Reference No: PC16017_LER-003_SISD Assessments_22.04.2022.docx
Revision No: 1

22 April 2022

Harley Dykstra
Unit 15, 2 Hensbrook Loop
FORRESTDALE WA 6112

Attention: Mr Henry Dykstra

Dear Henry,

RE: DR MEDIATION - DR 260/2021 A.C.N. 605 729 995 PTY LTD V CITY OF KALAMUNDA RESPONSES TO TRAFFIC ISSUES POST SAT MEDIATION SESSION #2

We are pleased to present our responses to the issues raised at the SAT mediation (session #2) undertaken for the above proceedings on Thursday 31/03/2022.

The main outcomes of the **SAT Mediation Session 2** and additional items still to be resolved were as follows:

1. *The city engineer made it quite clear from the outset that the city will not want to see any trees removed from the road reserve median strip, and the city also will not entertain a variety of traffic engineering views but wants to see definitive compliance with traffic standards.*

2. *The city accepts the applicant's solution to traffic item 1 (**Refer to Peritas letter** **PC16017_LER-002_SISD Assessments_29.03.2022.docx**) relating to the "left out" turning vehicles being permitted to remain "lane-correct" - (**No further action required**);*

3. *With respect to item 2, the sight distance, the city accepts the speed at 80km/hr with no need for a 10km/hr buffer. The city wants to see what needs to be pruned in order to obtain the adequate sight line. Peritas confirmed that only a few limbs of a tree/shrub would need removal. The city wants to see this done and checked prior to supporting an approval. Peritas and the city engineers and parks and Gardens staff will arrange this exercise sometime between the 6th and the 8th of April 2022;*

4. *With respect to the right turn slip lane, the city will not accept tree removal and will not accept a non compliant slip lane. The city would need definitive objective information to show that a slip lane is in fact not required by the standards. Peritas is to arrange from the traffic consultant some more definitive advice on this point and convey it to the city by the 22nd of April 2022;*

5. *The "right out" movement identified under item 4 at the first mediation is acceptable to council based on the information provided by Peritas - (**No further action required**);*

6. *The left in slip lane needs more technical argument to justify compliance in terms of its length, or it needs to be extended in order to comply. Peritas is to obtain more definitive and objective information on this from the traffic consultant and submit this to the city by the 22nd of April 2022.*

7. *The SAT orders that were issued were that the further information is to be provided to the city by the 22nd of April 2022, and a further mediation is scheduled for 10am on the 2nd of May 2022.*

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1. TERMS OF REFERENCE

The following terms of reference were used to guide the crossover and various road element design :

- Site and field measurements based on standard sight distance calculations. Additional Site measurements taken (20/04/2022) after tree trimming in verges.
- The following analysis drawings that demonstrate the field work and outcomes. Refer to **Appendix B** for details:
  - PC16017-CI-SK2 - Rev A
  - PC16017-CI-SK6 - Rev D
  - PC16017-CI-SK7 - Rev D
  - PC16017-CI-SK8 - Rev D
  - PC16017-CI-1100 - Rev H
- WA Road Traffic Code 2000
- Austroads Standards.
- Technical Note provided by Transcore (Tech Note 1_t16.340.mr.tn01 date 21/04/2022)

2. Item 3 – THE SIGHT DISTANCE FOR THE "RIGHT OUT" TURNING MOVEMENT TO VIEW THE TRAFFIC ONCOMING FROM THE LEFT (EAST)

Previous Sight distance analysis sketches presented to council were based on aerial photograph overlays and partial site measurements.

At the SAT mediation No. 2 held 31/03/2022, it was agreed that council would arrange for tree pruning of selected verge trees followed by reassessment of the critical sight distances (being SISD case).

Tree pruning was initially assessed by the City at a site meeting held on Tuesday 5/04/2022 attended by Travis Knox (CoK Parks & Gardens), Raktim Barua (CoK Engineering) and Enzo Biagioni-Froudist (Peritas Consulting). An agreed tree pruning extent was established with the tree pruning undertaken by the CoK on the 07/04/2022.

The results of the tree pruning and successful outcomes (being opening up the verge to more favourable sight distances) are illustrated in **Figure 1** and **photos 1 & 2** below. This has increased the sight distances available from the future crossover by more than 30 m.

Figure 1– Tree pruning Location shown in red border

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Photo 1 – Pre- tree pruning photo

Photo 2 – Post -pruning photo (considerable visual improvement)

Based on advice from the Traffic engineers (Refer to **Appendix A**), the appropriate 85th percentile speed has been sourced from Main Roads WA hourly speed records for Welshpool Road East (east of Tonkin Highway) dated 2020/ 2021.

Figure 4 and **Figure 5** below illustrate the 85th percentile speed through the day for eastbound and westbound traffic on Welshpool Road East respectively. The 85th percentile speed for eastbound and westbound traffic through the entire day was reported as 66km/h and 70.8km/h for eastbound and westbound directions respectively.

It should be noted that the 85th percentile speed during the road network peak hours is significantly lower than the average daily 85th percentile speed.

As discussed above, the actual 85th percentile speed of traffic on this section of Welshpool Road is actually **less than the posted speed limit of 80km/h**, so designing for 90km/h is neither necessary nor appropriate.

The Traffic Technical note (**Appendix A**) recommends therefore that the various sight distance calculations by Peritas Group should be reviewed and updated to reflect the above 85th percentile speed along Welshpool Road East being no more than 80-km/hr.

The various Sight Distance calculations were undertaken for the **85th percentile speed** as appropriate for each of the sight distance indicators being:

- Minimum Gap Sight Distance (MGSD)
- Safe Sight Distance (SSD)
- Safe Intersection Sight Distance (SISD)

To confirm available sight distances, measurements were undertaken on site utilising relevant measurements simulating traffic movements outgoing from the proposed facility utilising the following parameters :

- Based on a driver's eye height in a car is 1.1m and for a truck it is 2.4m.
- The driver position in a truck's cab is approximately 2.4m (Austroads 2013 – 19.0m semi-trailer). With an eye position setback 3.0 m would leave the nose of the cab 0.6m from the edge of the major road. Refer to **Figure 2** below.

Figure 2 – Truck configuration for calculations

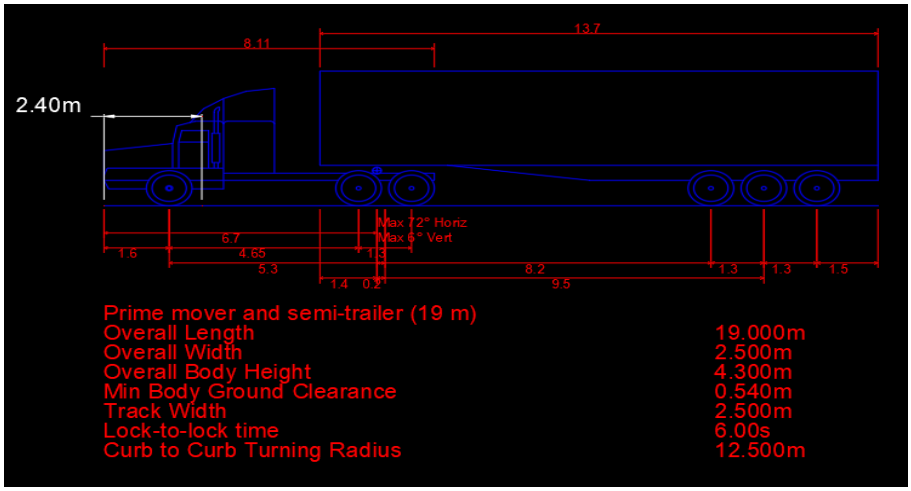

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Figure 3– Sight Distance Calculations & Illustration ("Right Out" heading West turning movement). Sight distances to view traffic oncoming for the east at 80 Kmph (85th percentile speed approx.). Refer also to Table 2.1.

The results of the re-assessed sight distances are summarised in **Table 2.1** and illustrated in the drawings provided in **Appendix B.**

All required sight distance parameters are satisfied.

Table 2-1: Sight Line Comparisons–Assessment Results (85th Percentile Speed or Posted Speed – 80KM/hr)

Description	Illustration Drawing	Required Sight Distances **Car**		Required Sight Distances **Truck**	
		Required	Provided	Required	Provided
MGSD (Min Gap Sight Distance approaching from the East)	SK7-Rev D	**200 m**	**220 m**	**200 m**	**220 m**
SSD (Stopping Sight Distance) approaching from the East)	SK9-Rev D	**Not assessed as 80KM/hr passes**	**200+ m**	**Not assessed as 80KM/hr passes**	**200+ m**
SISD (Safe Intersection Sight Distance approaching from the East)	SK2-Rev A	**183 m**	**220 m**	**200 m**	**220 m**

- Note : **Green** text Indicates pass, **Red** Text indicates deficiency.

