



Stantec Australia Pty Ltd

Level 16, 207 Kent Street
Sydney NSW 2000
Tel: +61 2 8448 1800
www.stantec.com

13 February 2023

Project/File: 300304302

EG Funds Management Pty Ltd

Level 21, Governor Phillip Tower
1 Farrer Place
SYDNEY NSW 2000

Attention: David Workman (Divisional Director – Urban and Community Planning)

Dear David,

Reference: 7 City View Road, Pennant Hills – Response to Gateway Condition 1(c) and Transport for NSW (TfNSW) Request For Information

1 Introduction

Stantec has been engaged by EG Funds Management to provide traffic consulting advice for a Planning Proposal that will facilitate a mixed-use development comprising residential, office and community space located at 7 City View Road, Pennant Hills.

A detailed Traffic Impact Assessment (TIA) for the planning proposal was previously prepared by GTA, now Stantec dated 30 November 2021, which was submitted to Hornsby Shire Council and subsequently referred to Transport for NSW (TfNSW). In reply, TfNSW provided comments on the planning proposal in a letter dated 24 June 2022 which is reproduced at Attachment A. Further, a condition of the Gateway Determination dated 26th August 2022 was to update the transport assessment to include queue lengths and level of service during peak hours.

This statement has been prepared to:

- update the traffic impact assessment to satisfy the Gateway Determination information request (condition 1(c)) concerning queue lengths and level of service - Section 2 below.
- provide a response to the TfNSW comments (i.e. Items 2-8) – Section 3 below.

For reference, the relevant comments from each agency are reproduced in italics (using their reference and item number), followed by Stantec's response.

Reference: 7 City View Road, Pennant Hills – Response to Transport for NSW (TfNSW) Request For Information

2 Response to Gateway Condition

Item 1 (c)

Update the transport impact assessment's modelling conditions, including queue lengths and level of service during peak hours, with scenarios for existing, concept design and cumulative impacts. This updated modelling should be prepared in accordance with the relevant guidelines and be provided to Transport for NSW for comment.

Response

The operation of the key intersections that are relevant to the Planning Proposal, namely Pennant Hills Road/ City View Road and City View Road/ site access have been assessed using SIDRA INTERSECTION¹ (SIDRA) during the peak hours for the existing and concept design scenarios. The modelling for these scenarios has been prepared in accordance with the relevant guidelines to address the specific comments received from Transport for NSW (TfNSW) relating to the proposed development and includes details of the modelled queue lengths and level of service.

The results of the analysis for the existing and concept design scenarios are discussed in detail in our response to the TfNSW comments in Section 3, with detailed SIDRA outputs also provided at Attachment B.

3 TfNSW Comments

Item 2 (Access)

There is limited storage available on City View Road in the northbound direction on approach to the traffic signals. Given most of the green time at the intersection of Pennant Hills Road / City View Road will be allocated to Pennant Hills Road, there may be a long wait time for traffic exiting City View Road, particularly in the peak hours for residents of the development. This may result in queues extending beyond the point of egress out of the proposed development in the peak hours, which in turn may result in queuing into the development.

¹ Program used under license from Akcelik & Associates Pty Ltd.

Reference: 7 City View Road, Pennant Hills – Response to Transport for NSW (TfNSW) Request For Information

Response

Queue length surveys were commissioned by Stantec on 15 November 2022 at the Pennant Hills Road/ City View Road/ Trebor Road signalised intersection. Maximum queue lengths for the City View Road leg were observed to be 3 vehicles per lane during the AM peak hour and between 4-5 vehicles per lane during the PM peak hour.

The operation of the key intersections within the study area, including the subject intersection and the nearby site access intersection to the proposed development, has also been assessed using the network functionality within SIDRA INTERSECTION (SIDRA), a computer-based modelling package which calculates intersection performance. The SIDRA model also reflects these queues, with a modelled 95th percentile queue length of 15 metres and 25 metres during the AM and PM peak hours, respectively under the existing scenario. Such queues are very infrequent and able to clear within one cycle of the traffic signals. The resultant queuing into the development was determined to be just 2 metres (or less than one vehicle length).

Under the post-development scenario, 95th percentile queues on the City View Road northbound approach to the traffic signals are predicted by SIDRA to increase to 28 metres and 39 metres during the AM and PM peaks, respectively as a result of the additional traffic generated by the development. However, queues within the development only increase to 4 metres (i.e. still less than one vehicle length) during the PM peak hour. Average delays for exiting vehicles were estimated at 8 seconds suggesting that vehicles experience minimal delay when egressing the site.

As noted above, the modelling has been conducted in SIDRA using the network functionality. This allows the impact of downstream queuing at the Pennant Hills Road traffic signals to be considered in assessing the performance of the site access intersection. That is, the capacity of an upstream lane is reduced according to the extent to which queues from a downstream intersection are predicted to extend back to / block that upstream intersection, with the resulting performance of the intersection (in this case the site access) based on that reduced capacity.

The modelling indicates a 19% probability of blockage on the northbound City View Road approach during the PM peak hour, that is, a probability of 19% that queues from the Pennant Hills Road intersection would extend past the site access driveway (based on a distance/ storage capacity between the two intersections of approximately 30m). Queue length predictions are based on a 95th percentile scenario and it is noted that internal queuing of up to 6-7 vehicles (about 50m) could be accommodated within the site if necessary.

Considering the available internal storage capacity and the low probability of queues extending past the site access, the proposed development and its associated trip generation is not anticipated to materially impact the operation of the site egress. The internal queuing within the site is predicted to remain at a minimal and acceptable level and would not have any impact on the operation of the development or the external road network.

The SIDRA results are discussed further in response to the next item.

Item 3 (Access)

The planning proposal states, "There is sufficient capacity within the immediate road network and intersection (Pennant Hills and City View) to accommodate the traffic generated by any future re-development of the site."

Reference: 7 City View Road, Pennant Hills – Response to Transport for NSW (TfNSW) Request For Information

TfNSW will require SIDRA analysis to confirm the intersection of Pennant Hills Road / City View Road will operate no worse than without as a result of the proposed development. TfNSW has concerns with the length of the existing right turn bay on Pennant Hills Road (west). It is noted that the traffic assessment assumes 2-3 additional vehicles on average per cycle. However, an assessment of the worst case (i.e., 95th percentile in the peak hours) should be assessed to ensure the existing right turn bay storage is sufficient to accommodate the proposed development.

It is noted that the net impact of the proposed development is less than that of the current permissible development. However, traffic patterns may change due to the proposed changes in zoning to E3 Productivity Support with residential uses as an additional permitted use and the impact is still required to be assessed, particularly in relation to critical movements at the intersection.

Response

As noted in response to the previous item, the operation of the key intersections within the study area has been assessed using SIDRA INTERSECTION (SIDRA), a computer-based modelling package which calculates intersection performance.

The commonly used measure of intersection performance, as defined by TfNSW, is vehicle delay. SIDRA determines the average delay that vehicles encounter and provides a measure of the level of service.

Table 1 shows the criteria that SIDRA adopts in assessing the level of service.

Table 1: SIDRA level of service criteria

Level of service (LOS)	Average delay per vehicle (secs/ veh)	Traffic signals, roundabout	Give way & stop sign
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required

Another commonly used measure of intersection performance is referred to as the Degree of Saturation (DOS). The DOS represents the volume (demand)-to-capacity ratio for the most critical movement on each leg of the intersection. For signalised intersections, a DOS of around 0.90 has been typically considered the practical capacity, beyond which queues and delays increase disproportionately. For unsignalised intersections (excluding roundabouts), the practical capacity is typically considered to equate to a DOS of 0.80.

Table 2 presents a summary of the existing operation of the intersections, with full results included in Attachment B to this report.

