rytenskild Traffic Engineering

Ph. 1300 220020
Facsimile: 1300 087177
info@rytenskildtraffic.com
RYTENSKILDTRAFFIC.COM

GOLD COAST
Suite 2
24 Surfers Avenue
Mermaid Beach QLD 4218

BRISBANE
Suite 52
149 Wickham Tce
Spring Hill QLD 4000

SYDNEY
Level 26
44 Market Street
Sydney NSW 2000

27 September 2023
RTEref: 22301

Chief Executive Officer
City of Gold Coast
C / - Gassman Development Perspectives

Dear Sir / Madam,

RESPONSE TO COUNCIL'S INFORMATION REQUEST
PROPOSED WELLBEING PRECINCT AND INDUSTRIAL LOTS (VANTAGE STAGE 3)
LOT 301, 302, 303 AND 401, VANTAGE ESTATE, YATALA

Reference is made to the project at the above address and Council's Information Request (COM/2023/82) dated 9th August 2023. We have been engaged to provide a response to Item 5 of the request in relation to external road upgrades (refer to Attachment A).

Our responses are provided below, as follows:

Response to Items A, B, C and F (Christensen Road / Eastern Service Road intersection):

Traffic forecasts have been provided by Council (refer to Attachment B). Council's modelling indicates that the extension of Christensen Road to Burnside Road will result in a minimal change to Base (without the extension) volumes on Christensen Road and the Eastern Service Road.

We have no objection to the plan proposed by Council for the Christensen Road / Eastern Service Road intersection.

RTE carried out updated traffic counts on a typical weekday in August 2023 (refer to Attachment C). SIDRA modelling has also been carried out for the Christensen Road / Eastern Service Road intersection, with the full Vantage Estate completed. This is a worse case scenario as traffic volumes at the intersection will reduce when the Christensen Road extension to Burnside Road occurs. The extension will allow traffic generated by Vantage Estate to distribute to the south via Christensen Road rather than having to travel north.

As shown as Attachment D, the SIDRA modelling indicates that the intersection will function satisfactorily, with a maximum queue length of approximately 88 metres on Christensen Road, extending to the north. This queuing will not impact upon the existing roundabout at the Stapylton Jacobs Well Road intersection.

A functional layout plan of the intersection with swept path analysis is provided as Attachment F.

Christensen Road / Christensen Road South intersection:

A functional layout plan of the intersection with swept path analysis is provided as Attachment E.

Please contact the undersigned regarding any queries in relation to this matter.

Yours faithfully

LUKE RYTENSKILD
DIRECTOR, B.ENG (Civil), RPEQ 6293

ATTACHMENT A -	COUNCIL INFORMATION REQUEST (TRANSPORT ITEMS)
ATTACHMENT B -	TRAFFIC FORECASTS RECEIVED FROM COUNCIL (EMAIL DATED 30 AUGUST 2023)
ATTACHMENT C -	SURVEYED TRAFFIC VOLUMES AT THE CHRISTENSEN ROAD / EASTERN SERVICE ROAD INTERSECTION
ATTACHMENT D –	SIDRA MODELLING (CHRISTENSEN ROAD / EASTERN SERVICE ROAD)
ATTACHMENT E –	FUNCTIONAL LAYOUT PLANS OF CHRISTENSEN ROAD / CHRISTENSEN ROAD SOUTH
ATTACHMENT F –	FUNCTIONAL LAYOUT PLANS OF CHRISTENSEN ROAD / EASTERN SERVICE ROAD

ATTACHMENT A – COUNCIL INFORMATION REQUEST (TRANSPORT ITEMS)

5. Traffic Impact Assessment

a General

- The traffic modelling references traffic volumes in Attachment G. It is not clear whether these traffic volumes represent existing conditions, year of opening with development traffic or a 10-year design horizon post-development opening. The traffic survey data, development trip generation and distributions and traffic growth assumptions need to be clearly documented.
- In reference to the SIDRA analysis completed, please provide further information on traffic data source and SIDRA analysis (current or year of opening or year of opening plus 10 years).
- Model the intersections to include the changed traffic volumes with the addition of the Christensen Road extension through to Burnside Road. The project Traffic Engineer is requested to contact officers to request the future modelled traffic volumes on Christensen Road and Eastern Service Road.

b Christensen Road / Christensen Road intersection

- Update the TIA incorporating the above changes/considerations.

c Christensen Road / Eastern Service Road intersection

- With the addition of traffic signals at Christensen Road/Eastern Service Road intersection, traffic modelling undertaken by the project Traffic Engineer indicates that vehicle queues will extend back into the eastern roundabout of Yatala North Exit 34. This is not acceptable impact. Modelling must demonstrate that vehicle queues do not extend back into the state-controlled road network.
- Provide signal phasing and signal phasing optimisation data used in the traffic modelling.
- Update the TIA incorporating the above changes/considerations.

d Christensen Road and Christensen Road South Upgrade –

Submit fully dimensioned functional road layout plans showing the upgrade of Christensen Road and Christensen Road South to an industrial collector street classification per the City's Land Development Guidelines. The extent of works are to include the full frontage of the subject site and connecting to stage 2 roadworks on the alignment shown in the following section titled 'Christensen Road / Christensen Road intersection'. The 'no-through' section of Christensen Road must be designed to the same classification as the rest of Christensen Road and Christensen Road South. Any concept plan is to show land dedication required to accommodate the future alignment. At the time of, Operational Works application, where the applicant proposes to retain and reuse and existing pavement, it will need to be demonstrated that the pavement meets the requirements of the conditioned road classification consistent with the City's Land Development Guidelines, otherwise the pavement will need to be fully reconstructed.

e Christensen Road / Christensen Road intersection

<u>Concept intersection design -</u>

The applicant is requested to provide a fully dimensioned concept plan of the proposed intersection, generally in accordance with the concept depicted below and the following:

General comments-

- Show any land dedication requirements to achieve the required intersection design.
- Industrial collector street classification for Christensen Road/Christensen Road South section, noting the curve radii dimension.
- Industrial access street classification for the Christensen Road stub, noting the curve radii dimension.
- Make good redundant road area into verge. Keep existing section of footpath on same alignment.
- Existing vehicle crossings to properties affected by the redesign to be realigned to suit new road alignment.
- Undertake a sight distance check at the intersection including, Approach Sight Distance (ASD), Stopping Sight Distance (SSD), Safe Intersection Sight Distance (SISD), and Minimum Gap Sight Distance (MGSD) in accordance with Austroads.
- At the time of, Operational Works application, where the applicant proposes to retain and reuse and existing pavement, it will need to be demonstrated that the pavement meets the requirements of the conditioned road classification consistent with the City's Land Development Guidelines, otherwise the pavement will need to be fully reconstructed.

