

Your reference: Email Dated 21 July 2025

Our reference: P6656.001L HopePoint Christian School_Traffic & PUDO_Further IR Response.docx

29 July 2025

City of Canterbury Bankstown

Attention: **Ms Sophie Griffiths**

Sent via email: lucia.uribe@leafarch.com.au

Dear Sohpie

**RE: FURTHER INFORMATION REQUEST RESPONSE: TRAFFIC AND TRANSPORT ITEMS
HOPEPOINT CHRISTIAN SCHOOL 42A BEALE STREET, GEORGES HALL NSW 2198**

This letter has been prepared in response to the Further Information Request (IR) issued by Canterbury-Bankstown Council via email dated 21 July 2025 regarding the above-mentioned Development Application. It outlines a summary of the applicant's response to the traffic and transport items raised in the Further IR email issued by Council's Senior Town Planner, Sophie Griffiths, based on internal comments from Council's Traffic and Transport team following review of the amended documentation.

The purpose of this letter is to address each of the outstanding traffic matters raised in Council's RFI, concerning the submitted Traffic Impact Assessment (TIA) prepared by Bitzios Consulting (ref: P6656.004R, dated 22 March 2025).

Specifically, the traffic and transport items include:

- Item 1: Traffic generation
- Item 2: Queueing
- Item 3: Drop-off/pick-up arrangements
- Item 4: Shuttle bus operations

The following sections provide a summary of the response to each specific item.

1. Traffic & Transport Items: Response Summary

1.1. Item 1: Traffic Generation

Council's RFI Item 1 is reproduced below for ease of reference.

Council refers to the 2025 TfNSW Guide to Transport Impact Assessment. The increase of 215 children would result in an increase of 151 vehicle trips during the AM peak hour period and 108 vehicle trips during the PM peak hour period. The applicant's more conservative rates and traffic generation figures is deemed acceptable.

A traffic count in December 2023 shows that this section of Beale Street has a 7-day AADT of 1154 vehicles with a peak AM volume of 209 vehicles between 8:00–9:00am and a peak PM volume of 177 vehicles between 3:00–4:00pm. The addition of 144 vehicles in the AM peak and 114 vehicles in the PM peak will have rather significant impacts to Beale Street and Ashcroft Street. The applicant needs to resolve this in order to accommodate the addition of 215 children.

Bitzios Consulting Response:

The submitted TIA (Table 4.1) estimates that the proposed expansion from 185 to 400 students will result in an increase in total driveway movements from:

- 124 to 268 vehicles during the AM peak; and
- 103 to 217 vehicles during the PM peak.

This equates to a net increase of 144 vehicle movements in the AM peak hour and 114 in the PM peak hour, distributed across both the Ashcroft Street and Beale Street access points.

This increase is concentrated within the 30–45 minute school-specific drop-off and pick-up windows and occurs almost exclusively in one direction (inbound in the morning, outbound in the afternoon). As such, it differs significantly from balanced bidirectional commuter traffic and places a more limited demand on available mid-block capacity.

Council's traffic counts for Beale Street indicate existing two-way peak volumes of:

- 209 vehicles during the AM peak; and
- 177 vehicles during the PM peak.

Even with the addition of school-generated traffic, total volumes are projected to remain at approximately 353 veh/h (AM) and 291 veh/h (PM).

By comparison, the Austroads Guide to Traffic Management Part 3 (AGTM3) and TfNSW environmental capacity benchmarks indicate that a two-lane local street with mostly uninterrupted flow conditions typically supports 900 to 1,000 veh/h without exceeding acceptable levels of service (LoS) or amenity. Based on this benchmark, the projected post-expansion volumes represent less than 40% of the environmental capacity of Beale Street.

Furthermore:

- There are no signalised intersections, school crossings, or friction elements that would otherwise constrain traffic flow on Beale Street
- The increase in school traffic occurs within short, well-defined windows, approximately 8:15–8:45 am and 3:00–3:30 pm, and does not overlap with broader commuter peak flows. This limits its impact on through traffic, ensuring that overall network performance is maintained.

In summary, the projected increase in school traffic is well within the available capacity of Beale Street and surrounding local roads. It is not expected to cause operational or safety concerns.

1.2. Item 2: Queueing

Council's RFI Item 2 is reproduced below for ease of reference.

The TIA states that current observation during the AM peak saw a maximum of three vehicles queuing in Ashcroft Street, with a typical drop-off being 40 seconds, and a maximum of 16 vehicles, 75 metres, queuing southbound in Ashcroft Street.