Figure 4 – Speed Profile (Eastbound)

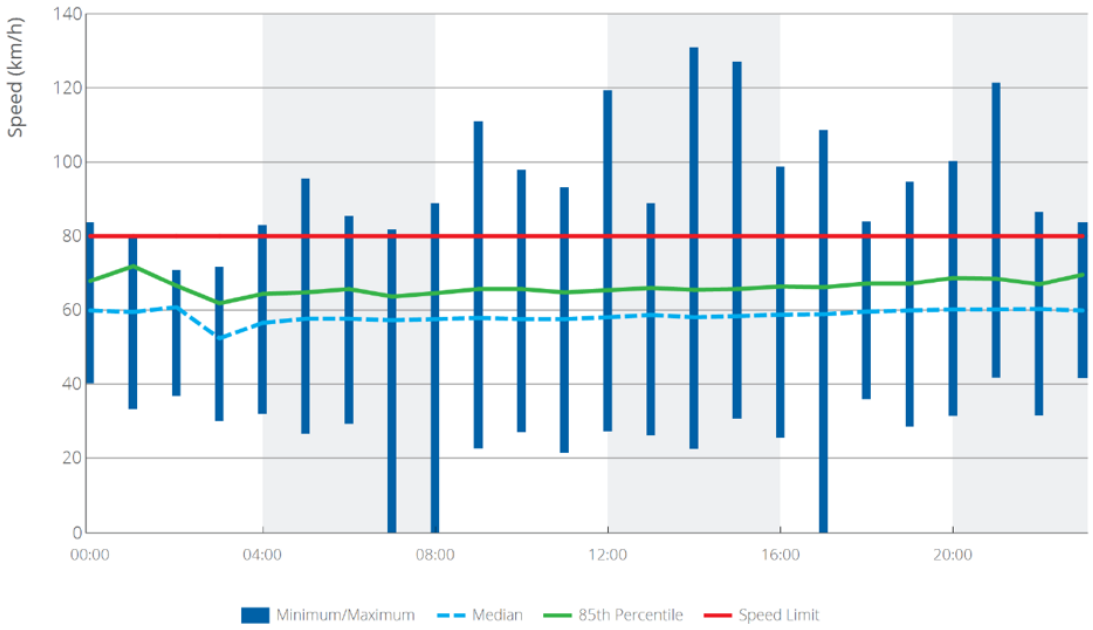


Figure 5 – Speed Profile (Westbound)

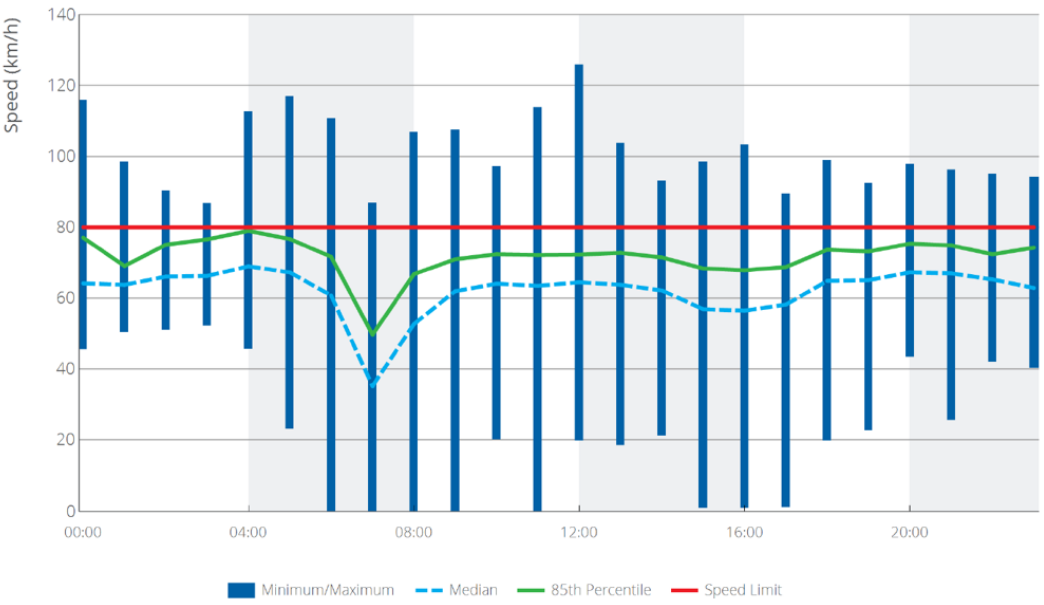


Photo 3 – View looking east towards the proposed crossover location in line the boundary. Refer to Figure 3 above and Peritas Drg PC16017-CI-1100 - Rev H – application drawing)

Photo 4 – View from observation position (car) looking east towards oncoming traffic

Photo 5 – Close up of Photo 4 with approaching vehicle in view.

Photo 6 – View from vehicle (car) at observation position looking east towards oncoming traffic

Photo 7 – View from vehicle (truck height) at observation position looking east towards oncoming traffic.

Photo 8 – View measured sight distance location east looking westwards back towards crossover with vehicle exiting at future crossover.

Photo 9 – Close up of Photo 8

3. Item 3 – RIGHT TURN SLIP LANE (EASTERN TRAFFIC INTO THE SITE)

Welshpool Road East in the vicinity of the subject site is a four-lane dual carriageway road with a kerbed and solid central median. Each carriageway is approximately 7.4 m wide and the median varies in width from approximately 4.5 m near the western property boundary to approximately 8.5 m wide near the eastern property boundary.

Median breaks and turn pockets are provided at multiple locations in this vicinity. The existing turn pockets are not compliant with respect to the requirements of Austroads Guidelines as it relates to deceleration length requirements.

A pedestrian footpath on the southern and a shared path on the northern side of Welshpool Road East is in place in the vicinity of the subject site.

According to the Main Roads WA *Metropolitan Functional Road Hierarchy* document, Welshpool Road East is classified as a *Distributor A* road. Refer **Figure 6** and **Figure 7** for more details.

Welshpool Road East is under with care and control of the local authority (vested by WAPC (*Other Regional Road*)).

Substantial vegetation also exists place within the road reserve along the northern side of Welshpool Road East as well as within the Welshpool Road East median. Refer to photos below.

According to available traffic data for Welshpool Riad East (east of Tonkin Highway – SLK 0.24) the vehicles per day counts in this section of road is 17,652 VPD (Source : 2020/2021 MRWA)

Welshpool Road East and operates under a sign posted speed limit of 80km/h in the vicinity of the subject site.

Photo 10 – Westbound view along Welshpool Road East in the vicinity of the subject site.

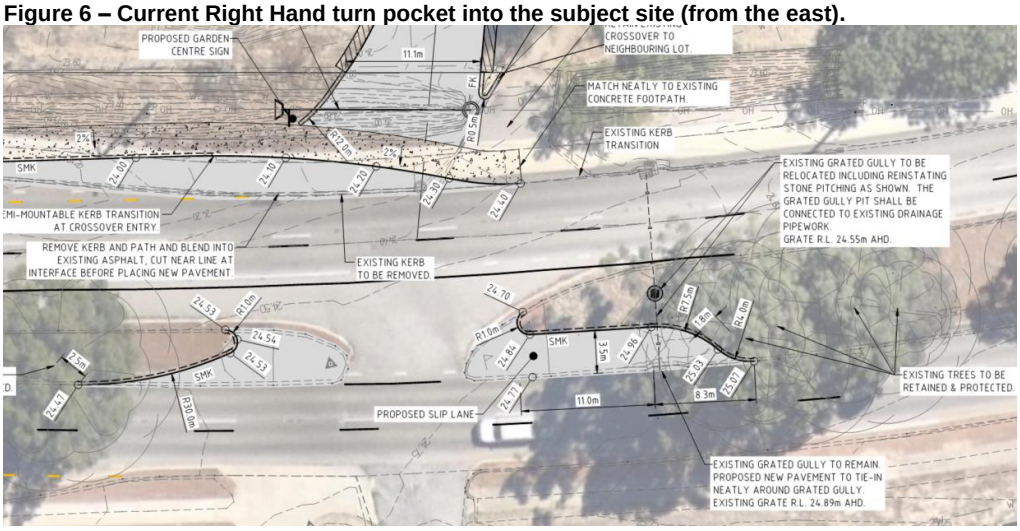
Photo 11 – Eastbound view along Welshpool Road East in the vicinity of the subject site.

During the early discussions with council regarding the crossover, the issue of a right turn pocket for vehicles approaching from the east to enter the proposed site was not considered necessary due to the dual lane configuration of Welshpool Road East at that location.

Traffic travelling from the east, westbound along Welshpool road had adequate sight distance (refer to SSD and MGSD **tabulation 2.1**) to see an exiting vehicle from the facility or see a vehicle waiting to turn into the facility and to be able to change lanes to pass the vehicle safely.

