Advisory Committee Hearing
Former Boronia Heights College
Traffic Engineering Evidence

Expert // David Graham
Client // Department of Treasury and Finance
Instructed by // Beni Roussos, Urbis
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1. Introduction

1.1 Background

The former Boronia Heights College was located at 40 Mount View Road, Boronia. The school closed and the buildings on the site were demolished in 2015. The site has since been determined surplus to the Victorian Government’s current and future requirements. On behalf of the Department of Education and Training, the Department of Treasury and Finance (DTF) has requested that the planning provisions for the site be changed to reflect that it is no longer required for public use. This is proposed to include rezoning the land to a Neighbourhood Residential Zone (NRZ1) and replacing the existing Design and Development Overlay (DDO) with a Development Plan Overlay (DPO). The site has been nominated for the Inclusionary Housing Pilot.

The Minister for Planning has referred the proposal to the Government Land Standing Advisory Committee for consideration. The Committee will also consider whether the Minister for Planning or Council should be the Responsible Authority for this site.

The proposal was advertised, and submissions were received from a number of third parties with various comments regarding the proposal including comments relating to:

1. The expected impact of traffic generated by the development of the site on the surrounding road network.
2. The potential site access locations.

1.2 Expert Witness Details

David Graham BE (Hons), BSc, VPELA, MIEAust
Director – GTA Consultants
L25, 55 Collins Street, Melbourne
Areas of Expertise: Traffic Engineering & Transport Planning

I have over 18 years’ experience in traffic engineering built across roles in both the public and private sector. I have a Bachelor of Engineering with Honours and a Bachelor of Science from the University of Melbourne.

I have extensive experience in the preparation of traffic impact assessments, traffic engineering advice on developments, intersection and traffic signal design and analysis, and car park design on various community, retail, commercial and residential developments. I have been involved in the management and delivery of a number of key traffic engineering projects ranging from bicycle route scoping to the development of traffic management treatments to improve route performance or address accident black spots, and the development of park and ride facilities. I am a highly experienced VicRoads accredited Senior Road Safety Auditor.

Further details of my experience are provided in Appendix A.

1.3 Relationship to Client

I have no ongoing business relationship with the Department of Treasury and Finance (DTF), and have been retained to provide expert witness services at this hearing for a mutually agreed fee.
1.4 Instructions & Scope of Report

GTA Consultants was commissioned by the DTF in 2017 to undertake a transport impact assessment of the proposed rezoning. I have now been engaged by the DTF to prepare and present expert traffic and transport evidence at the Advisory Committee hearing.

Prior to preparing this evidence I was briefed by Jane Kelly and Eleni Roussos of Urbis regarding the proposal via oral and written instructions.

This evidence sets out an assessment of the anticipated traffic and transport implications of the proposed rezoning, including consideration of the:

i existing traffic conditions surrounding the site
ii proposed access arrangements for the site
iii traffic generation characteristics of the proposed development
iv transport impact of the development proposal on the surrounding road network.

1.5 References

In preparing this evidence, reference has been made to the following:

- Knox Planning Scheme
- traffic surveys undertaken by GTA Consultants as referenced in the context of this report
- ‘40 Mount View Road, Boronia’ Planning Report, prepared by Urbis, dated August 2017
- Knox Road Management Plan 2015
- third party submissions to the Advisory Committee
- various technical data as referenced in this report
- an inspection of the site and its surrounds
- other documents as nominated.

1.6 Tests, Experiments & Assistance

In preparing this evidence, I received assistance from the following people:

Jason Sellars  Director  BEng(Hons) (Civil) (Trans)
Neale McCracken  Senior Consultant  MEng [Hons] (Civil Engineering)
Jordan Smith  Consultant  BEng (Civil) (Hons)
2. Existing Conditions

2.1 Subject Site

The former Boronia Heights College Mount View Campus site is located at 40 Mount View Road, Boronia and is bound by Mount View Road to the northeast, Paisley Avenue to the northwest, Harcourt Road to the southwest and Forest Road to the south. Residential properties generally border the site between each road frontage.

The surrounding properties are predominately residential in nature. The location of the subject site and the surrounding environs is shown in Figure 2.1, and the current land zoning is shown in Figure 2.2.

Figure 2.1: Subject Site and its Environs

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2.2 Road Network

2.2.1 Surrounding Roads

Mount View Road

Mount View Road is a local collector road (Council controlled). It is a two-way road aligned in a northwest-southeast direction and configured with a two-lane, 7.5m wide carriageway set within a 15m wide road reserve (approximately). Kerbside car parking is permitted. Mount View Road is shown in Figure 2.3 and Figure 2.4.