Reference: 7 City View Road, Pennant Hills – Response to Transport for NSW (TfNSW) Request For Information

Table 2: Existing operating conditions¹

Intersection	Peak	Degree of saturation (DOS)	Average delay (sec)	95th percentile queue (m)	Level of service (LOS)
Pennant Hills Road/ Trebor Road/ City View Road	AM	0.91	28	500	B
	PM	0.86	23	376	B
City View Road/ Site Access	AM	0.02	8	1	A
	PM	0.07	8	2	A
City View Road/ Boundary Road/ Wongala Crescent	AM	0.01	5	<1	A
	PM	0.02	5	1	A

¹ Results for traffic signals are based on performance of intersection as a whole. For priority-controlled intersections, the results correspond to the worst performing approach based on average delay.

Table 2 indicates that the surveyed intersections currently operate well during peak periods at level of service (LOS) B or better, however the Pennant Hills Road/ Trebor Road/ City View Road intersection is currently on the cusp of LOS C during the AM peak and is operating at or near its practical capacity. The maximum 95th percentile queue length for the right turning movement on Pennant Hills Road (west approach) was determined to be about 23 metres during the PM peak hour.

The future post-development operation of the intersection is summarised in Table 3.

Table 3: Future operating conditions – Post development¹

Intersection	Peak	Degree of saturation (DOS)	Average delay (sec)	95th percentile queue (m)	Level of service (LOS)
Pennant Hills Road/ Trebor Road/ City View Road	AM	0.93	31	530	C
	PM	0.86	24	380	B
City View Road/ Site Access	AM	0.07	8	2	A
	PM	0.15	8	4	A
City View Road/ Boundary Road/ Wongala Crescent	AM	0.01	5	<1	A
	PM	0.02	5	1	A

¹ Results for traffic signals are based on performance of intersection as a whole. For priority-controlled intersections, the results correspond to the worst performing approach based on average delay.

Table 3 indicates that the intersections would generally operate at existing levels of service, with minor increases to average delay and 95th percentile queue lengths. The additional traffic volumes increase the average delay for the Pennant Hills Road/ Trebor Road/ City View Road intersection by only 3 seconds in the AM peak. However as stated, the intersection is currently already at the upper limit of LOS B, and this additional delay is enough to reduce the level of service for the intersection to LOS C. Regardless, the additional delay would not materially impact the operation of the intersection.

The maximum 95th percentile queue length for the right turning movement on Pennant Hills Road (west approach) was determined to increase to 46 metres in the PM peak, remaining within the 47-metre length available for this short turning lane. As such, the existing short turning lane is of sufficient length

Reference: 7 City View Road, Pennant Hills – Response to Transport for NSW (TfNSW) Request For Information

to accommodate the additional volumes as part of the proposed development and queues are not predicted to extend beyond the short turning bay into the through lane.

Item 4 (Access)

Given the steep grade on the existing vehicular access and the level difference that is likely to limit sight lines for vehicles exiting from the development, further information as to how a safe pedestrian crossing across the access will be achieved is requested.

Response

It is noted that the subject vehicular access and its interface with the existing footpath is an existing arrangement that has been operating for a long time and has not been identified to cause any specific safety issues. Sight lines to the north for traffic egressing the site are sufficient for vehicles and pedestrians to safely observe each other. To the south, the removal of vegetation and/ or waste bins adjacent to the site access could be implemented, if necessary, which would be expected to improve the sight lines available to/ from egressing vehicles.

It is also important to recognise that the proposed development actively promotes pedestrian and cyclist connectivity. Internal footpaths (with shelter where possible) would be provided within the development site, to connect access points and internal open spaces with the adjacent street network. The concept scheme introduces a new street level frontage on City View Road, with a footpath pedestrian connection to Wongala Crescent, which will particularly enhance amenity for external public users walking to Pennant Hills Station. As such, pedestrian activity across the subject vehicular crossing is expected to be limited, with pedestrians preferring to utilise internal footpaths as a more direct route to surrounding locations including Pennant Hills Station.

Item 5 (Access)

The planning proposal states, "Access for services is proposed to be located on Boundary Road / Wongala Crescent, with a new service access proposed that will enable servicing of the site by 12.5m Heavy Rigid Vehicles."

A swept path analysis is required for heavy vehicles to ensure heavy vehicles will be able to access the proposed service area. This applies to deliveries and rubbish collection services to ensure an appropriate vehicle can access the proposed location in a safe and convenient manner.

Response

Swept path analysis has been undertaken using a 12.5m Heavy Rigid Vehicle which indicates that the vehicle is able to access the proposed service area using the designed access driveway. The proposal involves provision of a turntable which will assist with turning the vehicle to safely exit the site in a forward direction. Therefore, the proposed access driveway and service area arrangement is considered satisfactory.

The swept path analysis is provided in Attachment C.

Reference: 7 City View Road, Pennant Hills – Response to Transport for NSW (TfNSW) Request For Information

Item 6 (Car parking)

There are anomalies in relation to the calculation of car parking where the indicative concept outlines the provision of an amount less than that required by TfNSW's Guide to Traffic Generating Developments 2002 (187 car park spaces vs 206) however, the draft DCP outlines car parking must be calculated using Council's DCP parking rate resulting in a higher provision of 210 car parking spaces. Consideration should be given to a reduced car parking rate given the site's location to Pennant Hill's station and the economies of scale offered by a mixed-use development where parking not utilised by the commercial component can be utilised by other (residential) users particularly at off-peak periods at night-time and weekends.

Response

The Traffic Impact Assessment which accompanied the Planning Proposal provides an assessment relating to car parking provision with reference to the following documents:

- State Environmental Planning Policy No. 65 – Design Quality of Residential Apartment Development (SEPP 65)
- Apartment Design Guide
- Transport for NSW Guide to Traffic Generating Developments 2002 (the TfNSW Guide)
- Hornsby Development Control Plan 2013 (DCP 2013)

The assessment concluded that with reference to these documents, the proposed development will require a minimum of 206 car spaces. However, the following reductions in parking supply were considered appropriate:

1. No dedicated residential visitor parking, with visitors to make use of the parking supply for the community space.
2. 15 percent reduction in the DCP requirement for the community component to reflect ancillary use and local walk-up catchment.

Noting the above, the resultant car parking requirement was determined to be 187 car parking spaces to service the proposed development.

Based on the above it is evident that the resultant car parking provision proposed has already been reduced below the nominal parking requirement by approximately 19 spaces (10%). This has taken into consideration the proximity of the development to Pennant Hills station in particular, as well as the mixed nature of the proposed uses. It is anticipated that any further reduction in the car parking provision would potentially result in the development being unable to accommodate the parking demand that it generates, with any excess demand ultimately overflowing into the on-street parking spaces within the surrounding local streets.

In summary, the proposed provision of 187 parking spaces is considered to strike the right balance between providing an appropriate level of reduction in parking spaces having consideration to the location and nature of the proposed development, whilst seeking to ensure that no adverse impacts to local street amenity occur as a result of providing an inadequate parking supply.

Reference: 7 City View Road, Pennant Hills – Response to Transport for NSW (TfNSW) Request For Information

Item 7 (Public and active transport)

The planning proposal states “The proposed concept has considered both pedestrian and vehicular access to the site and incorporated both in a way that encourages pedestrian usage of the site and enhances pedestrian/cyclist access to areas beyond the site (such as Pennant Hills Station). This includes a through-site link from Boundary Road/Wongala Crescent to City View Road, providing a quicker, safer route to footpaths connected to Pennant Hills Station.

It is noted that active transport connectivity between the site and Pennant Hills Road via Boundary Road / Wongala Crescent is limited due to the site’s topography and lack of pedestrian footpath south of the site, on the northern side of Wongala Crescent. TfNSW notes and supports the proposal to extend the existing footpath on City View Road along Boundary Road with the potential for a wider footpath or shared path to connect to Pennant Hills Road to cater for pedestrians and cyclists travelling to Pennant Hills station.

Response

Stantec notes and agrees with TfNSW regarding the extension of the existing footpath on City View Road and this will be further developed in the consequent design development stages post approval.

Item 8 (Public and active transport)

The proposal is to ensure DDA compliant access to / from the site. The proposal needs to ensure safe and easy access for vulnerable road users such as people with disabilities, visually impaired people and people with prams.