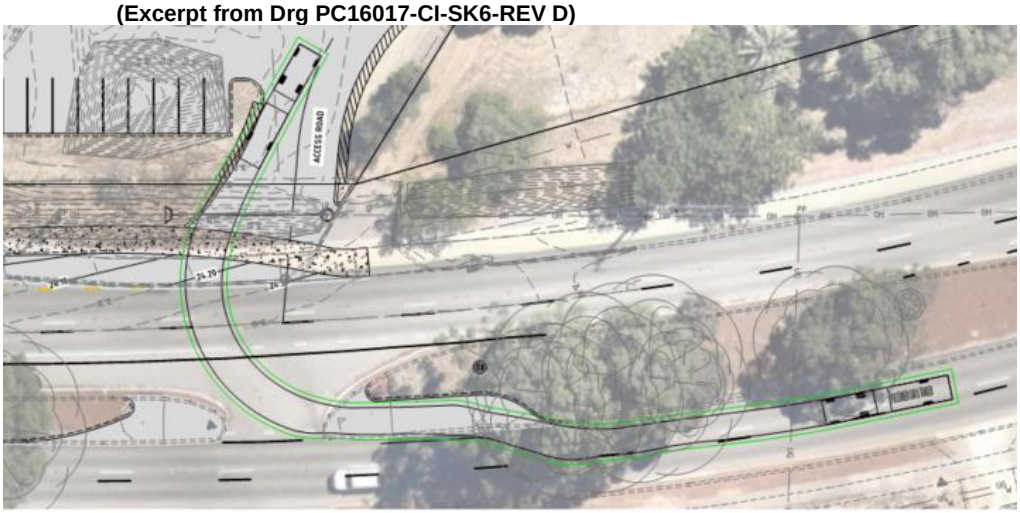
When further discussions with council were held after the initial submission, it was suggested that a nominal slip lane length would be better than none but at the same time ensuring that trees were retained. This resulted in the turn pocket configuration shown in **Figures 6 & 7** below.

Figure 6 – Current Right Hand turn pocket into the subject site (from the east).



On this basis a minimum slip lane length was included in the plans to at least cater for a single car/trailer combination that would also accommodate a single truck waiting to turn into the facility from the east. This avoided vegetation clearing in the median whist providing an improved entry into the proposed landscape centre.

Figure 7 – Current Proposed Slip Lane Configuration with Turning Movement shown (Excerpt from Drg PC16017-CI-SK6-REV D)



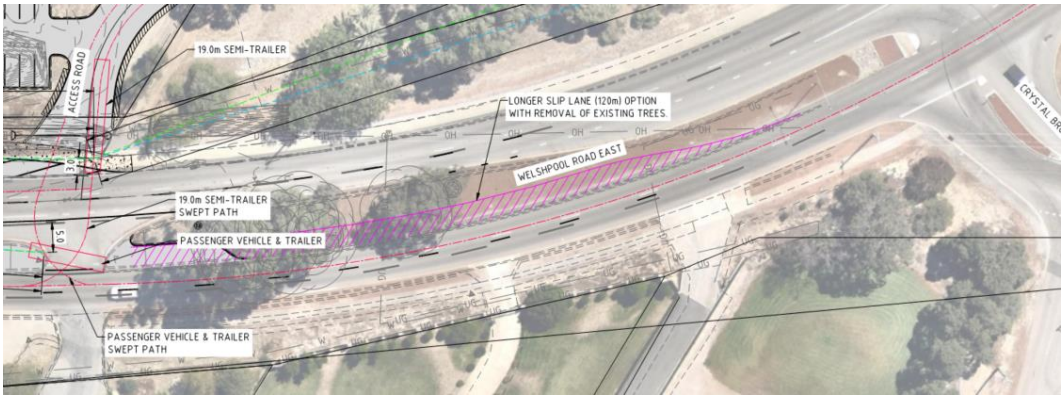
In addition to the above, refer to **Page 4 of Transcore's Technical Note 1 appended to this report in Appendix A** for commentary regarding the provisions in *Austroads Guide to Road Design 4A (unsignalized and signalised intersection)* for the *extended design domain (EDD) criteria*.

Table A16 and A17 of Austroads Guide to Road Design 4A (unsignalized and signalised intersection) provide extended design domain (EDD) values for intersection design criteria outside of the normal design domain (NDD) that provide a suitable solution in constrained situations (typically at brown field sites). **The values calculated by these provisions support a shorter slip lane of 45 m.**

The alternate longer slip lane arrangement has now also been provided for council engineer's consideration and an excerpt is shown in **Figure 8** below (refer also to Drg **PC16017-CI-SK8-REV D ins Appendix B**) but this will require the removal of existing trees located in the median.

The proponent is prepared include these works in the submission however, council would need to confirm their preference based on the two options presented.

Figure 8 – Current Proposed Slip Lane Configuration (Excerpt from Drg PC16017-CI-SK8-REV D)



The updated slip lane length option presented in **Figure 8** is based on the requirements noted in Austroads Table 5.3, See **Figure 9** below.

Figure 9– Slip Lane length Assessments based on Austroads (See Table 5.2 below)

Table 5.2: Deceleration distances required for cars on a level grade

Design speed of approach	Length of deceleration D – including diverge taper T										Diverge length Ld3 for lane widths	
	Stop condition1		Design speed of exit curve (km/h)2									
Road (km/h)	0	0	20	30	40	50	60	70	80	90	3.5 m[4]	3.0 m[4]
	Comf. 2.5 m/s²	Max. 3.5 m/s²	Comfortable average rate of deceleration 2.5m/s²									
50	40	30	30	25	15						33	27
60	55	40	50	40	30	15					40	33
70	75	55	70	60	50	40	20				47	40
80	100	70	95	85	75	60	45	25			54	44
90	125	90	120	110	100	85	70	50	25		60	50
100	155	110	150	140	130	115	100	80	55	30	67	57
110	185	135	180	175	160	150	130	110	90	60	74	62

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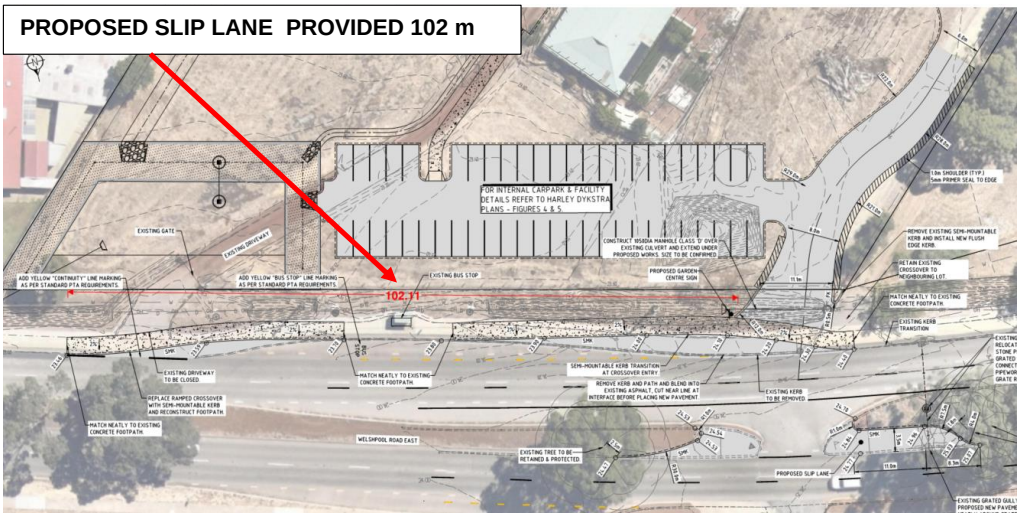
4. ITEM 6 - EASTBOUND ENTRY, LEFT TURN SLIP LANE COMPLIANCE

Council engineering requested additional information and justification regarding compliance of the eastbound entry slip lane. The RAS recommended 90 m whilst council had calculated that a 125 m slip lane was required.

Refer to **Transcore Technical Note 1 appended to this report in Appendix A** for additional commentary and supporting traffic advice to justify the use of the Extended Design Domain provisions.

Figure 10 below illustrates the issue raised by council. The length of slip lane provided is 102 m. The PTA confirmed that they approved of the joint slip lane bus-lane configuration and the proposed layout below.

Figure 10 – Eastbound Slip Lane Entry (Excerpt from Drg PC16017-CI-1100-REV H)



Based on commentary provided in Transcore Technical Note 1 in **Appendix A** it was condluded that:

The existing speed limit along this section of Welshpool Road East is 80km/h and a design speed 90km/h has previously been adopted for the major road approach, as discussed above. In accordance with Table A 17 for a design speed of 90km/h for a major road approach the minimum deceleration length is 45.0m including a taper length of 15.0m.

Considering that the provision of a full left turn lane (125m including taper) for the proposed crossover is constrained by the adjacent driveway further west, a shorter left turn lane of 97m including taper is suggested which satisfies and exceeds the minimum requirements of the Austroads EDD values and is therefore supported.

As discussed above, the actual 85th percentile speed of traffic on this section of Welshpool Road is actually less than the posted speed limit of 80km/h, so designing for 90km/h is neither necessary nor appropriate. The proposed 97m left turn lane length (including taper) is appropriate for the posted speed limit of 80km/h.

Similarly, considering that the provision of a full left turn lane (125 m including taper) for the proposed crossover is constrained by the adjacent driveway further west, a shorter left turn lane of 95 m including taper is suggested which satisfies and exceeds the minimum requirements of the Austroads EDD values and is therefore supported.

