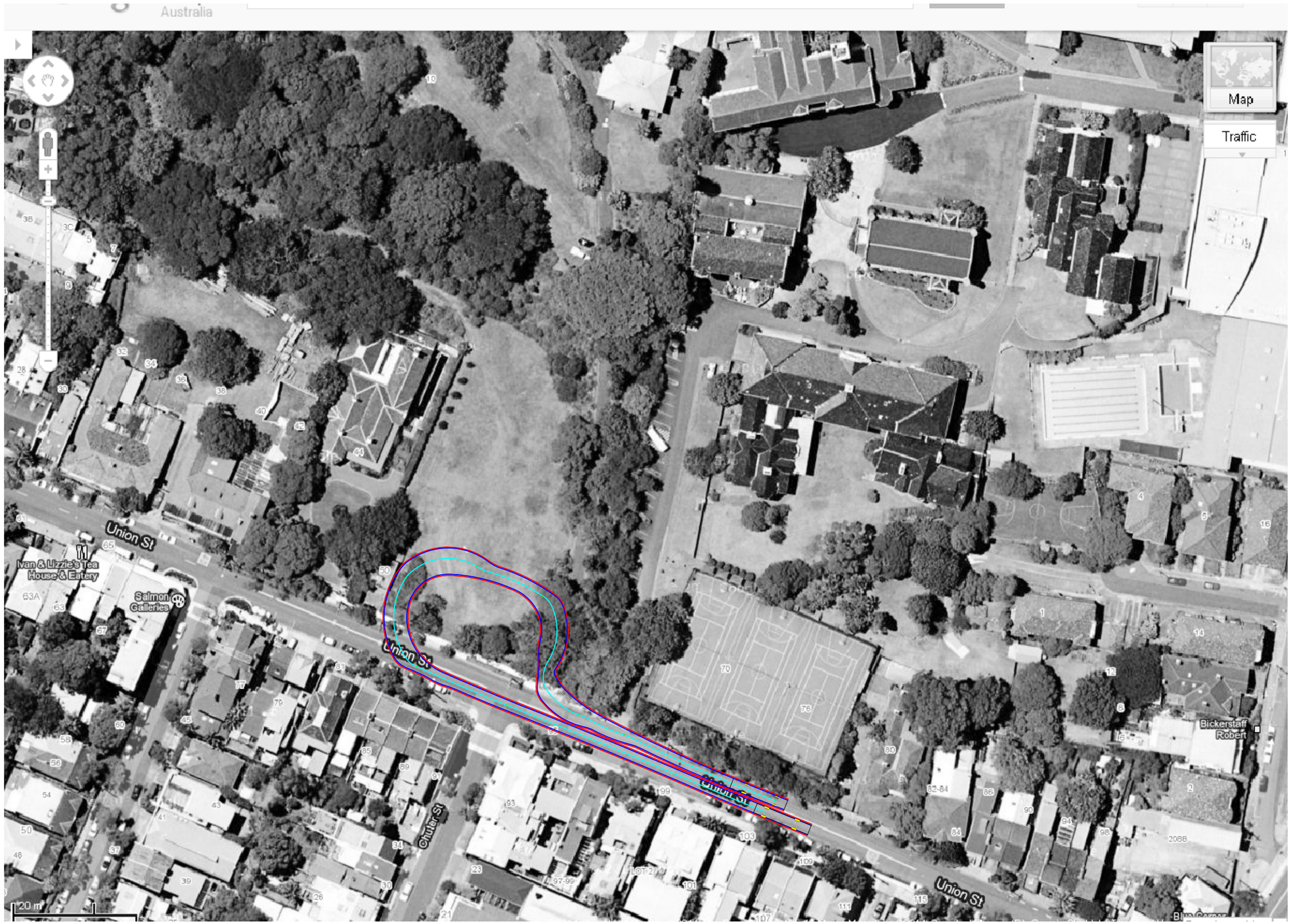
Filename: CTLRJQda01

Figure 1

Date: 30 JUNE 2011

14.5m STANDARD BUS TURN PATH - OPTION 3

GRAYTHWAITE HOUSE (SHORE SCHOOL)



