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TRANSPORT & URBAN PLANNING PTY LTD

TRAFFIC ENGINEERING - TRANSPORT PLANNING -
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1 June 2015

Andrew Needham
Development Manager
PO Box R1822
Royal Exchange NSW 1225

Dear Andrew,

Re: Proposed QuarryWEST Masterplan
Response to Submission
Traffic Issues

I have reviewed the various submissions made concerning the QuarryWEST Masterplan proposal. This letter sets out a response to traffic issues raised in these submissions.

Transport for NSW

Issue 1. Design Heavy Vehicles. It would be prudent to adapt the turning path of a vehicle PBS Level 2B (i.e. up to 30 metres in length) to test the largest vehicle combination likely to access the development in the foreseeable future.

Response: Prospect Highway (Reconciliation Road) is an approved 25 metre B Double route. Vehicles that are up to 30 metres long currently do not operate in the Sydney Area. It is understood from discussions with Department of Transport officials that these longer vehicles possibly could operate within the Sydney area at a future time, subject to regulatory approvals.

These longer vehicles are sometimes referred to as Super B Doubles and are typically 28-30 metres long and can be 32 metres long.

Transport and Urban Planning Pty Ltd has sourced details of a 32 metre long Super B Double and tested the swept path of this vehicle for the left and right turning movements into and out of the QuarryWEST Estate Roads at Prospect Highway (Reconciliation Road) (i.e. Bellevue Circuit Cul-De-Sac and Dolerite Close) and at the internal roundabout of Dolerite Close/Basalt Road.

The swept path diagrams are shown on **Figures 12A -12E**. Reference to these figures shows that these longer vehicles can negotiate these intersections in accordance with relevant Austroads requirements.

The matter of swept paths for the largest (longest) vehicles likely to access the QuarryWEST Estate will be further considered and taken into account when the detail design plans are prepared for these intersections.

Issue 2 Construction Traffic Management Plan (CTMP) be prepared prior to construction.

Response: A CTMP will be prepared in accordance with the Statement of Commitments



Issue 3 Bicycle Parking and Facilities

Response: Dexus will provide suitable parking for bicycles and associated facilities in accordance with its Statement of Commitments for buildings exceeding 4,000m² and the Greystanes SEL Urban Design Plan. These facilities will be included in design of the individual site developments.

Holroyd City Council

Traffic Comments

Issue 1 Assessment of Intersection of Dolerite Close and Basalt Road is required

Response: SIDRA modelling has been undertaken for this roundabout intersection for the AM and PM peak hours with the full Masterplan in place.

The modellings shows that the intersection will have a Level of Service A operation (ie. very good operation) with low vehicle delays for individual movements/approaches of less than 9.0 seconds per vehicle. SIDRA modelling outputs are enclosed.

Issue 2 SIDRA modellings shows that some Individual Traffic Movements are operating at a Level of Service E and these should be optimised for the individual movements to a level of service more satisfactory and submitted prior to detail design.

Response: Council's comments refer to the traffic modelling for the traffic signal controlled intersections along Prospect Highway (Reconciliation Road) at:

- Bellevue Circuit/Bellevue Circuit Cul De Sac;
- Basalt Road; and
- Dolerite Close/Turnbull Close

RMS Guidelines state that for intersections controlled by traffic signals the total average vehicle delay for all vehicles using the intersection (ie. sum of all individual delays/number of vehicles using the intersection) is the critical factor which determines the Level of Service for the intersection, not the delays and or levels of service for the individual movements.

A satisfactory operation is a Level of Service D operation or better for the intersection, which is based on the total average vehicle delay.
All these intersections will operate at Level of Service B or C operation and therefore have a satisfactory operation.

Page 12 of the Transport and Urban Planning Pty Ltd traffic assessment report provides an explanation of the individual movements Level of Service as follows:

"While the modelling has calculated that some individual movements at each intersection have a Level of Service E, this is due to the cycle length which at 120 seconds is longer than required for the traffic demands. The Degree of Saturation (DS) for these movements is quite low indicating satisfactory traffic conditions for these movements."



Cycle lengths for traffic signal controlled intersection vary based on the traffic demand at the intersection. The original modelling which was presented in the traffic report was undertaken for the maximum cycle length of 120 seconds.

Additional SIDRA modelling has been undertaken for the 3 intersections using lower cycle lengths of 90 and 100 seconds. This modelling shows that all the intersections will retain an overall Level of Service of either a B or C in the AM and PM peak hours based on the total average vehicle delay (ie. a satisfactory level of service). In addition the Levels of Service for the individual movements at each intersection are Level of Service D or better.

The SIDRA outputs for the intersections using the lower cycle lengths are enclosed.

Issue 3 Proposed road design (for the traffic signal intersection) shall be referred to Roads and Maritime Services for comments.

Response: The concept designs and traffic assessment report for the Masterplan have been forwarded to RMS for their comments. The final traffic signal and intersection designs for the above 3 intersections will require RMS approval.

Issue 4 Swept path analysis shall be provided with the road design details.

Response: Swept paths have been provided for the intersections.

Issue 5 A Traffic Management Plan (TMP) shall be submitted to Council prior to Construction Certificate.

Response: A TMP will be prepared in accordance with the Statement of Commitments.

Development Engineering Comments

Issue 1 The layout of the existing intersection of Prospect Highway (Reconciliation Road) and Bellevue Cul De Sac has some issues i.e. no right turn bay in northern approach of Prospect Highway (Reconciliation Road), traffic signals and street lighting will need to be relocated, the design of the intersection shall be to RMS requirements.

Response: It is agreed that the intersection will need to be redesigned and incorporate a right turn bay in the northern approach of Prospect Highway (Reconciliation Road) and street lighting and traffic signal hardware will need to be relocated. Also the intersection will need to be designed to RMS standards.

Public Submissions

Issue 1 Possible reopening of Butu Wargun Drive to all traffic

Response: This is not part of the Dexu QuarryWEST Estate proposal and any reopening of this road for use by all traffic, is not required by the QuarryWEST development. The re-opening of the road is a matter for Holroyd City Council.