Response

Stantec agrees with TfNSW that the proposal needs to ensure DDA compliant access is provided to / from the site. This will be incorporated in the subsequent design development stage post approval.

We trust that the above satisfactorily responds to the issues raised, however, please contact Jae Woo Jeon (in the first instance) or the undersigned on (02) 8448 1800 if you require any further information.

Yours sincerely,

STANTEC AUSTRALIA PTY LTD

Steve Manton

Principal Transportation Engineer
steve.manton@stantec.com

Attachment A: Transport for NSW (TfNSW) letter dated 24 June 2022

Attachment B: SIDRA modelling results

Attachment C: Swept Path Analysis

Reference: 7 City View Road, Pennant Hills – Response to Transport for NSW (TfNSW) Request For Information

Attachment A - Transport for NSW (TfNSW) letter dated 24 June 2022



24 June 2022

TfNSW Reference: Syd22/00448

Steven Head
General Manager
Hornsby Shire Council
PO Box 37
Hornsby NSW 1630

Attention: Taylor Richardson

Dear Mr Head,

PRE-PLANNING PROPOSAL FOR 7 CITY VIEW ROAD, PENNANT HILLS

We appreciate the opportunity to provide comment on the above proposal as referred to Transport for NSW (TfNSW) in Council's correspondence dated 14 April 2022.

TfNSW has reviewed the submitted documentation and notes that the planning proposal seeks to amend the Hornsby LEP 2013 to facilitate a mixed-use development comprising residential, commercial and community uses on the site by:

1. Increasing the floor space ratio from 1.5:1 to 2.7:1;
2. Retaining the existing B5 Business Development zone and building height of 23.5m and;
3. Allowing Residential flat buildings and/or seniors housing as an additional permitted use but only as part of a mixed-use redevelopment containing non-residential uses including office premises.

Preliminary comments on the pre-planning proposal are provided at **Attachment A** for Council's consideration. They are not to be interpreted as binding upon TfNSW and may change following review of the formal planning proposal referred from the appropriate planning authority. It is strongly recommended the proponent seeks the appropriate preliminary approvals on the proposal from Council and Department of Planning and Environment prior to undertaking further detailed studies.

Thank you for the opportunity to provide advice on the subject planning proposal. Should you have any questions or further enquiries in relation to this matter, Tricia Zapanta would be pleased to receive your email via development.sydney@transport.nsw.gov.au

Yours sincerely

A handwritten signature in black ink, appearing to read 'Carina Gregory'.

Carina Gregory
**Senior Manager, Strategic Land Use
Land Use, Network & Place Planning, Greater Sydney**

Transport for NSW

27-31 Argyle Street, Parramatta NSW 2150 | PO Box 973, Parramatta CBD NSW 2124
P 131782 | W transport.nsw.gov.au | ABN 18 804 239 602

Attachment A: Preliminary comments on the Pre-Planning Proposal for 7 City View Road, Pennant Hills (June 2022)

DPE Employment Zone Reforms

1. It is noted that, as a result of zoning changes proposed under DPE's Employment Zones Reform, the existing B5 Business Development zone for this subject site is proposed to be changed to a E3 Productivity Support Zone which permits with consent a range of land uses and prohibits residential accommodation.

The planning proposal which is seeking to allow residential uses in conjunction with mixed-use redevelopment containing non-residential uses, appears to be incompatible with the proposed objectives of the E3 zone to provide for employment purposes, and could set an undesirable precedent for residential uses on other E3 zoned land.

The draft DCP outlines a minimum GFA of 3,000m² for office premises, 500m² for community use and 120m² for café / retail use. The indicative concept outlined in the Planning Proposal proposes 3,449m² commercial / retail, 571m² for community uses and 77 apartments and 28 Independent Living Units with a combined total 8,400m² (assuming 80m² for an average dwelling). This will result in the proposed mixed-use development having a greater proportion of residential use over the business / productivity support use contradicting the proposal's intention for the residential use to be a complementary, additional use in the E3 zone.

Should Council proceed with the Planning Proposal as proposed, the potential impacts of an E3 zone with additional residential uses will require consideration of the following traffic and transport matters outlined below.

Access

2. There is limited storage available on City View Road in the northbound direction on approach to the traffic signals. Given most of the green time at the intersection of Pennant Hills Road / City View Road will be allocated to Pennant Hills Road, there may be a long wait time for traffic exiting City View Road, particularly in the peak hours for residents of the development. This may result in queues extending beyond the point of egress out of the proposed development in the peak hours, which in turn may result in queuing into the development.
3. The planning proposal states, "*There is sufficient capacity within the immediate road network and intersection (Pennant Hills and City View) to accommodate the traffic generated by any future re-development on the site.*"

TfNSW will require SIDRA analysis to confirm the intersection of Pennant Hills Road / City View Road will operate no worse than without as a result of the proposed development. TfNSW has concerns with the length of the existing right turn bay on Pennant Hills Road (west). It is noted the traffic assessment assumes 2-3 additional vehicles on average per cycle. However, an assessment of the worst case (i.e., 95th percentile in the peak hours) should be assessed to ensure the existing right turn bay storage is sufficient to accommodate the proposed development.

It is noted that the net impact of the proposed development is less than that of the current permissible development. However, traffic patterns may change due to the

proposed changes in zoning to E3 Productivity Support with residential uses as an additional permitted use and the impact is still required to be assessed, particularly in relation to critical movements at the intersection.

4. Given the steep grade on the existing vehicular access and the level difference that is likely to limit sight lines for vehicles exiting from the development, further information as to how a safe pedestrian crossing across the access will be achieved is requested.
5. The planning proposal states *“Access for services is proposed to be located on Boundary Road/Wongala Crescent, with a new service access proposed that will enable servicing of the site by 12.5m Heavy Rigid Vehicles.”*

A swept path analysis is required for heavy vehicles to ensure heavy vehicles will be able to access the proposed service area. This applies to deliveries and rubbish collection services to ensure an appropriate vehicle can access the proposed location in a safe and convenient manner.

Car parking

6. There are anomalies in relation to the calculation of car parking where the indicative concept outlines the provision of an amount less than that required by TfNSW's Guide to Traffic Generating Developments 2002 (187 car park spaces vs 206) however, the draft DCP outlines car parking must be calculated using Council's DCP parking rate resulting in a higher provision of 210 car parking spaces. Consideration should be given to a reduced car parking rate given the site's location to Pennant Hill's station and the economies of scale offered by a mixed-use development where parking not utilised by the commercial component can be utilised by other (residential) users particularly at off-peak periods at night-time and weekends.

Public and active transport

7. The planning proposal states *“The proposed concept has considered both pedestrian and vehicular access to the site and incorporated both in a way that encourages pedestrian usage of the site and enhances pedestrian/cyclist access to areas beyond the site (such as Pennant Hills Station). This includes a through-site link from Boundary Road/Wongala Crescent to City View Road, providing a quicker, safer route to footpaths connected to Pennant Hills Station.”*

It is noted that active transport connectivity between the site and Pennant Hills Road via Boundary Road / Wongala Crescent is limited due to the site's topography and lack of pedestrian footpath south of the site, on the northern side of Wongala Crescent. TfNSW notes and supports the proposal to extend the existing footpath on City View Road along Boundary Road with the potential for a wider footpath or shared path to connect to Pennant Hills Road to cater for pedestrians and cyclists travelling to Pennant Hills station.

8. The proposal is to ensure DDA compliant access to / from the site. The proposal needs to ensure safe and easy access for vulnerable road users such as people with disabilities, visually impaired people and people with prams.