Paisley Avenue

Paisley Avenue is a local access road (Council controlled). It is a two-way road aligned in a northeast-southwest direction and configured with a two-lane, 7m wide carriageway set within a 15m wide road reserve (approximately). Kerbside car parking is permitted. Paisley Avenue is shown in Figure 2.5 and Figure 2.6.
Harcourt Road

Harcourt Road is a local access road (Council controlled). It is a two-way road aligned in a northwest-southeast direction and configured with a two-lane, 7m wide carriageway set within a 15m wide road reserve (approximately). Kerbside car parking is permitted. Harcourt Avenue is shown in Figure 2.7 and Figure 2.8.

Forest Road

Forest Road is an arterial road located within a Road Zone (Category 1) in the Knox Planning Scheme and is controlled by VicRoads. It is a two-way road aligned in an east-west direction with a 10.5m wide carriageway set within a 30m wide road reserve (approximately). There are line-marked bicycle lanes on both sides of the road. Forest Road carries approximately 11,000 vehicles per day. Kerbside car parking is permitted. Forest Road is shown in Figure 2.9 and Figure 2.10.

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1 Based on 2017 AADT data available from the VicRoads online open data portal.
2.2.2 Traffic Volumes

GTA commissioned weeklong pneumatic tube traffic surveys on Harcourt Road and Mount View Road between Wednesday 24 May and Tuesday 30 May 2017. Traffic volume data for Forest Road has also been obtained from the VicRoads Traffic Profile Viewer. A summary of the results of these surveys is provided in Table 2.1.

Table 2.1: Existing Traffic Volumes

<table>
<thead>
<tr>
<th>Road</th>
<th>Location</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
<th>Daily</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mount View Road</td>
<td>Just north of Forest Road</td>
<td>50 veh/h</td>
<td>77 veh/h</td>
<td>735 veh/day</td>
</tr>
<tr>
<td>Harcourt Road</td>
<td>Just North of Forest Road</td>
<td>23 veh/h</td>
<td>40 veh/h</td>
<td>293 veh/day</td>
</tr>
<tr>
<td>Forest Road</td>
<td>Between Boronia Road &amp; Mountain Highway</td>
<td>1,000 veh/h</td>
<td>1,085 veh/h</td>
<td>10,700 veh/day</td>
</tr>
<tr>
<td>Albert Avenue</td>
<td>Between Miller Road &amp; Boronia Road</td>
<td>Not available</td>
<td></td>
<td>9,600 veh/day</td>
</tr>
</tbody>
</table>

2.2.3 Pedestrian Infrastructure

Sealed pedestrian paths are located on all roads surrounding the subject site.

2.2.4 Bicycle Infrastructure

There are existing bicycle lanes along Forest Road in the vicinity of the site. Forest Road is on the VicRoads Principal Bicycle Network and is a SmartRoads Bicycle Priority Route.

Albert Avenue is also on the VicRoads Principal Bicycle Network and is a SmartRoads Bicycle Priority Route. However, there are currently no formal bicycle facilities on Albert Avenue.

2.3 Public Transport

Figure 2.11 shows the subject site in relation to existing public transport routes within its vicinity, whilst Table 2.2 summarises the road based routes and major destinations that can be reached using these services.
Table 2.2: Public Transport within the vicinity of the site

<table>
<thead>
<tr>
<th>Service</th>
<th>Route Nos</th>
<th>Route Description</th>
<th>Distance to Nearest Stop (m)</th>
<th>Significant Destinations</th>
<th>Frequency On/Off Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus</td>
<td>755</td>
<td>Bayswater – Knox City</td>
<td>400m</td>
<td>Bayswater, The Basin, Boronia, Ferntree Gully, Knox</td>
<td>30 mins</td>
</tr>
<tr>
<td></td>
<td>690</td>
<td>Croydon – Boronia</td>
<td>600m</td>
<td>Croydon, Kilsyth, Canterbury Gardens, Kilsyth South, Boronia</td>
<td>30/40 mins</td>
</tr>
</tbody>
</table>

In addition to road based public transport, Boronia train station on the Belgrave line is located approximately 2.3km walk from the site.
3. Proposal

3.1 Site Development

The current proposal involves rezoning the site to a Neighbourhood Residential Zone (NRZ1) and replacing the existing Design and Development Overlay (DDO) with a Development Plan Overlay (DPO). A Development Plan for the site in accordance with the DPO requirements, and any specific development proposal on the site, would both be subject to a future authority approval process.

I am not aware of any concept plan that has been prepared by, or on behalf of, the Victorian Government of any specific development proposals for the site. Notwithstanding, the Victorian Government has listed the College site among five sites that could be used to deliver social housing. For the purposes of this report I have assumed that around 90 dwellings could be developed on the site, based on advice received from Urbis. I understand that this is considered a conservative on the high side estimate.