The TIA estimates that there will be an additional 27 vehicles (127 metres) that will join the queue during peak PM hours. This is close to double the current PM queue length. The estimated queue length is based on the assumption that demand for the kiss and drop zone will be proportionate to the school population increase. This is not acceptable and a queueing analysis is required.

Bitzios Consulting Response:

The queuing forecast in the TIA was deliberately conservative, based on realistic operational conditions observed on site, including measured vehicle dwell times, typical parent arrival patterns, and actual mode share proportions. The estimate of 127 metres was not based on a simplistic population scale-up but rather derived from how parents currently use the kiss-and-drop zone and how that usage is likely to grow with expansion.

To further validate this, a queuing analysis was undertaken via two (2) methodologies:

- **Method 1:** A deterministic arrival-departure queue analysis (constant arrivals/departures); and
- **Method 2:** Determination of steady state queues with random arrivals and service.

Method 1:

A deterministic arrival-departure queue analysis was undertaken using the same forecast of 27 vehicle arrivals over a 30-minute window and a service rate of 1.5 vehicles per minute (based on 40-second dwell time). The results show zero queue accumulation, confirming that the system operates well below capacity and that vehicle arrivals are cleared faster than they build up. The model assumes:

- 27 vehicles arriving over 30 minutes, or 0.9 vehicles per minute (λ),
- A service rate of 1 vehicle every 40 seconds, equivalent to 1.5 vehicles per minute (μ).

The queue accumulation formula is:

$$\text{Queue}(t) = \text{Queue}(t-1) + \text{Arrivals}(t) - \text{Departures}(t)$$

At a rate of 0.9 vehicles per minute, vehicles arrive, and at 1.5 vehicles per minute, they are processed. Because the service rate exceeds the arrival rate ($\mu > \lambda$), the queue never builds up.

For example:

- At $t = 1$ minute: Queue = $0 + 0.9 - 1.5 = 0$ (capped at zero),
- At $t = 2$ minutes: Queue = $0 + 0.9 - 1.5 = 0$,
- ... and so on.

This confirms that, even if all 27 vehicles arrive evenly over 30 minutes, the system has enough capacity to process vehicles faster than they arrive, preventing queue buildup and contradicting any claim that the queue would grow to 127 metres unless all vehicles arrived at once. However, in reality, many parents arrive early and begin queuing before dismissal starts, causing an initial surge and short-term queue accumulation. This early arrival pattern creates a turbulent front-end loading effect not captured in smooth arrival assumptions. The TIA's forecast queue of 127 metres explicitly allows for this early clustering and provides sufficient space for the queue to build, stabilise, and dissipate safely within school-controlled areas.

Method 2:

This method has been directly adopted from the *Austroads Guide to Traffic Management, Part 2: Traffic Theory* (AGTM2), specifically Section 4 and Equation 4.3. It is based on the utilisation factor, “ ρ ” (also known as queue intensity) which is based on the ratio of the determined average arrival rate, r and service rate, s .

That is:

$$\rho = r / s$$

The determination is based on *steady state queues with random arrivals and service*. Essentially, the formula being applied calculates the probability that there are n units in the system ($n \geq 0$). The formula is as follows:

$$P_n = (1 - \rho) * \rho^n$$

Where:

$$\rho = r / s$$

r = average arrival rate

s = average service rate

n = number of vehicles

P_n = probability of “ n ” vehicles required to queue

This can also be expressed as:

$$P_n = (1 - (r/s)) * (r/s)^n$$

Using the same forecast of 27 vehicle arrivals over a 30-minute window (conservatively assumed to be 54 vehicle per hour) and a service rate of 1.5 vehicles per minute (based on 40-second dwell time), this results in a 98th percentile queue of 5-6 vehicles (or 30-36m queue).

Table 1.1: 98th Percentile Queue Length Calculation

Queue Length		Probability	
Vehicles	Distance (m)	Exactly ‘n’ Vehicles	Less or Equal to ‘n’ Vehicles
0	0	40.0%	40.0%
1	6	24.0%	64.0%
2	12	14.4%	78.4%
3	18	8.6%	87.0%
4	24	5.2%	92.2%
5	30	3.1%	95.3%
6	36	1.9%	97.2%

Based on the above, both methods confirm the school’s service capacity, while the 127m design length indicates a realistic operational allowance for early-arriving parents and peak clustering, rather than a theoretical maximum.

The queues expected to propagate from the proposed development is therefore not expected to be proportionate to the increase in enrolments, and can be accommodated within the proposed pick-up / drop-off arrangement.

1.3. Item 3: Drop-off / Pick-Up Arrangements

Council's RFI Item 3 is reproduced below for ease of reference.