Swept path analysis-

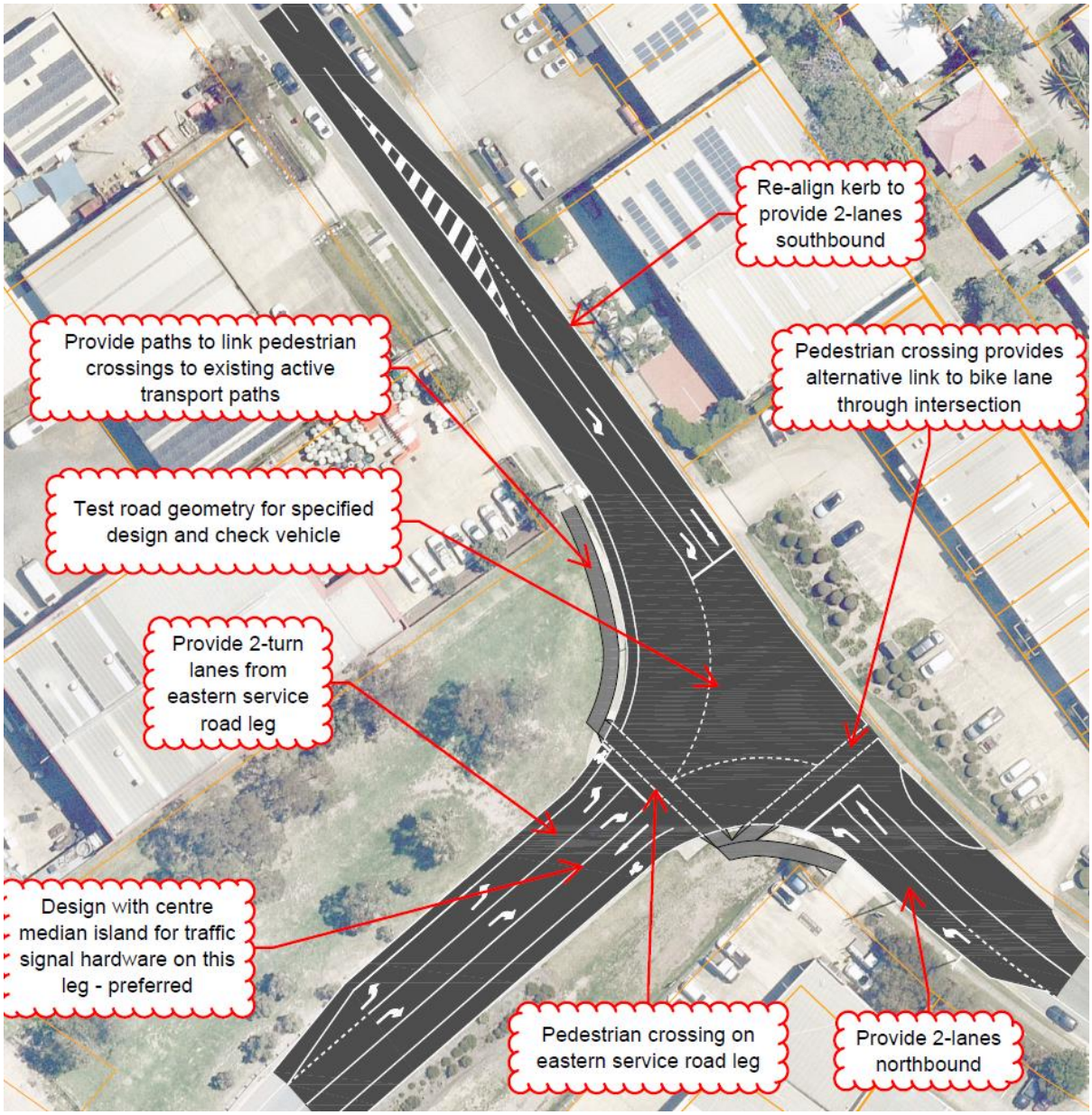
- Christensen Road is identified in the City Freight network plan as part of the principal freight network and currently approved for PBS Level 2A vehicles including A-doubles and B-doubles 25m/26m. The design vehicle for turning movements at intersections must cater for the future function of the road which is PBS Level 2B 30m and the design check vehicle should be the next highest classification.
- The swept path analysis undertaken adopts a 19m Articulated Vehicle (AV) and shows that the turning movements at these intersections encroach/overlap past the clearance zone of the 19m articulated vehicle which suggest that the proposed intersection configurations are not sufficient for the 19m AV or the required PBS Level 2B 30m vehicle.
- Apply design vehicle turning path templates to the intersection layout to accommodate the swept path with a minimum offset of 0.5 m from the extremities of the vehicle path to a kerb, edge line, pavement edge or centreline.

- The swept path analysis does not reference the design speed applied to the turning movements analysed. When undertaking the swept path analysis, the applicant is requested to adopt a turn speed of 15km/hr for all proposed turning movements.

f Christensen Road / Eastern Service Road intersection

Concept intersection design -

Provide a fully dimensioned concept plan of the proposed intersection, generally in accordance with the concept depicted below.



General comments-

In addition to the concept design drawing and comments above, the design is also to address the following points.