3.2 Development Plan Overlay (DPO)

Any future development on the site would need to be in accordance with an approved Development Plan, which meets the requirements of the proposed Schedule 13 to the Clause 43.04 Development Plan Overlay. The proposed Schedule to the DPO contains a number of requirements which must be addressed to the satisfaction of the responsible authority. These include:

- “A traffic management report prepared by a suitably qualified person(s), which identifies, as relevant:
  - Roads, pedestrian, cyclist and vehicle access locations.
  - An integrated pedestrian and bicycle path network, incorporated into the road and public open space system that:
    - Provides clear linkages within the land and connections to the surrounding community and other local destinations, including public transport.
    - Provides for community safety.
    - Any traffic management measures.”

Therefore, the preparation of a traffic management report as part of a future Development Plan for the site would provide an opportunity to consider more detail regarding the traffic impact of the potential future development of the site than can be considered at the rezoning stage.
4. Potential Traffic Impact

4.1 Introduction

When considering the expected impact of rezoning of the site on the nearby road network it is necessary to compare the traffic which is generated by the site under the current zoning and compare it with the traffic which could be expected to be generated by the site under the proposed zoning.

4.2 Previous Use

I am not aware of any data that is available of the traffic which was actually generated by the school. However, this can be estimated based on traffic surveys of other schools. I have sourced data from six surveys of other secondary schools in Melbourne. The survey data sources and surveyed traffic generation rates are shown in Table 4.1.

Table 4.1: Traffic Generation Rates for Schools

<table>
<thead>
<tr>
<th>School Name</th>
<th>Location</th>
<th>Size</th>
<th>Traffic Generation Rate per Student</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>AM Peak</td>
</tr>
<tr>
<td>Sohpie Munder Steiner School</td>
<td>Abbotsford</td>
<td>334 students</td>
<td>0.80</td>
</tr>
<tr>
<td>Eltham College</td>
<td>Research</td>
<td>1,057 students</td>
<td>0.40</td>
</tr>
<tr>
<td>Hillcrest Christian College Ayr Hill Campus</td>
<td>Clyde North</td>
<td>600 students</td>
<td>0.49</td>
</tr>
<tr>
<td>Penleigh &amp; Essendon Grammar School</td>
<td>Keilor East</td>
<td>1,000 students</td>
<td>0.92</td>
</tr>
<tr>
<td>Heatherton Christian College</td>
<td>Clarinda</td>
<td>214 students</td>
<td>0.72</td>
</tr>
<tr>
<td>Aitken College</td>
<td>Greenvale</td>
<td>1,207 students</td>
<td>0.87</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
<td>0.70</td>
</tr>
</tbody>
</table>

The survey data in Table 4.1 shows that the schools generated between 0.40 and 0.92 vehicle movements per student in the AM school peak hour and between 0.32 and 0.74 vehicle movements per student in the PM school peak hour.

It should be noted that all of the above schools are private schools, which typically enrol students from a wider area than government schools such as Boronia Heights College, which is likely to have mostly attracted students from Boronia and adjacent suburbs. Therefore, it is likely that a higher percentage of students that attended Boronia Heights College walked or cycled to school when compared with many of the surveyed schools. Accordingly, Boronia Heights College probably had a lower traffic generation rate than most of the schools listed above.

Consequently, I consider it reasonable to assume that the school generated traffic in the order of 0.4 vehicle movements per student in the AM peak hour and 0.3 vehicle movements per student in the PM peak hour.

I understand that the school had an enrolment of in the order of 360 students. This would equate to a traffic generation of at least 144 vehicle movements in the AM peak hour and 108 vehicle movements in the PM peak hour.
Data from various sources suggest that the peak to daily ratio of traffic generation for secondary schools is typically approximately 0.3. Therefore, the school could be expected to have generated at least 420 daily vehicle movements.

4.3 Proposed Use

The traffic volume which is generated by the site if it is rezoned and developed with residential uses will depend on the number, size and ownership type of the dwellings.

As rule of thumb, typically a single house on a standard lot in an outer metropolitan area will typically generate up to 1 trip in the peak hour and 8 to 10 trips per day. Medium density dwellings generally exhibit a lower traffic generation rate. In the outer metropolitan areas, where public transport accessibility is relatively low, the rate for medium density units is typically in the order of 6 to 8 trips per day. Closer to the Melbourne CAD the rate reduces to in the order of 3 to 6 trips per day depending on dwelling size, parking provisions and accessibility to public transport and local amenities, among other things. Peak hour rates are typically 10–12% of daily rates.

In order to estimate the likely future traffic volume generated by a residential development on this site I have sourced data from seven surveys of other residential subdivisions in Melbourne undertaken in the last 10 years. The survey data locations and surveyed traffic generation rates are shown in Table 4.2.