Reference: 7 City View Road, Pennant Hills – Response to Transport for NSW (TfNSW) Request For Information

Attachment B – SIDRA modelling results

MOVEMENT SUMMARY

Site: 1 [1. AM - Pennant Hills Road / City View Road / Trebor Road (Site Folder: Existing)]

Network: N101 [AM - Existing (Network Folder: Existing)]

Site Category: -

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: City View Road														
1	L2	31	6.9	31	6.9	0.104	47.0	LOS D	2.0	14.5	0.84	0.70	0.84	24.5
2	T1	8	0.0	8	0.0	0.104	44.9	LOS D	2.0	14.5	0.84	0.70	0.84	20.8
3	R2	21	0.0	21	0.0	0.117	60.8	LOS E	1.2	8.6	0.94	0.70	0.94	21.5
Approach		60	3.5	60	3.5	0.117	51.5	LOS D	2.0	14.5	0.87	0.70	0.87	22.8
East: Pennant Hills Road														
4	L2	31	0.0	31	0.0	0.797	25.2	LOS B	44.0	320.3	0.81	0.76	0.81	40.6
5	T1	2769	4.9	2769	4.9	0.797	18.5	LOS B	44.0	320.9	0.80	0.74	0.80	51.6
6	R2	83	0.0	83	0.0	*0.647	74.1	LOS F	5.5	38.3	1.00	0.80	1.08	25.3
Approach		2883	4.7	2883	4.7	0.797	20.2	LOS B	44.0	320.9	0.80	0.74	0.80	50.0
North: Trebor Road														
7	L2	24	0.0	24	0.0	0.132	55.9	LOS D	2.0	14.0	0.91	0.70	0.91	28.3
8	T1	12	0.0	12	0.0	0.132	52.5	LOS D	2.0	14.0	0.91	0.70	0.91	18.4
9	R2	135	3.1	135	3.1	*0.616	61.3	LOS E	8.3	59.7	0.99	0.81	1.00	26.8
Approach		171	2.5	171	2.5	0.616	60.0	LOS E	8.3	59.7	0.97	0.79	0.98	26.6
West: Pennant Hills Road														
10	L2	58	1.8	58	1.8	0.914	39.2	LOS C	68.6	498.8	0.95	0.96	1.04	35.0
11	T1	3167	4.8	3167	4.8	*0.914	32.8	LOS C	68.6	500.0	0.93	0.95	1.02	42.9
12	R2	49	4.3	49	4.3	0.396	72.0	LOS F	3.2	22.9	0.99	0.75	0.99	18.9
Approach		3275	4.7	3275	4.7	0.914	33.5	LOS C	68.6	500.0	0.94	0.95	1.02	42.3
All Vehicles		6388	4.6	6388	4.6	0.914	28.4	LOS B	68.6	500.0	0.88	0.85	0.92	44.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed	
					[Ped ped	Dist] m						
South: City View Road												
P1	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	223.0	212.9	0.95	
East: Pennant Hills Road												
P2	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	234.0	227.1	0.97	
North: Trebor Road												

P3 Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	223.0	212.9	0.95
All Pedestrians	158	59.3	LOS E	0.2	0.2	0.96	0.96	226.7	217.6	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: STANTEC NEW ZEALAND | Licence: NETWORK / Enterprise | Processed: Thursday, 9 February 2023 3:30:04 PM

Project: \\Au2019-pfss01\shared_projects\300304302\technical\modelling\sid_230110_4302_7_city_view_road.sip9

MOVEMENT SUMMARY

Site: 3 [3. AM - City View Road / Boundary Road / Wongala Crescent (Site Folder: Existing)]

Network: N101 [AM - Existing (Network Folder: Existing)]

Site Category: -
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
East: Wongala Crescent														
5	T1	1	0.0	1	0.0	0.016	0.0	LOS A	0.1	0.6	0.03	0.53	0.03	47.1
6	R2	27	7.7	27	7.7	0.016	4.6	LOS A	0.1	0.6	0.03	0.53	0.03	44.6
Approach		28	7.4	28	7.4	0.016	4.5	NA	0.1	0.6	0.03	0.53	0.03	44.7
North: City View Road														
7	L2	14	0.0	14	0.0	0.009	4.6	LOS A	0.0	0.3	0.01	0.53	0.01	44.4
9	R2	1	0.0	1	0.0	0.009	4.7	LOS A	0.0	0.3	0.01	0.53	0.01	43.7
Approach		15	0.0	15	0.0	0.009	4.6	LOS A	0.0	0.3	0.01	0.53	0.01	44.4
West: Boundary Road														
10	L2	3	0.0	3	0.0	0.002	4.6	LOS A	0.0	0.0	0.00	0.40	0.00	45.8
11	T1	1	0.0	1	0.0	0.002	0.0	LOS A	0.0	0.0	0.00	0.40	0.00	47.8
Approach		4	0.0	4	0.0	0.002	3.4	NA	0.0	0.0	0.00	0.40	0.00	46.5
All Vehicles		47	4.4	47	4.4	0.016	4.4	NA	0.1	0.6	0.02	0.51	0.02	44.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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

MOVEMENT SUMMARY

 Site: 2 [2. AM - City View Road / Site Access (Site Folder: Existing)]

 Network: N101 [AM - Existing (Network Folder: Existing)]

Site Category: -
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: City View Road														
2	T1	40	5.3	40	5.3	0.011	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	48.6
3	R2	1	0.0	1	0.0	0.011	4.8	LOS A	0.0	0.1	0.02	0.03	0.02	47.9
Approach		41	5.1	41	5.1	0.011	0.1	NA	0.0	0.1	0.01	0.01	0.01	48.5
East: Site Access														
4	L2	1	0.0	1	0.0	0.017	7.5	LOS A	0.1	0.5	0.17	0.89	0.17	41.9
6	R2	16	0.0	16	0.0	0.017	7.4	LOS A	0.1	0.5	0.17	0.89	0.17	41.9
Approach		17	0.0	17	0.0	0.017	7.4	LOS A	0.1	0.5	0.17	0.89	0.17	41.9
North: City View Road														
7	L2	60	0.0	60	0.0	0.045	3.0	LOS A	0.0	0.0	0.00	0.37	0.00	46.5
8	T1	23	4.5	23	4.5	0.045	0.0	LOS A	0.0	0.0	0.00	0.37	0.00	29.7
Approach		83	1.3	83	1.3	0.045	2.2	NA	0.0	0.0	0.00	0.37	0.00	45.8
All Vehicles		141	2.2	141	2.2	0.045	2.2	NA	0.1	0.5	0.02	0.33	0.02	45.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: STANTEC NEW ZEALAND | Licence: NETWORK / Enterprise | Processed: Thursday, 9 February 2023 3:30:04 PM

Project: \\Au2019-ppfss01\shared_projects\300304302\technical\modelling\sid_230110_4302_7_city_view_road.sip9

MOVEMENT SUMMARY

Site: 1 [1. PM - Pennant Hills Road / City View Road / Trebor Road (Site Folder: Existing)]

Network: N101 [PM - Existing (Network Folder: Existing)]

Site Category: -

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: City View Road														
1	L2	58	1.8	58	1.8	0.167	46.8	LOS D	3.5	24.8	0.85	0.73	0.85	25.1
2	T1	11	0.0	11	0.0	0.167	43.8	LOS D	3.5	24.8	0.85	0.73	0.85	23.0
3	R2	48	0.0	48	0.0	0.274	62.3	LOS E	2.9	20.4	0.96	0.74	0.96	21.1
Approach		117	0.9	117	0.9	0.274	52.9	LOS D	3.5	24.8	0.89	0.73	0.89	23.1
East: Pennant Hills Road														
4	L2	33	0.0	33	0.0	0.857	27.4	LOS B	52.2	375.5	0.88	0.83	0.88	38.8
5	T1	2999	3.4	2999	3.4	*0.857	20.9	LOS B	52.2	376.0	0.86	0.81	0.87	49.9
6	R2	100	0.0	100	0.0	*0.778	77.0	LOS F	6.8	47.6	1.00	0.86	1.22	26.2
Approach		3132	3.2	3132	3.2	0.857	22.8	LOS B	52.2	376.0	0.86	0.81	0.88	48.4
North: Trebor Road														
7	L2	47	0.0	47	0.0	0.189	54.9	LOS D	3.2	22.2	0.90	0.73	0.90	30.6
8	T1	11	0.0	11	0.0	0.189	50.3	LOS D	3.2	22.2	0.90	0.73	0.90	20.4
9	R2	142	0.0	142	0.0	*0.704	65.8	LOS E	9.1	63.9	1.00	0.86	1.09	28.0
Approach		200	0.0	200	0.0	0.704	62.4	LOS E	9.1	63.9	0.97	0.82	1.03	28.3
West: Pennant Hills Road														
10	L2	67	0.0	67	0.0	0.794	25.1	LOS B	44.2	315.2	0.81	0.76	0.81	44.3
11	T1	2789	2.3	2789	2.3	0.794	18.6	LOS B	44.3	316.4	0.80	0.74	0.80	51.5
12	R2	33	0.0	33	0.0	0.254	70.9	LOS F	2.0	14.3	0.98	0.73	0.98	19.1
Approach		2889	2.2	2889	2.2	0.794	19.3	LOS B	44.3	316.4	0.80	0.75	0.80	50.8
All Vehicles		6338	2.6	6338	2.6	0.857	23.0	LOS B	52.2	376.0	0.84	0.78	0.85	47.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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