- Any median sheltering signals shall be a minimum 1.6m.
- Existing bike lanes on Eastern Service Road are to be maintained at 2m wide.

- Bike lane from Eastern Service Road is to terminate prior to signals with Christensen Road and transition to footpath.
- Note any curve widening and identify the curve radius through the intersection ensuring it is suitable to accommodate the design service vehicle at the posted speed limit.
- Undertake a sight distance check at the intersection including, Approach Sight Distance (ASD), Stopping Sight Distance (SSD), Safe Intersection Sight Distance (SISD), and Minimum Gap Sight Distance (MGSD) in accordance with Austroads.
- The intersection must be designed to avoid land dedication requirements.
- Maintain a minimum 4.5m wide verge to the full perimeter of the intersection.
- At the time of, Operational Works application, where the applicant proposes to retain and reuse and existing pavement, it will need to be demonstrated that the pavement meets the requirements of the conditioned road classification consistent with the City's Land Development Guidelines, otherwise the pavement will need to be fully reconstructed.

Swept paths-

- Christensen Road is identified in the City Freight network plan as part of the principal freight network and currently approved for PBS Level 2A vehicles including A-doubles and B-doubles 25m/26m. The design vehicle for turning movements at intersections must cater for the future function of the road which is PBS Level 2B 30m and the design check vehicle should be the next highest classification.
- The swept path analysis undertaken adopts a 19m Articulated Vehicle (AV) and shows that the turning movements at these intersections encroach/overlap past the clearance zone of the 19m articulated vehicle which suggest that the proposed intersection configurations are not sufficient for the 19m AV or the required PBS Level 2B 30m vehicle.
- Apply design vehicle turning path templates to the intersection layout to accommodate the swept path with a minimum offset of 0.5 m from the extremities of the vehicle path to a kerb, edge line, pavement edge or centreline.
- The swept path analysis does not reference the design speed applied to the turning movements analysed. When undertaking the swept path analysis, the applicant is requested to adopt a turn speed of 15km/hr for all proposed turning movements.

ATTACHMENT B – TRAFFIC FORECASTS RECEIVED FROM COUNCIL (EMAIL DATED 30 AUGUST 2023)

Eastern Service Road -

- 2021 to 2031 = 1.8%
- 2031 to 2041 = -3.9%

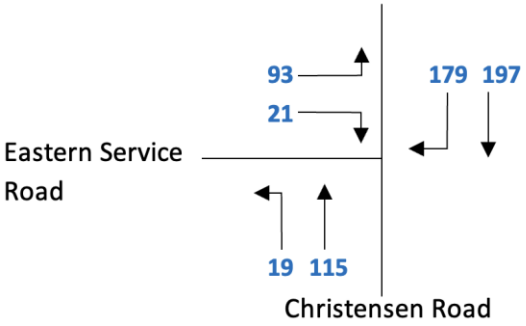
Christensen Road -

- 2021 to 2031 = 1.1%
- 2031 to 2041 = -0.9%

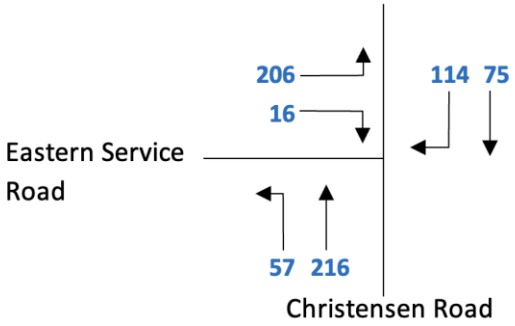
The model assumes the Coomera Connector and bridge extension are completed during 2031 and 2041 hence the negative growth rates above.

ATTACHMENT C – SURVEYED TRAFFIC VOLUMES AT THE CHRISTENSEN ROAD / EASTERN SERVICE ROAD INTERSECTION

AM PEAK HOUR TRAFFIC VOLUMES
(7.15AM - 8.15AM WED 23 AUG 2023)



PM PEAK HOUR TRAFFIC VOLUMES
(2.45PM - 3.45PM WED 23 AUG 2023)



MANUAL TRAFFIC SURVEY RESULTS

Unit Type: Camera
RTE ID: 22301
Location: Christensen Road / Eastern Service Road
Date: Wednesday, 23 August 2023
Comments: Fine weather
Class **All Vehicles**

Time	N-Thru	N-Right	N-Left	S-Thru	S-Right	S-Left	E-Thru	E-Right	E-Left	W-Thru	W-Right	W-Left	Total	Cumul Tot
06:00	47	27	0	24	0	1	0	0	0	0	3	23	125	
06:15	47	45	0	24	0	1	0	0	0	0	4	14	135	
06:30	47	39	0	23	0	7	0	0	0	0	7	25	148	
06:45	55	46	0	26	0	3	0	0	0	0	4	26	160	568
07:00	45	38	0	20	0	4	0	0	0	0	6	18	131	574
07:15	64	43	0	32	0	5	0	0	0	0	4	19	167	606
07:30	48	49	0	32	0	5	0	0	0	0	10	19	163	621
07:45	45	48	0	21	0	6	0	0	0	0	3	26	149	610
08:00	40	39	0	30	0	3	0	0	0	0	4	29	145	624
08:15	39	32	0	18	0	3	0	0	0	0	9	35	136	593
08:30	37	35	0	17	0	9	0	0	0	0	7	30	135	565
08:45	39	37	0	37	0	5	0	0	0	0	6	25	149	565
09:00	47	36	0	26	0	7	0	0	0	0	8	34	158	578
09:15	37	23	0	40	0	7	0	0	0	0	5	21	133	575
09:30	29	32	0	33	0	7	0	0	0	0	4	34	139	579
09:45	26	22	0	37	0	8	0	0	0	0	2	45	140	570
AM PEAK HR	**197**	**179**	**0**	**115**	**0**	**19**	**0**	**0**	**0**	**0**	**21**	**93**	**624**	
14:30	17	24	0	62	0	20	0	0	0	0	9	49	181	
14:45	24	41	0	57	0	21	0	0	0	0	4	32	179	
15:00	20	30	0	63	0	10	0	0	0	0	4	52	179	
15:15	12	24	0	44	0	14	0	0	0	0	4	32	130	669
15:30	19	19	0	52	0	12	0	0	0	0	4	90	196	684
15:45	23	21	0	41	0	10	0	0	0	0	0	29	124	629
16:00	12	43	0	70	0	16	0	0	0	0	0	37	178	628
16:15	15	24	0	52	0	4	0	0	0	0	0	34	129	627
16:30	11	29	0	35	0	10	0	0	0	0	0	49	134	565
16:45	13	36	0	32	0	4	0	0	0	0	0	40	125	566
17:00	13	41	0	31	0	2	0	0	0	0	4	44	135	523
17:15	9	28	0	26	0	8	0	0	0	0	0	41	112	506
PM PEAK HR	**75**	**114**	**0**	**216**	**0**	**57**	**0**	**0**	**0**	**0**	**16**	**206**	**684**	

