CARPARK AND DRIVEWAY CERTIFICATION OF A PROPOSED SENIORS HOUSING DEVELOPMENT

21 Charles Street and 7-9 Brighton Road, Peakhurst

Prepared for: NSW Land and Housing Corporation

N221953A (Version 1a)

March 2023

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1. INTRODUCTION

Motion Traffic Engineers was commissioned by NSW Land and Housing Corporation to prepare a car park certification of a proposed Seniors Housing Development at 21 Charles Street and 7-9 Brighton Road in Peakhurst.

Two car park areas are provided: a single accessible car space running off Charles Street, and a parking block with vehicle access/egress via Brighton Road.

Reference is made to AS2890.1 (2004), AS2890.6 (2009), AS4299 (1995), and Council's Development Control Plan for compliance.

2. DRIVEWAY

The details of the proposed driveway from Brighton Road into the ground floor from the perspective of the inbound movement for description purposes are as follows:

- The driveway is 3.6 metres wide at the property line
- Gradients along the centreline of the driveway is kept below 5 percent

The details of the proposed driveway from Charles Street into the accessible car space from the perspective of the inbound movement for description purposes are as follows:

- The driveway is 3.6 metres wide at the property line
- Gradients along the centreline of the driveway are 11 percent for 7.6 metres and then 4.55 percent for 4.3 metres

The driveway location complies with Figure 3.1 of AS2900.1 and Section 3.2.3 of the same standard.

3. CAR SPACES

The details of the car parking area are as follows for the Brighton Road car park area:

- The car parking aisle is 5.8 metres wide at minimum.
    - Maximum of 5 percent gradient is provided
- The general 90-degree and tandem car spaces are 2.4 metres wide minimum with a length of 5.6 metres
    - 300mm clearance is provided for car spaces adjacent to wall
- The disabled car space is 2.4 metres wide and 5.6 long
    - A shared zone with the same dimensions has been provided
    - Bollard with compliant setback has been provided
- Blind aisle extension of compliant width is provided

The accessible car space that is accessed off Charles Street is 4.15 metres wide and 7.3 metres long. This car space complies with AS4299. Entry is forward in and reverse out (or vice versa). Council generally permits the reverse movement for a single car space on a local road.

4. SWEPT PATHS

A swept turning path analysis is performed using 4.9 metres long B85 car to confirm that vehicle movements are adequate.

The following Swept Paths have been performed:

- B85 car forward inbound and reverse outbound for car spaces adjacent to wall.
- B85 car reverse inbound and forward outbound for car space middle car space.

Swept paths for all car spaces show adequate manoeuvrability.
The swept paths are provided in the Appendix A of this report.

5. SIGHT DISTANCE

The car driver's vehicle sight distance requirement to enter the external road is stated in Figure 3.2 of AS2890.1.

The sight distance varies according to the speed of the external road. Brighton Road has a default speed limit of 50km/hr.

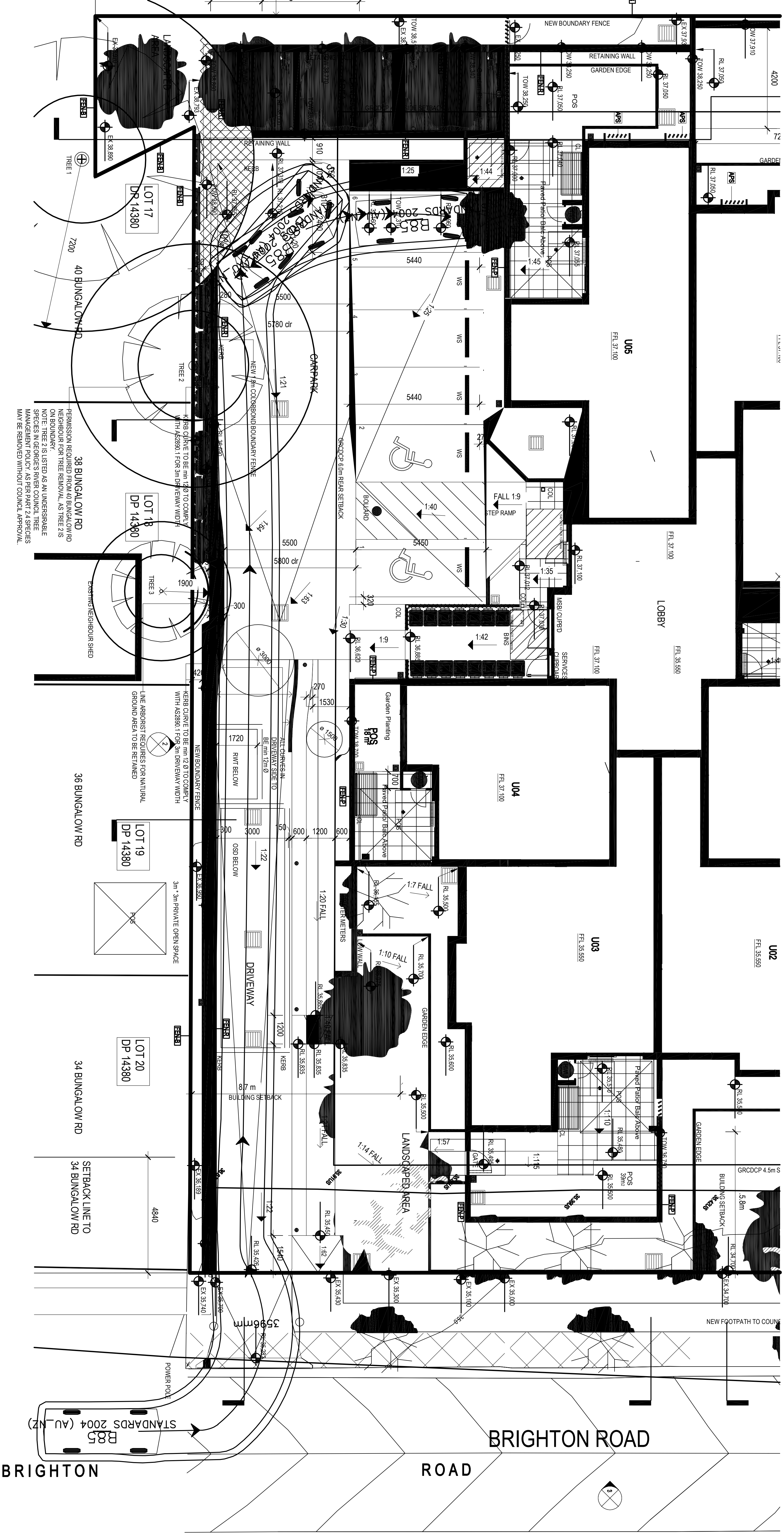
The minimum vehicle sight distance required is 45 metres. Site measurements showed that the minimum sight distance looking left and right is met.

The pedestrian sight distance as set out in Figure 3.3 of AS2890.1 is met as well.

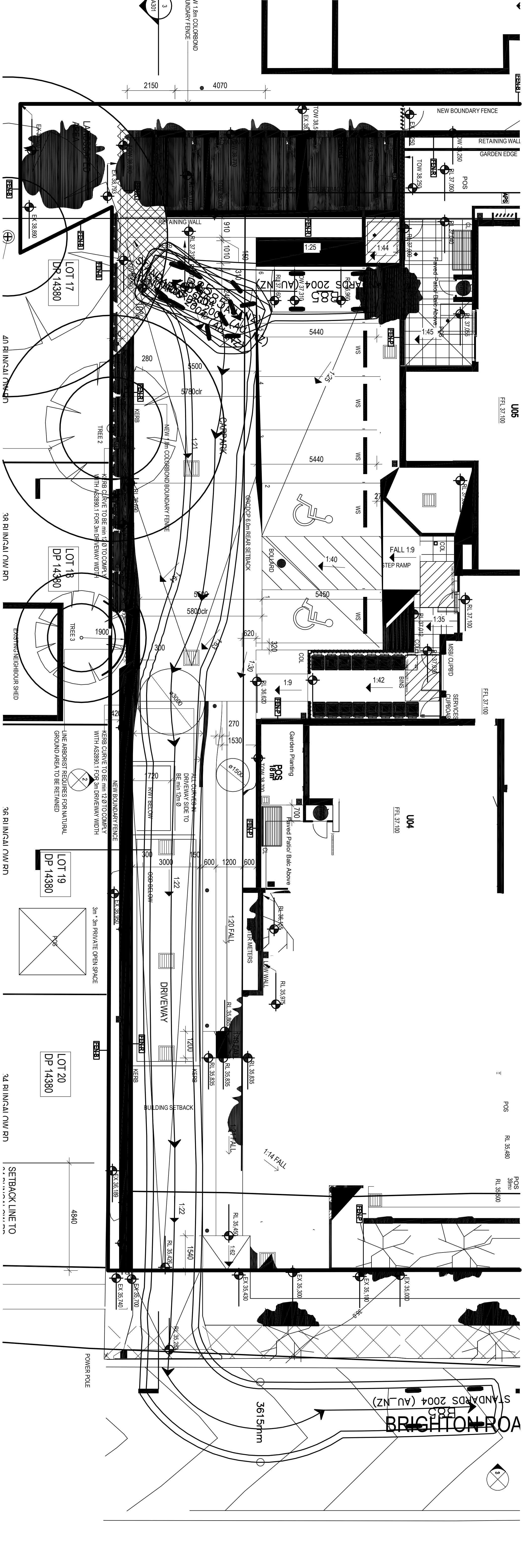
6. CONCLUSIONS AND RECOMMENDATIONS

The car parking area and driveway is compliant with Australian Standards and Council's DCP.

APPENDIX A
Swept Paths



NEW BOUNDARY FENCE
RETAINING WALL
GARDEN EDGE
POS
LANDSCAPED AREA
TREE 1
LOT 17
DP 14380
40 BUNGALOW RD
TREE 2
CARPARK
NEW 1.8m COLORBOND BOUNDARY FENCE
KERB CURVE TO BE min 12Ø TO COMPLY WITH AS2890.1 FOR 3m DRIVEWAY WIDTH
38 BUNGALOW RD
PERMISSION REQUIRED FROM 40 BUNGALOW RD NEIGHBOUR FOR TREE REMOVAL, AS TREE 2 IS ON BOUNDARY.
NOTE: TREE 2 IS LISTED AS AN UNDERSIRABLE SPECIES IN GEORGE'S RIVER COUNCIL TREE MANAGEMENT POLICY. AS PER PART 2.4 SPECIES MAY BE REMOVED WITHOUT COUNCIL APPROVAL.
LOT 18
DP 14380
TREE 3
EXISTING NEIGHBOUR SHED
GRCDCP 6.0m REAR SETBACK
BOLLARD
STEP RAMP
FALL 1:9
U05
FFL 37.100
LOBBY
FFL 35.550
MSB/ CUPB'D
SERVICES CUPBOARD
BINS
Paved Patio/ Balc Above
LINE ARBORIST REQUIRES FOR NATURAL GROUND AREA TO BE RETAINED
ALL CURVES IN DRIVEWAY SIDE TO BE min 12m Ø
RWT BELOW
Garden Planting
POS 18m²
U04
36 BUNGALOW RD
LOT 19
DP 14380
OSD BELOW
3m * 3m PRIVATE OPEN SPACE
1:20 FALL
1:7 FALL
1:10 FALL
METERS
LOW WALL
DRIVEWAY
U03
U02
LOT 20
DP 14380
34 BUNGALOW RD
KERB
8.7 m
BUILDING SETBACK
1:14 FALL
GATE
POS 39m²
SETBACK LINE TO 34 BUNGALOW RD
4840
GRCDCP 4.5m S
BUILDING SETBACK
NEW FOOTPATH TO COUNC
POWER POLE
3596mm
B85
STANDARDS 2004 (AU_NZ)
BRIGHTON ROAD
BRIGHTON
ROAD



NEW BOUNDARY FENCE
RETAINING WALL
GARDEN EDGE
POS
LOT 17
DP 14380
LOT 18
DP 14380
LOT 19
DP 14380
LOT 20
DP 14380
CARPARK
DRIVEWAY
U05
U04
BINS
STEP RAMP
BOLLARD
FALL 1:9
Garden Planting
Paved Patio/ Balc Above
BUILDING SETBACK
KERB
POWER POLE
3m * 3m PRIVATE OPEN SPACE
BRIGHTON ROA