Issue 2 Other traffic issues/objections

Response: The remainder of the other public submissions that have raised traffic are general in nature and non specific. While some of these submissions raise residential amenity impacts, any traffic from the QuarryWEST development will



be contained on the Industrial Estate Roads and Reconciliation Road and then dispersed across the wider arterial road network including Prospect Highway, M4, Great Western Highway, Widemere Road and Hassal Street.

Traffic generated by QuarryWEST should have no direct impact on the residential areas of Pemulwuy.

Other Matters

Please contact the undersigned if you require any clarification of the matters discussed above.

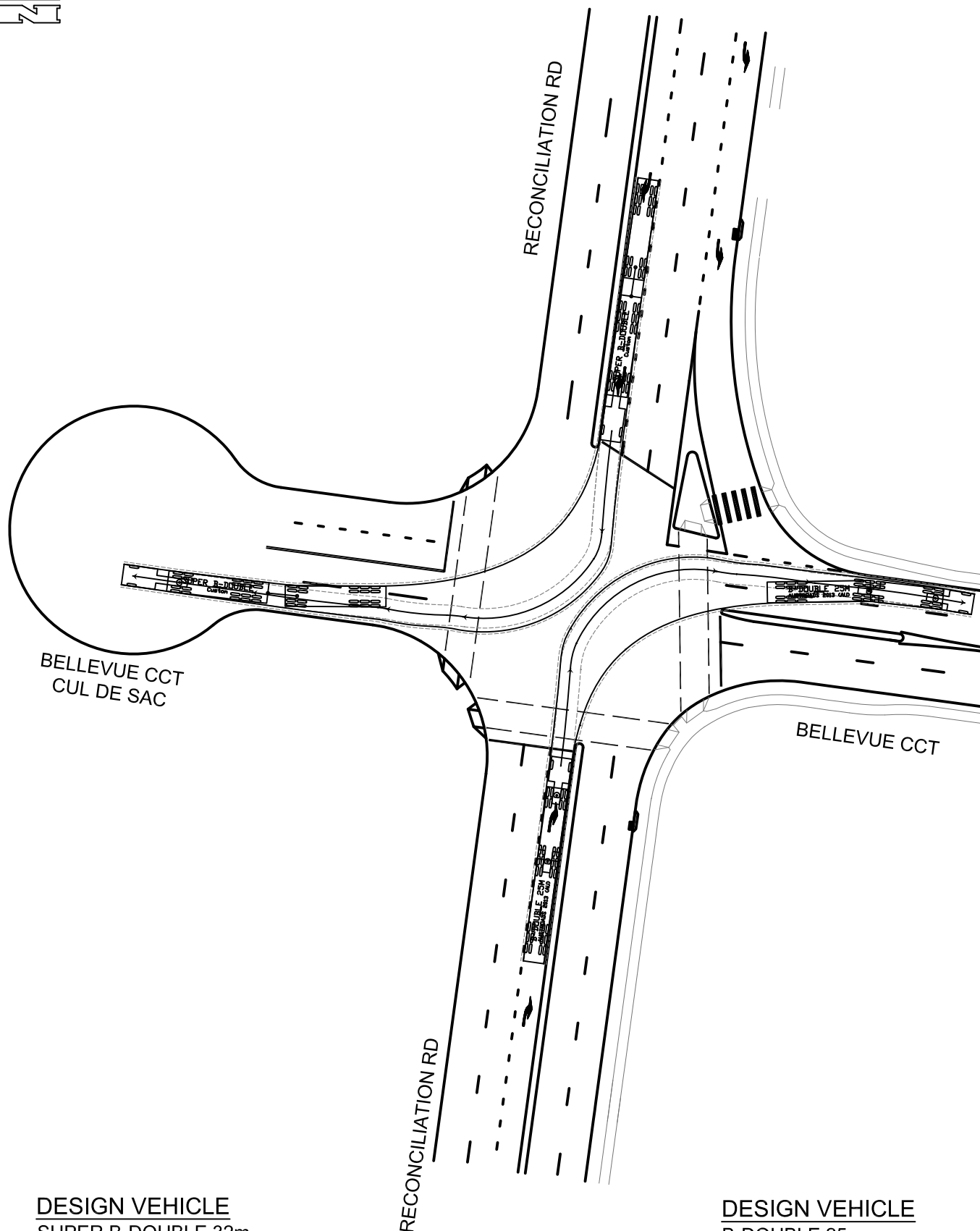
Yours faithfully

Terry Lawrence