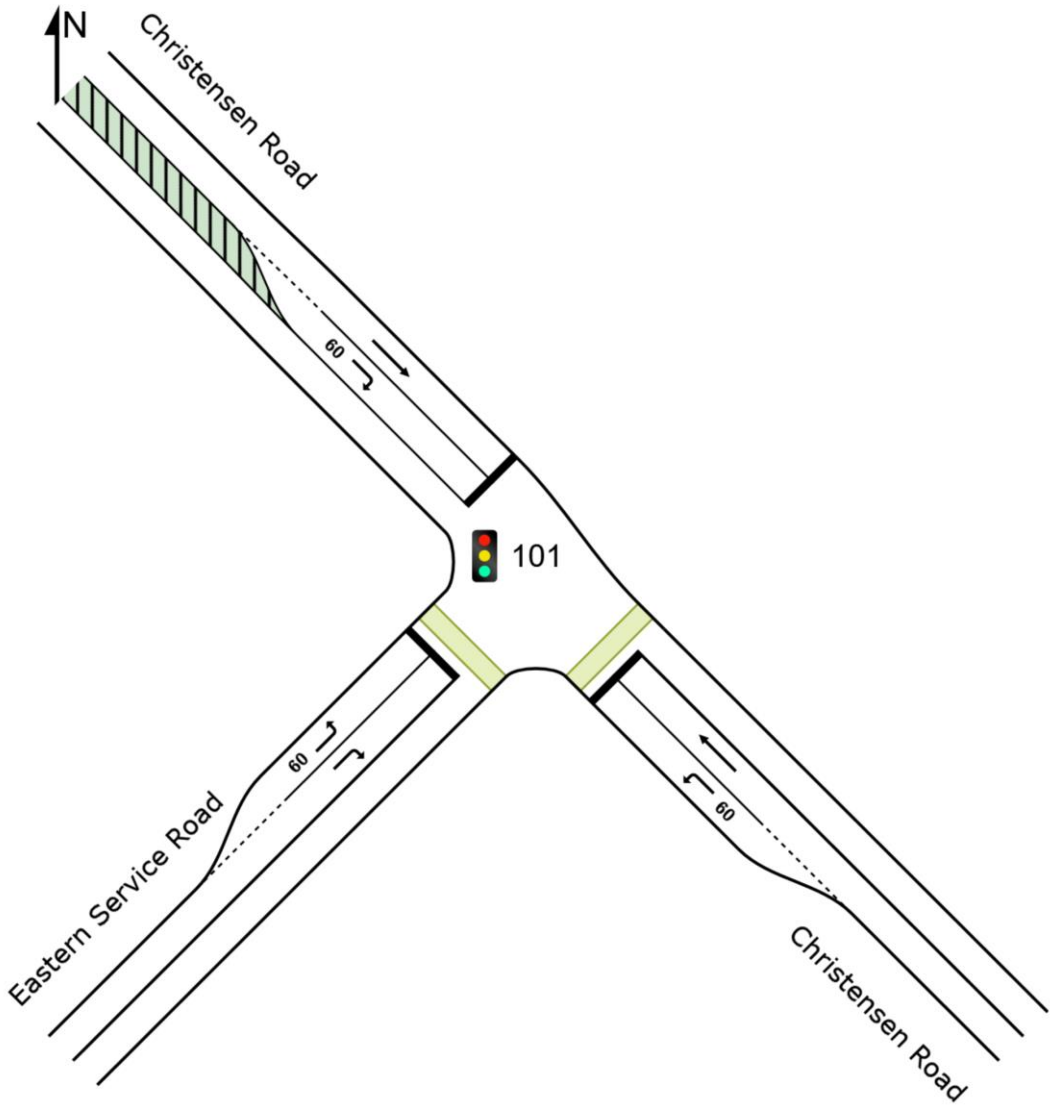
ATTACHMENT D – SIDRA MODELLING OF THE CHRISTENSEN ROAD / EASTERN SERVICE ROAD INTERSECTION

SITE LAYOUT

Site: 101 [Surveyed Peak Hour AM (Site Folder: Christensen Rd / Eastern Service Rd)]