U03
FFL 35.550

U04
FFL 37.100

FFL 37.100

RL 37,100

MSB/ CUPB'D

SERVICES CUPBOARD

COL

RL 37,030

RL 37,010

FALL 1:9 STEP RAMP

1:35

1:42

1:45

1:44

1:25

1:40

1:20

1:21

1:30

1:22

1:62

1:115

1:57

1:7 FALL

1:10 FALL

1:14 FALL

1:20 FALL

NEW BOUNDARY FENCE

RET

GATE

POS

CL

RL 37,050

RL 37,040

Paved Patio/ Balc Above

TOW 38,250

EX 38,250

RL 37,000

TOW 38,340

WS

RL 36,960

5440

TOW 37,310

RL 37,160

TOW 38,5

EX 38

FEN-P

FEN-R

FEN-B

Garden Planting

POS 18 m²

700

Paved Patio/ Balc Above

RL 36,620

TOW 38,700

BOLLARD

GRODCP 6.0m REAR SETBACK

150

310

910

1010

2400

CARPARK

5500

5780dir

10%

RL 37,310

RL 37,215

AWNING WALL

KERB

RL 37,355

TOW 38,250

TOW 38,770

TOW 38,000

EX 38,793

EX 38,890

RL 36,690

NEW 1.8m COLORBOND BOUNDARY FENCE

TREE 1

TREE 2

TREE 3

7200

1900

ALL CURVES IN DRIVEWAY SIDE TO BE min 12m Ø

DRIVEWAY

RWT BELOW

OSD BELOW

1200

3000

1530

1720

ø1500

ø3000

KERB CURVE TO BE min 12 Ø TO COMPLY WITH AS2890.1 FOR 3m DRIVEWAY WIDTH

LINE ARBORIST REQUIRES FOR NATURAL GROUND AREA TO BE RETAINED

3m * 3m PRIVATE OPEN SPACE

POS

RL 35,500

RL 35,600

RL 35,700

GARDEN EDGE

LANDSCAPED AREA

RL 36,155

RL 35,975

LOW WALL

WATER METERS

RL 35,865

RL 35,835

KERB

BUILDING SETBACK

RL 35,450

RL 35,420

EX 35,000

EX 35,100

EX 35,300

EX 35,430

EX 35,700

EX 35,740

EX 36,189

EX 36,950

RL 35,495

3615mm

POWER POLE

4840

LOT 17 DP 14380

LOT 18 DP 14380

LOT 19 DP 14380

LOT 20 DP 14380

40 BUNGALOW RD

38 BUNGALOW RD

36 BUNGALOW RD

34 BUNGALOW RD

SETBACK LINE TO 34 BUNGALOW RD

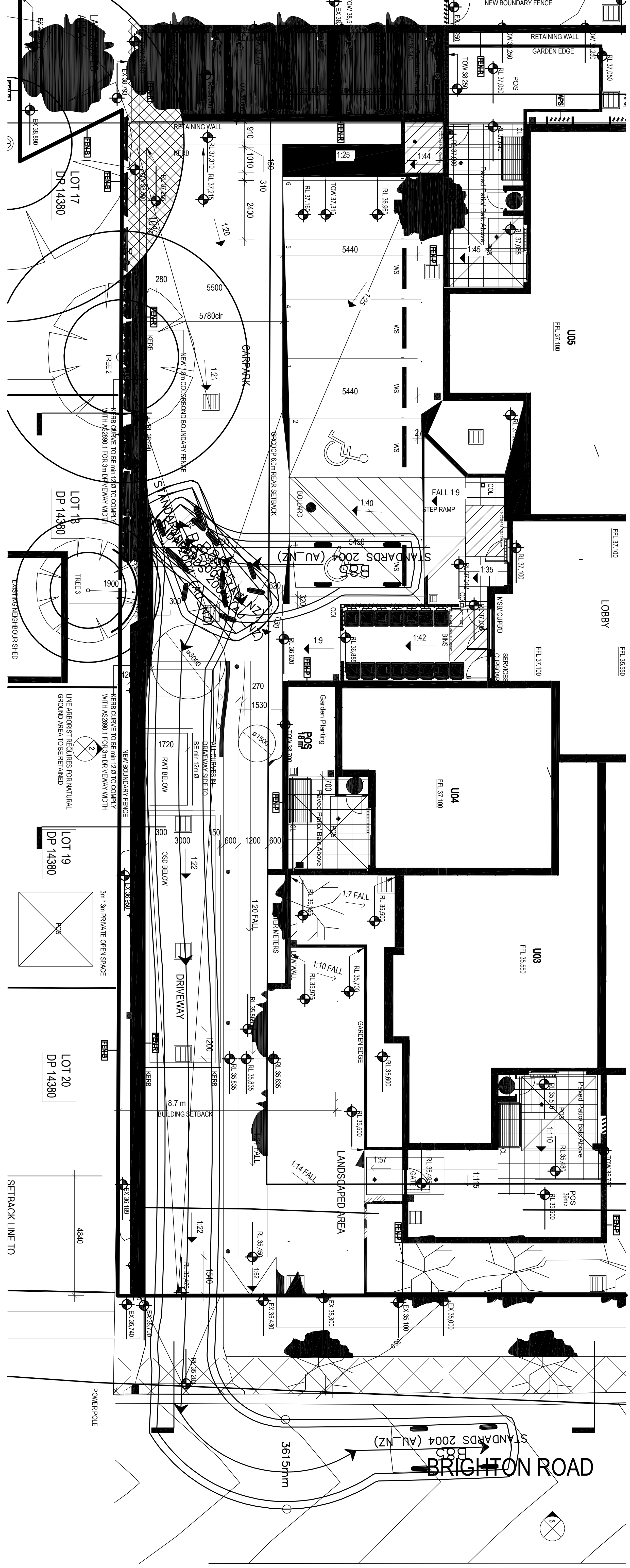
EXISTING NEIGHBOUR SHED

PERMISSION REQUIRED FROM 40 BUNGALOW RD NEIGHBOUR FOR TREE REMOVAL, AS TREE 2 IS ON BOUNDARY.
NOTE: TREE 2 IS LISTED AS AN UNDERSIRABLE SPECIES IN GEORGE'S RIVER COUNCIL TREE MANAGEMENT POLICY. AS PER PART 2.4 SPECIES MAY BE REMOVED WITHOUT COUNCIL APPROVAL.

LANDSCAPED AREA

BRIGHTON ROAD

B85 STANDARDS 2004 (AU_NZ)



BRIGHTON ROAD
CARPARK
DRIVEWAY
LANDSCAPED AREA
LOBBY
U05
U04
U03
FFL 37.100
FFL 35.550
LOT 17 DP 14380
LOT 18 DP 14380
LOT 19 DP 14380
LOT 20 DP 14380
TREE 2
TREE 3
EXISTING NEIGHBOUR SHED
NEW BOUNDARY FENCE
RETAINING WALL
GARDEN EDGE
Paved Patio/ Balc Above
Garden Planting
STEP RAMP
BINS
BOLLARD
KERB
BUILDING SETBACK
SETBACK LINE TO
POWER POLE
3m * 3m PRIVATE OPEN SPACE
STANDARDS 2004 (AU_NZ)
B85
3615mm

FFL 37.100

U03
FFL 35.550

U04
FFL 37.100

FFL 37.100

NEW BOUNDARY FENCE

RETAINING

GARDEN EDGE

APS

POS

TOW 39.250

RL 37.050

FEN-R

TOW 38.250

EX 38.250

Raised Patio/ Balc Above

RL 37.000

RL 37.055

RL 37.040

1:45

1:44

Garden Planting

TOW 38.340

EX 38.340

RL 36.960

WS

1:25

5440

TOW 38.5

EX 38.5

TOW 37.310

RL 37.160

B85 STANDARDS 2004 (AU_NZ)

FALL 1:9 STEP RAMP

RL 37.100

RL 37.012

COL

1:35

MSB/ CUPB'D

SERVICES CUPBOARD

RL 37.930

COL

BINS

1:42

RL 36.880

COL

1:9

RL 36.620

BOLLARD

1:40

5450

320

1:30

ORCDCP 6.0m REAR SETBACK

150

310

910

1010

2400

CARPARK

1:20

B85 STANDARDS 2004 (AU_NZ)

1:21

RL 37.310

RL 37.215

KERB

RL 37.255

10%

TOW 38.770

EX 38.793

LANDSCAPED AREA

NEW 1.8m COLORBOND BOUNDARY FENCE

1:45

280

300

RL 36.650

TOW 38.800

EX 38.890

TREE 1

7200

TREE 2

KERB CURVE TO BE min 12.0 TO COMPLY WITH AS2890.1 FOR 3m DRIVEWAY WIDTH

1900

TREE 3

EXISTING NEIGHBOUR SHED

KERB CURVE TO BE min 12 Ø TO COMPLY WITH AS2890.1 FOR 3m DRIVEWAY WIDTH

2

LINE ARBORIST REQUIRES FOR NATURAL GROUND AREA TO BE RETAINED

4070

2150

270

1530

ø1500

1200

600

1:20 FALL

ALL CURVES IN DRIVEWAY SIDE TO BE min 12m Ø

ø3000

1:22

1720

RWT BELOW

300

3000

OSD BELOW

DRIVEWAY

KERB

8.7 m BUILDING SETBACK

NEW BOUNDARY FENCE

EX 36.950

EX 36.189

3m * 3m PRIVATE OPEN SPACE

POS

4840

SETBACK LINE TO 34 BUNGALOW RD

POWER POLE

LOT 17 DP 14380

LOT 18 DP 14380

LOT 19 DP 14380

LOT 20 DP 14380

40 BUNGALOW RD

38 BUNGALOW RD

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36 BUNGALOW RD

34 BUNGALOW RD

POS
RL 35.510

1:110

RL 35.500

1:115

RL 35.490

GATE

FEN-P

RL 35.600

RL 35.500

GARDEN EDGE

RL 35.700

RL 35.500

LANDSCAPED AREA

1:7 FALL

1:10 FALL

RL 35.975

LOW WALL

RL 36.150

METER METERS

1:14 FALL

RL 35.835

RL 35.835

RL 35.835

KERB

1:22

RL 35.426

RL 35.450

1:62

1540

EX 35.000

EX 35.100

EX 35.300

EX 35.430

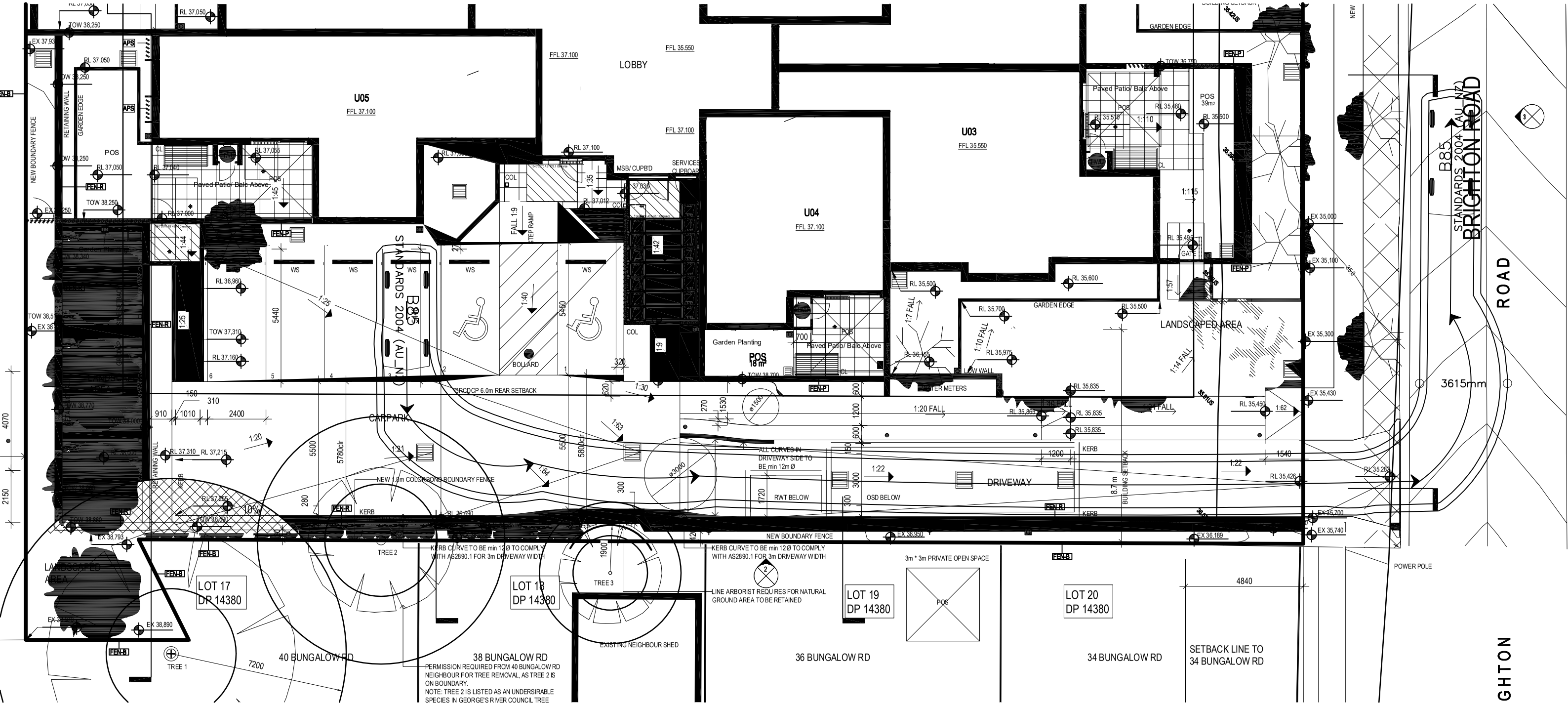
EX 35.700

EX 35.740

BRIGHTON ROAD

BRIGHTON

B85 STANDARDS 2004 (AU_NZ)


U05
FFL 37.100
LOBBY
FFL 37.100
FFL 35.550
U03
FFL 35.550
U04
FFL 37.100
Paved Patio/ Balc Above
POS
Garden Planting
POS 18 m²
Paved Patio/ Balc Above
POS 39m²
GARDEN EDGE
LANDSCAPED AREA
RETAINING WALL
GARDEN EDGE
NEW BOUNDARY FENCE
CARPARK
DRIVEWAY
KERB
RWT BELOW
OSD BELOW
ALL CURVES IN DRIVEWAY SIDE TO BE min 12m Ø
NEW 1.8m COLORBOND BOUNDARY FENCE
ORCDCP 6.0m REAR SETBACK
BOLLARD
STEP RAMP
FALL 1:9
STANDARDS 2004 (AU_NZ)
B85
STANDARDS 2004 (AU_NZ)
B85
BRIGHTON ROAD
BUILDING SETBACK
8.7 m
3615mm
POWER POLE
NEW BOUNDARY FENCE
KERB CURVE TO BE min 12Ø TO COMPLY WITH AS2890.1 FOR 3m DRIVEWAY WIDTH
KERB CURVE TO BE min 12Ø TO COMPLY WITH AS2890.1 FOR 3m DRIVEWAY WIDTH
LINE ARBORIST REQUIRES FOR NATURAL GROUND AREA TO BE RETAINED
3m * 3m PRIVATE OPEN SPACE
POS
LOT 17 DP 14380
LOT 18 DP 14380
LOT 19 DP 14380
LOT 20 DP 14380
40 BUNGALOW RD
38 BUNGALOW RD
36 BUNGALOW RD
34 BUNGALOW RD
SETBACK LINE TO 34 BUNGALOW RD
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TREE 2
TREE 3
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4840
7200
4070
2150

TRAFFIC AND PARKING IMPACT ASSESSMENT

Proposed Seniors Living

7-9 Brighton Road, Peakhurst & 21 Charles St Riverwood

Prepared for: NSW Land and Housing Corporation

N221953A (Version 1a)

June 2023

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Contents

1.INTRODUCTION

Motion Traffic Engineers was commissioned by NSW Land and Housing Corporation to undertake a traffic and parking impact assessment of a proposed affordable seniors living development at 7-9 Brighton Road, Peakhurst & 21 Charles Street, Riverwood.