Scale: 1:1000@A3

Halcrow

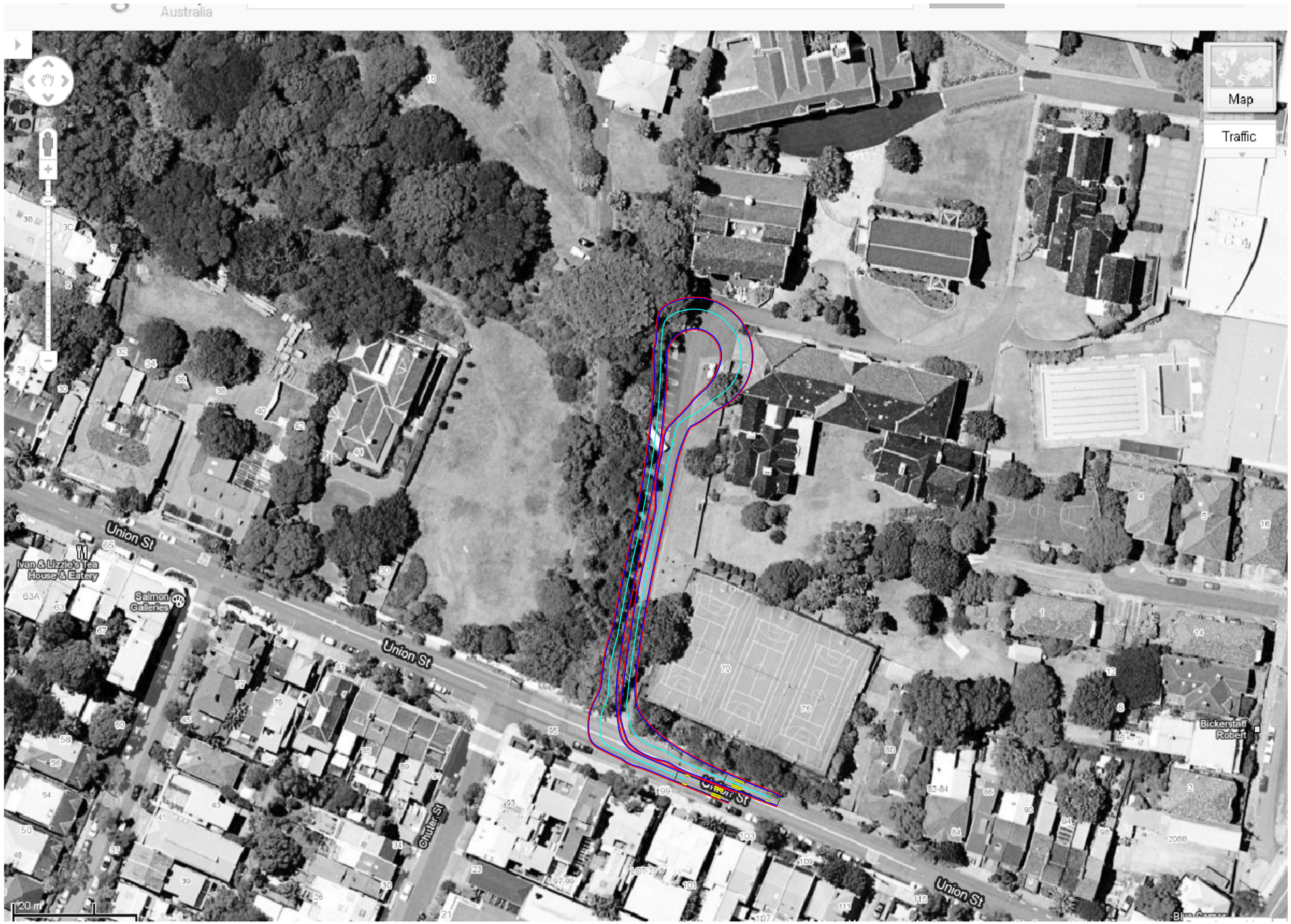
Filename: CTLRJQda01

Figure 3

Date: 19 JULY 2011

14.5m STANDARD BUS TURN PATH - OPTION 2

GRAYTHWAITE HOUSE (SHORE SCHOOL)