Christensen Road / Eastern Service Road
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 101 [Surveyed Peak Hour AM (Site Folder: Christensen Rd / Eastern Service Rd)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Christensen Road / Eastern Service Road
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Christensen Road															
21	L2	All MCs	20	5.0	20	5.0	0.112	33.8	LOS C	0.6	4.1	0.94	0.69	0.94	37.5
22	T1	All MCs	121	5.0	121	5.0	*0.240	9.9	LOS A	1.5	11.0	0.82	0.64	0.82	51.6
Approach			141	5.0	141	5.0	0.240	13.3	LOS B	1.5	11.0	0.84	0.65	0.84	49.0
NorthWest: Christensen Road															
28	T1	All MCs	207	5.0	207	5.0	0.253	11.8	LOS B	3.9	28.5	0.67	0.56	0.67	50.3
29	R2	All MCs	188	5.0	188	5.0	*0.630	32.7	LOS C	5.5	40.4	0.98	0.83	1.05	37.8
Approach			396	5.0	396	5.0	0.630	21.7	LOS C	5.5	40.4	0.82	0.69	0.85	43.5
SouthWest: Eastern Service Road															
30	L2	All MCs	98	5.0	98	5.0	*0.328	30.6	LOS C	2.7	19.4	0.92	0.76	0.92	38.7
32	R2	All MCs	22	5.0	22	5.0	0.074	29.1	LOS C	0.6	4.1	0.87	0.70	0.87	39.3
Approach			120	5.0	120	5.0	0.328	30.3	LOS C	2.7	19.4	0.91	0.75	0.91	38.8
All Vehicles			657	5.0	657	5.0	0.630	21.5	LOS C	5.5	40.4	0.84	0.69	0.86	43.6

MOVEMENT SUMMARY

Site: 101 [Surveyed Peak Hour PM (Site Folder: Christensen Rd / Eastern Service Rd)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Christensen Road / Eastern Service Road
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Christensen Road															
21	L2	All MCs	60	5.0	60	5.0	0.335	34.9	LOS C	1.8	12.9	0.97	0.74	0.97	37.1
22	T1	All MCs	227	5.0	227	5.0	*0.451	10.8	LOS B	3.3	24.4	0.88	0.72	0.88	50.9
Approach			287	5.0	287	5.0	0.451	15.8	LOS B	3.3	24.4	0.90	0.72	0.90	47.2
NorthWest: Christensen Road															
28	T1	All MCs	79	5.0	79	5.0	0.109	12.9	LOS B	1.5	10.9	0.67	0.53	0.67	49.5
29	R2	All MCs	120	5.0	120	5.0	*0.574	35.0	LOS C	3.6	26.4	0.99	0.80	1.04	36.9
Approach			199	5.0	199	5.0	0.574	26.2	LOS C	3.6	26.4	0.86	0.69	0.90	41.1
SouthWest: Eastern Service Road															
30	L2	All MCs	217	5.0	217	5.0	*0.558	29.2	LOS C	5.9	43.2	0.94	0.81	0.94	39.3
32	R2	All MCs	17	5.0	17	5.0	0.043	26.0	LOS C	0.4	2.9	0.82	0.68	0.82	40.6
Approach			234	5.0	234	5.0	0.558	29.0	LOS C	5.9	43.2	0.93	0.80	0.93	39.4
All Vehicles			720	5.0	720	5.0	0.574	23.0	LOS C	5.9	43.2	0.90	0.74	0.91	42.7

MOVEMENT SUMMARY

Site: 101 [DESIGN Peak Hour AM (Stages 1- 3) (Site Folder: Christensen Rd / Eastern Service Rd)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Christensen Road / Eastern Service Road
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Christensen Road															
21	L2	All MCs	20	5.0	20	5.0	0.098	36.9	LOS D	0.6	4.7	0.92	0.70	0.92	36.3
22	T1	All MCs	278	5.0	278	5.0	*0.542	12.7	LOS B	4.8	35.1	0.90	0.75	0.90	49.7
Approach			298	5.0	298	5.0	0.542	14.3	LOS B	4.8	35.1	0.90	0.74	0.90	48.5
NorthWest: Christensen Road															
28	T1	All MCs	493	5.0	493	5.0	0.553	14.3	LOS B	12.1	88.5	0.77	0.67	0.77	48.5
29	R2	All MCs	188	5.0	188	5.0	*0.460	31.5	LOS C	5.7	41.9	0.91	0.80	0.91	38.3
Approach			681	5.0	681	5.0	0.553	19.1	LOS B	12.1	88.5	0.81	0.71	0.81	45.2
SouthWest: Eastern Service Road															
30	L2	All MCs	98	5.0	98	5.0	*0.347	35.3	LOS D	3.1	22.8	0.93	0.77	0.93	36.9
32	R2	All MCs	22	5.0	22	5.0	0.078	33.5	LOS C	0.7	4.9	0.88	0.70	0.88	37.5
Approach			120	5.0	120	5.0	0.347	34.9	LOS C	3.1	22.8	0.92	0.76	0.92	37.0
All Vehicles			1099	5.0	1099	5.0	0.553	19.5	LOS B	12.1	88.5	0.85	0.72	0.85	44.9

MOVEMENT SUMMARY

Site: 101 [DESIGN Peak Hour PM (Stages 1- 3) (Site Folder: Christensen Rd / Eastern Service Rd)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