Director
Transport and Urban Planning Pty Ltd

*Attachments: Figures 12A-12E
SIDRA Modelling Outputs*

ATTACHMENT 1

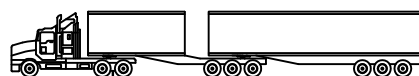
FIGURES 12A – 12 E



DESIGN VEHICLE
SUPER B-DOUBLE 32m



DESIGN VEHICLE
B-DOUBLE 25m



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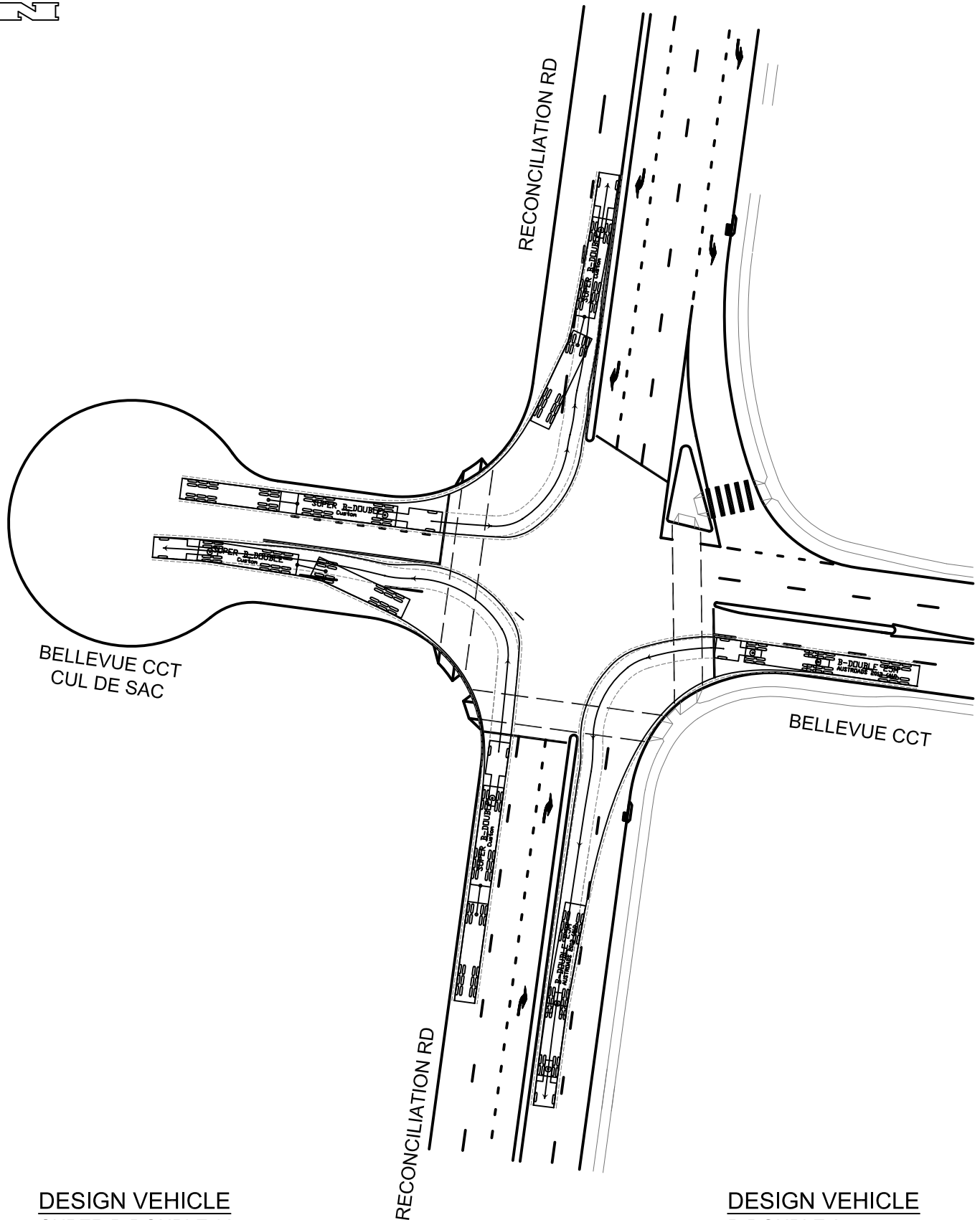
FIGURE 12 A

QUARRY WEST ESTATE
RECONCILIATION RD, PEMULWUY

TURNPATH DIAGRAM

RIGHT TURN - RECONCILIATION RD TO BELLEVUE CCT

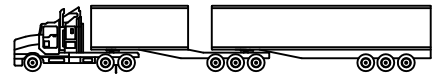
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DESIGN VEHICLE
SUPER B-DOUBLE 32m



DESIGN VEHICLE
B-DOUBLE 25m



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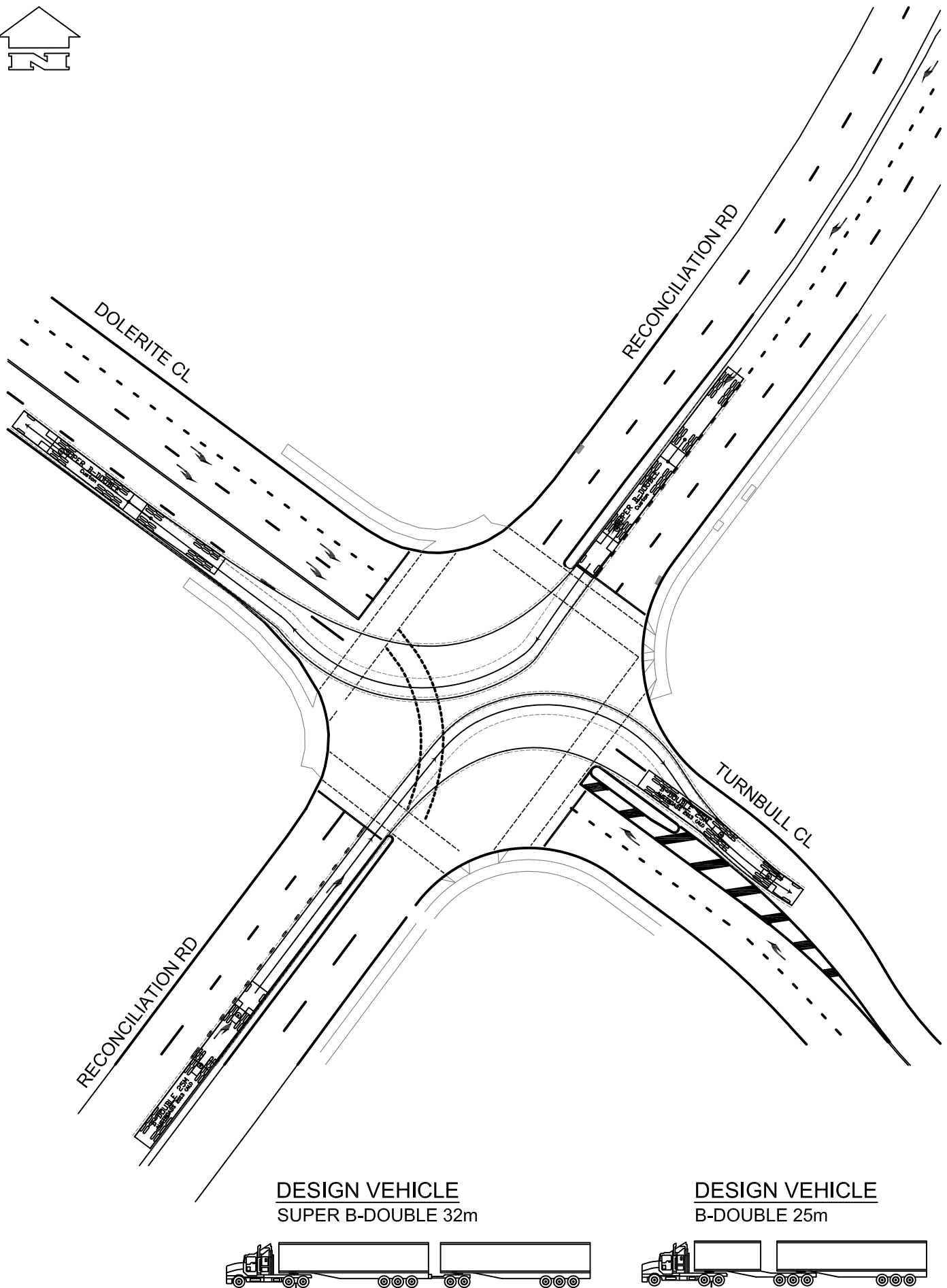
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FIGURE 12 B