The site is currently single residential dwelling with frontage to Brighton Road and Charles Street.

This traffic report presents an assessment of the anticipated transport implications of the proposed seniors living, with the following considerations:

- Background and existing traffic and parking conditions of the proposed site
- Assessment of the public transport network within the vicinity of the site
- Adequacy of car, bicycle and motorcycle parking provision
- The projected traffic generation of the proposed seniors living and;
- The transport impact of the proposed seniors living on the surrounding road network.

In the course of preparing this assessment, the proposed site and its environs have been inspected, plans of the development are examined, all relevant traffic and parking data have been collected and analysed.

2. BACKGROUND AND EXISTING CONDITIONS OF THE PROPOSED SITE

2.1. Location and Land Use

The seniors living site is located at 7-9 Brighton Road in Peakhurst and 21 Charles St Riverwood. The site is located East of Riverwood Train Station and town centre. The immediate surroundings of the site are residential dwellings in a predominantly *Low Density Residential(R2) Zone*. The site is near Charles Reserve. The site is located in *Low Density Residential (R2) zone.*

Figures 1 and 2 show the location of the Proposed Seniors Living from aerial and street map perspective respectively. Figure 2 also shows the location of the surveyed intersections in relation to the site.

Figure 3 shows a photography of the site frontage taken from Brighton Road.

Figure 1: Location of the Proposed Seniors Living site on Aerial

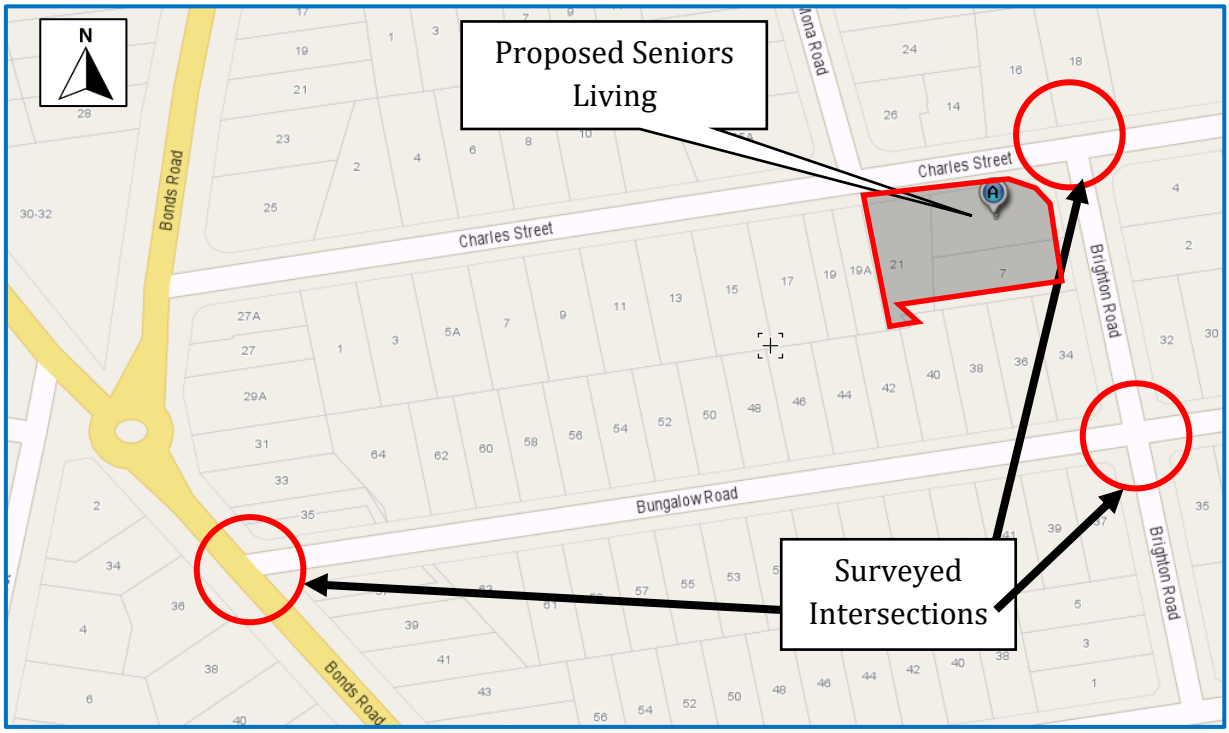

Figure 2: Location of the Proposed Seniors Living site on Aerial

Figure 3: Photograph of the Site from CNR Brighton Road & Charles St

2.2. Road Network

This section discusses the road network adjacent to the site.

Bonds Road is a collector road with one lane each way and sign posted speed limit is 50km/hr. Double barriers lines separate the opposing traffic lanes. The parking lane is generally marked out. Time unrestricted on-street parking is permitted on both sides of the road within the line marked parking lanes. Figure 4a shows a photograph of Bonds Road.

Bungalow Road is a local road with one each way with sign posted speed limit of 50 km/hr. Time un-restricted on-street parking is permitted on both sides of the road. Figure 4b shows a photograph of Bungalow Road.

Brighton Road is a local road with one lane each way with default speed limit of 50km/hr. Time un-restricted on-street parking is permitted on both sides of the road. No pedestrian side walk is provided on both sides of the road. Figure 4c shows a photograph of Brighton Road.

Charles Street is a local road with one lane each way with default speed limit of 50km/hr. Time un-restricted on-street parking is permitted on both sides of the road. No pedestrian side walk is provided on one side of the road. Figure 4d shows a photograph of Charles Street.

Figure 4a: Bonds Road Looking North from Bungalow Road

Figure 4b: Bungalow Road Looking West from Brighton Road

Figure 4c: Brighton Road Looking South from Charles Street

Figure 4d: Charles Street Looking East from Brighton Road

2.3.Public Transport

The nearest bus stop to the site is approximately 350 metres (radial distance) away on Bonds Road which is serviced by bus routes 944 and 945. These provide transport to nearby suburbs including Hurstville, Mortdale and Bankstown and their respective train stations. Figure 5 shows the public transport services near the development.

Overall, the site has good access to public transport.

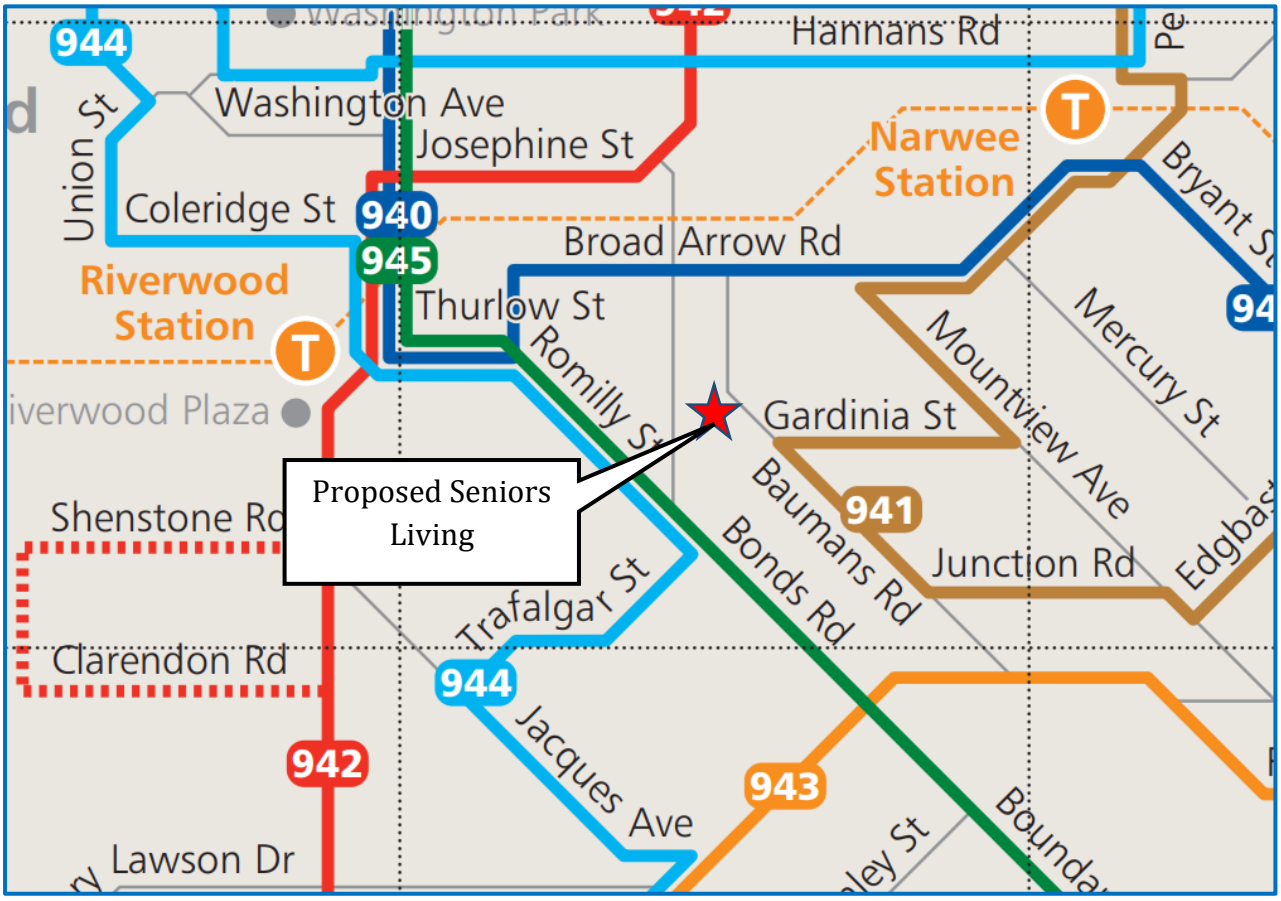

Figure 5: Location of the Proposed site in Relation to the Public Transport

2.4.Public Parking

The proposed seniors living is located in a residential area where on-street parking is permitted on Brighton Road as well as Charles Street. Site visits show that there are vacant car spaces on Brighton Road and Charles Street. Many of the residential dwellings have on-site parking and do not necessarily need to park on-street.

These on-street parking spaces can be utilised by visitors should any additional visitor parking demand arises.

2.5. Intersection Description

As part of the traffic impact assessment, the performance of the nearby intersection was surveyed and assessed:

- Priority intersection of Bonds Road with Bungalow Road
- Priority intersection of Bungalow Road with Brighton Road
- Priority intersection of Brighton Road with Charles Street

External traffic travelling to and from the development is likely to travel through the intersection mentioned above.

The priority intersection of Bonds Road with Bungalow Road is a three-leg intersection with all turn movements permitted. Drivers on Bungalow Road must give way to traffic on Bonds Road. Figure 6a presents the layout of this intersection using SIDRA 9 – an industry standard intersection assessment software and Figure 6b represents the ariel view of the intersection. The numbers on the lanes represent the length of short lanes in metres.

The priority intersection of Bungalow Road with Brighton Road is a four-leg intersection with all turn movements permitted. Drivers on Brighton Road must give way to traffic on Bungalow Road. Figure 6c presents the layout of this intersection using SIDRA 9 and Figure 6d represents the ariel view of the intersection.

Priority intersection of Brighton Road with Charles Street is a three-leg intersection with all turn movements permitted. Drivers on Brighton Road must give way to traffic on Charles Street. Figure 6e presents the layout of this intersection using SIDRA 9 and Figure 6f represents the ariel view of the intersection.

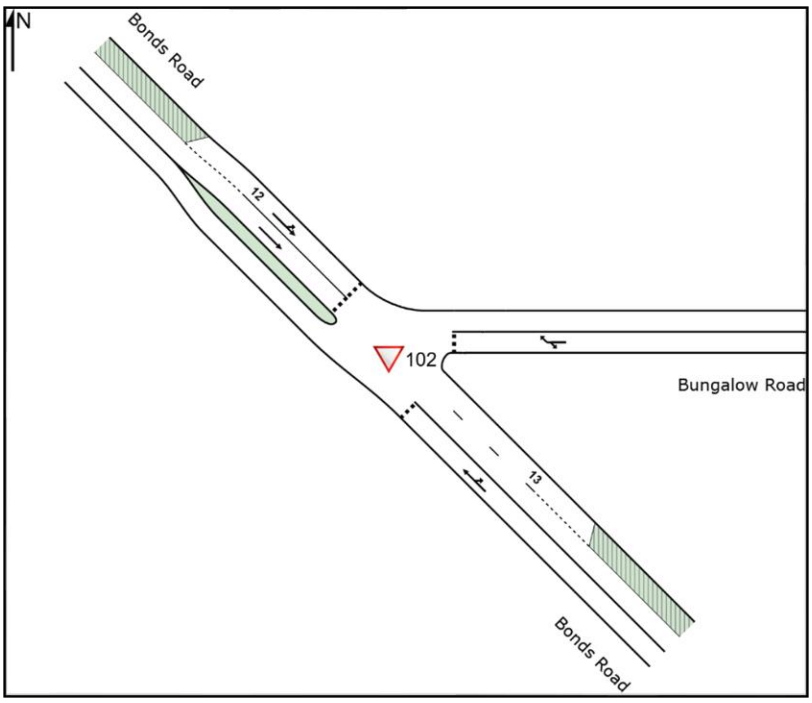

Figure 6a: Priority Intersection of Bonds Road with Bungalow Road SIDRA)