As can be seen for **Figure 10** above and **Drg PC16017-CI-1100-REV H** in **Appendix B**, the slip lane length provided is 102 m and hence should be considered adequate for the purposes of this entry to the facility.

5. CONCLUSIONS AND OTHER MATTERS

It is clear from the additional field investigations and site measurements that the proponent is offering practical solutions to the traffic management for vehicles entering and exiting the site to mitigate perceived safety issues.

In regard to the major **sight line considerations** we can conclude that, all major indicators meet all the "Posted Speed" requirements and operating speed requirements.

Consideration was given to council's commentary on the **Slip Lane (eastern traffic approach)** into the facility. Due to the dual lane configuration of the road at this location we do not believe that from a traffic point of view that the inclusion of a slip lane is justified at this location, however, we have provided justification in Section 4 above and have also provided the general configuration for the alternate longer slip lane arrangement for council engineer's consideration (refer to Drg **PC16017-CI-SK8-REV D ins Appendix B**). Council would need to confirm their preference based on the two options presented noting that the longer slip lane would require mature vegetation clearing within the medians.

Consideration was given to council's concerns regarding the **Slip Lane (Left turn eastbound into the facility)** into the facility. Again, the actual 85th percentile speed of traffic on this section of Welshpool Road is actually less than the posted speed limit of 80km/h, so designing for 90km/h is neither necessary nor appropriate. The proposed 97m left turn lane length (including taper) is appropriate for the posted speed limit of 80km/h.

To provide additional security that the facility will manage its operations to minimise potential for traffic impacts on the local road network, a condition could be placed on the planning approval restricting truck delivery to and from site to outside peak traffic times only, such as "***deliveries to and from site only between 9:30am and 3:30pm"***.

We trust the above provides council with sufficient data to recommend that the traffic issues have been adequately addressed and application can move forward to its logical conclusion to being approved with specific conditions relating to traffic provisions As there was previous support for the application, we trust that based on the above matters being addressed the application can be resolved.

Yours faithfully,

Enzo Biagioni-Froudist
Principal - Civil
Peritas Consulting Pty Ltd

Encl. Appendix A – Tech Note 1_t16.340.mr.tn01 date 21/04/2022
Appendix B – Illustration Drawings

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APPENDIX A– TRANSCORE TECH NOTE 1 (t16.340.mr.tn01 DATED 21/04/2022)

Transcore (Traffic Consultant) supporting advice responding to the City Engineers request to clarify certain traffic.

transport planning
traffic engineering
transport modelling

Technical Note:	No 1	**Date:** 21/04/2022
Project No:	t16.340	
Project:	Lot 150 (No.720) Welshpool Road East, Wattle Grove	
Subject:	DR MEDIATION - DR 260/2021 A.C.N. 605 729 995 PTY LTD V CITY OF KALAMUNDA Responses to outstanding traffic issues	

INTRODUCTION

This technical note has been prepared by Transcore for Community Greenwaste Recycling P/L to address the outstanding traffic issues raised at the SAT mediation undertaken for the above proceedings held on Tuesday 1/02/2022.

The outstanding traffic issues raised by the City of Kalamunda that required resolution, are as follows:

1. With respect to the left out swept path, Council Engineers have yet to confirm whether they accept that the vehicle does not need to stay in the inside lane but can stay "lane correct". The proponent is to provide some further supporting information on that position for consideration by the Council Engineer.
2. The site distance for the "right out" turning movement to view the traffic oncoming from the left (east) needs further survey specific information to demonstrate the precise sight distance that a truck and car will have when at the curb face and confirm that distance in the context of the 80km posted speed limit and the 90km design limit.
3. The Road Safety Audit (RSA) (Oct 2020) and Main Roads WA response (19/02/2021) both identified a concern that the currently proposed left turn slip lane length of approximately 97m is non-compliant with the standards. The City estimates a compliant slip lane would need to be 125m. Can the applicant please assess the length of the slip lane and advise on the compliance and provide relevant calculations, or otherwise extend the slip lane length.

ITEM 1: LEFT OUT SWEPT PATH

The WA Road Traffic Code 2000 sets out the regulations for driving on WA roads. It does not specifically state which traffic lane a vehicle must enter in this situation.

Regulation 112 relates to keeping as far left as practicable ("*a driver must keep the vehicle as close as practicable to the left boundary of the carriageway, except where 2 or more lanes marked on the carriageway are available exclusively for vehicles travelling in the same direction.*")

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Transcore Pty Ltd ACN 094 951 318 ABN 19 094 951 318
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Regulation 113 relates to restriction on use of right lane, but only applies if the speed limit is 90km/h or more, or a "*Keep left unless overtaking*" sign applies on that part of the carriageway.

Regulation 21 relates to left turns at intersections with multiple lanes. It only specifies the traffic lanes a vehicle can use to approach and enter the intersection, not which lanes it must use on exit from the intersection. However, it is worth noting that 21(2) makes special provision for vehicles 7.5m long (or longer) to also use the lane adjacent to the left-hand lane on approach to the intersection to turn left if required, if safe to do so and if it is not practicable for the driver to turn left from within the left lane.

Accordingly, a truck should be permitted to turn left out from a driveway into either lane on the adjacent carriageway of this dual lane road, not just into the left-hand lane.

ITEM 2: SIGHT DISTANCE

The various sight distance calculations by Peritas Group were based on the posted speed (80km/h) and design speed (90km/h) along Welshpool Road East.

Austroads *Guide to Road Design Part 3: Geometric Design* (2016) provides the following guidance on design speed:

> *Design speed is a fixed speed for the design and correlation of geometric features of a carriageway that influence vehicle operation ... It is used for the calculation of various geometric design parameters (e.g. sight distance, application of superelevation, horizontal and vertical curve radii). The design speed should not be less than the expected operating (85th percentile) speed for the road. If the operating speed varies along the road, the design speed may vary accordingly.*

The 90km/h design speed adopted in the sight distance calculations is based on the common practice among design engineers of using posted speed limit plus 10km/h as the design speed where actual 85th percentile speed is not known.

The appropriate 85th percentile speed has been sourced from Main Roads WA hourly speed records for Welshpool Road East (east of Tonkin Highway) dated 2020/ 2021. **Figure 1** and **Figure 2** illustrate the 85th percentile speed through the day for eastbound and westbound traffic on Welshpool Road East respectively. The 85th percentile speed for eastbound and westbound traffic through the entire day was reported as 66km/h and 70.8km/h for eastbound and westbound directions respectively. It should be noted that the 85th percentile speed during the road network peak hours is significantly lower than the average daily 85th percentile speed.

It is suggested that the various sight distance calculations by Peritas Group should be reviewed and updated to reflect the above 85th percentile speed along Welshpool Road East.

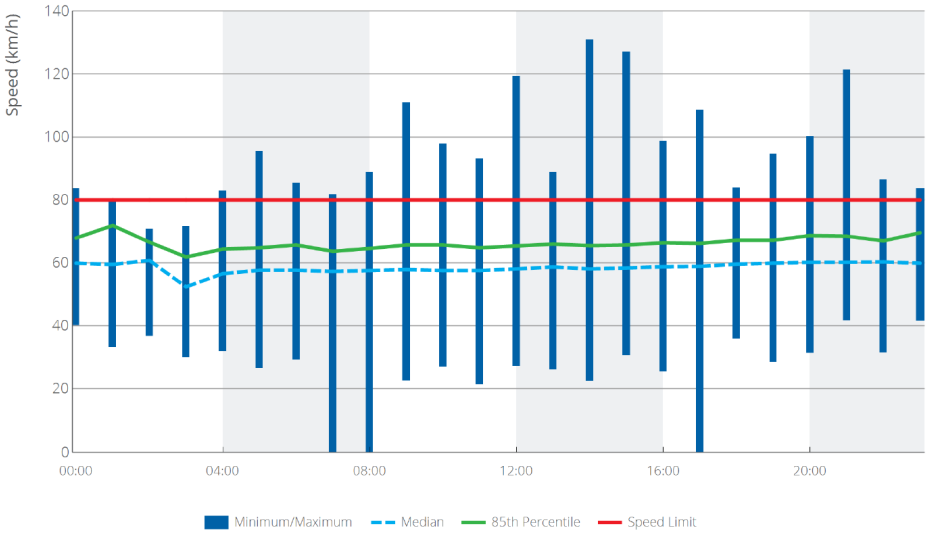

Figure 1. Speed profile (eastbound)