QUARRY WEST ESTATE
RECONCILIATION RD, PEMULWUY
TURNPATH DIAGRAM

LEFT TURN - BELLEVUE CCT TO RECONCILIATION RD

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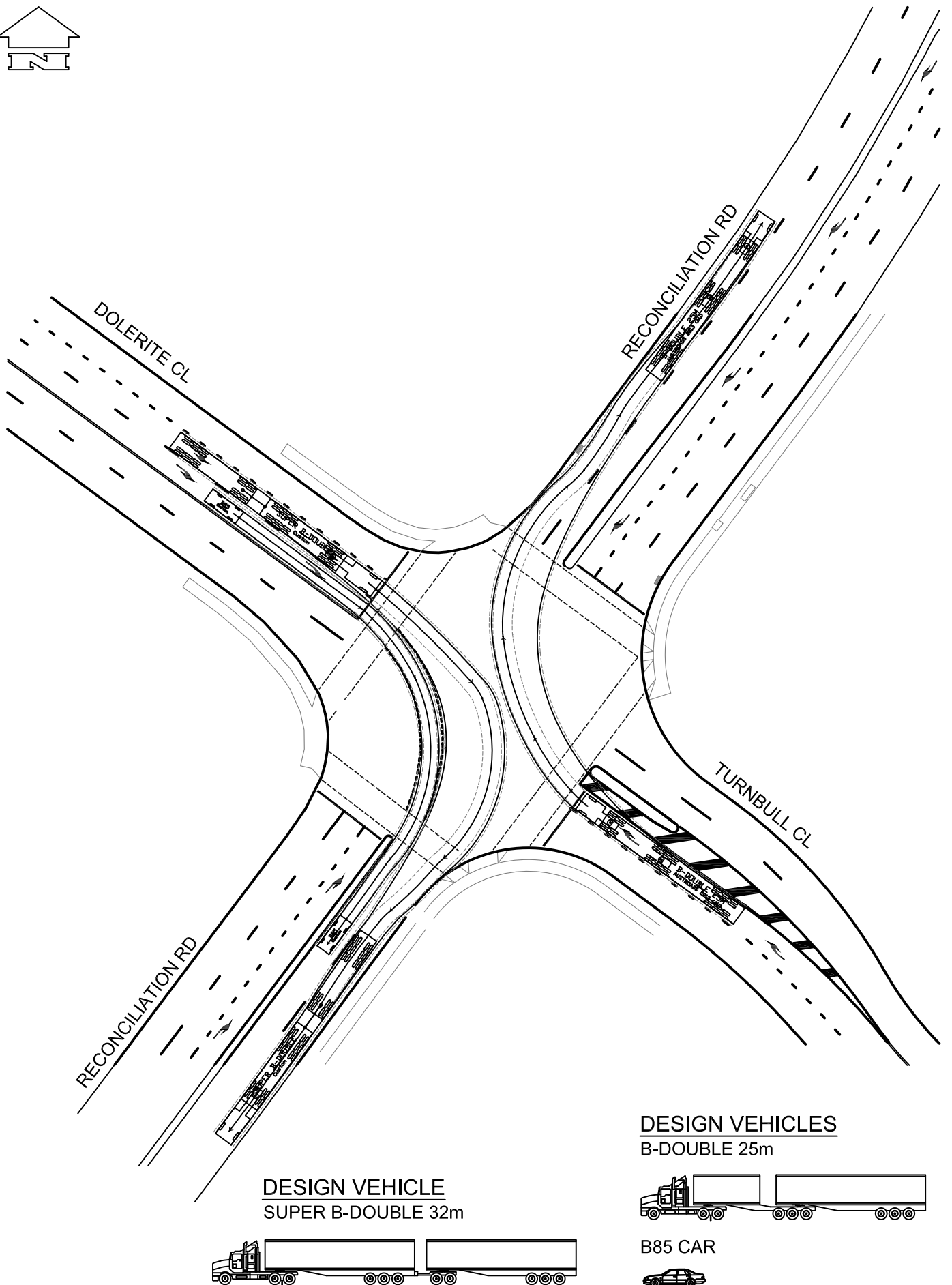
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FIGURE 12 C

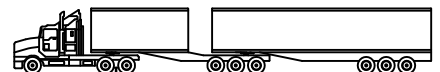
QUARRY WEST ESTATE
RECONCILIATION RD, PEMULWUY

TURNPATH DIAGRAM - RIGHT TURN
RECONCILIATION RD TO TURNBULL CL & DOLERITE CL

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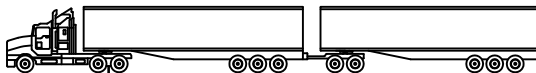
DESIGN VEHICLES
B-DOUBLE 25m