Figure 6b: Priority Intersection of Bonds Road with Bungalow Road Aerial View

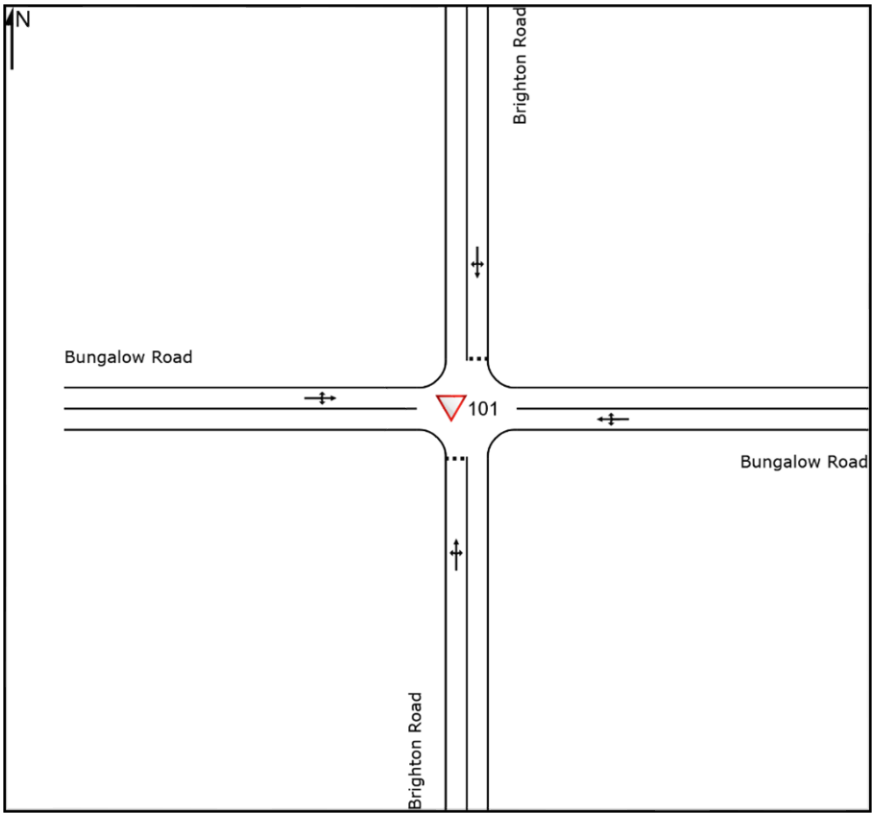

Figure 6c: Priority Intersection of Bungalow Road with Brighton Road SIDRA)

Figure 6d: Priority Intersection of Bungalow Road with Brighton Road Aerial View

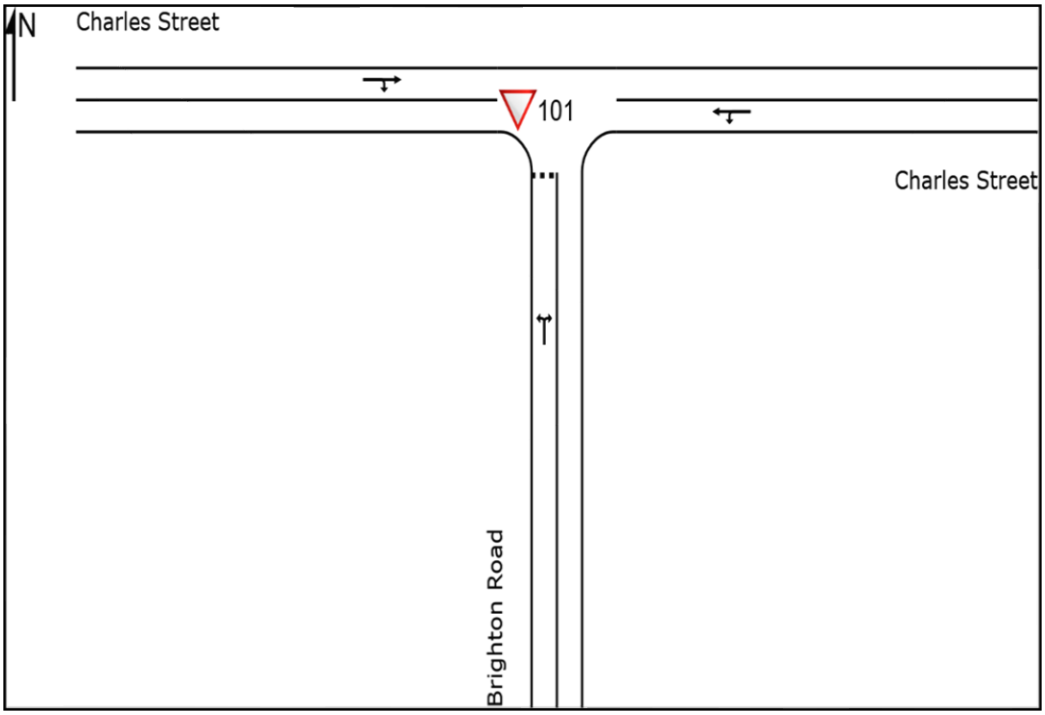

Figure 6e: Priority Intersection of Brighton Road with Charles Street SIDRA)

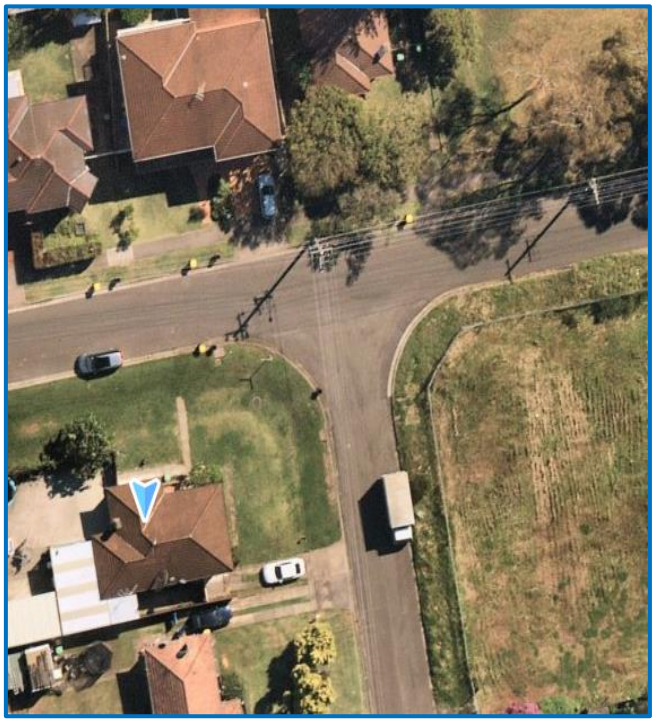

Figure 6f: Priority Intersection of Brighton Road with Charles Street Aerial View

2.6. Existing Traffic Volume

As part of the traffic assessment, traffic counts have been undertaken at the above-mentioned intersections and the AM and PM peak hours are identified accordingly. The AM peak hour is 7:45 am to 8:45am and the PM peak hour is 5pm to 6pm. The traffic survey were undertaken in November 2022.

The following Figures present the traffic volumes in vehicles for the weekday peak hours.

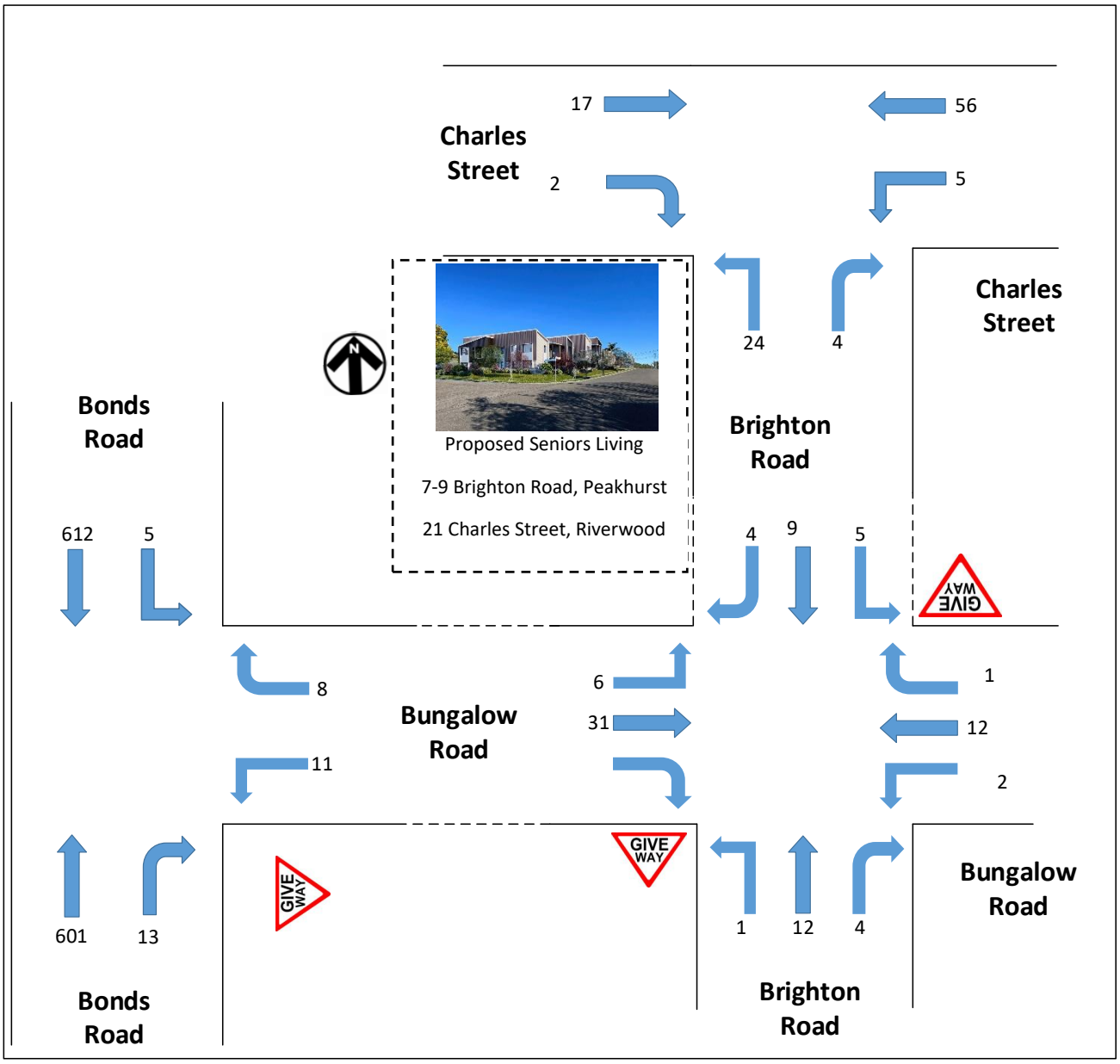

Figure 8a: Existing Weekday Traffic Volumes AM Peak Hour

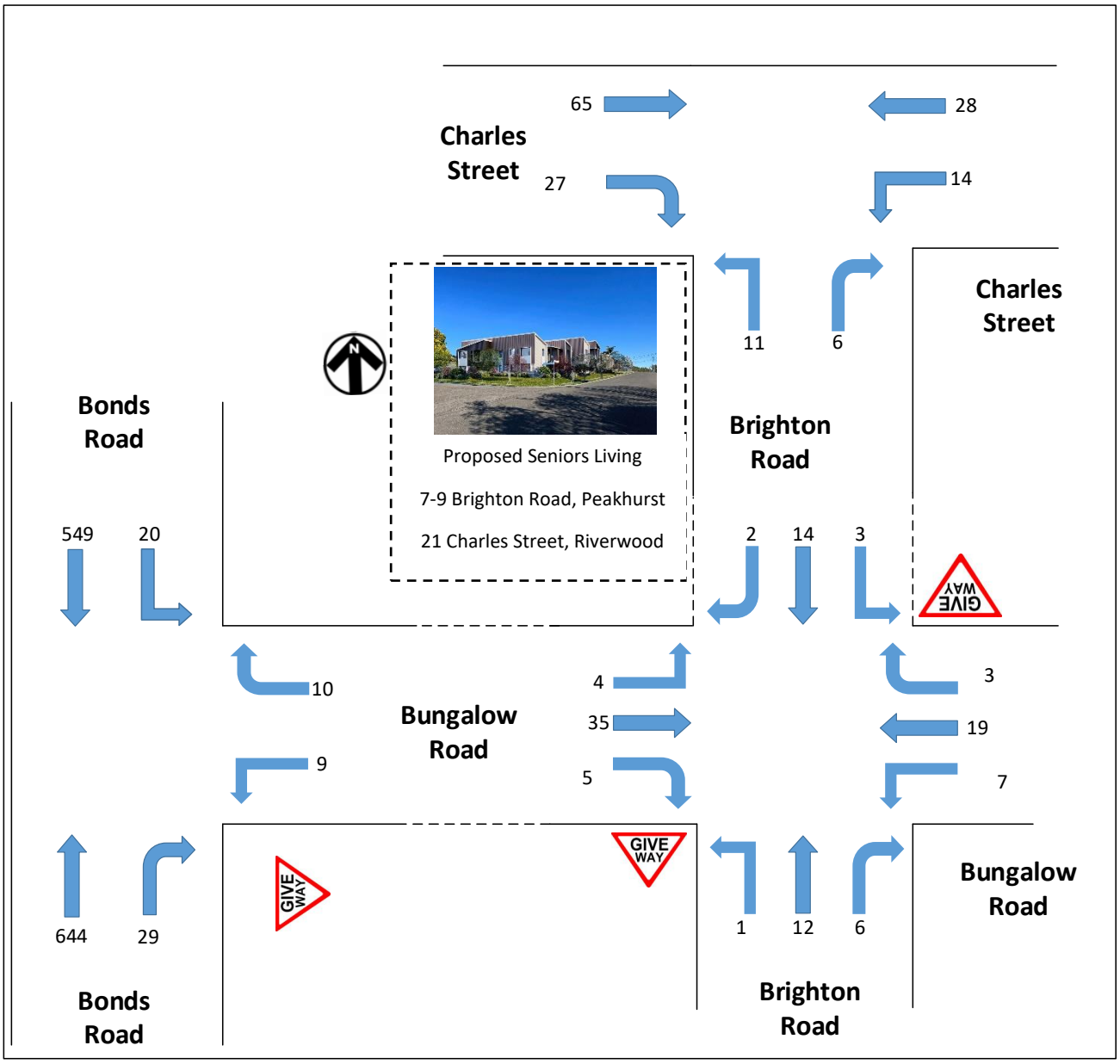

Figure 8b: Existing Weekday Traffic Volumes PM Peak Hour

2.7. Intersection Assessment with Existing Traffic

An intersection assessment has been undertaken for the:

- Priority intersection of Bonds Road with Bungalow Road
- Priority intersection of Bungalow Road with Brighton Road
- Priority intersection of Brighton Road with Charles Street

The existing intersection operating performance was assessed using the SIDRA software package (version 9.1) to determine the Degree of Saturation (DS), Average Delay (AVD in seconds) and

Level of Service (LoS) at each intersection. The SIDRA program provides Level of Service Criteria Tables for various intersection types. The key indicator of intersection performance is Level of Service, where results are placed on a continuum from 'A' to 'F', as shown in Table 1.