* Critical Movement (Signal Timing)

Pedestrian Movement Performance											
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
					[Ped ped	Dist] m					
South: City View Road											
P1	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	223.0	212.9	0.95
East: Pennant Hills Road											
P2	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	234.0	227.1	0.97
North: Trebor Road											

P3 Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	223.0	212.9	0.95
All Pedestrians	158	59.3	LOS E	0.2	0.2	0.96	0.96	226.7	217.6	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: STANTEC NEW ZEALAND | Licence: NETWORK / Enterprise | Processed: Thursday, 9 February 2023 3:30:21 PM

Project: \\Au2019-pfss01\shared_projects\300304302\technical\modelling\sid_230110_4302_7_city_view_road.sip9

MOVEMENT SUMMARY

 Site: 2 [2. PM - City View Road / Site Access (Site Folder: Existing)]

 Network: N101 [PM - Existing (Network Folder: Existing)]

Site Category: -
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: City View Road														
2	T1	45	4.7	45	4.7	0.012	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	48.8
3	R2	1	0.0	1	0.0	0.012	4.8	LOS A	0.0	0.1	0.02	0.03	0.02	48.0
Approach		46	4.5	46	4.5	0.012	0.1	NA	0.0	0.1	0.01	0.01	0.01	48.7
East: Site Access														
4	L2	1	0.0	1	0.0	0.069	7.6	LOS A	0.3	2.0	0.22	0.88	0.22	41.9
6	R2	66	0.0	66	0.0	0.069	7.5	LOS A	0.3	2.0	0.22	0.88	0.22	41.9
Approach		67	0.0	67	0.0	0.069	7.5	LOS A	0.3	2.0	0.22	0.88	0.22	41.9
North: City View Road														
7	L2	15	0.0	15	0.0	0.035	3.0	LOS A	0.0	0.0	0.00	0.11	0.00	48.3
8	T1	53	0.0	53	0.0	0.035	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	41.0
Approach		67	0.0	67	0.0	0.035	0.7	NA	0.0	0.0	0.00	0.11	0.00	46.5
All Vehicles		181	1.2	181	1.2	0.069	3.1	NA	0.3	2.0	0.09	0.37	0.09	43.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: STANTEC NEW ZEALAND | Licence: NETWORK / Enterprise | Processed: Thursday, 9 February 2023 3:30:21 PM

Project: \\Au2019-ppfss01\shared_projects\300304302\technical\modelling\sid_230110_4302_7_city_view_road.sip9

MOVEMENT SUMMARY

Site: 3 [3. PM - City View Road / Boundary Road / Wongala Crescent (Site Folder: Existing)]

Network: N101 [PM - Existing (Network Folder: Existing)]

Site Category: -
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
East: Wongala Crescent														
5	T1	1	0.0	1	0.0	0.014	0.0	LOS A	0.1	0.5	0.04	0.52	0.04	47.1
6	R2	24	4.3	24	4.3	0.014	4.6	LOS A	0.1	0.5	0.04	0.52	0.04	44.5
Approach		25	4.2	25	4.2	0.014	4.4	NA	0.1	0.5	0.04	0.52	0.04	44.7
North: City View Road														
7	L2	33	0.0	33	0.0	0.022	4.6	LOS A	0.1	0.6	0.01	0.53	0.01	44.4
9	R2	2	0.0	2	0.0	0.022	4.7	LOS A	0.1	0.6	0.01	0.53	0.01	43.7
Approach		35	0.0	35	0.0	0.022	4.6	LOS A	0.1	0.6	0.01	0.53	0.01	44.4
West: Boundary Road														
10	L2	6	0.0	6	0.0	0.004	4.6	LOS A	0.0	0.0	0.00	0.46	0.00	45.2
11	T1	1	0.0	1	0.0	0.004	0.0	LOS A	0.0	0.0	0.00	0.46	0.00	47.5
Approach		7	0.0	7	0.0	0.004	3.9	NA	0.0	0.0	0.00	0.46	0.00	45.8
All Vehicles		67	1.6	67	1.6	0.022	4.4	NA	0.1	0.6	0.02	0.52	0.02	44.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: STANTEC NEW ZEALAND | Licence: NETWORK / Enterprise | Processed: Thursday, 9 February 2023 3:30:21 PM

Project: \\Au2019-pfss01\shared_projects\300304302\technical\modelling\sid_230110_4302_7_city_view_road.sip9

MOVEMENT SUMMARY

Site: 1 [1. AM - Pennant Hills Road / City View Road / Trebor Road (Site Folder: Future)]

Network: N101 [AM - Post Development (Network Folder: Post Development)]

Site Category: -

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: City View Road														
1	L2	65	3.2	65	3.2	0.184	46.2	LOS D	3.9	27.7	0.84	0.74	0.84	25.1
2	T1	11	0.0	11	0.0	0.184	44.1	LOS D	3.9	27.7	0.84	0.74	0.84	20.9
3	R2	31	0.0	31	0.0	0.175	61.4	LOS E	1.8	12.7	0.94	0.72	0.94	21.3
Approach		106	2.0	106	2.0	0.184	50.4	LOS D	3.9	27.7	0.87	0.73	0.87	23.4
East: Pennant Hills Road														
4	L2	43	0.0	43	0.0	0.801	25.3	LOS B	44.3	323.0	0.81	0.76	0.81	40.5
5	T1	2769	4.9	2769	4.9	0.801	18.6	LOS B	44.4	323.8	0.80	0.74	0.80	51.5
6	R2	83	0.0	83	0.0	0.647	74.1	LOS F	5.5	38.3	1.00	0.80	1.08	25.3
Approach		2896	4.7	2896	4.7	0.801	20.3	LOS B	44.4	323.8	0.80	0.75	0.81	49.9
North: Trebor Road														
7	L2	24	0.0	24	0.0	0.147	55.2	LOS D	2.2	15.1	0.90	0.70	0.90	28.4
8	T1	15	0.0	15	0.0	0.147	51.8	LOS D	2.2	15.1	0.90	0.70	0.90	18.6
9	R2	135	3.1	135	3.1	* 0.699	65.3	LOS E	8.7	62.3	1.00	0.86	1.09	26.1
Approach		174	2.4	174	2.4	0.699	62.7	LOS E	8.7	62.3	0.98	0.83	1.04	25.9
West: Pennant Hills Road														
10	L2	58	1.8	58	1.8	0.925	42.6	LOS D	72.7	528.6	0.97	0.99	1.08	33.9
11	T1	3167	4.8	3167	4.8	* 0.925	36.2	LOS C	72.7	529.9	0.94	0.97	1.05	41.3
12	R2	96	2.2	96	2.2	* 0.757	76.4	LOS F	6.5	46.2	1.00	0.85	1.19	18.1
Approach		3321	4.6	3321	4.6	0.925	37.5	LOS C	72.7	529.9	0.94	0.97	1.06	40.3
All Vehicles		6497	4.6	6497	4.6	0.925	30.7	LOS C	72.7	529.9	0.88	0.86	0.94	43.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed	
					[Ped ped	Dist] m						
South: City View Road												
P1	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	223.0	212.9	0.95	
East: Pennant Hills Road												
P2	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	234.0	227.1	0.97	
North: Trebor Road												