B85 CAR



DESIGN VEHICLE
SUPER B-DOUBLE 32m



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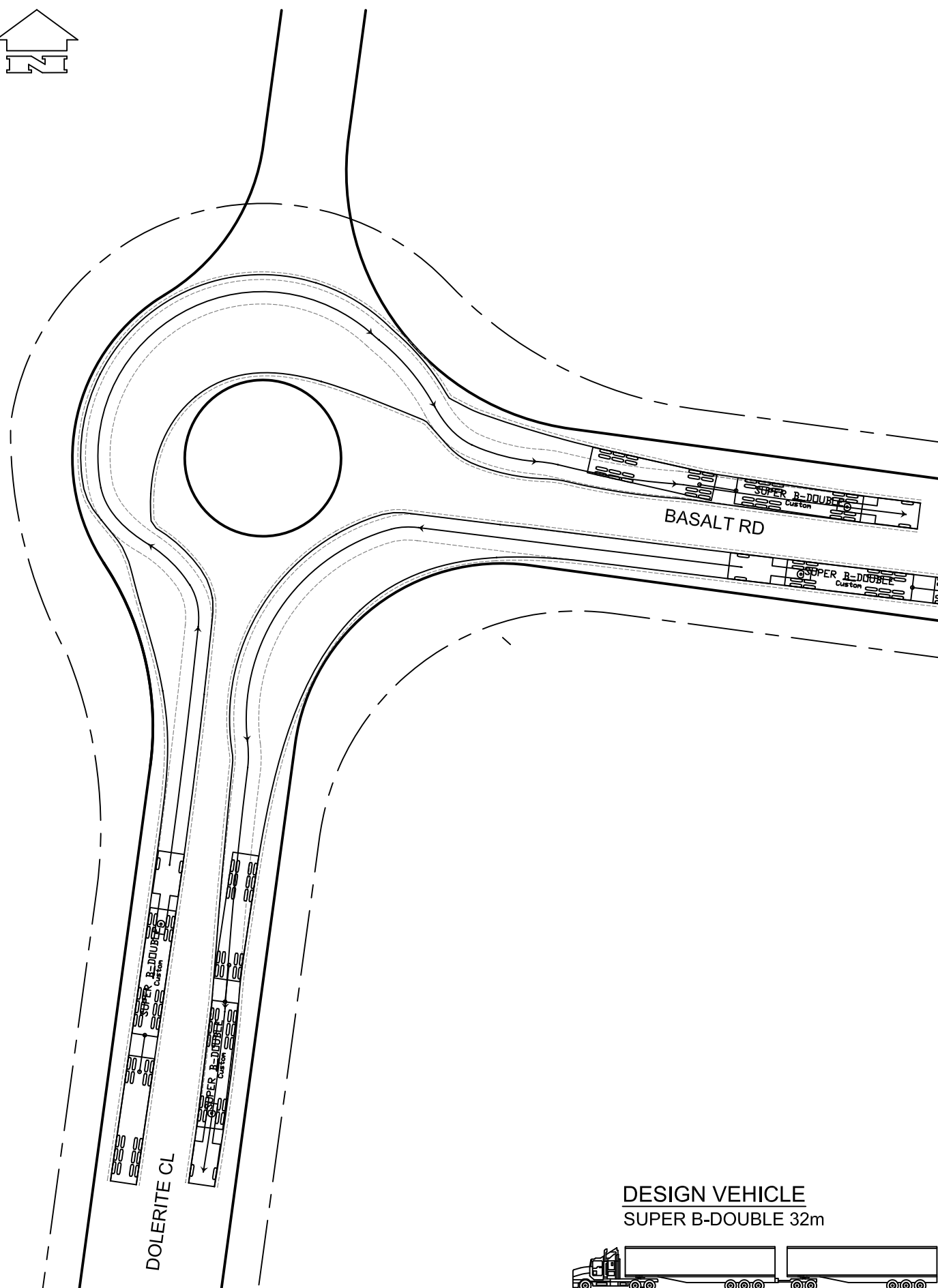
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FIGURE 12 D

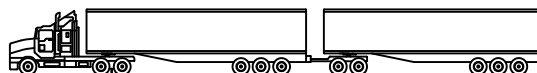
QUARRY WEST ESTATE
RECONCILIATION RD, PEMULWUY

TURNPATH DIAGRAM - RIGHT TURN
TURNBULL CL & DOLERITE CL TO RECONCILIATION RD

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DESIGN VEHICLE
SUPER B-DOUBLE 32m



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FIGURE 12 E

QUARRY WEST ESTATE
RECONCILIATION RD, PEMULWUY

TURNPATH DIAGRAM

INTERNAL ROUNDABOUT - DOLERITE CL

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ATTACHMENT 2

SIDRA MODELLING OUTPUTS

MOVEMENT SUMMARY

 Site: Basalt Rd & Dolerite CI - AM Masterplan

AM Masterplan
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg Sam v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Dolerite CI											
2	T1	5	0.0	0.057	4.6	LOS A	0.2	1.5	0.10	0.62	53.1
3	R2	72	10.0	0.057	8.7	LOS A	0.2	1.5	0.10	0.62	52.5
Approach		77	9.3	0.057	8.5	LOS A	0.2	1.5	0.10	0.62	52.5
East: Basalt Rd											
4	L2	237	10.0	0.167	4.4	LOS A	0.7	5.5	0.04	0.52	54.2
6	R2	33	0.0	0.167	8.5	LOS A	0.7	5.5	0.04	0.52	55.7
Approach		269	8.8	0.167	4.9	LOS A	0.7	5.5	0.04	0.52	54.4
North: Estate Rd											
7	L2	21	0.0	0.020	4.5	LOS A	0.1	0.7	0.22	0.46	54.4
8	T1	5	0.0	0.020	4.8	LOS A	0.1	0.7	0.22	0.46	55.7
Approach		26	0.0	0.020	4.6	LOS A	0.1	0.7	0.22	0.46	54.7
All Vehicles		373	8.3	0.167	5.6	LOS A	0.7	5.5	0.06	0.53	54.0

Level of Service (LOS) Method: Delay (RTA NSW).