LoS	Traffic Signal / Roundabout	Give Way / Stop Sign / T-Junction control
A	Good operation	Good operation
B	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	Satisfactory	Satisfactory, but accident study required
D	Operating near capacity	Near capacity & accident study required
E	At capacity, at signals incidents will cause excessive delays.	At capacity, requires other control mode
F	Unsatisfactory and requires additional capacity, Roundabouts require other control mode	At capacity, requires other control mode

Table 1: Intersection Level of Service

The Average Vehicle Delay (AVD) provides a measure of the operational performance of an intersection as indicated below, which relates AVD to LOS. The AVD's should be taken as a guide only as longer delays could be tolerated in some locations (i.e. inner city conditions) and on some roads (i.e. minor side street intersecting with a major arterial route). For traffic signals, the average delay over all movements should be taken. For roundabouts and priority control intersections (sign control) the critical movement for level of service assessment should be that movement with the highest average delay.

LoS	Average Delay per Vehicles (seconds/vehicle)
A	Less than 14
B	15 to 28
C	29 to 42
D	43 to 56
E	57 to 70
F	>70

Table 2: Intersection Average Delay (AVD)

The degree of saturation (DS) is another measure of the operational performance of individual intersections. For intersections controlled by traffic signals both queue length and delay increase rapidly as DS approaches 1. It is usual to attempt to keep DS to less than 0.9. Degrees of Saturation in the order of 0.7 generally represent satisfactory intersection operation. When DS exceed 0.9 queues can be anticipated.

The results of the intersection analysis are as follows:

Intersection/ Performance criteria	AM Peak Hour Existing	PM Peak Hour Existing
Bonds Rd-Bungalow Rd *LoS* *AVD* *DS*	 N/A (Worst: F) 4 0.34	 N/A (Worst: D) 4.2 0.39
Bungalow Rd-Brighton Rd *LoS* *AVD* *DS*	 N/A(Worst: A) 2.1 0.020	 N/A(Worst: A) 2.1 0.024
Brighton Rd-Charles St *LoS* *AVD* *DS*	 N/A(Worst: A) 1.5 0.032	 N/A(Worst: A) 1.8 0.05

Table 3: Existing Intersection Performances

As presented in Table 3, all the intersections are performing well with existing traffic. However, the level of services of the right turn movement from Bonds Road to Bungalow Road is poor due to the high traffic volume on Bonds Road.

Overall, there is spare capacity to accommodate the additional traffic.

The full SIDRA results for the intersection assessment are presented in Appendix A.

2.8.Conclusion of existing conditions

The proposed seniors living is located in an area where there are a reasonable number of vacant car spaces on a weekday along Brighton Road and Charles Street.

All the intersections perform well under existing traffic volumes except the right turn movement from Bonds Road onto Bungalow Road.

The site has good access to public transport.

3.PROPOSED SENIORS LIVING

A description of the development for which approval is now sought features the following elements:

- Demolition of existing building and structures
- Construction of new seniors living

3.1.Seniors Living

The proposed seniors living consists of:

- Six 1-bedroom units
- Eight 2-bedroom units

A total of fourteen units and are affordable units.

3.2.Parking

Parking is provided on ground level. Access and egress to the ground level is via a two-way driveway runs off Brighton Road. However, one accessible car space is accessed through Charles Street. The development is being carried out under *State Environmental Planning Policy (Housing) 2021* (Housing SEPP).

The total number of car parking spaces is calculated as follows (Section 42(1)(d)):

(i) *For each dwelling containing 1 bedroom – 0.4 parking spaces,*

(ii) *For each dwelling containing 2 bedrooms – 0.5 parking spaces*

Under Section 108(2)(j) of the Housing SEPP, Senior's housing developments must provide 1 accessible car space in 5 spaces, and Schedule 4 of the Housing SEPP require these spaces to comply with AS2890.6: 2.2.1 – (a) (i) *In Australia* – 2400mm wide by 5400mm long. In addition, one of these spaces is to be designed to enable the width of the space to be increased to 3.8m.

- Seven car spaces including three accessible car spaces that comply with AS2980.6

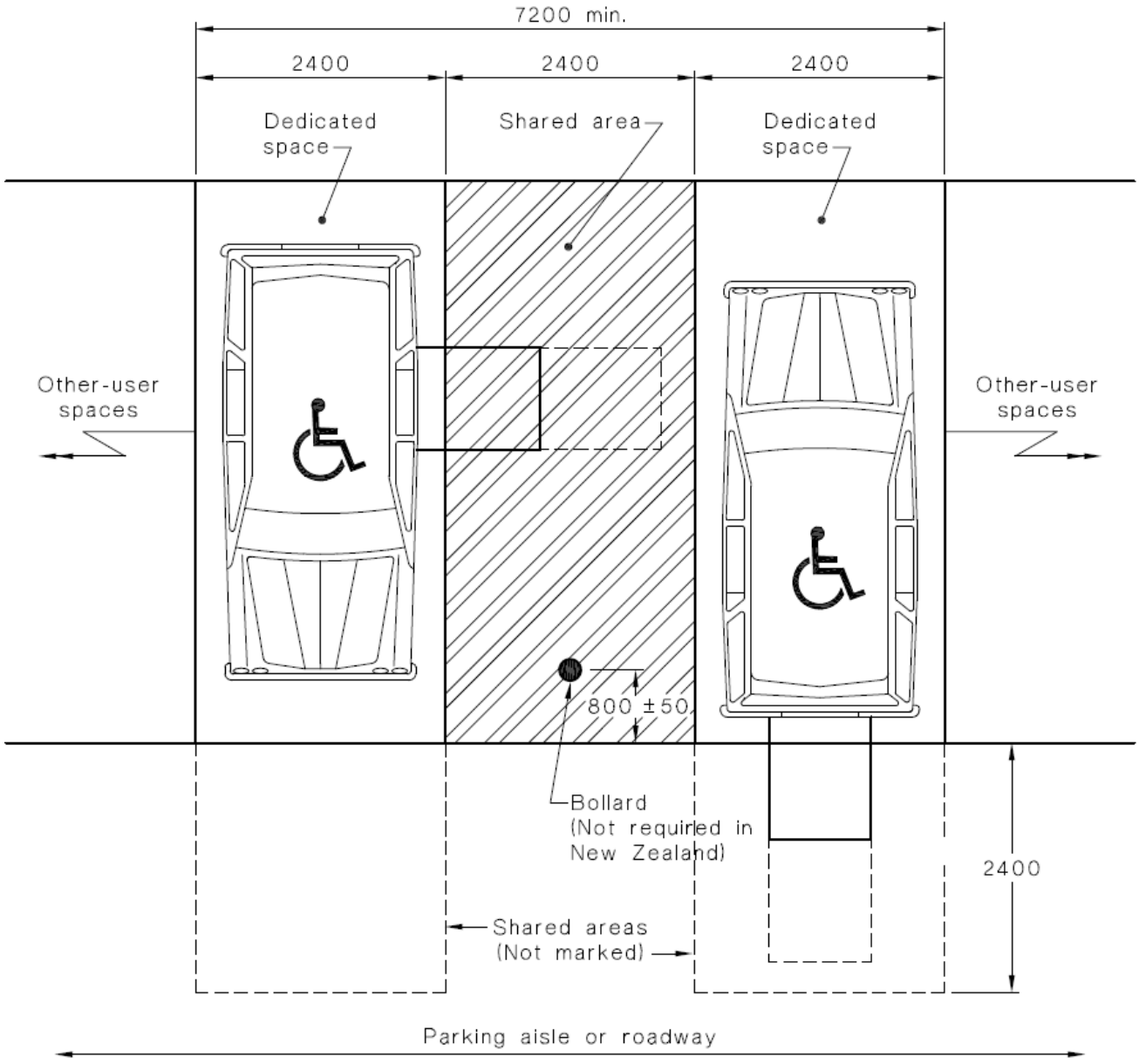

Figure 8c: AS/NZS 2890.6:2009 EXAMPLE OF TWO PARKING SPACES WITH COMMON SHARED AREA

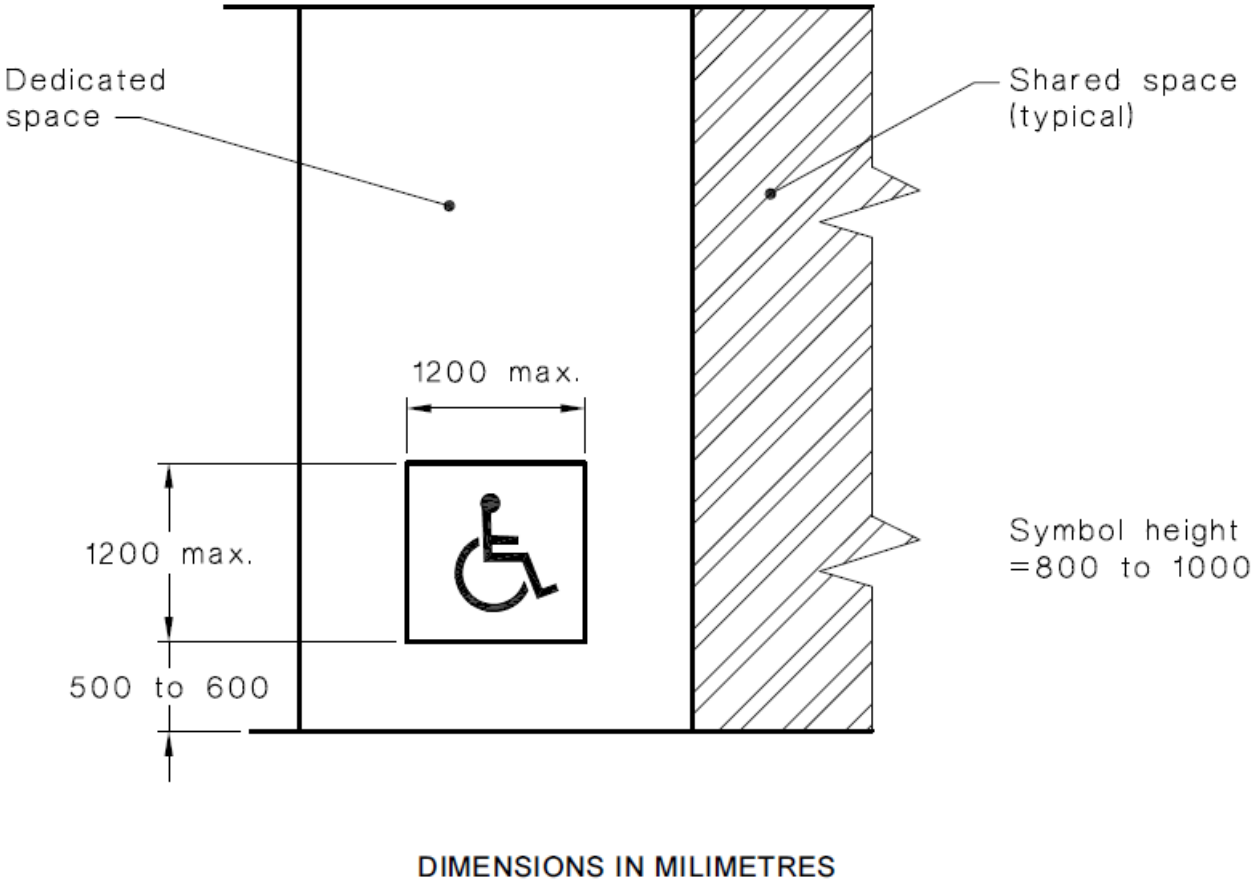

Figure 8d: AS/NZS 2890.6:2009 USE OF SYMBOL OF ACCESS TO IDENTIFY SPACES

A full scaled plan of the proposed seniors living is provided as part of the Activity.

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4. PARKING REQUIREMENTS

4.1.Car Parking

The car parking requirements for residential apartments are presented in *Statement Environmental Planning Policy (Housing) 2021 (Housing SEPP)* with the car parking rates as follows as it applies to the proposed residential dwellings (for a social provider):

- 0.4 car space per each dwelling containing 1 bedroom
- 0.5 car space per each dwelling containing 2 bedrooms

	Number	Car Parking Rate	Car Spaces Required	Car Spaces Provided
1 bedroom	3	0.4	1.2	3
2 bedroom	4	0.5	2	4
		Total	3.2	7

Table 4a: Summary of Car Parking Requirements

As presented in Table 4a above, the proposed seniors living complies with the SEPP with one car space per dwelling.

There is no requirement for visitor parking on-site. Any visitor parking will need to be met in the public parking areas. The site visit showed there vacant on-street car spaces nearby.

4.2. Bicycle Parking

Neither *Georges River Development Control Plan 2021* nor *NSW RTA Guide to Traffic Generating Developments 2002* outlines the requirements for bicycle spaces. However, the proposed seniors living is not providing any spaces. This is acceptable.

4.3.Motorcycle Parking

Neither *Georges River DCP 2021* nor *NSW RTA Guide to Traffic Generating Developments 2002* outlines the requirements for motorcycle spaces hence no motorcycle spaces are provided. This is acceptable.

5. TRAFFIC GENERATION AND IMPACT

5.1.Proposed Traffic Generation

5.1.1.Seniors Living

The *NSW RTA Guide to Traffic Generating Developments 2013* outlines the trip generation rates for a housing for seniors as follows.

- 0.4 trips per dwelling for AM peak hour
- 0.4 trips per dwelling for PM peak hour

Application of the above-mentioned rates to the proposed seniors living results the peak hour trip generation presented in Table 5a below:

Peak Hour	Use	Number of Units	Trip Generation Rate	Trip Generated
AM	Seniors living	14	0.4	6
PM			0.4	6

Table 5a: Trips generated by the proposed seniors living in weekday peak hours

The development site in currently occupied by three dwellings. The *NSW RTA Guide to Traffic Generating Developments 2002* outlines the trip generation of residential dwellings as follows:

- 0.85 trips per dwelling for both AM and PM peak hour

Application of the above-mentioned rates to the proposed residential development results the peak hour trip generation presented in Table 5b below:

Peak Hour	Use	Number of Dwellings	Trip Generation Rate	Trip Generated
AM	Residential Dwellings	1	0.85	1
PM			0.85	1

Table 5b: Trips generated by the existing residential dwellings in weekday peak hours

5.2.Trip Distribution

The proposed seniors living is a low trip generator in both AM and PM peak hours.