P3 Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	223.0	212.9	0.95
All Pedestrians	158	59.3	LOS E	0.2	0.2	0.96	0.96	226.7	217.6	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: STANTEC NEW ZEALAND | Licence: NETWORK / Enterprise | Processed: Thursday, 9 February 2023 3:30:36 PM

Project: \\Au2019-pfss01\shared_projects\300304302\technical\modelling\sid_230110_4302_7_city_view_road.sip9

MOVEMENT SUMMARY

 Site: 2 [2. AM - City View Road / Site Access (Site Folder: Future)]

 Network: N101 [AM - Post Development (Network Folder: Post Development)]

Site Category: -
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: City View Road														
2	T1	40	5.3	40	5.3	0.011	0.0	LOS A	0.0	0.1	0.02	0.01	0.02	48.4
3	R2	1	0.0	1	0.0	0.011	5.0	LOS A	0.0	0.1	0.03	0.03	0.03	47.9
Approach		41	5.1	41	5.1	0.011	0.1	NA	0.0	0.1	0.02	0.01	0.02	48.3
East: Site Access														
4	L2	1	0.0	1	0.0	0.065	7.5	LOS A	0.3	1.9	0.23	0.88	0.23	41.8
6	R2	62	0.0	62	0.0	0.065	7.6	LOS A	0.3	1.9	0.23	0.88	0.23	41.8
Approach		63	0.0	63	0.0	0.065	7.6	LOS A	0.3	1.9	0.23	0.88	0.23	41.8
North: City View Road														
7	L2	121	0.0	121	0.0	0.077	3.0	LOS A	0.0	0.0	0.00	0.42	0.00	46.2
8	T1	23	4.5	23	4.5	0.077	0.0	LOS A	0.0	0.0	0.00	0.42	0.00	28.1
Approach		144	0.7	144	0.7	0.077	2.5	NA	0.0	0.0	0.00	0.42	0.00	45.7
All Vehicles		248	1.3	248	1.3	0.077	3.4	NA	0.3	1.9	0.06	0.47	0.06	44.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: STANTEC NEW ZEALAND | Licence: NETWORK / Enterprise | Processed: Thursday, 9 February 2023 3:30:36 PM

Project: \\Au2019-pfss01\shared_projects\300304302\technical\modelling\sid_230110_4302_7_city_view_road.sip9

MOVEMENT SUMMARY

Site: 3 [3. AM - City View Road / Boundary Road / Wongala Crescent (Site Folder: Future)]

Network: N101 [AM - Post Development (Network Folder: Post Development)]

Site Category: -
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
East: Wongala Crescent														
5	T1	1	0.0	1	0.0	0.016	0.0	LOS A	0.1	0.6	0.03	0.53	0.03	47.1
6	R2	27	7.7	27	7.7	0.016	4.6	LOS A	0.1	0.6	0.03	0.53	0.03	44.6
Approach		28	7.4	28	7.4	0.016	4.5	NA	0.1	0.6	0.03	0.53	0.03	44.7
North: City View Road														
7	L2	14	0.0	14	0.0	0.009	4.6	LOS A	0.0	0.3	0.01	0.53	0.01	44.4
9	R2	1	0.0	1	0.0	0.009	4.7	LOS A	0.0	0.3	0.01	0.53	0.01	43.7
Approach		15	0.0	15	0.0	0.009	4.6	LOS A	0.0	0.3	0.01	0.53	0.01	44.4
West: Boundary Road														
10	L2	3	0.0	3	0.0	0.002	4.6	LOS A	0.0	0.0	0.00	0.40	0.00	45.8
11	T1	1	0.0	1	0.0	0.002	0.0	LOS A	0.0	0.0	0.00	0.40	0.00	47.8
Approach		4	0.0	4	0.0	0.002	3.4	NA	0.0	0.0	0.00	0.40	0.00	46.5
All Vehicles		47	4.4	47	4.4	0.016	4.4	NA	0.1	0.6	0.02	0.51	0.02	44.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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

MOVEMENT SUMMARY

Site: 1 [1. PM - Pennant Hills Road / City View Road / Trebor Road (Site Folder: Future)]

Network: N101 [PM - Post Development (Network Folder: Post Development)]

Site Category: -

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 130 seconds (Network Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: City View Road														
1	L2	94	1.1	94	1.1	0.249	46.1	LOS D	5.5	38.6	0.85	0.75	0.85	25.3
2	T1	13	0.0	13	0.0	0.249	43.2	LOS D	5.5	38.6	0.85	0.75	0.85	23.1
3	R2	58	0.0	58	0.0	0.331	62.8	LOS E	3.5	24.6	0.97	0.75	0.97	21.0
Approach		164	0.6	164	0.6	0.331	51.8	LOS D	5.5	38.6	0.89	0.75	0.89	23.4
East: Pennant Hills Road														
4	L2	40	0.0	40	0.0	0.859	27.7	LOS B	52.7	379.0	0.88	0.83	0.89	38.5
5	T1	2999	3.4	2999	3.4	* 0.859	21.2	LOS B	52.7	379.6	0.86	0.81	0.87	49.7
6	R2	100	0.0	100	0.0	* 0.778	77.0	LOS F	6.8	47.6	1.00	0.86	1.22	26.2
Approach		3139	3.2	3139	3.2	0.859	23.1	LOS B	52.7	379.6	0.86	0.81	0.88	48.2
North: Trebor Road														
7	L2	47	0.0	47	0.0	0.202	55.1	LOS D	3.3	23.1	0.90	0.74	0.90	30.6
8	T1	13	0.0	13	0.0	0.202	50.5	LOS D	3.3	23.1	0.90	0.74	0.90	20.4
9	R2	142	0.0	142	0.0	* 0.815	73.0	LOS F	9.8	68.3	1.00	0.93	1.24	26.5
Approach		202	0.0	202	0.0	0.815	67.4	LOS E	9.8	68.3	0.97	0.88	1.14	27.1
West: Pennant Hills Road														
10	L2	67	0.0	67	0.0	0.801	25.3	LOS B	45.0	320.4	0.81	0.77	0.81	44.2
11	T1	2789	2.3	2789	2.3	0.801	18.6	LOS B	45.1	321.6	0.80	0.75	0.80	51.5
12	R2	60	0.0	60	0.0	0.467	72.3	LOS F	3.8	26.9	1.00	0.76	1.00	18.9
Approach		2917	2.2	2917	2.2	0.801	19.8	LOS B	45.1	321.6	0.80	0.75	0.80	50.4
All Vehicles		6422	2.6	6422	2.6	0.859	23.8	LOS B	52.7	379.6	0.84	0.78	0.85	47.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed	
					[Ped ped	Dist] m						
South: City View Road												
P1	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	223.0	212.9	0.95	
East: Pennant Hills Road												
P2	Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	234.0	227.1	0.97	
North: Trebor Road												

P3 Full	53	59.3	LOS E	0.2	0.2	0.96	0.96	223.0	212.9	0.95
All Pedestrians	158	59.3	LOS E	0.2	0.2	0.96	0.96	226.7	217.6	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: STANTEC NEW ZEALAND | Licence: NETWORK / Enterprise | Processed: Thursday, 9 February 2023 3:30:54 PM

Project: \\Au2019-pfss01\shared_projects\300304302\technical\modelling\sid_230110_4302_7_city_view_road.sip9

MOVEMENT SUMMARY

 Site: 2 [2. PM - City View Road / Site Access (Site Folder: Future)]

 Network: N101 [PM - Post Development (Network Folder: Post Development)]