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.

Roundabout Capacity Model: SIDRA Standard.

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

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

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

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MOVEMENT SUMMARY

 Site: Basalt Rd & Dolerite Cl - PM Masterplan

PM Masterplan
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Dolerite Cl											
2	T1	5	0.0	0.144	4.5	LOS A	0.6	4.3	0.05	0.63	53.1
3	R2	216	10.0	0.144	8.7	LOS A	0.6	4.3	0.05	0.63	52.5
Approach		221	9.8	0.144	8.6	LOS A	0.6	4.3	0.05	0.63	52.5
East: Basalt Rd											
4	L2	61	10.0	0.047	4.4	LOS A	0.2	1.5	0.04	0.52	54.1
6	R2	11	0.0	0.047	8.5	LOS A	0.2	1.5	0.04	0.52	55.6
Approach		72	8.5	0.047	5.0	LOS A	0.2	1.5	0.04	0.52	54.3
North: Estate Rd											
7	L2	42	0.0	0.042	5.3	LOS A	0.2	1.5	0.39	0.52	53.9
8	T1	5	0.0	0.042	5.6	LOS A	0.2	1.5	0.39	0.52	55.1
Approach		47	0.0	0.042	5.3	LOS A	0.2	1.5	0.39	0.52	54.0
All Vehicles		340	8.1	0.144	7.4	LOS A	0.6	4.3	0.10	0.59	53.1

Level of Service (LOS) Method: Delay (RTA NSW).

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.

Roundabout Capacity Model: SIDRA Standard.

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

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

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

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MOVEMENT SUMMARY

Site: Reconciliation Rd & Bellevue Cct- AM Traffic Signals Full Masterpan - LC

AM - SDO with Cross Phase- Lower Cycle Length

Signals - Fixed Time Isolated Cycle Time = 100 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg Sam v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reconciliation Rd											
1	L2	39	5.1	0.269	18.8	LOS B	6.7	52.3	0.57	0.53	25.8
2	T1	481	13.7	0.269	13.2	LOS A	6.7	52.3	0.57	0.51	49.1
3	R2	114	3.5	0.449	49.6	LOS D	5.3	38.1	0.96	0.78	32.5
Approach		634	11.3	0.449	20.1	LOS B	6.7	52.8	0.64	0.56	43.6
East: Bellevue Cct											
4	L2	21	10.0	0.068	39.0	LOS C	1.0	7.6	0.82	0.69	36.2
5	T1	5	0.0	0.068	33.4	LOS C	1.0	7.6	0.82	0.69	29.0
6	R2	44	9.1	0.208	48.2	LOS D	2.0	14.9	0.92	0.74	33.2
Approach		70	8.7	0.208	44.4	LOS D	2.0	14.9	0.89	0.72	33.8
North: Reconciliation Rd											
7	L2	205	2.5	0.144	6.6	LOS A	1.3	9.3	0.21	0.61	53.3
8	T1	935	6.4	0.462	15.0	LOS B	13.8	102.2	0.66	0.58	48.1
9	R2	100	5.0	0.398	49.2	LOS D	4.6	33.6	0.95	0.78	24.2
Approach		1240	5.6	0.462	16.4	LOS B	13.8	102.2	0.61	0.60	46.7
West: Bellevue Circuit Cul de sac											
10	L2	10	5.0	0.046	41.4	LOS C	0.6	4.4	0.85	0.66	27.5
11	T1	5	0.0	0.046	36.7	LOS C	0.6	4.4	0.85	0.66	28.2
12	R2	10	5.0	0.048	46.7	LOS D	0.4	3.2	0.90	0.67	25.3
Approach		25	4.0	0.048	42.6	LOS D	0.6	4.4	0.87	0.66	26.7
All Vehicles		1969	7.6	0.462	18.9	LOS B	13.8	102.2	0.63	0.59	44.8

Level of Service (LOS) Method: Delay (RTA NSW).

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.

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	50	44.3	LOS E	0.1	0.1	0.94	0.94	
P2	East Full Crossing	50	16.3	LOS B	0.1	0.1	0.57	0.57	
P4	West Full Crossing	50	15.7	LOS B	0.1	0.1	0.56	0.56	
All Pedestrians		150	25.4	LOS C			0.69	0.69	

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.

MOVEMENT SUMMARY

Site: Reconciliation Rd & Bellevue Cct- PM Traffic Signals Full Masterplan - LC

PM - SDO with Cross Phase- Lower Cycle Length

Signals - Fixed Time Isolated Cycle Time = 100 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reconciliation Rd											
1	L2	10	10.0	0.595	27.8	LOS B	18.6	134.0	0.81	0.72	23.4
2	T1	1013	3.0	0.595	22.1	LOS B	18.7	134.1	0.81	0.72	44.0
3	R2	6	16.7	0.060	56.2	LOS D	0.3	2.3	0.97	0.65	30.6
Approach		1029	3.1	0.595	22.4	LOS B	18.7	134.1	0.81	0.72	43.7
East: Bellevue Cct											
4	L2	116	2.5	0.160	24.8	LOS B	3.6	26.0	0.66	0.72	41.9
5	T1	5	0.0	0.160	19.2	LOS B	3.6	26.0	0.66	0.72	35.3
6	R2	227	2.5	0.578	39.7	LOS C	9.7	69.6	0.91	0.82	36.0
Approach		348	2.5	0.578	34.4	LOS C	9.7	69.6	0.82	0.79	37.8
North: Reconciliation Rd											
7	L2	41	7.3	0.031	7.1	LOS A	0.3	2.3	0.23	0.60	52.8
8	T1	429	8.4	0.258	18.3	LOS B	6.5	48.4	0.66	0.56	46.2
9	R2	20	5.0	0.186	56.9	LOS E	1.0	7.2	0.98	0.70	22.3
Approach		490	8.2	0.258	18.9	LOS B	6.5	48.4	0.64	0.57	45.5
West: Bellevue Circuit Cul de sac											
10	L2	79	2.5	0.104	22.8	LOS B	2.3	16.5	0.63	0.71	35.3
11	T1	5	0.0	0.104	26.4	LOS B	2.3	16.5	0.74	0.70	32.1
12	R2	35	5.7	0.104	33.8	LOS C	1.4	10.4	0.77	0.70	30.1
Approach		119	3.3	0.104	26.2	LOS B	2.3	16.5	0.67	0.71	33.5
All Vehicles		1986	4.3	0.595	23.9	LOS B	18.7	134.1	0.76	0.69	42.4

Level of Service (LOS) Method: Delay (RTA NSW).