Scale: 1:1000@A3

Halcrow

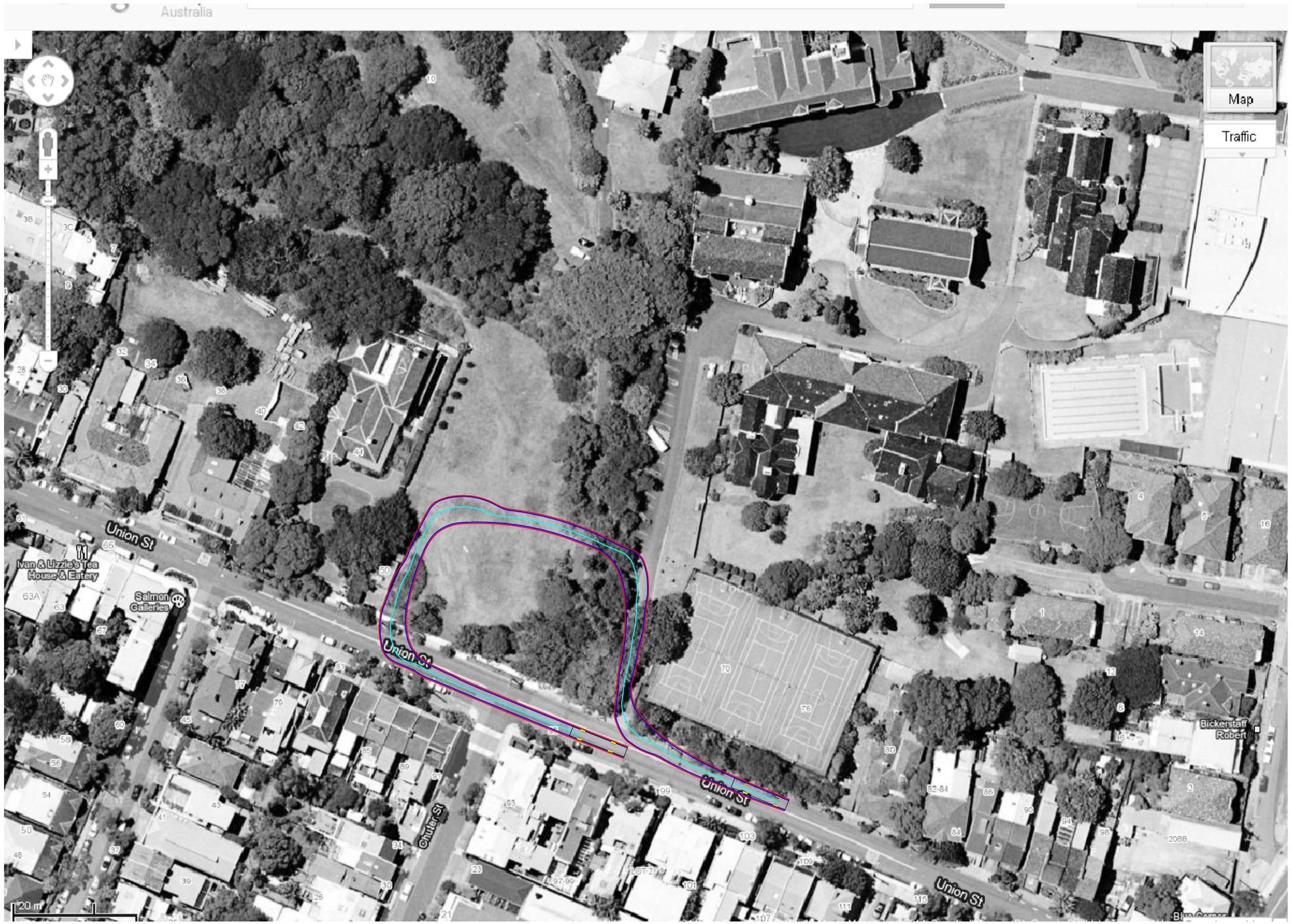
Filename: CTLRJQda01

Figure 2

Date: 30 JUNE 2011

14.5m STANDARD BUS TURN PATH - OPTION 4

GRAYTHWAITE HOUSE (SHORE SCHOOL)