Site Category: -
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: City View Road														
2	T1	45	4.7	45	4.7	0.014	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	48.7
3	R2	1	0.0	1	0.0	0.014	4.9	LOS A	0.0	0.1	0.02	0.02	0.02	48.0
Approach		46	4.5	46	4.5	0.014	0.1	NA	0.0	0.1	0.01	0.01	0.01	48.6
East: Site Access														
4	L2	1	0.0	1	0.0	0.146	7.6	LOS A	0.5	3.6	0.25	0.88	0.25	41.8
6	R2	114	0.0	114	0.0	0.146	7.7	LOS A	0.5	3.6	0.25	0.88	0.25	41.8
Approach		115	0.0	115	0.0	0.146	7.7	LOS A	0.5	3.6	0.25	0.88	0.25	41.8
North: City View Road														
7	L2	52	0.0	52	0.0	0.055	3.0	LOS A	0.0	0.0	0.00	0.26	0.00	47.3
8	T1	53	0.0	53	0.0	0.055	0.0	LOS A	0.0	0.0	0.00	0.26	0.00	33.8
Approach		104	0.0	104	0.0	0.055	1.5	NA	0.0	0.0	0.00	0.26	0.00	46.0
All Vehicles		265	0.8	265	0.8	0.146	3.9	NA	0.5	3.6	0.11	0.48	0.11	43.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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

SIDRA INTERSECTION 9.0 | Copyright © 2000-2020 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: STANTEC NEW ZEALAND | Licence: NETWORK / Enterprise | Processed: Thursday, 9 February 2023 3:30:54 PM

Project: \\Au2019-pfss01\shared_projects\300304302\technical\modelling\sid_230110_4302_7_city_view_road.sip9

MOVEMENT SUMMARY

Site: 3 [3. PM - City View Road / Boundary Road / Wongala Crescent (Site Folder: Future)]

Network: N101 [PM - Post Development (Network Folder: Post Development)]

Site Category: -
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
East: Wongala Crescent														
5	T1	1	0.0	1	0.0	0.014	0.0	LOS A	0.1	0.5	0.04	0.52	0.04	47.1
6	R2	24	4.3	24	4.3	0.014	4.6	LOS A	0.1	0.5	0.04	0.52	0.04	44.5
Approach		25	4.2	25	4.2	0.014	4.4	NA	0.1	0.5	0.04	0.52	0.04	44.7
North: City View Road														
7	L2	33	0.0	33	0.0	0.022	4.6	LOS A	0.1	0.6	0.01	0.53	0.01	44.4
9	R2	2	0.0	2	0.0	0.022	4.7	LOS A	0.1	0.6	0.01	0.53	0.01	43.7
Approach		35	0.0	35	0.0	0.022	4.6	LOS A	0.1	0.6	0.01	0.53	0.01	44.4
West: Boundary Road														
10	L2	6	0.0	6	0.0	0.004	4.6	LOS A	0.0	0.0	0.00	0.46	0.00	45.2
11	T1	1	0.0	1	0.0	0.004	0.0	LOS A	0.0	0.0	0.00	0.46	0.00	47.5
Approach		7	0.0	7	0.0	0.004	3.9	NA	0.0	0.0	0.00	0.46	0.00	45.8
All Vehicles		67	1.6	67	1.6	0.022	4.4	NA	0.1	0.6	0.02	0.52	0.02	44.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

Delay Model: SIDRA Standard (Geometric Delay is included).

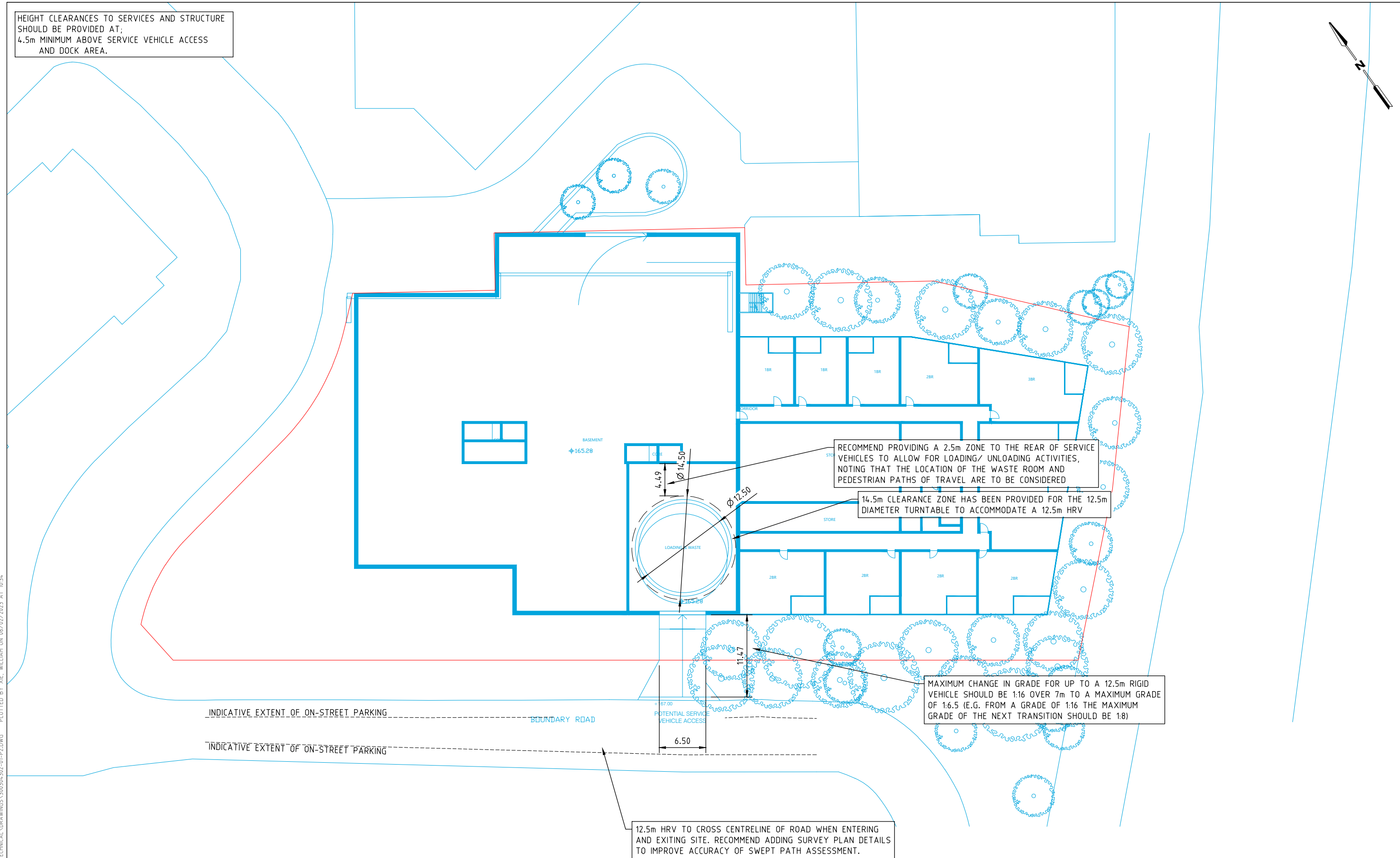
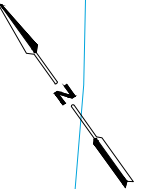
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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

Reference: 7 City View Road, Pennant Hills – Response to Transport for NSW (TfNSW) Request For Information

Attachment C – Swept Path Analysis

HEIGHT CLEARANCES TO SERVICES AND STRUCTURE SHOULD BE PROVIDED AT:
4.5m MINIMUM ABOVE SERVICE VEHICLE ACCESS AND DOCK AREA.