**Table 4.2: Residential Traffic Generation**

<table>
<thead>
<tr>
<th>Location</th>
<th>Number of Dwellings</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
<th>Daily</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pakenham</td>
<td>70</td>
<td>0.41</td>
<td>0.54</td>
<td>6.73</td>
</tr>
<tr>
<td>Mulgrave</td>
<td>229</td>
<td>0.53</td>
<td>0.54</td>
<td>-</td>
</tr>
<tr>
<td>Carrum Downs</td>
<td>50</td>
<td>0.82</td>
<td>0.78</td>
<td>8.88</td>
</tr>
<tr>
<td>Macleod</td>
<td>84</td>
<td>0.77</td>
<td>0.77</td>
<td>8.29</td>
</tr>
<tr>
<td>Wallan</td>
<td>284</td>
<td>0.58</td>
<td>0.78</td>
<td>-</td>
</tr>
<tr>
<td>Wantima</td>
<td>113</td>
<td>1.04</td>
<td>0.84</td>
<td>-</td>
</tr>
<tr>
<td>Berwick</td>
<td>616</td>
<td>-</td>
<td>0.71</td>
<td>-</td>
</tr>
<tr>
<td><strong>Weighted Average</strong></td>
<td></td>
<td><strong>0.65</strong></td>
<td><strong>0.70</strong></td>
<td><strong>7.90</strong></td>
</tr>
</tbody>
</table>

Based on the above survey data, a typical residential development on the subject site could be expected to generate in the order of 8 daily vehicle movements per dwelling, including 0.7 vehicle movements in a peak hour.

Consequently, if the site is developed with 90 dwellings, these could be expected to generate in the order of 720 daily vehicle movements, including 63 vehicle movements in a peak hour.

I note that public housing typically generates lower traffic volumes than privately-owned housing as the residents of public housing have lower average car ownership rates. Notwithstanding, in order to be conservative, I have assumed that the future dwellings on the site could be typical privately-owned dwellings.

4.4 Potential Traffic Impact

4.4.1 General Impact of Rezoning

The above analysis indicates that the rezoning of the site and subsequent change of use to residential dwellings will result in less site-generated traffic at peak periods than would have been
generated by the school when it was in operation. This is not surprising, as schools typically have very ‘peaky’ traffic generation, whereas the traffic generation of residential uses is more evenly spread throughout the day. Consequently, the short periods of high traffic volumes and congestion in the adjacent road network that would have occurred during the peak drop-off and pick-up periods for the school will no longer occur if the site is rezoned to a residential use. I note that one of the submissions from a resident of Mount View Road indicated that “the traffic that used to be on Mount View Rd when the school was operating was very heavy”, and that this caused the submitter difficulty with being able to exit their driveway. This situation will not occur if the site is rezoning to a residential use.

Notwithstanding, the overall traffic generation of the site throughout the day will likely be higher if the site is rezoned for a residential use than would have been generated by the school, with a generation of in the order of 720 daily vehicle movements for a residential use, compared with at least 420 daily vehicle movements for the school.

4.4.2 Road Capacity

As noted previously, surveys indicate that Mount View Road currently carries in the order of 735 vehicles per day in the vicinity of Forest Road.

A residential development on the site is likely to only gain access from Mount View Road. Traffic travelling to and from the site using Mount View Road is likely to be split between those accessing the site to/from the north (Albert Avenue) and the south (Forest Road). I expect that slightly more traffic would access the site to/from the south than the north as the site access points are likely to be slightly closer to Forest Road than Albert Avenue.

If up to 2/3 of the site-generated traffic accesses the site to/from the south, then there could be up to 480 additional daily vehicle movements in this section of Mount View Road. This would increase the daily traffic volume in this section of Mount View Road to in the order of 1,215 vehicle movements per day.

Mount View Road has the characteristics of an ‘Access Street – Level 2’ in Clause 56.06-8 of the Knox Planning Scheme. This Clause indicates that an Access Street – Level 2 can accommodate an indicative maximum volume of 2,000 to 3,000 vehicles per day. Conversely, the ‘Knox City Council Road Management Plan’ identifies Mount View Road as a ‘Collector Road’ with an expected functional daily traffic volume capacity of up to 6,000 vehicles per day. Therefore, whilst the rezoning of the site will likely result in increased daily traffic volumes when compared with the existing situation (and when the site operated as a school), the daily traffic volume at any location on Mount View Road is still expected to be well within the capacity of the road.

Any traffic volume increases on other roads as a result of the development of the site would be less than the increase on Mount View Road due to the disbursement of traffic as it travels further from the site, and therefore are unlikely to impact the capacity of these roads.