Scale: 1:1000@A3

Halcrow

Filename: CTLRJQda01

Figure 4

Date: 19 JULY 2011

Appendix G Road Network Traffic Implications – Original Concept Plan (Stage 2 and Stage 3)

Source: Graythwaite Part 3A Concept Application & Stage 1 Project Application, Transport and Accessibility Impact Assessment, prepared by Halcrow Pacific Pty Ltd (24 November 2010)

The results of the traffic assessment presented in this appendix assumed a School population increase of 500 students and 50 staff.

G.1 Stage 2

G.1.1 Changes to Travel Demand

Changes to the existing travel demand of the combined Shore School and Graythwaite site will occur during Stage 2 as a result of additional students (+100) and staff (+10).

The extent of the travel demand changes and the implications to the surrounding road network will depend on whether the additional students and staff are related to the Preparatory School or Senior School. The two schools have different travel behaviour with a higher vehicle drop off / pick up rate for Preparatory School students than Senior School students who have a relatively higher use of public transport modes.

Furthermore the behaviour of student drop offs and pick ups will be different with Preparatory School movements focusing on Edward Street / Mount Street and the Senior School to Blue Street / William Street.

To assess the road network implications of Stage 2 two options have been considered, namely:

- Option A : + 100 Preparatory School students and +10 staff
- Option B : + 100 Senior School students and +10 staff

In addition to the student drop off and pick vehicle movements, it is noted that an additional 41 staff (or visitor) car parking spaces will be provided under the East Building in Stage 2. The traffic generation potential of these spaces has been included in the assessment. To assess the potential worst case for traffic impacts, it has been assumed that all of the new parking spaces will be fully occupied by new and existing staff (who currently don't park at or near the School) at Stage 2. This assessment will also address the maximum potential impacts from this parking provision for Stage 3.

G.1.2 Traffic Generation Implications

The estimated traffic generation for Stage 2 is shown in Table G.1 - . These traffic estimates have been used in the intersection analysis. The estimates are based on

surveyed existing travel behaviour obtained by traffic and pedestrian counts and the travel questionnaire.

Table G.1 - Stage 2 Traffic Generation

	Option A Prep School	**Option B Senior School**
Student No. Increase	100	100
Rate of Vehicle Drop Off / Pick Up per student (One Way)	0.48 trips per student	0.24 trips per student
Number of Student One Way Trips	48	24
Total Number of Student Trips (Inbound + Outbound)	96	48
Staff Trip Rate	0.5 trips / parking space	0.5 trips / parking space
No. of Staff Parking Spaces	41	41
No. of Staff Trips	21	21
Total Vehicle Trips / Peak Hour	117	69

The estimated traffic generation for Stage 2 have been added to the surveyed traffic flows on the surrounding road network and re-analysed using SIDRA.

The results are presented in Table G.1 and show that the additional traffic generation of Stage 2 options can be adequately accommodated within the existing road network capacity without significant adverse impacts to 'Level of Service' or average vehicle delays.

While the network operates satisfactorily it is noted that the average vehicle delays at the Edward Street / Mount Street intersection increase from 8 seconds to 15 seconds per vehicle in the PM Peak Hour for Option A (i.e. + 100 Preparatory School students).