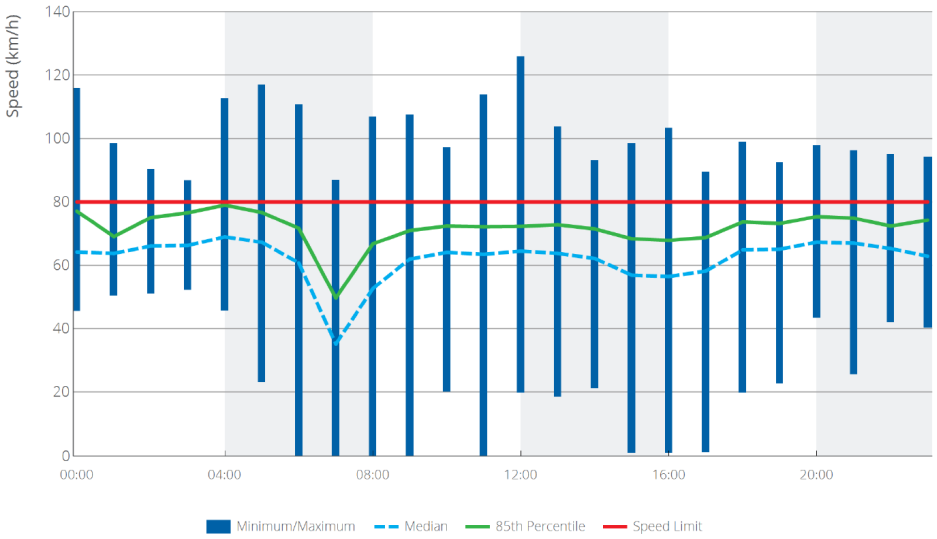

Figure 2: Speed profile (westbound)

ITEM 3: LEFT TURN SLIP LANE

Austroads document ''*Guide to Road Design – Part 4A: Unsignalised and Signalised Intersections''* provides guidelines for auxiliary lanes including left turn deceleration lanes.

Section 5.2.2 and Table 5.2 provide deceleration distances for greenfield sites in unconstrained situations and Appendix A and in particular section A.5.6 and Table A 17 provide deceleration distances for brownfield and constrained situations.

Appendix A provides extended design domain (EDD) values for intersection design criteria and states that: *The EDD values are outside of the normal design domain (NDD) that through research and/or operating experience, particular road agencies have found to provide a suitable solution in constrained situations (typically at brownfield sites).*

EDD may be considered when:

- *Reviewing the geometry of existing intersections;*
- *New intersections are being retrofitted on existing roads in constrained locations;*
- *Improving the standard of existing intersections in constrained locations; and,*
- *Building temporary intersections.*

The second dot point in circumstances where EDD may be considered is applicable to the proposed development crossover and the proposed left turn deceleration lane.

The existing speed limit along this section of Welshpool Road East is 80km/h and a design speed 90km/h has previously been adopted for the major road approach, as discussed above. In accordance with Table A 17 for a design speed of 90km/h for a major road approach the minimum deceleration length is 45.0m including a taper length of 15.0m.

Considering that the provision of a full left turn lane (125m including taper) for the proposed crossover is constrained by the adjacent driveway further west, a shorter left turn lane of 97m including taper is suggested which satisfies and exceeds the minimum requirements of the Austroads EDD values and is therefore supported.

As discussed above, the actual 85th percentile speed of traffic on this section of Welshpool Road is actually less than the posted speed limit of 80km/h, so designing for 90km/h is neither necessary nor appropriate. The proposed 97m left turn lane length (including taper) is appropriate for the posted speed limit of 80km/h.

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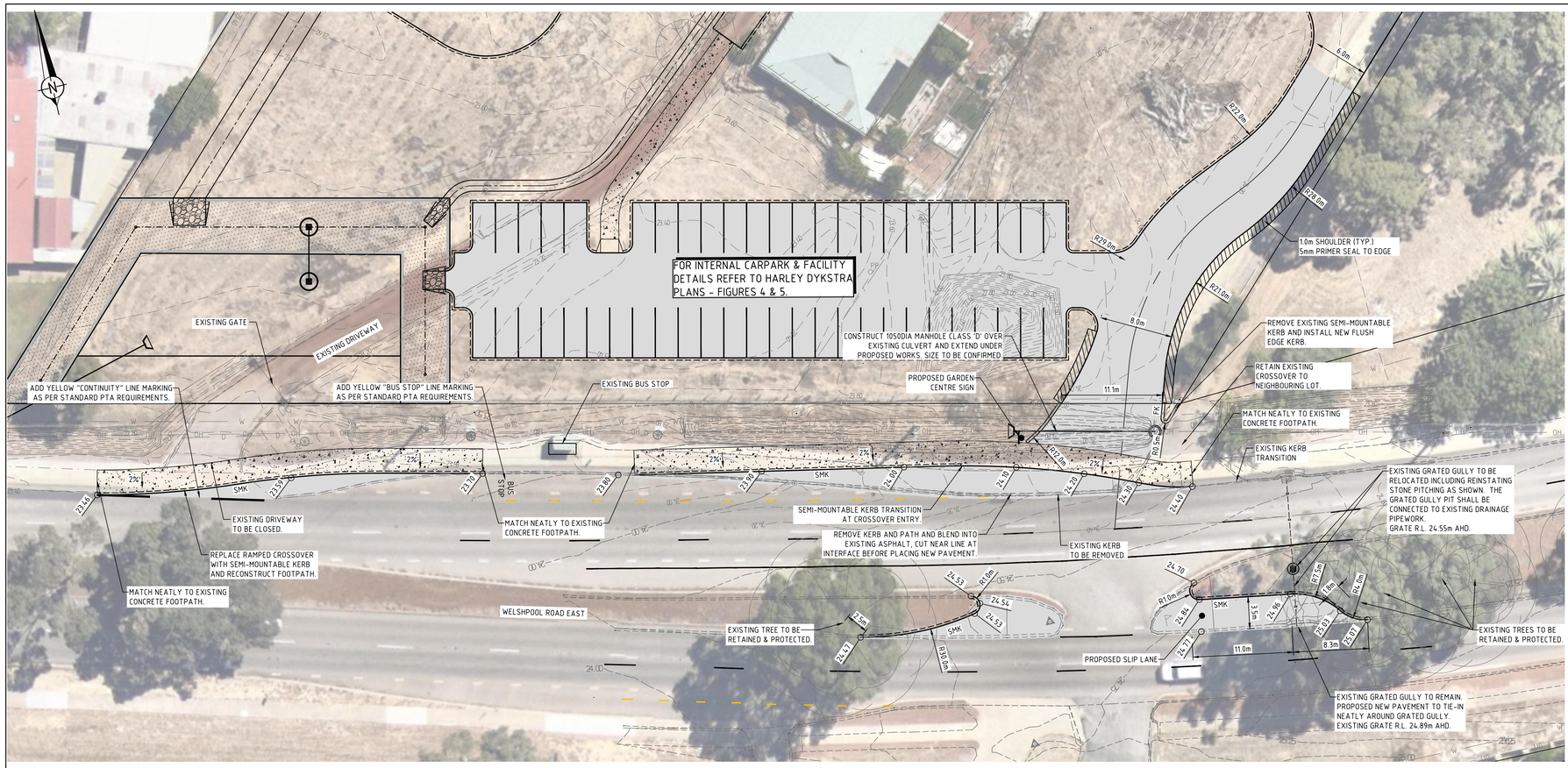
APPENDIX B–ILLUSTRATION DRAWINGS

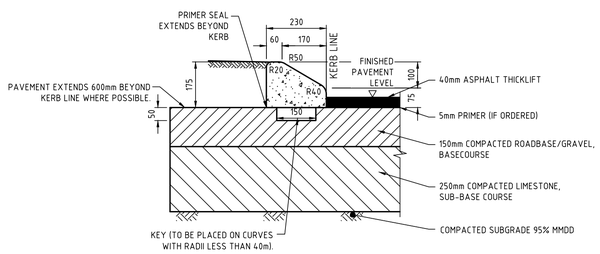


LEGEND

- EXISTING CONTOUR
- EXISTING KERB
- EXISTING BATTER
- EXISTING BUILDING
- EXISTING FOOTPATH
- EXISTING FENCE
- EXISTING DRAINAGE
- EXISTING OVERHEAD POWER
- EXISTING UNDERGROUND POWER
- EXISTING WATER
- EXISTING TREE
- EXISTING DRAINAGE JUNCTION
- EXISTING POWER POLE
- EXISTING SIDE ENTRY PIT
- EXISTING GRATE PIT
- PROPOSED SEMI MOUNTABLE KERB
- PROPOSED FLUSH KERB
- PROPOSED 2.5m WIDE CONCRETE SHARED PATH
- PROPOSED UNSEALED SHOULDER
- PROPOSED ASPHALT PAVEMENT
- PROPOSED DESIGN LEVELS

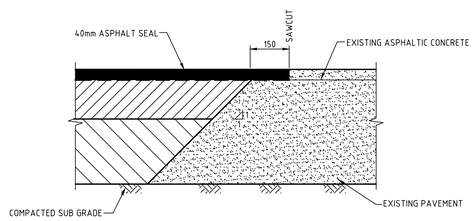
GENERAL MANAGEMENT PLAN

SCALE 1:250



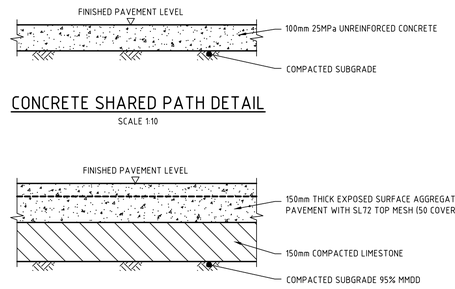
SEMI MOUNTABLE KERB AND PAVEMENT DETAIL (SMK)