Table 6 shows the net trip calculation from existing and proposed trips and distributed to the road network assuming 80% origin trips 20% destination trips for the AM peak hour and 20% origin trips 80% destination trips for the PM peak hour, which results in the following:

	Peak Hour	Origin	Destination	Net Trips
PROPOSED	AM	4	2	6
	PM	2	4	6
EXISTING	AM	0	1	1
	PM	1	0	1
Net	**AM**	**4**	**1**	**5**
	PM	**1**	**4**	**5**

Table 6: Summary of Net trip generation

5.3.Traffic Volume with Seniors Living traffic

The additional development trips are assigned onto the local traffic network. The following figures present the traffic volume with the development trips (in red for origin trips and blue for destination trips) for the weekday AM and PM peak hours.

The additional development trips represent a small proportion of the existing traffic volumes.

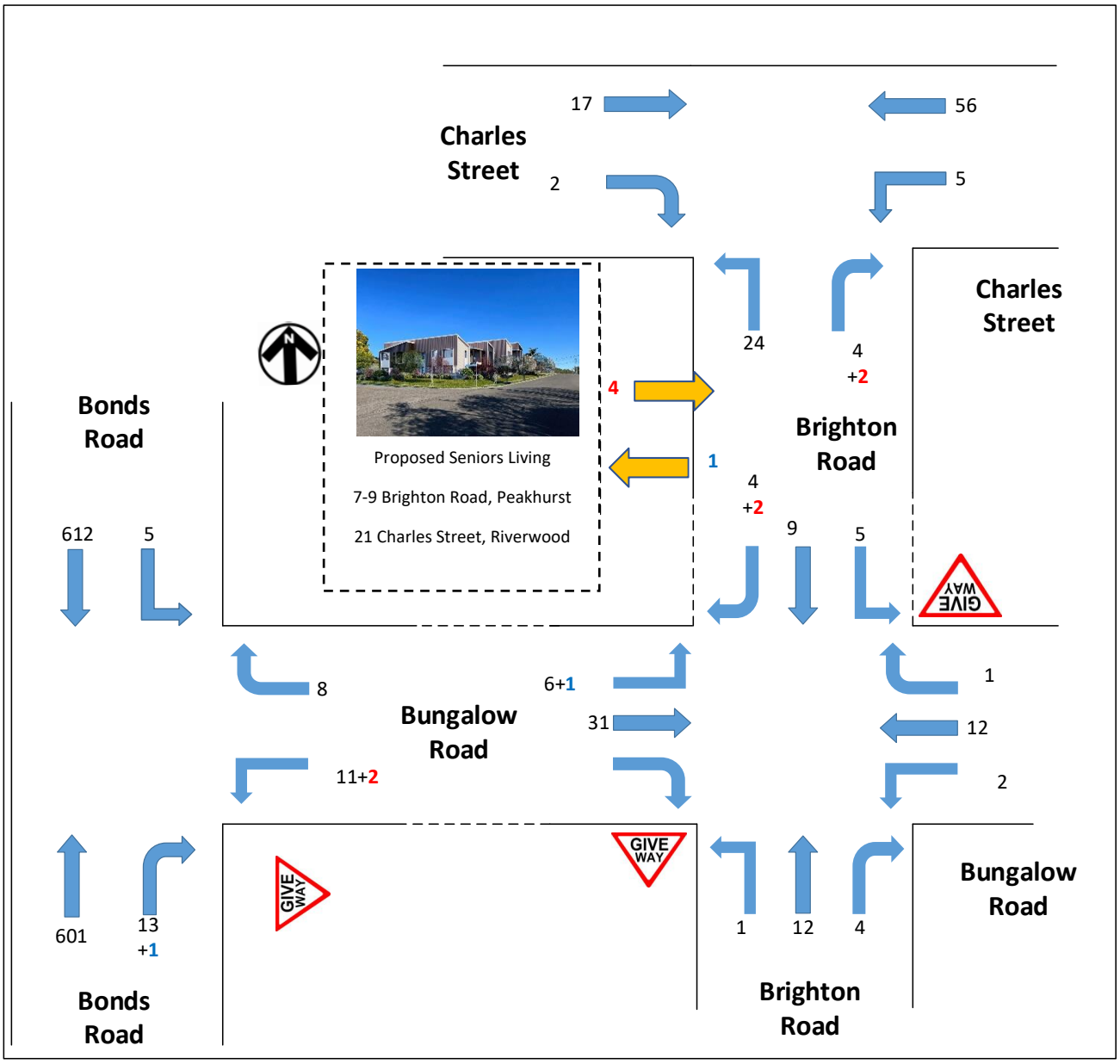


Figure 9a: Existing Weekday Traffic Volumes with seniors living traffic AM Peak Hour

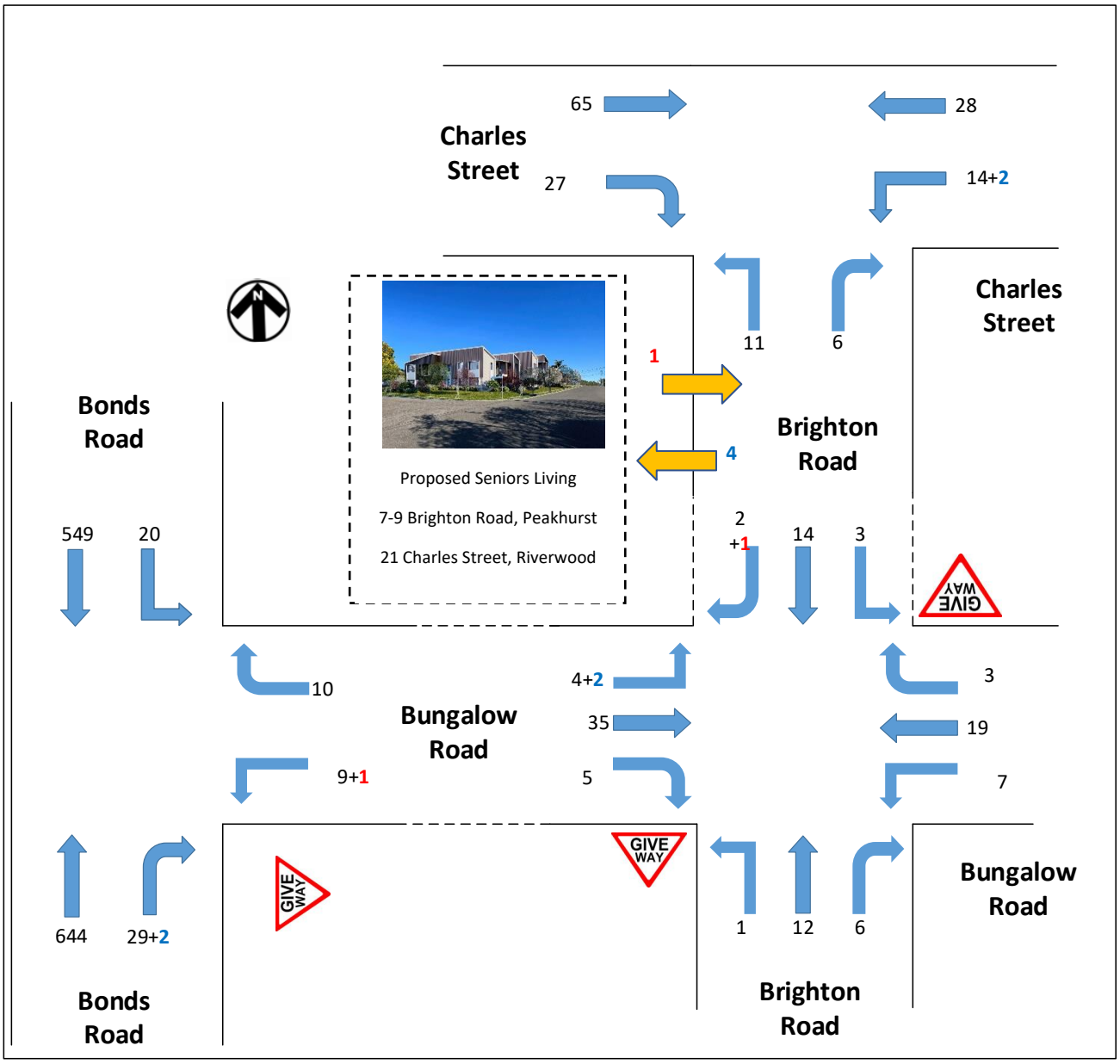


Figure 9b: Existing Weekday Traffic Volumes with seniors living traffic PM Peak Hour

5.4. Traffic Impact

This section assesses the following intersections for the existing traffic with the senior living traffic. The results of the intersection assessment are as follows:

Intersection/ Performance criteria	Performance with Existing Traffic		Projected Performance with Existing and seniors living traffic	
	AM Peak Hour Existing	PM Peak Hour Existing	AM Peak Hour Projected	PM Peak Hour Projected
Bonds Rd-Bungalow Rd *LoS* *AVD* *DS*	N/A (Worst: F) 4.0 0.34	N/A (Worst: D) 4.2 0.39	N/A (Worst: F) 4.0 0.34	N/A (Worst: D) 4.3 0.39
Bungalow Rd-Brighton Rd *LoS* *AVD* *DS*	N/A(Worst: A) 2.1 0.020	N/A(Worst: A) 2.1 0.024	N/A(Worst: A) 2.2 0.021	N/A(Worst: A) 2.2 0.025
Brighton Rd-Charles St *LoS* *AVD* *DS*	N/A(Worst: A) 1.5 0.032	N/A(Worst: A) 1.8 0.05	N/A(Worst: A) 1.6 0.033	N/A(Worst: A) 1.9 0.05

Table 7: Projected intersection performance with seniors living traffic

As presented in Table 7 above, the additional trips generated by the proposed seniors living have minimum impact on the intersection performances in both AM and PM peak hours. The LoS, AVD and DS of each intersection are not significantly affected by the addition of seniors living traffic.

The traffic impacts of the proposed seniors living are therefore considered acceptable.

The full SIDRA results are presented in Appendix B for the intersection assessment with the seniors living traffic.

6.CARPARK & DRIVEWAY CERTIFICATION OF A PROPOSED SENIORS HOUSING DEVELOPMENT

6.1.Introduction

Motion Traffic Engineers was commissioned by NSW Land and Housing Corporation to prepare a car park certification of a proposed Seniors Housing Development at 21 Charles Street and 7-9 Brighton Road in Peakhurst.

Two car park areas are provided: a single accessible car space running off Charles Street, and a parking block with vehicle access/egress via Brighton Road.

Reference is made to AS2890.1 (2004), AS2890.6 (2009), AS4299 (1995), and Council's Development Control Plan for compliance.

6.2.Driveway

The details of the proposed driveway from Brighton Road into the ground floor from the perspective of the inbound movement for description purposes are as follows:

- The driveway is 3.6 metres wide at the property line
- Gradients along the centreline of the driveway is kept below 5 percent

The details of the proposed driveway from Charles Street into the accessible car space from the perspective of the inbound movement for description purposes are as follows:

- The driveway is 3.6 metres wide at the property line
- Gradients along the centreline of the driveway are 11 percent for 7.6 metres and then 4.55 percent for 4.3 metres

The driveway location complies with Figure 3.1 of AS2900.1 and Section 3.2.3 of the same standard.

6.3.Car Spaces

The details of the car parking area are as follows for the Brighton Road car park area:

- The car parking aisle is 5.8 metres wide at minimum.
  - Maximum of 5 percent gradient is provided
- The general 90-degree and tandem car spaces are 2.4 metres wide minimum with a length of 5.6 metres
  - 300mm clearance is provided for car spaces adjacent to wall
- The disabled car space is 2.4 metres wide and 5.6 long
  - A shared zone with the same dimensions has been provided
  - Bollard with compliant setback has been provided
- Blind aisle extension of compliant width is provided

The accessible car space that is accessed off Charles Street is 4.15 metres wide and 7.3 metres long. This car space complies with AS4299. Entry is forward in and reverse out (or vice versa). Council generally permits the reverse movement for a single car space on a local road.

6.4.Swept Paths

A swept turning path analysis is performed using 4.9 metres long B85 car to confirm that vehicle movements are adequate.

The following Swept Paths have been performed:

- B85 car forward inbound and reverse outbound for car spaces adjacent to wall.
- B85 car reverse inbound and forward outbound for car space middle car space.

Swept paths for all car spaces show adequate manoeuvrability.

The cars in car space 1 to 6 can enter and leave in forward direction but the car in car space 7 cannot leave in forward direction.

The swept paths are provided in the Appendix A of this report.

6.5.Sight Distances

The car driver's vehicle sight distance requirement to enter the external road is stated in Figure 3.2 of AS2890.1.

The sight distance varies according to the speed of the external road. Brighton Road has a default speed limit of 50km/hr.

The minimum vehicle sight distance required is 45 metres. Site measurements showed that the minimum sight distance looking left and right is met.

The pedestrian sight distance as set out in Figure 3.3 of AS2890.1 is met as well.

6.6.Conclusions & Recommendations

The car parking area and driveway is compliant with Australian Standards and Council's DCP.

7. CONCLUSIONS

This traffic impact assessment reports relates to a proposed seniors living at 7-*9 Brighton Road, Peakhurst & 21 Charles Street, Riverwood*. Based on the analysis and discussions presented in this report, the following conclusions are made:

- The senior's living site is located in a *Low Density Residential(R2) zone* with good access to local public transport service. Vacant on-street parking spaces can be located along Brighton Road and Charles Street.
- All the intersections perform well with existing traffic volumes with spare capacity to accommodate additional traffic.
- The minimum car parking requirements outlined in the *State Environmental Planning Policy (Housing) 2021 (Housing SEPP) is met.*
- The proposed residential development is expected to generate low number of additional trips in both AM and PM peak hours.
- According to the intersection assessment, the additional trips can be accommodated in the nearby intersections without significantly affecting the performance of any turn movement, approach arm or the overall intersection. The traffic impacts of the proposed seniors living are therefore considered acceptable.

There are no traffic engineering reasons why a development consent for the proposed seniors living at 7-9 Brighton Road, Peakhurst & 21 Charles Street, Riverwood should be refused.