4.4.3 Intersection Capacity

The critical intersection which will be impacted by the rezoning will be the intersection of Mount View Road and Forest Road, as this is the closest intersection to the site which provides access to an arterial road. Also, the rezoning will increase the volume of vehicles turning right out of Mount View Road, which is the movement that is subject to the greatest delays.

The existing traffic volumes at the intersection were estimated using the results of the traffic volume surveys noted in Section 2.2.2 of this evidence, and assuming that 80% of traffic turning at
the intersection turned to/from the west, which is consistent with site observations. Based on these assumptions, the existing peak hour volumes are shown in Figure 4.1 and Figure 4.2.

As noted above, following the rezoning and development of the site with residential uses, it could be expected to generate up to 63 vehicle movements in a peak hour, of which up to \( \frac{2}{3} \) could travel through the intersection of Mount View Road and Forest Road. Assuming typical residential splits of 20% in / 80% out in the AM peak hour and 70% in / 30% out in the PM peak hour, and adopting the assumption that 80% of traffic turning at the intersection will turn to/from the west, the potential site-generated peak hour volumes are shown in Figure 4.3 and Figure 4.4.

By adding the existing traffic volumes to the estimated future site-generated traffic volumes we can obtain the estimated future traffic volumes at the intersection. These are shown in Figure 4.5 and Figure 4.6.
In order to estimate the likely impact of the rezoning on this intersection, an analysis has been undertaken of the existing and future operation of the intersection using SIDRA Intersection software. The results of this analysis are shown in Table 4.3, with full results in Appendix B.

Table 4.3: Mount View Road & Forest Road – SIDRA Intersection Model Results

<table>
<thead>
<tr>
<th>Peak Hour</th>
<th>Approach</th>
<th>DOS [1]</th>
<th>Average Delay</th>
<th>95th %ile Queue</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing</td>
<td>Future</td>
<td></td>
<td>Existing</td>
</tr>
<tr>
<td>AM</td>
<td>Forest Road (East)</td>
<td>0.34</td>
<td>0 sec</td>
<td>0 sec</td>
</tr>
<tr>
<td></td>
<td>Mount View Road</td>
<td>0.10</td>
<td>17 sec</td>
<td>18 sec</td>
</tr>
<tr>
<td></td>
<td>Forest Road (West)</td>
<td>0.22</td>
<td>0 sec</td>
<td>0 sec</td>
</tr>
<tr>
<td>PM</td>
<td>Forest Road (East)</td>
<td>0.25</td>
<td>0 sec</td>
<td>1 sec</td>
</tr>
<tr>
<td></td>
<td>Mount View Road</td>
<td>0.15</td>
<td>20 sec</td>
<td>21 sec</td>
</tr>
<tr>
<td></td>
<td>Forest Road (West)</td>
<td>0.38</td>
<td>0 sec</td>
<td>1 sec</td>
</tr>
</tbody>
</table>

[1] Degree of Saturation. The DOS represents the flow-to-capacity ratio for the most critical movement on each leg of the intersection.

As can be seen from Table 4.3, the SIDRA modelling indicates that the additional traffic using the intersection of Mount View Road and Forest Road following the rezoning will have minimal impact on the operation of the intersection, with only minor increases to average delays and queues. Indeed, given that the residential traffic will be more evenly spread throughout the day than traffic generated by the site’s former use as a school, there will be less delay in turning out of Mount View Road into Forest Road during the peak residential traffic periods than there would have been during the peak school periods.
5. Site Access & Internal Roads

5.1 Potential Vehicle Access Points

In determining the potential vehicle access points to the site, the following site characteristics should be considered:

- The location of vegetation.
- Other constraints such as grades.
- The location of the existing previously-used site access points to the College.
- Surrounding roads and nearby intersections.
- Traffic expected to be generated by the indicative development.

Due to the location of existing vegetation and the grades within the site, site access is most likely to be limited to the two existing accesses on Mount View Road that previously served the College car park. These potential site access points are shown below in Figure 5.1 and the width of the property in these areas is approximately 15.3m, which is the same as the road reserve width of Mount View Road.

Figure 5.1: Potential Site Access Points

5.2 Internal Road Network Design

5.2.1 Overview

The internal road network should be designed in accordance with the requirements of Clause 56 of the Knox Planning Scheme, whilst also having regard to the Knox City Council Road Management Plan, and the Victorian Planning Authority (VPA) – Precinct Structure Plan (PSP) Design Guides. It is anticipated that this matter will be considered more fully at any planning permit stage.
5.2.2 Clause 56.06-08 Knox Planning Scheme

Clause 56.06-08 of the Knox Planning Scheme provides details for the design of roads and
neighbourhood streets within new residential subdivisions. In addition to individual lot access and
crossover requirements, the Clause also provides guidance on a road’s configuration based on its
proposed role in the road hierarchy. Given the site is likely to generate less than 1,000 vehicle
movements per day, the formation of the internal road network using ‘Access Streets’ with some
‘Access Places’ is considered an appropriate approach.