SCALE 1:10



CUTBACK DETAIL

SCALE 1:10

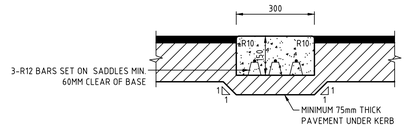


CONCRETE SHARED PATH DETAIL

SCALE 1:10

CONCRETE THRESHOLD DETAIL

SCALE 1:10



FLUSH KERB DETAIL

SCALE 1:10

METRES 1.0 0 1.0 2.0 3.0m

SCALE 1:10

METRES 0.5 0 0.5 1.0 1.5m

SCALE 1:250

N:\Archive\Projects\Civil\2016\PC16017 - Lot 150 Welshpool Road Wattle Grove\2.0 Design\2.34 Drawings\2.34.1 Acad\PC16017-CI-1100.dwg

No.	REVISION	BY	DATE
H	SLIP LANE AMENDED; DESIGN LEVELS ADDED	DA	23.06.21
G	SLIP LANE ADDED	DA	19.04.21
F	INTERNAL CARPARK LAYOUT UPDATED	DA	26.06.20
E	CHANGES MADE AS PER COMMENTS FROM COUNCIL MEETING	DA	12.06.18
D	REISSUED FOR APPROVAL	MD	04.12.17
C	ISSUED FOR APPROVAL	MD	22.05.17
B	REVISED TO MATCH ADDITIONAL SURVEY	MD	09.08.16
A	ISSUED FOR INFORMATION	MD	05.08.16

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PROJECT:
PROPOSED DRIVEWAY
720 WELSHPOOL ROAD
WATTLE GROVE

DRAWING TITLE:
GENERAL ARRANGEMENT PLAN

SCALE	AS SHOWN	FILE	
HORIZONTAL	–	DESIGN	MD
VERTICAL	–	DRAWN	MD
SURVEY DATUM	AHD	CHECKED	EBF
WAPC No	—	DATE	JULY 16
CADFILE NAME	PC16017-CI	DRAWING No.	PC16017-CI-1100
REV.	H		

THIS PLAN IS NOT TO BE USED FOR CONSTRUCTION UNLESS SIGNED BELOW

APPROVED .....

N

SISD (A) DESIGN CRITERIA (CAR):

DECISION TIME (sec) = OBSERVATION TIME (3 sec) + REACTION TIME (2 sec)	= TOTAL 5 sec
V (Design Speed km/h)	= 80 km/h
d (COEFFICIENT OF DECELERATION)	= 0.36
a (LONGITUDINAL GRADE IN %)	= -1.07% AVG.
BASE ON THE "EQUATION 2" FROM "AUSTROADS" PART 4a SISD	= 183m

SISD (B) DESIGN CRITERIA (TRUCK):

DECISION TIME (sec) = OBSERVATION TIME (2.5sec) + REACTION TIME (2 sec)	= TOTAL 4.5 sec
V (Design Speed km/h)	= 80 km/h
d (COEFFICIENT OF DECELERATION)	= 0.29
a (LONGITUDINAL GRADE IN %)	= -1.07% AVG.
BASE ON THE "EQUATION 2" FROM "AUSTROADS" PART 4a SISD	= 200m

SISD (C) DESIGN CRITERIA (CAR):

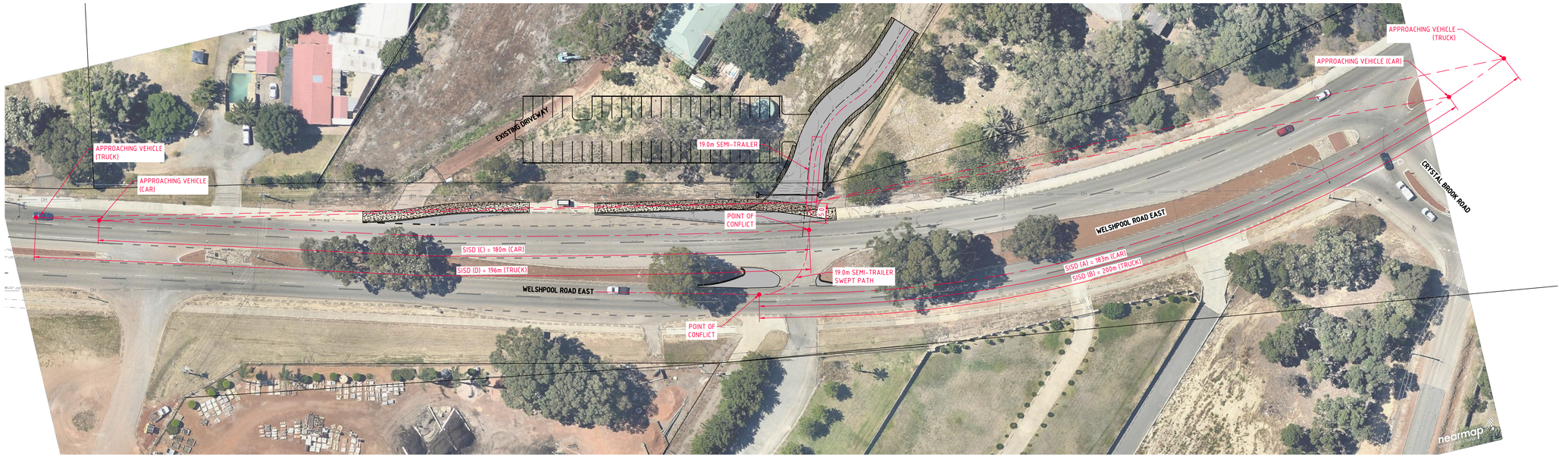
DECISION TIME (sec) = OBSERVATION TIME (3 sec) + REACTION TIME (2 sec)	= TOTAL 5 sec
V (Design Speed km/h)	= 80 km/h
d (COEFFICIENT OF DECELERATION)	= 0.36
a (LONGITUDINAL GRADE IN %)	= 0.733% AVG.
BASE ON THE "EQUATION 2" FROM "AUSTROADS" PART 4a SISD	= 180m

SISD (D) DESIGN CRITERIA (TRUCK):

DECISION TIME (sec) = OBSERVATION TIME (2.5sec) + REACTION TIME (2 sec)	= TOTAL 4.5 sec
V (Design Speed km/h)	= 80 km/h
d (COEFFICIENT OF DECELERATION)	= 0.29
a (LONGITUDINAL GRADE IN %)	= 0.733% AVG.
BASE ON THE "EQUATION 2" FROM "AUSTROADS" PART 4a SISD	= 196m

LEGEND

- EXISTING CONTOUR
- EXISTING KERB
- EXISTING BATTER
- EXISTING BUILDING
- EXISTING FOOTPATH
- EXISTING FENCE
- EXISTING DRAINAGE
- EXISTING OVERHEAD POWER
- EXISTING UNDERGROUND POWER
- EXISTING WATER
- EXISTING TREE
- EXISTING DRAINAGE JUNCTION
- EXISTING POWER POLE
- EXISTING SIDE ENTRY PIT
- EXISTING GRATE PIT
- PROPOSED SEMI MOUNTABLE KERB
- PROPOSED FLUSH KERB
- PROPOSED 2.5m WIDE CONCRETE SHARED PATH
- PROPOSED UNSEALED SHOULDER
- PROPOSED ASPHALT PAVEMENT



(SISD) SAFE INTERSECTION SIGHT DISTANCE PLAN

SCALE 1:500

METRES
10 0 10 20 30m
SCALE 1:500

F:\Project Delivery (PD)\3.0 Projects\3.4 Civil\2016\PC16017 – Lot 150 Welshpool Road Wattle Grove\2.0 Design\2.34 Drawings\2.34.1 Acad\PC16017-CI-SK2.dwg

No.	REVISION	BY	DATE
A	ISSUED FOR INFORMATION	DA	12.06.18

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PO Box 5486

PROJECT:
PROPOSED DRIVEWAY
720 WELSHPOOL ROAD
WATTLE GROVE

DRAWING TITLE:
SAFE INTERSECTION SIGHT DISTANCE PLAN

SCALE	AS SHOWN	FILE	
HORIZONTAL	–	DESIGN	DA
VERTICAL	–	DRAWN	DA
SURVEY DATUM	AHD	CHECKED	EBF
WAPC No	—	DATE	MAY 18
CADFILE NAME	PC16017-CI	DRAWING No.	PC16017-CI-SK2
		REV.	A