APPENDIX A

INTERSECTION ASSESSMENT FOR EXISTING TRAFFIC

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: Bonds Road															
22	T1	All MCs	633	0.0	633	0.0	0.343	3.3	LOS A	1.8	12.7	0.42	0.66	0.46	25.5
23b	R3	All MCs	14	0.0	14	0.0	0.343	98.0	LOS F	1.8	12.7	0.42	0.66	0.46	45.3
Approach			646	0.0	646	0.0	0.343	5.3	LOS A	1.8	12.7	0.42	0.66	0.46	26.0
East: Bungalow Road															
4b	L3	All MCs	12	0.0	12	0.0	0.048	6.8	LOS A	0.2	1.1	0.52	0.53	0.52	42.3
6a	R1	All MCs	8	0.0	8	0.0	0.048	19.4	LOS B	0.2	1.1	0.52	0.53	0.52	23.7
Approach			20	0.0	20	0.0	0.048	12.1	LOS A	0.2	1.1	0.52	0.53	0.52	34.6
NorthWest: Bonds Road															
27a	L1	All MCs	5	0.0	5	0.0	0.056	3.3	LOS A	0.0	0.0	0.00	0.45	0.00	45.0
28	T1	All MCs	644	0.0	644	0.0	0.278	2.4	LOS A	0.0	0.0	0.00	0.45	0.00	45.9
Approach			649	0.0	649	0.0	0.278	2.4	LOS A	0.0	0.0	0.00	0.45	0.00	45.9
All Vehicles			1316	0.0	1316	0.0	0.343	4.0	NA	1.8	12.7	0.22	0.55	0.23	33.1

Table A1: Weekday Priority Intersection Performance of Bonds Road with Bungalow Road for the AM Peak Hour

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
South: Brighton Road															
1	L2	All MCs	1	0.0	1	0.0	0.015	4.6	LOS A	0.1	0.4	0.12	0.47	0.12	39.9
2	T1	All MCs	13	0.0	13	0.0	0.015	3.4	LOS A	0.1	0.4	0.12	0.47	0.12	35.0
3	R2	All MCs	4	0.0	4	0.0	0.015	4.8	LOS A	0.1	0.4	0.12	0.47	0.12	39.9
Approach			18	0.0	18	0.0	0.015	3.8	LOS A	0.1	0.4	0.12	0.47	0.12	37.0
East: Bungalow Road															
4	L2	All MCs	2	0.0	2	0.0	0.008	4.6	LOS A	0.0	0.1	0.02	0.11	0.02	44.8
5	T1	All MCs	13	0.0	13	0.0	0.008	0.0	LOS A	0.0	0.1	0.02	0.11	0.02	48.6
6	R2	All MCs	1	0.0	1	0.0	0.008	4.7	LOS A	0.0	0.1	0.02	0.11	0.02	44.3
Approach			16	0.0	16	0.0	0.008	0.9	NA	0.0	0.1	0.02	0.11	0.02	48.0
North: Brighton Road															
7	L2	All MCs	5	0.0	5	0.0	0.015	4.6	LOS A	0.1	0.4	0.12	0.48	0.12	40.1
8	T1	All MCs	9	0.0	9	0.0	0.015	3.3	LOS A	0.1	0.4	0.12	0.48	0.12	34.6
9	R2	All MCs	4	0.0	4	0.0	0.015	4.8	LOS A	0.1	0.4	0.12	0.48	0.12	39.1
Approach			19	0.0	19	0.0	0.015	4.0	LOS A	0.1	0.4	0.12	0.48	0.12	37.8
West: Bungalow Road															
10	L2	All MCs	6	0.0	6	0.0	0.021	4.6	LOS A	0.0	0.1	0.01	0.10	0.01	44.8
11	T1	All MCs	33	0.0	33	0.0	0.021	0.0	LOS A	0.0	0.1	0.01	0.10	0.01	48.8
12	R2	All MCs	1	0.0	1	0.0	0.021	4.6	LOS A	0.0	0.1	0.01	0.10	0.01	44.2
Approach			40	0.0	40	0.0	0.021	0.8	NA	0.0	0.1	0.01	0.10	0.01	48.2
All Vehicles			93	0.0	93	0.0	0.021	2.1	NA	0.1	0.4	0.05	0.25	0.05	44.9

Table A2: Weekday Priority Intersection Performance of Bungalow Road with Brighton Road for the AM Peak Hour

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
South: Brighton Road															
1	L2	All MCs	25	0.0	25	0.0	0.020	4.7	LOS A	0.1	0.5	0.14	0.50	0.14	38.6
3	R2	All MCs	4	0.0	4	0.0	0.020	4.8	LOS A	0.1	0.5	0.14	0.50	0.14	37.6
Approach			29	0.0	29	0.0	0.020	4.7	LOS A	0.1	0.5	0.14	0.50	0.14	38.5
East: Charles Street															
4	L2	All MCs	5	0.0	5	0.0	0.033	4.6	LOS A	0.0	0.0	0.00	0.04	0.00	45.4
5	T1	All MCs	59	0.0	59	0.0	0.033	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	49.4
Approach			64	0.0	64	0.0	0.033	0.4	NA	0.0	0.0	0.00	0.04	0.00	49.2
West: Charles Street															
11	T1	All MCs	18	0.0	18	0.0	0.010	0.0	LOS A	0.0	0.0	0.02	0.03	0.02	49.5
12	R2	All MCs	1	0.0	1	0.0	0.010	4.7	LOS A	0.0	0.0	0.02	0.03	0.02	45.1
Approach			19	0.0	19	0.0	0.010	0.3	NA	0.0	0.0	0.02	0.03	0.02	49.3
All Vehicles			113	0.0	113	0.0	0.033	1.5	NA	0.1	0.5	0.04	0.16	0.04	46.5

Table A3: Weekday Priority Intersection Performance of Charles Street with Brighton Road for the AM Peak Hour

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
South: Brighton Road															
1	L2	All MCs	25	0.0	25	0.0	0.020	4.7	LOS A	0.1	0.5	0.14	0.50	0.14	38.6
3	R2	All MCs	4	0.0	4	0.0	0.020	4.8	LOS A	0.1	0.5	0.14	0.50	0.14	37.6
Approach			29	0.0	29	0.0	0.020	4.7	LOS A	0.1	0.5	0.14	0.50	0.14	38.5
East: Charles Street															
4	L2	All MCs	5	0.0	5	0.0	0.033	4.6	LOS A	0.0	0.0	0.00	0.04	0.00	45.4
5	T1	All MCs	59	0.0	59	0.0	0.033	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	49.4
Approach			64	0.0	64	0.0	0.033	0.4	NA	0.0	0.0	0.00	0.04	0.00	49.2
West: Charles Street															
11	T1	All MCs	18	0.0	18	0.0	0.010	0.0	LOS A	0.0	0.0	0.02	0.03	0.02	49.5
12	R2	All MCs	1	0.0	1	0.0	0.010	4.7	LOS A	0.0	0.0	0.02	0.03	0.02	45.1
Approach			19	0.0	19	0.0	0.010	0.3	NA	0.0	0.0	0.02	0.03	0.02	49.3
All Vehicles			113	0.0	113	0.0	0.033	1.5	NA	0.1	0.5	0.04	0.16	0.04	46.5

Table A4: Weekday Priority Intersection Performance of Bonds Road with Bungalow Road for the PM Peak Hour

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
South: Brighton Road															
1	L2	All MCs	1	0.0	1	0.0	0.017	4.6	LOS A	0.1	0.4	0.15	0.47	0.15	39.6
2	T1	All MCs	13	0.0	13	0.0	0.017	3.4	LOS A	0.1	0.4	0.15	0.47	0.15	34.6
3	R2	All MCs	6	0.0	6	0.0	0.017	4.9	LOS A	0.1	0.4	0.15	0.47	0.15	39.6
Approach			20	0.0	20	0.0	0.017	4.0	LOS A	0.1	0.4	0.15	0.47	0.15	37.1
East: Bungalow Road															
4	L2	All MCs	7	0.0	7	0.0	0.016	4.6	LOS A	0.0	0.2	0.04	0.19	0.04	43.7
5	T1	All MCs	20	0.0	20	0.0	0.016	0.0	LOS A	0.0	0.2	0.04	0.19	0.04	47.7
6	R2	All MCs	3	0.0	3	0.0	0.016	4.7	LOS A	0.0	0.2	0.04	0.19	0.04	43.2
Approach			31	0.0	31	0.0	0.016	1.6	NA	0.0	0.2	0.04	0.19	0.04	46.5
North: Brighton Road															
7	L2	All MCs	3	0.0	3	0.0	0.016	4.7	LOS A	0.1	0.4	0.14	0.46	0.14	40.4
8	T1	All MCs	15	0.0	15	0.0	0.016	3.4	LOS A	0.1	0.4	0.14	0.46	0.14	35.0
9	R2	All MCs	2	0.0	2	0.0	0.016	4.9	LOS A	0.1	0.4	0.14	0.46	0.14	39.4
Approach			20	0.0	20	0.0	0.016	3.8	LOS A	0.1	0.4	0.14	0.46	0.14	36.9
West: Bungalow Road															
10	L2	All MCs	4	0.0	4	0.0	0.024	4.6	LOS A	0.0	0.3	0.03	0.11	0.03	44.5
11	T1	All MCs	37	0.0	37	0.0	0.024	0.0	LOS A	0.0	0.3	0.03	0.11	0.03	48.6
12	R2	All MCs	5	0.0	5	0.0	0.024	4.6	LOS A	0.0	0.3	0.03	0.11	0.03	43.8
Approach			46	0.0	46	0.0	0.024	0.9	NA	0.0	0.3	0.03	0.11	0.03	47.9
All Vehicles			117	0.0	117	0.0	0.024	2.1	NA	0.1	0.4	0.07	0.25	0.07	44.7

Table A5: Weekday Priority Intersection Performance of Bungalow Road with Brighton Road for the PM Peak Hour

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
South: Brighton Road															
1	L2	All MCs	12	0.0	12	0.0	0.013	4.6	LOS A	0.0	0.3	0.11	0.51	0.11	38.8
3	R2	All MCs	6	0.0	6	0.0	0.013	5.0	LOS A	0.0	0.3	0.11	0.51	0.11	37.7
Approach			18	0.0	18	0.0	0.013	4.8	LOS A	0.0	0.3	0.11	0.51	0.11	38.4
East: Charles Street															
4	L2	All MCs	15	0.0	15	0.0	0.023	4.6	LOS A	0.0	0.0	0.00	0.18	0.00	43.3
5	T1	All MCs	29	0.0	29	0.0	0.023	0.0	LOS A	0.0	0.0	0.00	0.18	0.00	47.8
Approach			44	0.0	44	0.0	0.023	1.5	NA	0.0	0.0	0.00	0.18	0.00	46.5
West: Charles Street															
11	T1	All MCs	68	0.0	68	0.0	0.052	0.0	LOS A	0.2	1.1	0.08	0.17	0.08	47.6
12	R2	All MCs	28	0.0	28	0.0	0.052	4.8	LOS A	0.2	1.1	0.08	0.17	0.08	42.9
Approach			97	0.0	97	0.0	0.052	1.4	NA	0.2	1.1	0.08	0.17	0.08	46.4
All Vehicles			159	0.0	159	0.0	0.052	1.8	NA	0.2	1.1	0.06	0.21	0.06	45.6

Table A6: Weekday Priority Intersection Performance of Charles Street with Brighton Road for the PM Peak Hour

APPENDIX B

INTERSECTION ASSESSMENT WITH SENIORS LIVING TRAFFIC

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: Bonds Road															
22	T1	All MCs	633	0.0	633	0.0	0.344	3.3	LOS A	1.8	12.9	0.42	0.66	0.46	25.5
23b	R3	All MCs	15	0.0	15	0.0	0.344	91.8	LOS F	1.8	12.9	0.42	0.66	0.46	45.3
Approach			647	0.0	647	0.0	0.344	5.3	LOS A	1.8	12.9	0.42	0.66	0.46	26.0
East: Bungalow Road															
4b	L3	All MCs	14	0.0	14	0.0	0.050	6.9	LOS A	0.2	1.1	0.50	0.53	0.50	42.6
6a	R1	All MCs	8	0.0	8	0.0	0.050	19.5	LOS B	0.2	1.1	0.50	0.53	0.50	23.9
Approach			22	0.0	22	0.0	0.050	11.7	LOS A	0.2	1.1	0.50	0.53	0.50	35.5
NorthWest: Bonds Road															
27a	L1	All MCs	5	0.0	5	0.0	0.056	3.3	LOS A	0.0	0.0	0.00	0.45	0.00	45.0
28	T1	All MCs	644	0.0	644	0.0	0.278	2.4	LOS A	0.0	0.0	0.00	0.45	0.00	45.9
Approach			649	0.0	649	0.0	0.278	2.4	LOS A	0.0	0.0	0.00	0.45	0.00	45.9
All Vehicles			1319	0.0	1319	0.0	0.344	4.0	NA	1.8	12.9	0.22	0.55	0.23	33.2

Table B1: Weekday Priority Intersection Performance of Bonds Road with Bungalow Road for the AM Peak Hour with seniors living traffic