RECOMMEND PROVIDING A 2.5m ZONE TO THE REAR OF SERVICE VEHICLES TO ALLOW FOR LOADING/ UNLOADING ACTIVITIES, NOTING THAT THE LOCATION OF THE WASTE ROOM AND PEDESTRIAN PATHS OF TRAVEL ARE TO BE CONSIDERED

14.5m CLEARANCE ZONE HAS BEEN PROVIDED FOR THE 12.5m DIAMETER TURNTABLE TO ACCOMMODATE A 12.5m HRV

MAXIMUM CHANGE IN GRADE FOR UP TO A 12.5m RIGID VEHICLE SHOULD BE 1:16 OVER 7m TO A MAXIMUM GRADE OF 1:6.5 (E.G. FROM A GRADE OF 1:16 THE MAXIMUM GRADE OF THE NEXT TRANSITION SHOULD BE 1:8)

12.5m HRV TO CROSS CENTRELINE OF ROAD WHEN ENTERING AND EXITING SITE. RECOMMEND ADDING SURVEY PLAN DETAILS TO IMPROVE ACCURACY OF SWEEP PATH ASSESSMENT.

LOWER GROUND 2

SCALE 1:500@A3

ARCHITECTURAL BASE IN BLUE
DRAWING 7 LOWER GROUND 2
REVISION -
BY FENDER KATSALIDIS ARCHITECTS
RECEIVED 03.02.2023



PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY
SUBJECT TO CHANGE WITHOUT
NOTIFICATION

WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES ARE
APPROXIMATE ONLY AND THEIR EXACT POSITION
SHOULD BE PROVEN ON SITE. NO GUARANTEE IS
GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

DESIGNED
W.XIE

APPROVED BY
S.MANTON

DESIGN CHECK
S.MANTON

DATE ISSUED
6 FEBRUARY 2023

SCALE
A3 0 2.5 5 10 1:500

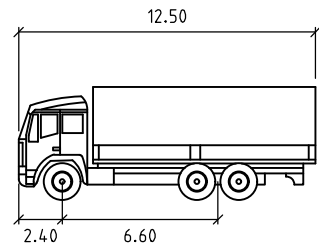
CAD FILE NO.
300304302-01-P2.DWG

7 CITY VIEW ROAD, PENNANT HILLS NSW 2120
PLANNING PROPOSAL
LOADING DOCK
HIGH-LEVEL DESIGN ADVICE
DRAWING NO. 300304302-01-01 SHEET 01 OF 02 ISSUE P2

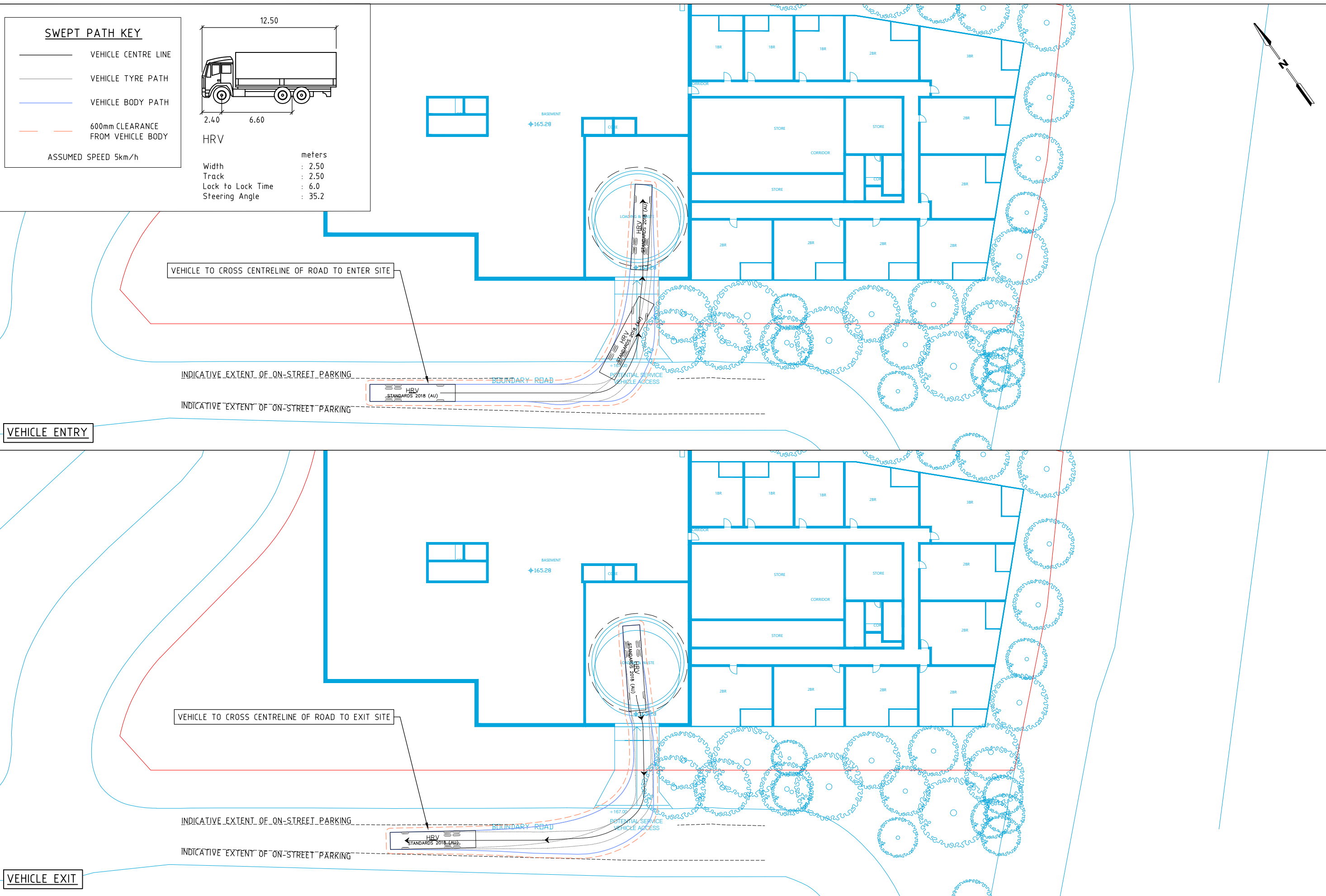
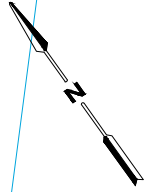
\\AU2019-PPF5501\SHARED_PROJECTS\300304302\TECHNICAL_DRAWINGS\300304302-01-P2.DWG PLOTTED BY XIE, WILLIAM ON 06/02/2023 AT 10:34

SWEPT PATH KEY

- VEHICLE CENTRE LINE
 - VEHICLE TYRE PATH
 - VEHICLE BODY PATH
 - 600mm CLEARANCE FROM VEHICLE BODY
- ASSUMED SPEED 5km/h



HRV
 Width : 2.50 meters
 Track : 2.50
 Lock to Lock Time : 6.0
 Steering Angle : 35.2



\\AU2019-PPF5501\SHARED_PROJECTS\300304302\TECHNICAL_DRAWINGS\300304302-01-P2.DWG PLOTTED BY XIE, WILLIAM ON 06/02/2023 AT 10:34



PRELIMINARY PLAN
 FOR DISCUSSION PURPOSES ONLY
 SUBJECT TO CHANGE WITHOUT
 NOTIFICATION

WARNING
 BEWARE OF UNDERGROUND SERVICES
 THE LOCATIONS OF UNDERGROUND SERVICES ARE
 APPROXIMATE ONLY AND THEIR EXACT POSITION
 SHOULD BE PROVEN ON SITE. NO GUARANTEE IS
 GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

DESIGNED
 W.XIE
 APPROVED BY
 S.MANTON

DESIGN CHECK
 S.MANTON
 DATE ISSUED
 6 FEBRUARY 2023

SCALE
 A3 0 2.5 5 10 1:500
 CAD FILE NO.
 300304302-01-P2.DWG

7 CITY VIEW ROAD, PENNANT HILLS NSW 2120
 PLANNING PROPOSAL
 LOADING DOCK
 VEHICLE SWEEP PATH ASSESSMENT
 DRAWING NO. 300304302-01-02 SHEET 02 OF 02 ISSUE P2