An ‘Access Street – Level 1’ has an indicative capacity of up to 2,000 vehicles per day and
includes a 5.5m wide carriageway within a 13.5m wide road reserve, whilst an ‘Access Street –
Level 2’ has an indicative capacity of up to 3,000 vehicles per day and includes a 7m or 7.5m
wide carriageway within a 16m or 16.5m wide road reserve.

5.2.3 Knox City Council Road Management Plan

The Knox City Council Road Management Plan provides guidance for the classification of roads
based on daily traffic volumes. Adopting these limits for new streets in this subdivision, the
provision of ‘Access Roads’ is considered to be appropriate. As guided by Clause 56.06-08, these
local roads have daily traffic volumes of up to 2,000 vehicles per day.

5.2.4 VPA – PSP Guidelines

The VPA Precinct Structure Plan (PSP) guidelines provide guidance on the classification of roads
based on daily traffic volumes. These guidelines suggest that the provision of streets similar to the
VPA ‘Access Place/Access Street Level 1’ is considered appropriate.

5.3 Summary

Given that the site is 15.3m wide at the two most likely site access locations, there is adequate
space to accommodate an ‘Access Street – Level 1’ at either of these locations, in accordance
with Clause 56.06-08 of the Knox Planning Scheme. This road type has an indicative capacity for
up to 2,000 vehicle movements per day.

As the site will generate less than 1,000 vehicle movements per day, it would be adequate to
provide access at only one location. Notwithstanding, providing access from multiple locations
would also be appropriate.

If the development was to be accessed from a single location, it is recommended that the
southern-most access on Mount View Road be chosen. This is due to intersection spacing
between it and the nearby Sapphire Avenue being larger than the next site access to the north
and its lesser spacing to Emerald Court.

As previously noted, the proposed Schedule to the DPO contains the following requirement which must be addressed to the satisfaction of the responsible authority:

- “A traffic management report prepared by a suitably qualified person(s), which identifies, as relevant:
  - Roads, pedestrian, cyclist and vehicle access locations.
  - An integrated pedestrian and bicycle path network, incorporated into the road and public open space system that:
    - Provides clear linkages within the land and connections to the surrounding community and other local destinations, including public transport.
    - Provides for community safety.
  - Any traffic management measures.”

I consider this requirement to be appropriate.

In addition, Council has requested that the following additional requirement be added to the Schedule to the DPO for inclusion in the traffic management report:

- “The capacity of surrounding roads and intersections and impacts of additional access points into the site.”

I consider that this is an appropriate addition to the proposed Schedule to the DPO and will assist with ensuring that the traffic impacts of any future residential development on the site are appropriately considered, particularly given that the size of such a development has not been confirmed at this time.
7. Other Matters

7.1 Car Parking Requirements

The provision and design of car parking would be considered at the planning permit stage. Notwithstanding, it should be in accordance with Clause 52.06 of the Knox Planning Scheme.

I expect that the resident car parking would be provided within individual garages/car ports, with residential visitor car parking provided kerbside of the internal roads or within angled off-street car parking spaces. Therefore, there should be negligible overspill of car parking from the subject site onto the existing adjacent residential streets.

7.2 Waste Collection

It is anticipated that waste will be stored within each individual lot and brought kerbside for collection as part of Council’s regular service. The internal road network should be designed to accommodate Council’s typical waste collection vehicle.

7.3 Emergency Vehicles

The internal road layout should be designed so that emergency vehicle access is available to any part of the development. Specifically, the internal road network should be designed to accommodate vehicles of a size up to and including 9.8m long fire trucks.

7.4 Bicycle Facilities

A residential development on the site is not expected to generate a statutory bicycle parking requirement. Notwithstanding, any garages and car ports provided with dwellings should have sufficient dimensions to accommodate a resident’s bicycle.

7.5 Pedestrian Facilities

Pedestrian footpaths with a minimum width of 1.5m should be provided on both sides of the internal roads. The use of shared spaces (i.e. where pedestrians and vehicles occupy the same space but with priority to pedestrians) could be considered acceptable on those parts of the road network expected to carry low traffic volumes.
8. Summary of Opinion & Other Statements

8.1 Summary of Opinion

Based on the analysis and discussions presented within this evidence, the following is a summary of my opinion:

i. A potential future residential development on the subject site is likely to generate less traffic during the peak periods than would have been generated by the school, but more daily traffic.

ii. There is adequate capacity in the surrounding road network to accommodate the traffic which is expected to be generated by a residential use on the subject site.

iii. The traffic which is expected to be generated by a residential use on the subject site is not expected to significantly increase delays and queues at nearby intersections.

iv. There are at least two potential access points to the site which are suitable for accommodating roads with adequate capacity to cater for the traffic likely to be generated by a future residential development on the site, noting that all the traffic would be able to be accommodated through one site access point if necessary.

v. I consider the requirements of the proposed Schedule to the DPO to be appropriate, and Council’s recommended modification to the requirement regarding the traffic management report is also appropriate.

vi. I have no reason to suggest that a residential development on the site would not be able to appropriately accommodate the car parking demands generated by the site. I also have no reason to suggest that a residential development on the site would not be able to accommodate appropriate waste collection arrangements, emergency access, bicycle access and pedestrian access.