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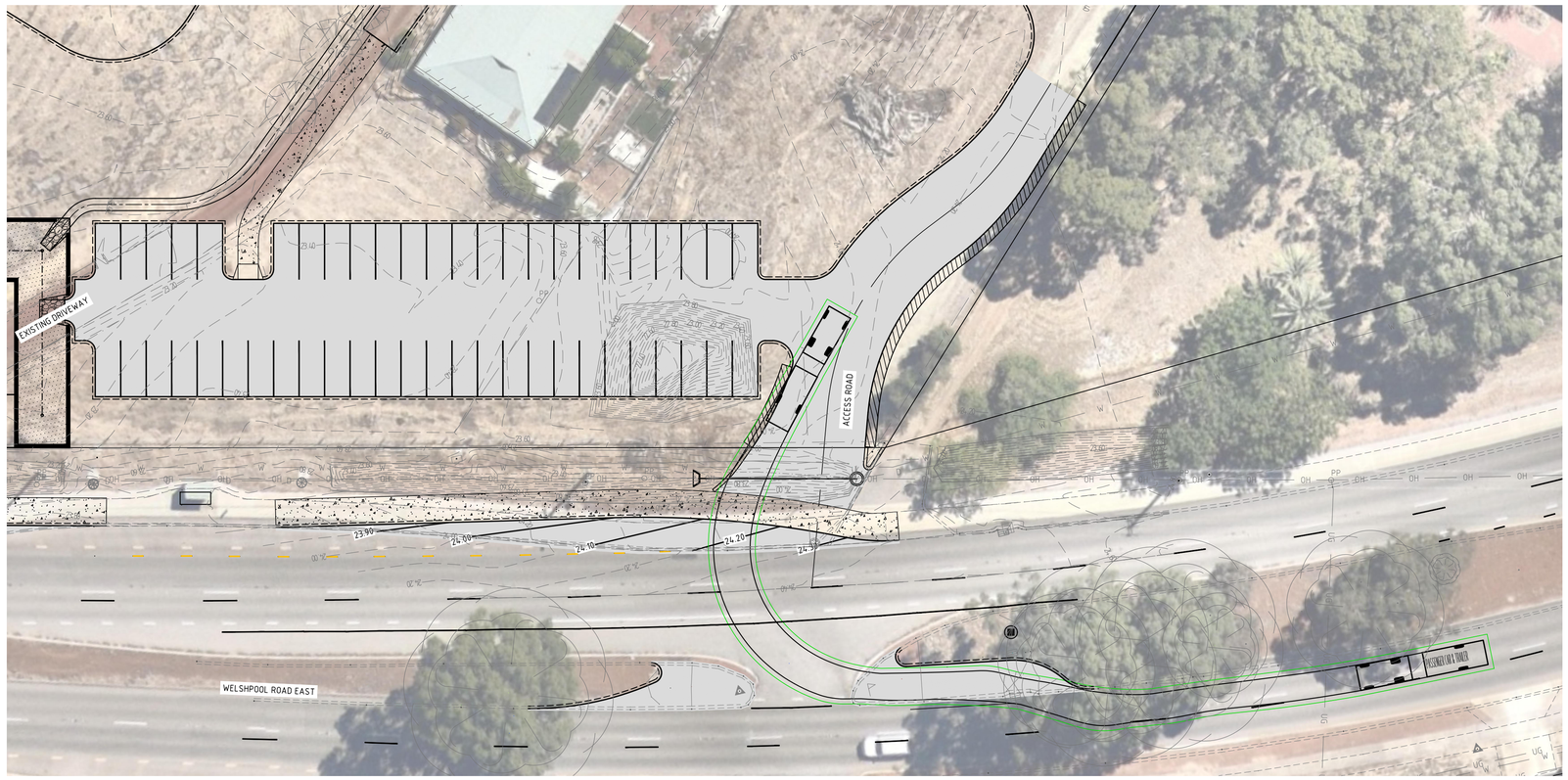
APPROVED



TURNING MOVEMENT PLAN

SCALE 1:250

LEGEND

- EXISTING CONTOUR
- EXISTING KERB
- EXISTING BATTER
- EXISTING BUILDING
- EXISTING FOOTPATH
- EXISTING FENCE
- EXISTING DRAINAGE
- EXISTING OVERHEAD POWER
- EXISTING UNDERGROUND POWER
- EXISTING WATER
- EXISTING TREE
- EXISTING DRAINAGE JUNCTION
- EXISTING POWER POLE
- EXISTING SIDE ENTRY PIT
- EXISTING GRATE PIT
- PROPOSED SEMI MOUNTABLE KERB
- PROPOSED FLUSH KERB
- PROPOSED 2.5m WIDE CONCRETE SHARED PATH
- PROPOSED UNSEALED SHOULDER
- PROPOSED ASPHALT PAVEMENT

TURNING MOVEMENT LEGEND

(LARGE PASSENGER VEHICLE & TRAILER)

- VEHICLE BODY
- 500mm CLEARANCE

METRES

0.5 0 0.5 1.0 1.5m

SCALE 1:250

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No.	REVISION	BY	DATE
D	DRAWING UPDATED	DA	23.06.21
C	SLIP LANE ADDED; TURNING TEMPLATE UPDATED	DA	19.04.21
B	TURNING TEMPLATE UPDATED	DA	24.06.20
A	ISSUED FOR INFORMATION	DA	12.06.18

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PROJECT:
PROPOSED DRIVEWAY
720 WELSHPOOL ROAD
WATTLE GROVE

DRAWING TITLE:
TURNING
MOVEMENT SHEET 4

SCALE	AS SHOWN	FILE	
HORIZONTAL	–	DESIGN	DA
VERTICAL	–	DRAWN	DA
SURVEY DATUM	AHD	CHECKED	EBF
WAPC No	—	DATE	JUNE 18
CADFILE NAME	PC16017-CI	DRAWING No.	PC16017-CI-SK6
REV.	D		

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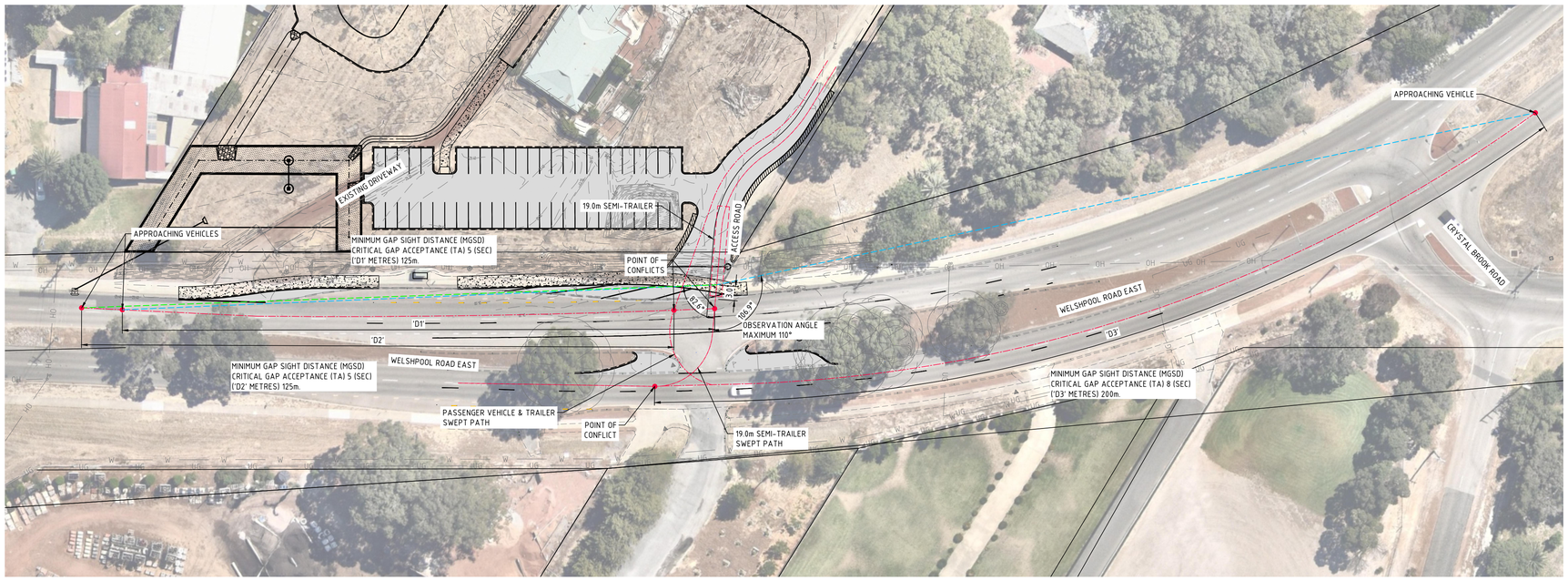
APPROVED .....