Table G.2 – Stage 2 Intersection Operation

	Existing				Stage 2 - Option A				Stage 2 - Option B			
	AM		PM		AM		PM		AM		PM	
	Ave Delay	LoS	Ave Delay	LoS	Ave Delay	LoS	Ave Delay	LoS	Ave Delay	LoS	Ave Delay	LoS
Edward St-Mount St	6	A	8	A	6	A	15	B	6	A	8	A
Edward St-Lord St	5	A	6	A	6	A	8	A	5	A	6	A
William St-Blue St	6	A	6	A	6	A	6	A	6	A	6	A
Union St-Chuter St	6	A	6	A	6	A	6	A	6	A	6	A
Union St-School Access	6	A	6	A	6	A	6	A	6	A	6	A
Union St-Blues Point Rd	26	B	25	B	26	B	25	B	26	B	25	B
Blue St-Miller St	27	B	17	B	29	C	17	B	29	C	17	B

This reflects the inclusion of the existing peak 15 minute pick up behaviour of the Preparatory School drop off / pick up facility in the afternoon in the modelling analysis.

If it is determined that Stage 2 and 3 project applications include development for the Preparatory School that results in an overall increase in Preparatory School student numbers, the School will examine strategies to address the actual additional traffic load in Edward Street.

G.2 Stage 3 - New West Building

G.2.1 Changes to Travel Demand

At the completion of Stage 3, it is proposed that the School population will have increased above existing levels in the order of 500 students and 50 staff. This will be made up of some 100 Preparatory School students and 400 Senior School Students.

G.2.2 Traffic Generation Implications

The estimated traffic generation for Stage 3 is shown in Table G.3. These traffic estimates have been used in the intersection analysis. The estimates are based on surveyed existing travel behaviour obtained by traffic and pedestrian counts and the travel questionnaire.

Table G.3 – Stage 3 Traffic Generation (Cumulative of Stages 1, 2 and 3)

	Prep School	Senior School	Total
Student No. Increase	100	400	500
Rate of Vehicle Drop Off / Pick Up per student (One Way)	0.48 trips per student	0.24 trips per student	
Number of Student One Way Trips	48	96	144
Total Number of Student Trips (Inbound + Outbound)	96	192	288
Staff Trip Rate	0.5 trips / parking space	-	
No. of Staff Parking Spaces	41	-	
No. of Staff Trips	21	-	21
Total Vehicle Trips / Peak Hour	117	192	309

The estimated traffic generation for Stage 3 have been added to the surveyed traffic flows on the surrounding road network and re-analysed using SIDRA.

The results are presented in Table G.6-1 and show that the additional traffic generation of Stage 3 options can be adequately accommodated within the existing road network capacity without significant adverse impacts to 'Level of Service' or average vehicle delays.

In particular the volume of traffic generated for Stage 2 / 3 accessing the School via Union Street (ie. staff accessing the additional on site parking under the East Building) would not be significant enough to change the existing vehicle delays and Level of Service along Union Street.

Furthermore, the assessment has assumed (as a worst case) that all additional preparatory school students are accommodated in Stage 2 with Stage 3 being Senior School students. Senior school students generate significantly less vehicle trips than Preparatory school students. Hence the relative change in impact is low as shown in Table G.4.

Table G.6-1 – Stage 3 Intersection Operations

	Existing				Stage 3			
	AM		PM		AM		PM	
	Ave Delay	LoS	Ave Delay	LoS	Ave Delay	LoS	Ave Delay	LoS
Edward St-Mount St	6	A	8	A	6	A	15	B
Edward St-Lord St	5	A	6	A	6	A	8	A
William St-Blue St	6	A	6	A	7	A	6	A
Union St-Chuter St	6	A	6	A	6	A	6	A
Union St-School Access	6	A	6	A	6	A	6	A
Union St-Blues Point Rd	26	B	25	B	27	B	26	B
Blue St-Miller St	27	B	17	B	33	C	18	B

As discussed for Stage 2 Option A, while the network operates satisfactorily it is noted that the average vehicle delays at the Edward Street / Mount Street intersection increase from 8 seconds to 15 seconds per vehicle in the PM peak hour for when the additional 100 Preparatory School students are accommodated.

This indicates that management of the Edward Street drop off / pick up facility will need to be considered and implemented when the Preparatory School population increases.