8.2 Other Statements

i. No opinion provided in this evidence is provisional.

ii. No questions or statements outside of my expertise have been addressed in this evidence.

iii. This evidence is not incomplete or inaccurate.

Declaration

I have made all the inquiries that I believe are desirable and appropriate and that no matters of significance that I regard as relevant have, to my knowledge, been withheld from the advisory committee.

David Graham
Director
5 February 2018
Appendix A

David Graham – Curriculum Vitae
David Graham  
Director  
GTA Consultants  
transportation planning, design and delivery

David is a Director at GTA Consultants who has over eighteen years’ experience in traffic and transport engineering built across roles in both the public and private sector. He has a Bachelor of Engineering with Honours and a Bachelor of Science from the University of Melbourne.

David has extensive experience in the preparation of traffic impact assessments, traffic engineering advice on developments, intersection and traffic signal design and analysis, and car park design. His experience encompasses a broad range of public facility, retail, commercial and residential developments, including land rezoning. He has been involved in the management and delivery of a number of key traffic engineering projects ranging from bicycle route scoping to the development of traffic management treatments to improve route performance or address accident black spots. He also has experience with public consultation and planning scheme amendments, appears regularly at VCAT as an expert witness, and is a highly experienced VicRoads accredited Senior Road Safety Auditor.

Office  
Melbourne  

Qualifications  
BEng(Hons), University of Melbourne  
BSc, University of Melbourne  

Memberships and Affiliations  
Member Engineers Australia (MIEAust)  
Member Victorian Planning & Environmental Law Association (VPELA)

Project Experience  
Traffic & Transport Planning  
Melbourne Park Redevelopment Eastern Plaza  
Melbourne Rectangular Stadium (AAMI Park)  
Various Woolworths & Coles Supermarkets  
Bradmill Site, Francis Street, Yarraville  
‘Society’ South Yarra  
‘The Quays’, ‘Harbour One’ & ‘NewQuay Promenade’, New Quay, Docklands  
SmartBus Bus Stop Designs  
Doncaster Hill Development Contributions Plan  
Doncaster Hill Pedestrian and Cycling Strategy  
Manningham Arterial Road Improvement Strategy  

Expert Evidence  
Mortlake Power Station  
Wendouree Shopping Centre Expansion  
Various other residential, retail, industrial & commercial developments  

Road Safety  
Over 100 road safety audits including:  
CityLink Western Link  
Road side advertising signs adjacent to CityLink, EastLink, the Western Ring Road and Hume Highway  
Federation Trail shared path  
Bus Lanes in Stud Road, Victoria and Victoria Road, Rydalmere, NSW  

Professional Background  
2004 – Present: GTA Consultants  
In his time at GTA Consultants, David has provided strategic traffic and transport engineering and design advice on a wide variety of development projects including shopping centres, offices, residential developments and public buildings. His strong road safety skills have been applied through participation in over 100 road safety audits in Victoria, NSW & Queensland, most as lead auditor. He has also used his design expertise in overseeing the designs of numerous bus stops, intersections and other traffic treatments. Additionally, David’s background in the public sector has assisted him in supervising the preparation of scoping reports for various proposed works, and in undertaking planning permit referral assessments on behalf of a number of Councils.

1999 – 2004: Manningham City Council  
During his tenure at Manningham City Council, David provided significant input into the implementation of the Doncaster Hill Strategy and associated plans. He also prepared scoping reports for a variety of projects including blackspots and bicycle treatments, project managed road improvement projects, developed and implemented LATM schemes and provided strategic advice to Council regarding traffic and transport related issues.
Appendix B

SIDRA Analysis
## MOVEMENT SUMMARY

**Site: 101 [AM Peak Existing]**

**Forest Road & Mount View Road**

**Stop (Two-Way)**

### Movement Performance - Vehicles

<table>
<thead>
<tr>
<th>Mov ID</th>
<th>OD Mov</th>
<th>Demand Flows</th>
<th>HV (%)</th>
<th>Deg. Satn</th>
<th>Average Delay</th>
<th>Level of Service</th>
<th>95% Back of Queue</th>
<th>Queue Distance</th>
<th>Prop. Queued</th>
<th>Effective Stop Rate</th>
<th>Average Speed</th>
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- **Site Level of Service (LOS) Method:** Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
- Vehicle movement LOS values are based on average delay per movement.
- Minor Road Approach LOS values are based on average delay for all vehicle movements.
- NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
- SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
- HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: GTA CONSULTANTS | Processed: Wednesday, 31 January 2018 5:08:09 PM