The TIA states that the kiss and drop zone will continue to operate from Ashcroft Street. The report refers to using the existing internal car park, accessed from Beale Street, as a secondary drop-off/pick-up zone. However, the report does not specify whether this area is currently used or how it will be used once the development is completed.

Council is seeking clarity on the intended use of the Beale Street car park in the post-expansion scenario, including whether this will assist with queue containment. A plan illustrating circulation and kiss and drop access should be provided.

Bitzios Consulting Response:

The school currently operates a single kiss-and-drop arrangement via Ashcroft Street. Under existing conditions, this layout functions adequately, but the available queuing space is insufficient to manage the projected increase in vehicle demand associated with the expansion to 400 students.

To address this, the TIA (Section 5.1) proposes a revised dual-access PUDO strategy involving:

- Continued use of the Ashcroft Street loop; and
- Introduction of a managed pick-up route through the internal car park accessed via Beale Street.

This is a new operational arrangement designed specifically to handle the forecast queue of up to 127 metres during the PM peak, by distributing vehicles between the two frontages and leveraging the internal circulation network.

Functional Role of the Beale Street Car Park:

- Parent vehicles will enter from Beale Street and queue internally through the car park's access aisle, under supervision by school staff
- The internal layout is designed to accommodate queued vehicles while maintaining access to parking bays safely
- This configuration provides critical additional queuing capacity, reducing the burden on Ashcroft Street and ensuring that vehicle queues do not impact public road intersections.

Illustration of Operation:

A site circulation diagram is provided, showing:

- Dual entry/exit gates at Ashcroft and Beale Streets
- Movement paths for queued vehicles during pick-up periods
- The proposed integration of internal car park aisles into the PUDO system.

This layout ensures safe and efficient operation, with all queuing and circulation fully contained within school property, while managing student / pedestrian safety through the provision of raised pedestrian crossings slowing vehicles, and maintaining pedestrian priority.

The circulation plan illustrating this arrangement is depicted below



Figure 1.1: Internal Queuing and Circulation Plan

1.4. Item 4: Shuttle Bus Operations

Council's RFI Item 4 is reproduced below for ease of reference.

The report states that the school currently operates one PM bus service and will require two in the future. Council is seeking confirmation on the number and timing of buses proposed. Will the proposed number of services be sufficient to accommodate the increase in student numbers?

The bus zone on Ashcroft Street should be of sufficient length to cater for two buses. The applicant should confirm how the proposed kiss-and-drop and shuttle bus arrangements will operate simultaneously without causing safety issues or conflicting movements.

Bitzios Consulting Response:

The TIA (Section 5.1) confirms that, under the proposed expansion, the school will run two afternoon shuttle bus services. These services are operated directly by the school, using school-owned buses, and will serve students travelling from surrounding catchment areas.

The second bus is expected to start from Term 1 of the expanded service, depending on enrolment demand. Based on current growth estimates and the predicted uptake of the shuttle, two buses will be enough to carry eligible students without the need for extra services.

Timing and Conflict Management:

- The two PM services will operate in a staggered pattern, with departures expected approximately 5–10 minutes apart
- The school will manage bus loading and supervision internally, with staff present at all times to direct boarding
- Bus departure times will be programmed to avoid overlap with the peak of private vehicle pick-up, minimising interaction with kiss-and-drop traffic.

Bus Zone Layout and Operation:

The existing bus zone on Ashcroft Street accommodates one bus. To support the second PM service, the TIA recommends a modest extension of the zone northward, toward the kiss-and-drop exit driveway.

The proposed extension involves converting a currently unrestricted kerbside area between the existing bus zone and the PUDO exit, which is currently used for general parking, into a bus zone. This change will not worsen sightlines, as it does not introduce new fixed obstructions or encroach closer to the driveway than the current setup.

Formalising this kerb space as a supervised, time-limited bus zone will improve operational clarity and predictability, ensuring visibility at the PUDO exit is maintained and no informal parking occurs in that critical zone.

The full two-bus capacity will then operate safely within the extended frontage, without overlapping with the kiss-and-drop flow.

2. Concluding Statement

I trust the information provided herein suitably addresses Council's RFI Items 1-4 in relation to traffic and transport.

Please do not hesitate to contact us if you have any questions or require further clarification on the above information.

Yours sincerely,

A handwritten signature in blue ink, appearing to read "Luke Darragh", is positioned below the "Yours sincerely," text.

Luke Darragh
National Manager – Operations
Principal Traffic Engineer / Transport Planner
B ENG (Civil) | MAITPM | RSA
BITZIOS CONSULTING