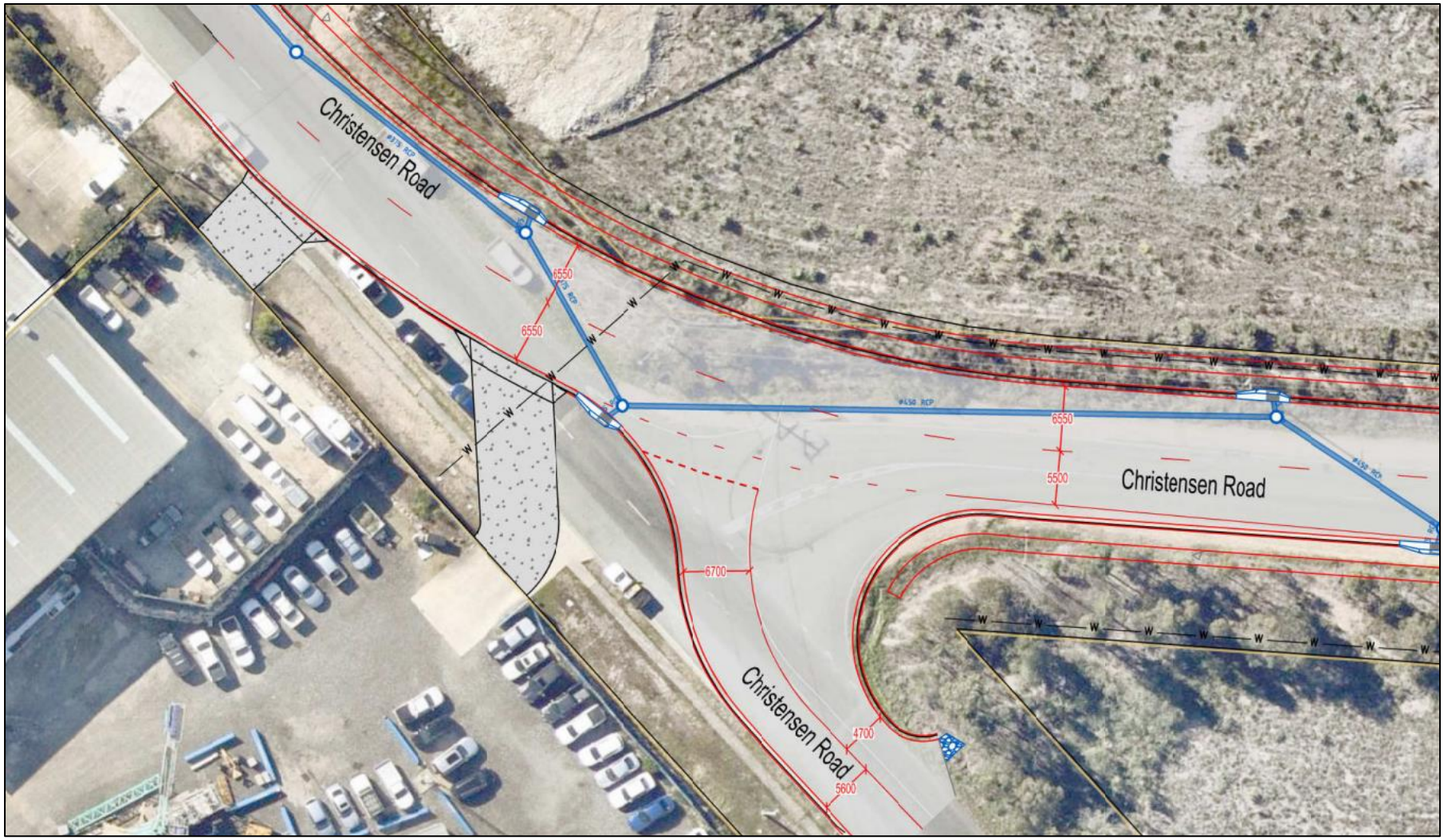
Christensen Road / Eastern Service Road
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

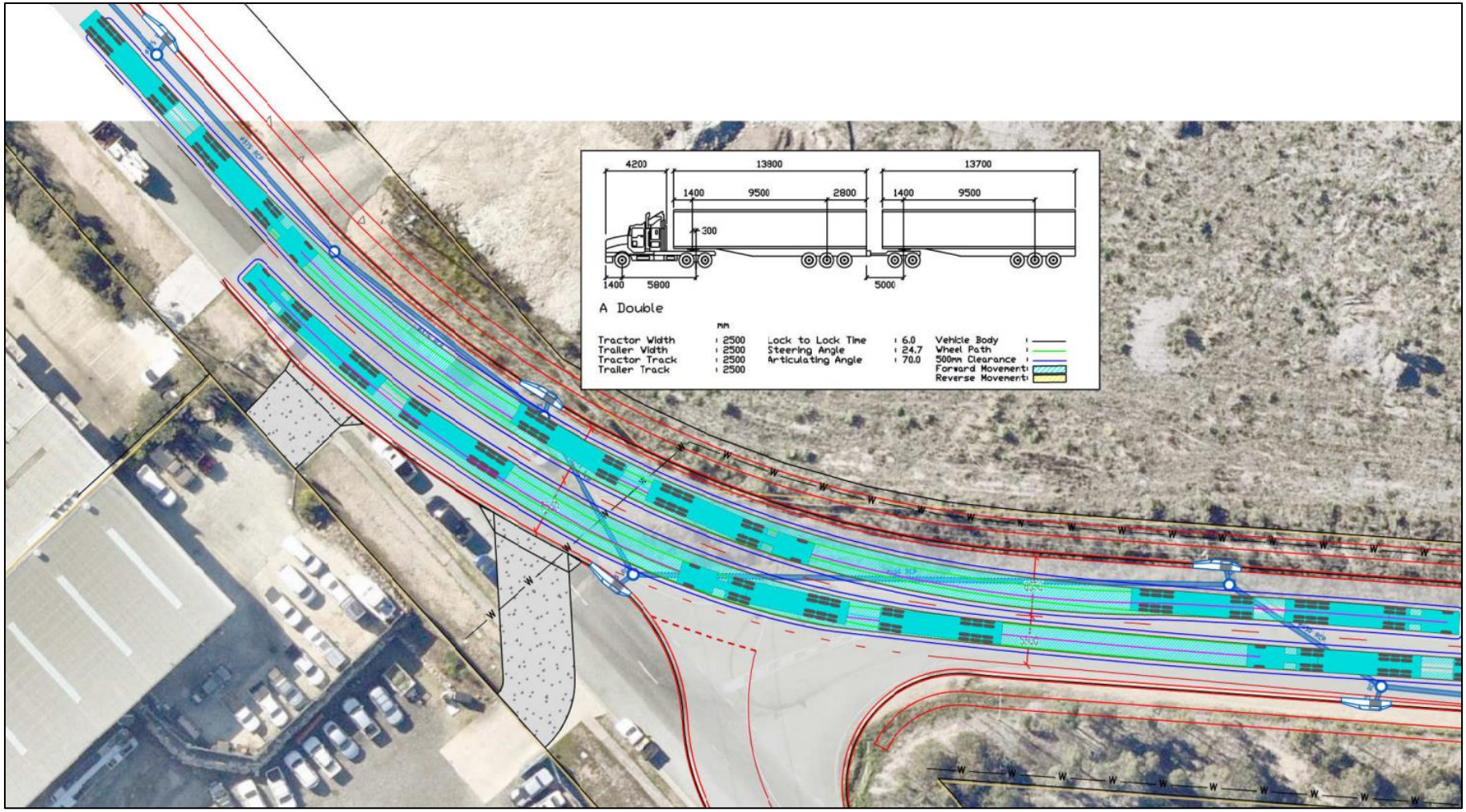
Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Christensen Road															
21	L2	All MCs	60	5.0	60	5.0	0.180	32.3	LOS C	1.8	13.0	0.88	0.74	0.88	38.1
22	T1	All MCs	593	5.0	593	5.0	*0.757	11.7	LOS B	11.0	80.2	0.91	0.83	0.97	50.3
Approach			653	5.0	653	5.0	0.757	13.6	LOS B	11.0	80.2	0.91	0.82	0.96	48.9
NorthWest: Christensen Road															
28	T1	All MCs	169	5.0	169	5.0	0.224	15.0	LOS B	3.8	28.0	0.70	0.57	0.70	48.1
29	R2	All MCs	120	5.0	120	5.0	*0.781	44.9	LOS D	4.6	33.5	1.00	0.92	1.32	33.5
Approach			289	5.0	289	5.0	0.781	27.4	LOS C	4.6	33.5	0.82	0.72	0.95	40.8
SouthWest: Eastern Service Road															
30	L2	All MCs	217	5.0	217	5.0	*0.770	40.5	LOS D	7.9	58.0	1.00	0.91	1.21	35.1
32	R2	All MCs	17	5.0	17	5.0	0.060	33.4	LOS C	0.5	3.7	0.88	0.69	0.88	37.5
Approach			234	5.0	234	5.0	0.770	39.9	LOS D	7.9	58.0	0.99	0.90	1.18	35.2
All Vehicles			1176	5.0	1176	5.0	0.781	22.2	LOS C	11.0	80.2	0.90	0.81	1.00	43.4