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.

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

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

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

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	50	34.5	LOS D	0.1	0.1	0.83	0.83
P2	East Full Crossing	50	21.8	LOS C	0.1	0.1	0.66	0.66
P4	West Full Crossing	50	21.2	LOS C	0.1	0.1	0.65	0.65
All Pedestrians		150	25.8	LOS C			0.71	0.71

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.

MOVEMENT SUMMARY

Site: Reconciliation Rd & Basalt St- AM Signals Full Masterplan - LC

AM SDO with Cross Phase - Lower Cycle Length

Signals - Fixed Time Isolated Cycle Time = 100 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reconciliation Rd											
1	L2	91	5.5	0.380	23.3	LOS B	10.1	77.0	0.68	0.64	44.5
2	T1	567	12.0	0.380	17.7	LOS B	10.2	78.4	0.68	0.61	46.1
3	R2	59	6.8	0.167	41.7	LOS C	2.4	17.9	0.86	0.74	34.9
Approach		717	10.7	0.380	20.4	LOS B	10.2	78.4	0.69	0.63	44.7
East: Basalt St											
4	L2	20	15.0	0.030	25.0	LOS B	0.6	4.6	0.63	0.67	41.4
5	T1	5	0.0	0.149	42.2	LOS C	1.3	10.1	0.91	0.71	34.0
6	R2	24	16.7	0.149	48.0	LOS D	1.3	10.1	0.91	0.71	33.3
Approach		49	14.3	0.149	38.0	LOS C	1.3	10.1	0.80	0.70	36.3
North: Reconciliation Rd											
7	L2	73	6.9	0.437	23.9	LOS B	12.3	91.6	0.70	0.65	44.4
8	T1	703	7.4	0.437	18.3	LOS B	12.4	92.5	0.70	0.63	45.9
9	R2	160	4.4	0.444	44.2	LOS D	7.0	50.9	0.93	0.80	34.2
Approach		936	6.8	0.444	23.2	LOS B	12.4	92.5	0.74	0.66	43.2
West: Basalt St											
10	L2	51	5.0	0.071	25.3	LOS B	1.5	11.1	0.65	0.70	41.5
11	T1	5	0.0	0.125	41.7	LOS C	1.2	8.6	0.91	0.71	34.2
12	R2	22	5.0	0.125	47.4	LOS D	1.2	8.6	0.91	0.71	33.6
Approach		78	4.7	0.125	32.6	LOS C	1.5	11.1	0.74	0.70	38.4
All Vehicles		1780	8.5	0.444	22.8	LOS B	12.4	92.5	0.72	0.65	43.4

Level of Service (LOS) Method: Delay (RTA NSW).

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.

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

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

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

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	50	44.3	LOS E	0.1	0.1	0.94	0.94
P2	East Full Crossing	50	22.5	LOS C	0.1	0.1	0.67	0.67
P3	North Full Crossing	50	44.3	LOS E	0.1	0.1	0.94	0.94
P4	West Full Crossing	50	22.5	LOS C	0.1	0.1	0.67	0.67
All Pedestrians		200	33.4	LOS D			0.81	0.81

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.

MOVEMENT SUMMARY

Site: Reconciliation Rd & Basalt St- PM Signals Full Masterplan - LC

PM SDO with Cross Phase - Lower Cycle Length

Signals - Fixed Time Isolated Cycle Time = 90 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reconciliation Rd											
1	L2	23	5.0	0.404	18.4	LOS B	10.6	76.8	0.63	0.56	48.1
2	T1	815	3.5	0.404	12.8	LOS A	10.7	77.0	0.63	0.56	49.5
3	R2	12	8.3	0.103	50.7	LOS D	0.5	3.9	0.97	0.68	32.1
Approach		850	3.6	0.404	13.5	LOS A	10.7	77.0	0.63	0.56	49.1
East: Basalt St											
4	L2	60	3.3	0.103	28.6	LOS C	1.8	13.3	0.73	0.72	40.0
5	T1	5	0.0	0.326	39.1	LOS C	2.7	19.4	0.94	0.76	34.8
6	R2	60	3.3	0.326	44.7	LOS D	2.7	19.4	0.94	0.76	34.3
Approach		125	3.2	0.326	36.7	LOS C	2.7	19.4	0.84	0.74	36.8
North: Reconciliation Rd											
7	L2	20	25.0	0.268	17.5	LOS B	6.2	46.7	0.57	0.51	48.1
8	T1	522	6.7	0.268	11.7	LOS A	6.3	46.8	0.57	0.50	50.3
9	R2	40	2.5	0.329	51.9	LOS D	1.8	12.9	0.99	0.73	31.9
Approach		582	7.0	0.329	14.6	LOS B	6.3	46.8	0.60	0.51	48.3
West: Basalt St											
10	L2	154	2.5	0.262	30.0	LOS C	5.0	36.0	0.78	0.77	39.4
11	T1	5	0.0	0.397	38.5	LOS C	3.8	26.9	0.94	0.77	35.0
12	R2	86	2.5	0.397	44.1	LOS D	3.8	26.9	0.94	0.77	34.5
Approach		245	2.4	0.397	35.1	LOS C	5.0	36.0	0.84	0.77	37.4
All Vehicles		1802	4.5	0.404	18.4	LOS B	10.7	77.0	0.66	0.58	45.8

Level of Service (LOS) Method: Delay (RTA NSW).