Project: `\gta.com.au\projectfiles\ProjectFilesMelb\V12700-12799\V127691 Former Boronia Heights College - Hearing\Modelling\180201sid-V127691 Forest Rd & Mount View Rd.sip7`
### Movement Performance - Vehicles

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<th>Level of Service</th>
<th>95% Back of Queue Distance</th>
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<td>veh m per veh km/h</td>
<td>veh m per veh km/h</td>
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</tr>
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**East: Forest Road (East)**

- **5** T1
  - 643
  - 3.0
  - 0.343
  - 0.1
  - LOS A
  - 0.1
  - 0.8
  - 0.02
  - 0.01
  - 59.9

- **6a** R1
  - 7
  - 3.0
  - 0.343
  - 0.1
  - LOS A
  - 0.1
  - 0.8
  - 0.02
  - 0.01
  - 58.1

- **Approach**
  - 651
  - 3.0
  - 0.343
  - 0.1
  - NA
  - 0.1
  - 0.8
  - 0.02
  - 0.01
  - 59.8

**NorthWest: Mount View Road**

- **27a** L1
  - 14
  - 1.0
  - 0.210
  - 9.8
  - LOS A
  - 0.7
  - 4.8
  - 0.73
  - 0.99
  - 45.7

- **29b** R3
  - 55
  - 1.0
  - 0.210
  - 19.8
  - LOS C
  - 0.7
  - 4.8
  - 0.73
  - 0.99
  - 45.6

- **Approach**
  - 68
  - 1.0
  - 0.210
  - 17.8
  - LOS C
  - 0.7
  - 4.8
  - 0.73
  - 0.99
  - 45.7

**West: Forest Road (West)**

- **10b** L3
  - 26
  - 3.0
  - 0.229
  - 6.5
  - LOS A
  - 0.0
  - 0.0
  - 0.00
  - 0.04
  - 58.2

- **11** T1
  - 406
  - 3.0
  - 0.229
  - 0.0
  - LOS A
  - 0.0
  - 0.0
  - 0.00
  - 0.04
  - 59.6

- **Approach**
  - 433
  - 3.0
  - 0.229
  - 0.4
  - NA
  - 0.0
  - 0.0
  - 0.00
  - 0.04
  - 59.5

**All Vehicles**

- 1152
- 2.9
- 0.343
- 1.3
- NA
- 0.7
- 4.8
- 0.05
- 0.08
- 58.6

---

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.


HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
### Movement Summary

**Site: 101 [PM Peak Existing]**

Forest Road & Mount View Road
Stop (Two-Way)

#### Movement Performance - Vehicles

<table>
<thead>
<tr>
<th>Mov ID</th>
<th>OD Mov</th>
<th>Demand Flows</th>
<th>HV veh/h</th>
<th>Deg Satn</th>
<th>Average Delay</th>
<th>Level of Service</th>
<th>95% Back of Queue Distance</th>
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<th>Average Speed km/h</th>
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<tr>
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<td><strong>NorthWest: Mount View Road</strong></td>
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<td>8</td>
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Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.


HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
## Movement Summary

**Site: 101 [PM Peak Future]**  
Forest Road & Mount View Road  
Stop (Two-Way)

### Movement Performance - Vehicles

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<thead>
<tr>
<th>Mov ID</th>
<th>OD Mov</th>
<th>Demand Flows</th>
<th>Deg Satn</th>
<th>Average Delay</th>
<th>Level of Service</th>
<th>95% Back of Queue Vehicles</th>
<th>Prop. Queued</th>
<th>Effective Stop Rate Per Veh</th>
<th>Average Speed</th>
<th>Level of Service</th>
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<td></td>
<td><strong>HV %</strong></td>
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<td><strong>veh/h</strong></td>
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<td><strong>veh km/h</strong></td>
<td><strong>veh km/h</strong></td>
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<td>1274</td>
<td></td>
<td>2.9</td>
<td>0.394</td>
<td>1.5</td>
<td>NA</td>
<td>0.7</td>
<td>4.6</td>
<td>0.06</td>
<td>0.08</td>
<td>58.4</td>
</tr>
</tbody>
</table>

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
Vehicle movement LOS values are based on average delay per movement.  
Minor Road Approach LOS values are based on average delay for all vehicle movements.  
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.  
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.  
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.