ATTACHMENT E – FUNCTIONAL LAYOUT PLANS OF CHRISTENSEN ROAD / CHRISTENSEN ROAD SOUTH

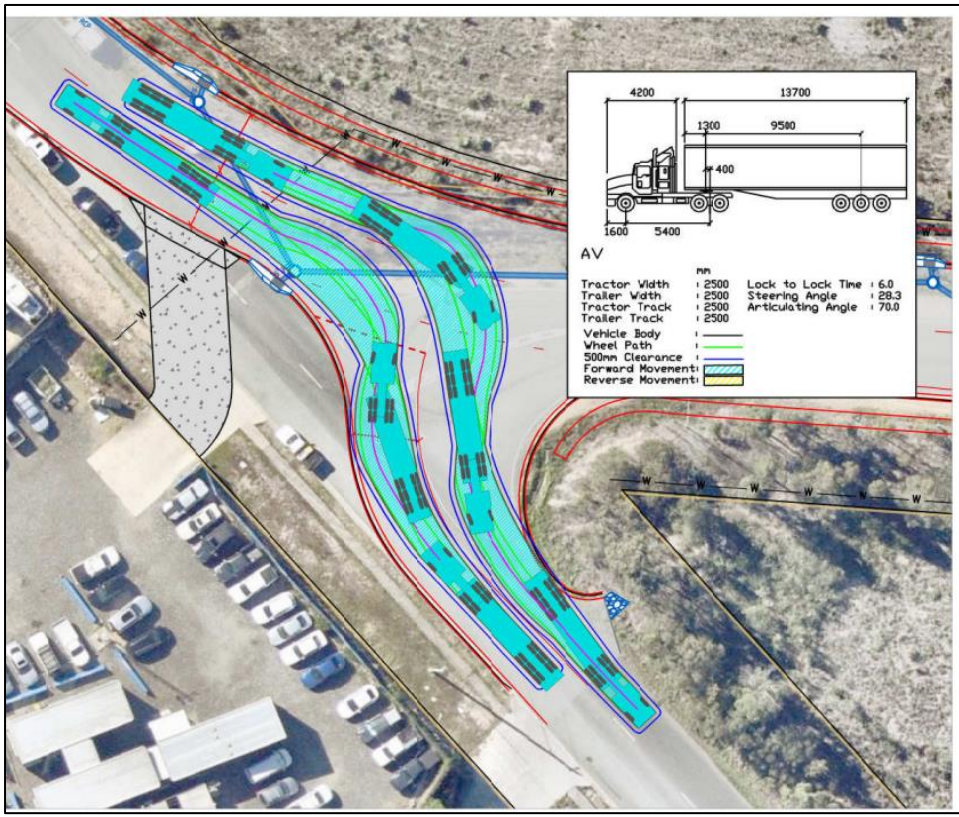
INTERSECTION LAYOUT

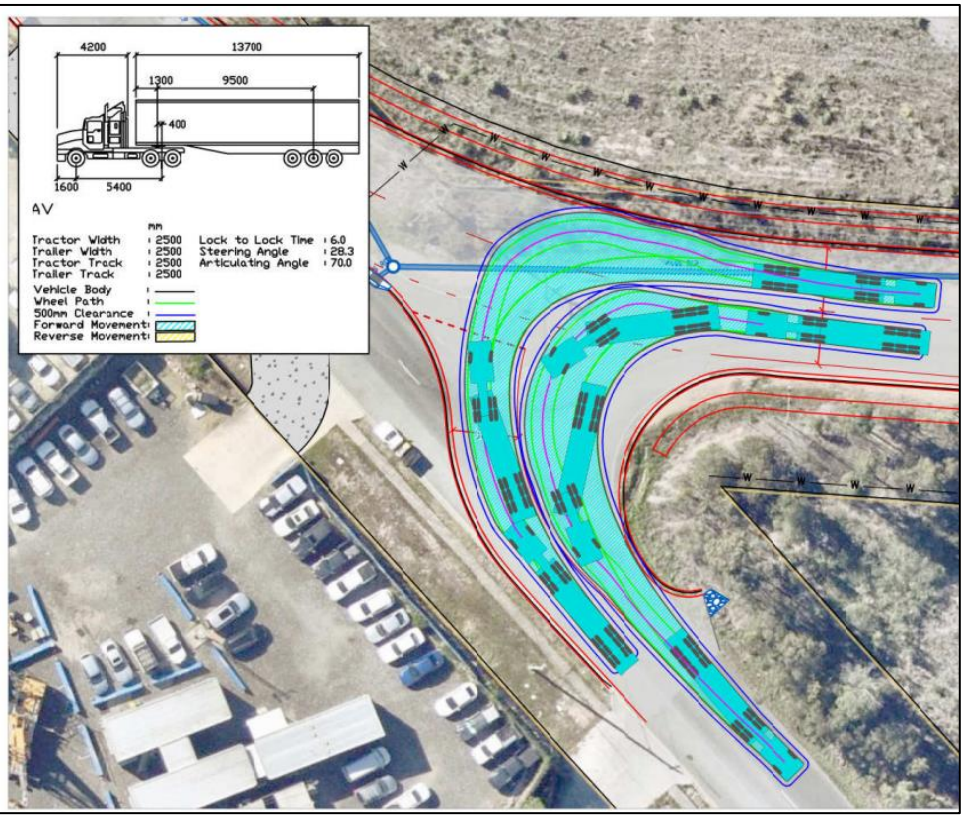


SWEPT PATH ANALYSIS (A-DOUBLE)



SWEPT PATH ANALYSIS (20m ARTICULATED VEHICLE)