LEGEND

- EXISTING CONTOUR
- EXISTING KERB
- EXISTING BATTER
- EXISTING BUILDING
- EXISTING FOOTPATH
- EXISTING FENCE
- EXISTING DRAINAGE
- EXISTING OVERHEAD POWER
- EXISTING UNDERGROUND POWER
- EXISTING WATER
- EXISTING TREE
- EXISTING DRAINAGE JUNCTION
- EXISTING POWER POLE
- EXISTING SIDE ENTRY PIT
- EXISTING GRATE PIT
- PROPOSED SEMI MOUNTABLE KERB
- PROPOSED FLUSH KERB
- PROPOSED 2.5m WIDE CONCRETE SHARED PATH
- PROPOSED UNSEALED SHOULDER
- PROPOSED ASPHALT PAVEMENT

(MGSD) MINIMUM GAP SIGHT DISTANCE PLAN

SCALE 1:250

METRES
0.5 0 0.5 1.0 1.5m
SCALE 1:250

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No.	REVISION	BY	DATE
D	DRAWING UPDATED	DA	21.02.22
C	DRAWING UPDATED	DA	23.06.21
B	AERIAL UPDATED; SLIP LANE ADDED	DA	19.04.21
A	ISSUED FOR INFORMATION	DA	24.06.20

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PO Box 5486

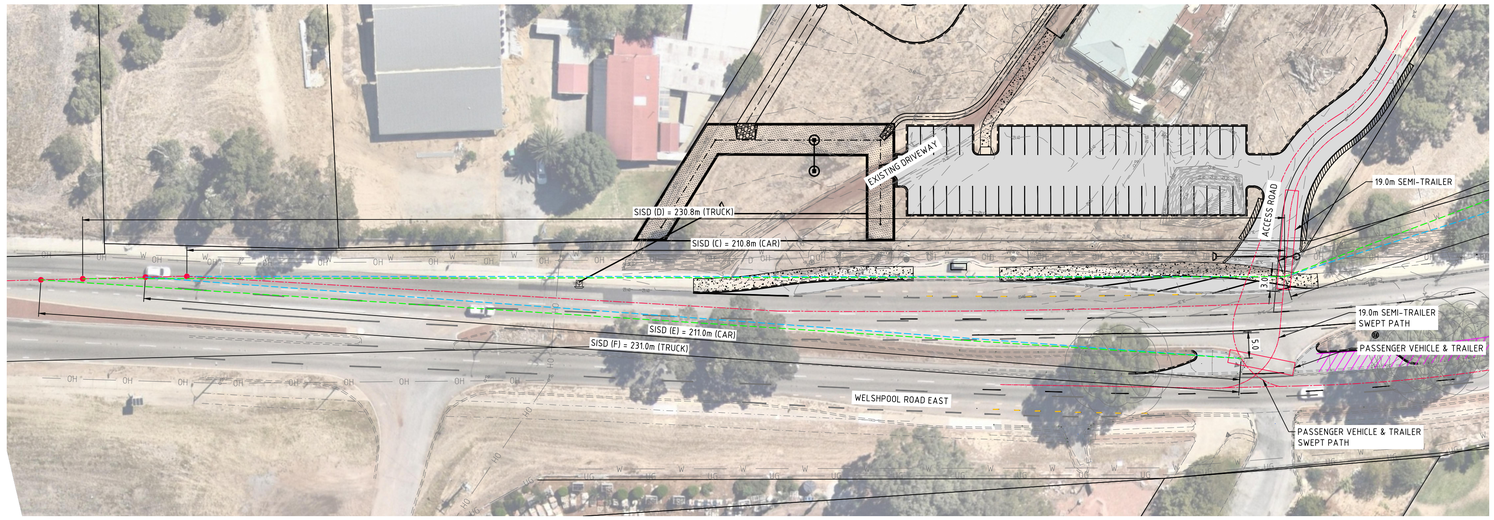
PROJECT:
PROPOSED DRIVEWAY
720 WELSHPOOL ROAD
WATTLE GROVE

DRAWING TITLE:
MINIMUM GAP SIGHT
DISTANCE PLAN

SCALE	AS SHOWN	FILE	
HORIZONTAL	–	DESIGN	DA
VERTICAL	–	DRAWN	DA
SURVEY DATUM	AHD	CHECKED	EBF
WAPC No	—	DATE	JUNE 20
CADFILE NAME	PC16017-CI	DRAWING No.	PC16017-CI-SK7
REV.	D		

THIS PLAN IS NOT TO BE USED FOR CONSTRUCTION UNLESS SIGNED BELOW

APPROVED .....



(SISD) SAFE INTERSECTION STOPPING DISTANCE PLAN 1

SCALE 1:500

(SISD) SAFE INTERSECTION STOPPING DISTANCE PLAN 2

SCALE 1:500

LEGEND

- EXISTING CONTOUR
- EXISTING KERB
- EXISTING BATTER
- EXISTING BUILDING
- EXISTING FOOTPATH
- EXISTING FENCE
- EXISTING DRAINAGE
- EXISTING OVERHEAD POWER
- EXISTING UNDERGROUND POWER
- EXISTING WATER
- EXISTING TREE
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- EXISTING GRATE PIT
- PROPOSED SEMI MOUNTABLE KERB
- PROPOSED FLUSH KERB
- PROPOSED 2.5m WIDE CONCRETE SHARED PATH
- PROPOSED UNSEALED SHOULDER
- PROPOSED ASPHALT PAVEMENT

SISD (A) DESIGN CRITERIA (CAR):

DECISION TIME (sec) = OBSERVATION TIME (3 sec) + REACTION TIME (2 sec)	= TOTAL 5 sec
V (Design Speed km/h)	= 90 km/h
d (COEFFICIENT OF DECELERATION)	= 0.36
a (LONGITUDINAL GRADE IN %)	= -1.2% AVG.
BASE ON THE "EQUATION 2" FROM "AUSTROADS" PART 4a SISD	= 217m

SISD (B) DESIGN CRITERIA (TRUCK):

DECISION TIME (sec) = OBSERVATION TIME (3sec) + REACTION TIME (2 sec)	= TOTAL 5 sec
V (Design Speed km/h)	= 90 km/h
d (COEFFICIENT OF DECELERATION)	= 0.29
a (LONGITUDINAL GRADE IN %)	= -1.2% AVG.
BASE ON THE "EQUATION 2" FROM "AUSTROADS" PART 4a SISD	= 240m

SISD (C) DESIGN CRITERIA (CAR):

DECISION TIME (sec) = OBSERVATION TIME (3 sec) + REACTION TIME (2 sec)	= TOTAL 5 sec
V (Design Speed km/h)	= 90 km/h
d (COEFFICIENT OF DECELERATION)	= 0.36
a (LONGITUDINAL GRADE IN %)	= 1.2% AVG.
BASE ON THE "EQUATION 2" FROM "AUSTROADS" PART 4a SISD	= 211m

SISD (D) DESIGN CRITERIA (TRUCK):

DECISION TIME (sec) = OBSERVATION TIME (3 sec) + REACTION TIME (2 sec)	= TOTAL 5 sec
V (Design Speed km/h)	= 90 km/h
d (COEFFICIENT OF DECELERATION)	= 0.29
a (LONGITUDINAL GRADE IN %)	= 1.2% AVG.
BASE ON THE "EQUATION 2" FROM "AUSTROADS" PART 4a SISD	= 231m

SISD (E) DESIGN CRITERIA (CAR):

DECISION TIME (sec) = OBSERVATION TIME (3 sec) + REACTION TIME (2 sec)	= TOTAL 5 sec
V (Design Speed km/h)	= 90 km/h
d (COEFFICIENT OF DECELERATION)	= 0.36
a (LONGITUDINAL GRADE IN %)	= 1.2% AVG.
BASE ON THE "EQUATION 2" FROM "AUSTROADS" PART 4a SISD	= 211m

SISD (F) DESIGN CRITERIA (TRUCK):

DECISION TIME (sec) = OBSERVATION TIME (2.5sec) + REACTION TIME (2 sec)	= TOTAL 5 sec
V (Design Speed km/h)	= 90 km/h
d (COEFFICIENT OF DECELERATION)	= 0.29
a (LONGITUDINAL GRADE IN %)	= 01.2% AVG.
BASE ON THE "EQUATION 2" FROM "AUSTROADS" PART 4a SISD	= 231m

METRES 10 0 10 20 30m

SCALE 1:500

N:\Archive\Projects\Civil\2016\PC16017 – Lot 150 Welshpool Road Wattle Grove\2.0 Design\2.34 Drawings\2.34.1 Acad\PC16017-CI-SK8.dwg

No.	REVISION	BY	DATE
D	DRAWING UPDATED	DA	21.02.22
C	DRAWING UPDATED	DA	23.06.21
B	AERIAL UPDATED, SLIP LANE ADDED	DA	19.04.21
A	ISSUED FOR INFORMATION	DA	24.06.20

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PO Box 5486

PROJECT:
PROPOSED DRIVEWAY
720 WELSHPOOL ROAD
WATTLE GROVE

DRAWING TITLE:
SAFE INTERSECTION STOPPING DISTANCE PLAN

SCALE	AS SHOWN	FILE	
HORIZONTAL	–	DESIGN	DA
VERTICAL	–	DRAWN	DA
SURVEY DATUM	AHD	CHECKED	EBF
WAPC No	—	DATE	JUNE 20
CADFILE NAME	PC16017-CI	DRAWING No.	PC16017-CI-SK8
		REV.	D

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APPROVED .....