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.

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	50	39.3	LOS D	0.1	0.1	0.94	0.94	
P2	East Full Crossing	50	17.5	LOS B	0.1	0.1	0.62	0.62	
P3	North Full Crossing	50	39.3	LOS D	0.1	0.1	0.94	0.94	
P4	West Full Crossing	50	17.5	LOS B	0.1	0.1	0.62	0.62	
All Pedestrians		200	28.4	LOS C			0.78	0.78	

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.

MOVEMENT SUMMARY

Site: Reconciliation Rd & Dolerite / Turnbull CI - AM Signals Full Masterplan - LC

AM DDO - Lower Cycle Length

Signals - Fixed Time Isolated Cycle Time = 90 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reconciliation Rd											
1	L2	181	5.0	0.545	26.0	LOS B	13.7	103.3	0.79	0.75	42.6
2	T1	627	12.1	0.545	21.1	LOS B	13.7	103.3	0.80	0.72	44.1
3	R2	25	8.0	0.128	46.0	LOS D	1.0	7.7	0.93	0.71	33.6
Approach		833	10.4	0.545	22.9	LOS B	13.7	103.3	0.80	0.72	43.4
East: Turnbull CI											
4	L2	15	6.7	0.054	36.3	LOS C	0.7	5.2	0.83	0.67	37.4
5	T1	5	0.0	0.054	30.7	LOS C	0.7	5.2	0.83	0.67	38.2
6	R2	15	6.7	0.127	50.9	LOS D	0.7	4.9	0.97	0.69	32.3
Approach		35	5.7	0.127	41.8	LOS C	0.7	5.2	0.89	0.68	35.1
North: Reconciliation Rd											
7	L2	30	3.5	0.437	25.4	LOS B	10.4	77.5	0.76	0.67	44.0
8	T1	637	7.9	0.437	20.2	LOS B	10.5	78.5	0.76	0.66	45.0
9	R2	100	5.0	0.502	48.3	LOS D	4.4	31.8	0.98	0.78	33.0
Approach		767	7.3	0.502	24.1	LOS B	10.5	78.5	0.79	0.68	42.9
West: Dolerite CI											
10	L2	70	4.3	0.150	32.1	LOS C	2.5	18.1	0.79	0.73	38.7
11	T1	5	0.0	0.150	26.5	LOS B	2.5	18.1	0.79	0.73	39.5
12	R2	98	5.0	0.410	52.4	LOS D	2.2	16.3	1.00	0.74	31.8
Approach		173	4.6	0.410	43.5	LOS D	2.5	18.1	0.91	0.74	34.5
All Vehicles		1808	8.5	0.545	25.7	LOS B	13.7	103.3	0.81	0.70	42.0

Level of Service (LOS) Method: Delay (RTA NSW).

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.

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	50	39.3	LOS D	0.1	0.1	0.94	0.94	
P2	East Full Crossing	50	24.3	LOS C	0.1	0.1	0.73	0.73	
P3	North Full Crossing	50	39.3	LOS D	0.1	0.1	0.94	0.94	
P4	West Full Crossing	50	24.3	LOS C	0.1	0.1	0.73	0.73	
All Pedestrians		200	31.8	LOS D			0.84	0.84	

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.

MOVEMENT SUMMARY

Site: Reconciliation Rd & Dolerite / Turnbull CI - PM Signals Full Masterplan - LC

PM DDO - Lower Cycle Length

Signals - Fixed Time Isolated Cycle Time = 90 seconds (User-Given Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Reconciliation Rd											
1	L2	160	2.5	0.643	31.2	LOS C	15.7	113.5	0.89	0.80	40.4
2	T1	681	4.0	0.643	26.3	LOS B	15.7	113.5	0.89	0.78	41.6
3	R2	15	6.7	0.069	44.3	LOS D	0.6	4.4	0.91	0.69	34.1
Approach		856	3.8	0.643	27.5	LOS B	15.7	113.5	0.89	0.79	41.2
East: Turnbull CI											
4	L2	25	4.0	0.071	34.7	LOS C	1.0	7.4	0.81	0.69	37.9
5	T1	5	0.0	0.071	29.1	LOS C	1.0	7.4	0.81	0.69	38.7
6	R2	30	4.0	0.136	44.9	LOS D	1.2	8.8	0.93	0.72	34.1
Approach		60	3.7	0.136	39.3	LOS C	1.2	8.8	0.87	0.70	35.9
North: Reconciliation Rd											
7	L2	15	6.7	0.418	29.4	LOS C	9.0	66.7	0.80	0.69	42.0
8	T1	523	6.9	0.418	24.1	LOS B	9.1	67.4	0.81	0.69	43.0
9	R2	133	2.5	0.596	48.1	LOS D	5.8	41.7	0.99	0.80	33.1
Approach		671	6.0	0.596	29.0	LOS C	9.1	67.4	0.85	0.71	40.6
West: Dolerite CI											
10	L2	144	2.5	0.267	30.8	LOS C	4.9	35.4	0.79	0.76	39.2
11	T1	5	0.0	0.267	25.2	LOS B	4.9	35.4	0.79	0.76	40.0
12	R2	273	2.5	0.612	48.3	LOS D	6.0	43.0	1.00	0.81	33.1
Approach		422	2.5	0.612	42.0	LOS C	6.0	43.0	0.92	0.79	35.0
All Vehicles		2009	4.2	0.643	31.4	LOS C	15.7	113.5	0.88	0.76	39.3

Level of Service (LOS) Method: Delay (RTA NSW).

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.

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

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	50	39.3	LOS D	0.1	0.1	0.94	0.94	
P2	East Full Crossing	50	28.9	LOS C	0.1	0.1	0.80	0.80	
P3	North Full Crossing	50	39.3	LOS D	0.1	0.1	0.94	0.94	
P4	West Full Crossing	50	28.9	LOS C	0.1	0.1	0.80	0.80	
All Pedestrians		200	34.1	LOS D			0.87	0.87	

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.