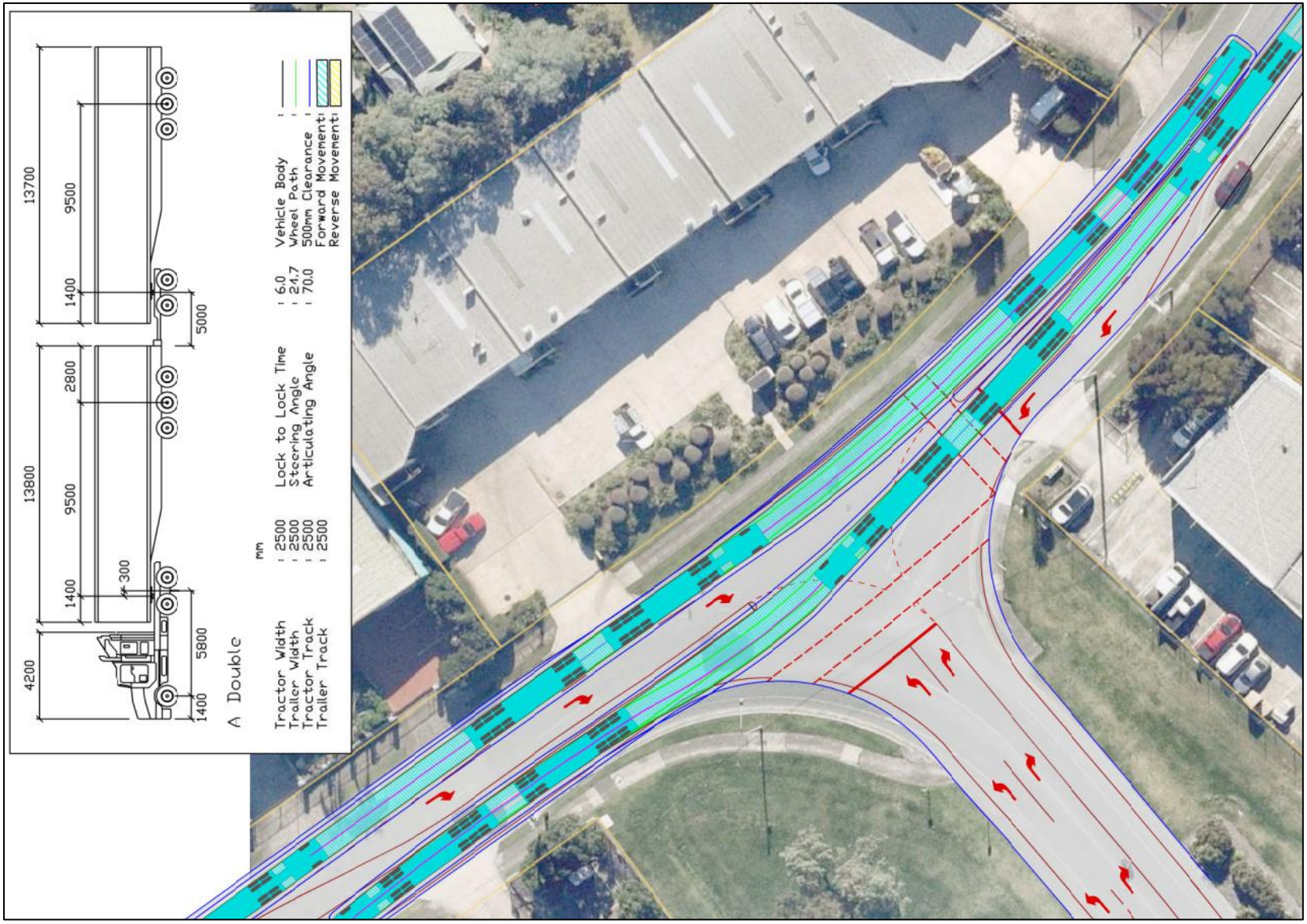




ATTACHMENT F – FUNCTIONAL LAYOUT PLANS OF CHRISTENSEN ROAD / EASTERN SERVICE ROAD

INTERSECTION LAYOUT

SWEPT PATH ANALYSIS (A-DOUBLE)



SWEPT PATH ANALYSIS (20m ARTICULATED VEHICLE)