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
South: Brighton Road															
1	L2	All MCs	1	0.0	1	0.0	0.015	4.6	LOS A	0.1	0.4	0.12	0.47	0.12	39.9
2	T1	All MCs	13	0.0	13	0.0	0.015	3.4	LOS A	0.1	0.4	0.12	0.47	0.12	35.0
3	R2	All MCs	4	0.0	4	0.0	0.015	4.8	LOS A	0.1	0.4	0.12	0.47	0.12	39.9
Approach			18	0.0	18	0.0	0.015	3.8	LOS A	0.1	0.4	0.12	0.47	0.12	37.0
East: Bungalow Road															
4	L2	All MCs	2	0.0	2	0.0	0.008	4.6	LOS A	0.0	0.1	0.02	0.11	0.02	44.8
5	T1	All MCs	13	0.0	13	0.0	0.008	0.0	LOS A	0.0	0.1	0.02	0.11	0.02	48.6
6	R2	All MCs	1	0.0	1	0.0	0.008	4.7	LOS A	0.0	0.1	0.02	0.11	0.02	44.3
Approach			16	0.0	16	0.0	0.008	0.9	NA	0.0	0.1	0.02	0.11	0.02	48.0
North: Brighton Road															
7	L2	All MCs	5	0.0	5	0.0	0.017	4.6	LOS A	0.1	0.4	0.12	0.48	0.12	40.0
8	T1	All MCs	9	0.0	9	0.0	0.017	3.4	LOS A	0.1	0.4	0.12	0.48	0.12	34.4
9	R2	All MCs	6	0.0	6	0.0	0.017	4.8	LOS A	0.1	0.4	0.12	0.48	0.12	39.0
Approach			21	0.0	21	0.0	0.017	4.1	LOS A	0.1	0.4	0.12	0.48	0.12	37.8
West: Bungalow Road															
10	L2	All MCs	7	0.0	7	0.0	0.021	4.6	LOS A	0.0	0.1	0.01	0.11	0.01	44.6
11	T1	All MCs	33	0.0	33	0.0	0.021	0.0	LOS A	0.0	0.1	0.01	0.11	0.01	48.7
12	R2	All MCs	1	0.0	1	0.0	0.021	4.6	LOS A	0.0	0.1	0.01	0.11	0.01	44.0
Approach			41	0.0	41	0.0	0.021	0.9	NA	0.0	0.1	0.01	0.11	0.01	48.0
All Vehicles			96	0.0	96	0.0	0.021	2.2	NA	0.1	0.4	0.06	0.26	0.06	44.7

Table B2: Weekday Priority Intersection Performance of Bungalow Road with Brighton Road for the AM Peak Hour with seniors living traffic

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
South: Brighton Road															
1	L2	All MCs	25	0.0	25	0.0	0.021	4.7	LOS A	0.1	0.6	0.14	0.50	0.14	38.6
3	R2	All MCs	6	0.0	6	0.0	0.021	4.8	LOS A	0.1	0.6	0.14	0.50	0.14	37.6
Approach			32	0.0	32	0.0	0.021	4.7	LOS A	0.1	0.6	0.14	0.50	0.14	38.4
East: Charles Street															
4	L2	All MCs	5	0.0	5	0.0	0.033	4.6	LOS A	0.0	0.0	0.00	0.04	0.00	45.4
5	T1	All MCs	59	0.0	59	0.0	0.033	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	49.4
Approach			64	0.0	64	0.0	0.033	0.4	NA	0.0	0.0	0.00	0.04	0.00	49.2
West: Charles Street															
11	T1	All MCs	18	0.0	18	0.0	0.010	0.0	LOS A	0.0	0.0	0.02	0.03	0.02	49.5
12	R2	All MCs	1	0.0	1	0.0	0.010	4.7	LOS A	0.0	0.0	0.02	0.03	0.02	45.1
Approach			19	0.0	19	0.0	0.010	0.3	NA	0.0	0.0	0.02	0.03	0.02	49.3
All Vehicles			115	0.0	115	0.0	0.033	1.6	NA	0.1	0.6	0.04	0.17	0.04	46.3

Table B3: Weekday Priority Intersection Performance of Charles Street with Brighton Road for the AM Peak Hour with seniors living traffic

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: Bonds Road															
22	T1	All MCs	678	0.0	678	0.0	0.391	3.4	LOS A	2.3	16.2	0.42	0.65	0.51	25.5
23b	R3	All MCs	33	0.0	33	0.0	0.391	46.3	LOS D	2.3	16.2	0.42	0.65	0.51	45.3
Approach			711	0.0	711	0.0	0.391	5.4	LOS A	2.3	16.2	0.42	0.65	0.51	26.4
East: Bungalow Road															
4b	L3	All MCs	11	0.0	11	0.0	0.058	6.6	LOS A	0.2	1.3	0.54	0.52	0.54	41.7
6a	R1	All MCs	11	0.0	11	0.0	0.058	19.6	LOS B	0.2	1.3	0.54	0.52	0.54	23.4
Approach			21	0.0	21	0.0	0.058	13.1	LOS A	0.2	1.3	0.54	0.52	0.54	32.6
NorthWest: Bonds Road															
27a	L1	All MCs	21	0.0	21	0.0	0.051	3.3	LOS A	0.0	0.0	0.00	0.46	0.00	44.8
28	T1	All MCs	578	0.0	578	0.0	0.256	2.4	LOS A	0.0	0.0	0.00	0.45	0.00	45.8
Approach			599	0.0	599	0.0	0.256	2.4	LOS A	0.0	0.0	0.00	0.45	0.00	45.8
All Vehicles			1331	0.0	1331	0.0	0.391	4.2	NA	2.3	16.2	0.23	0.56	0.28	32.6

Table B4: Weekday Priority Intersection Performance of Bonds Road with Bungalow Road for the PM Peak Hour with seniors living traffic

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
South: Brighton Road															
1	L2	All MCs	1	0.0	1	0.0	0.017	4.6	LOS A	0.1	0.4	0.15	0.47	0.15	39.6
2	T1	All MCs	13	0.0	13	0.0	0.017	3.4	LOS A	0.1	0.4	0.15	0.47	0.15	34.6
3	R2	All MCs	6	0.0	6	0.0	0.017	4.9	LOS A	0.1	0.4	0.15	0.47	0.15	39.6
Approach			20	0.0	20	0.0	0.017	4.0	LOS A	0.1	0.4	0.15	0.47	0.15	37.1
East: Bungalow Road															
4	L2	All MCs	7	0.0	7	0.0	0.016	4.6	LOS A	0.0	0.2	0.04	0.19	0.04	43.7
5	T1	All MCs	20	0.0	20	0.0	0.016	0.0	LOS A	0.0	0.2	0.04	0.19	0.04	47.7
6	R2	All MCs	3	0.0	3	0.0	0.016	4.7	LOS A	0.0	0.2	0.04	0.19	0.04	43.2
Approach			31	0.0	31	0.0	0.016	1.6	NA	0.0	0.2	0.04	0.19	0.04	46.5
North: Brighton Road															
7	L2	All MCs	3	0.0	3	0.0	0.017	4.7	LOS A	0.1	0.4	0.15	0.47	0.15	40.3
8	T1	All MCs	15	0.0	15	0.0	0.017	3.4	LOS A	0.1	0.4	0.15	0.47	0.15	34.9
9	R2	All MCs	3	0.0	3	0.0	0.017	4.9	LOS A	0.1	0.4	0.15	0.47	0.15	39.4
Approach			21	0.0	21	0.0	0.017	3.8	LOS A	0.1	0.4	0.15	0.47	0.15	36.9
West: Bungalow Road															
10	L2	All MCs	6	0.0	6	0.0	0.025	4.6	LOS A	0.0	0.3	0.03	0.13	0.03	44.2
11	T1	All MCs	37	0.0	37	0.0	0.025	0.0	LOS A	0.0	0.3	0.03	0.13	0.03	48.3
12	R2	All MCs	5	0.0	5	0.0	0.025	4.6	LOS A	0.0	0.3	0.03	0.13	0.03	43.6
Approach			48	0.0	48	0.0	0.025	1.1	NA	0.0	0.3	0.03	0.13	0.03	47.5
All Vehicles			120	0.0	120	0.0	0.025	2.2	NA	0.1	0.4	0.07	0.26	0.07	44.6

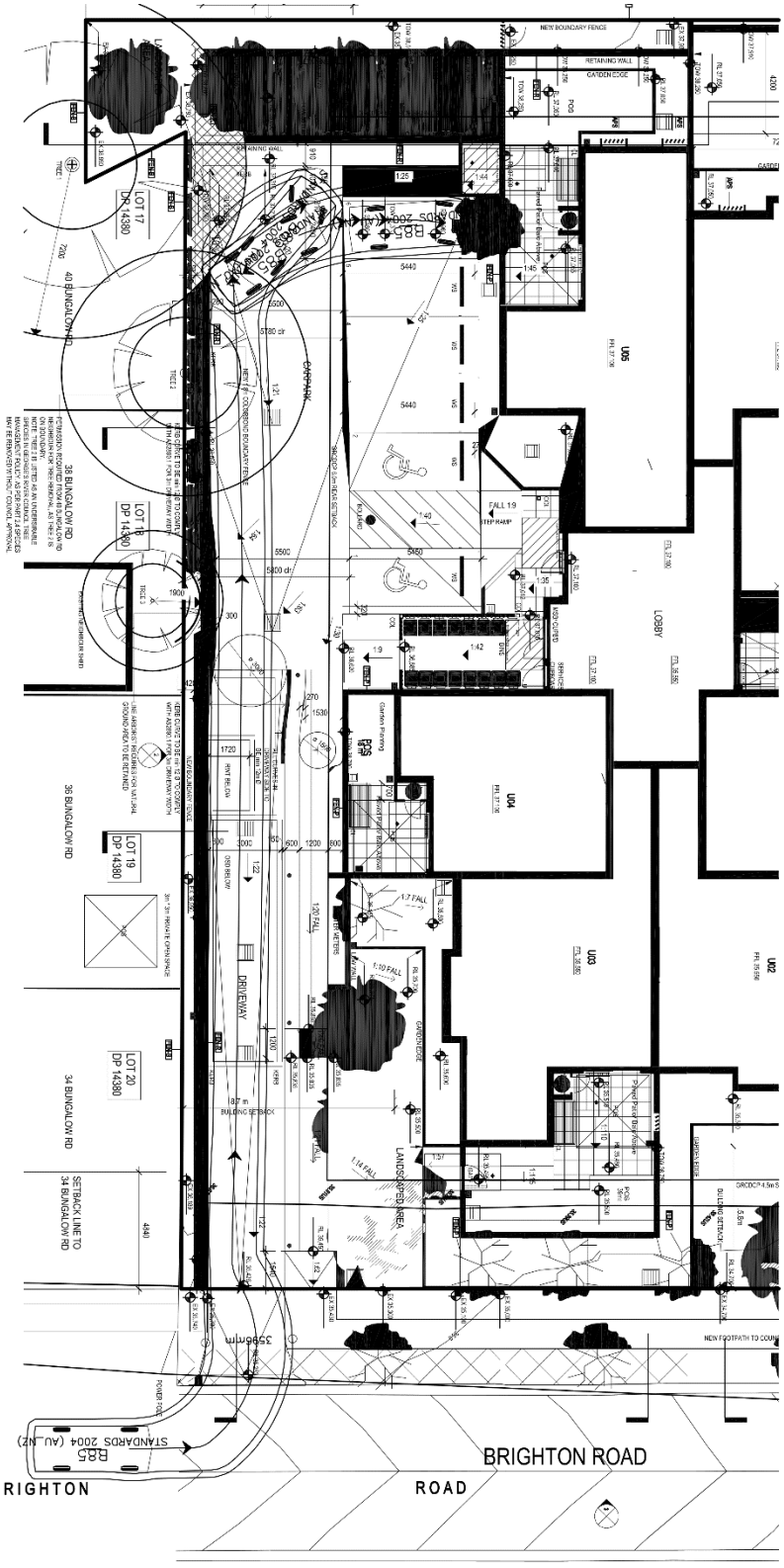
Table B5: Weekday Priority Intersection Performance of Bungalow Road with Brighton Road for the PM Peak Hour with seniors living traffic

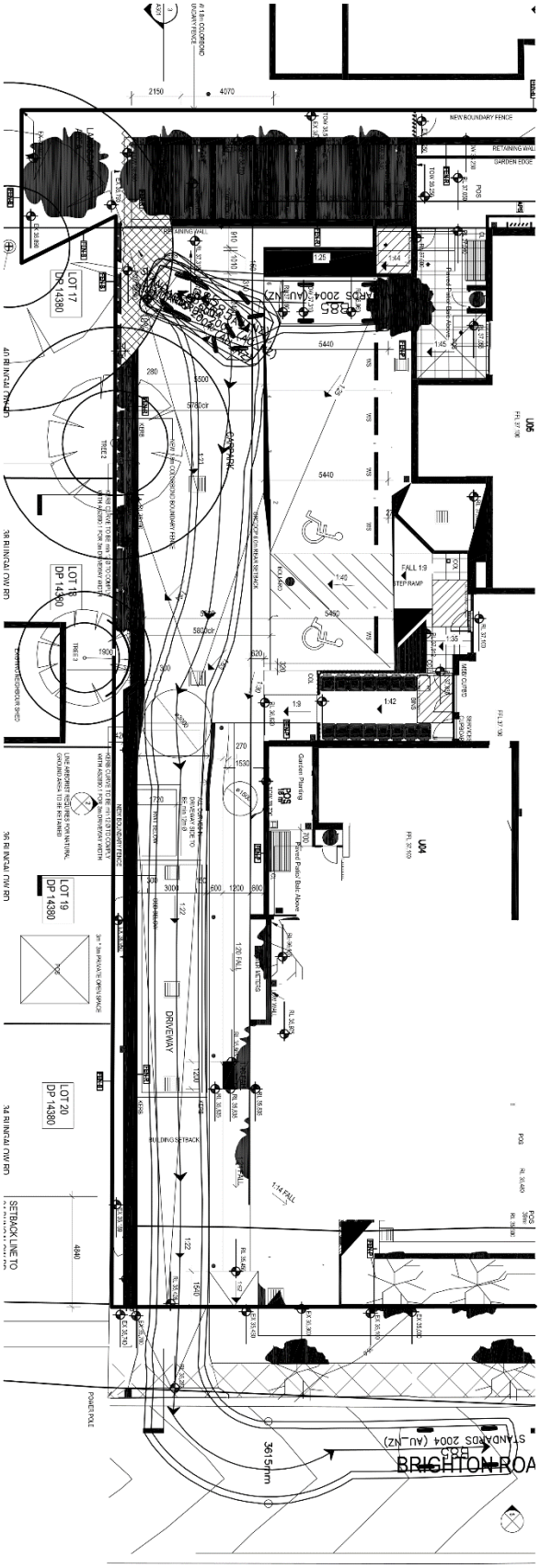
Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Brighton Road															
1	L2	All MCs	12	0.0	12	0.0	0.013	4.6	LOS A	0.0	0.3	0.11	0.51	0.11	38.8
3	R2	All MCs	6	0.0	6	0.0	0.013	5.0	LOS A	0.0	0.3	0.11	0.51	0.11	37.7
Approach			18	0.0	18	0.0	0.013	4.8	LOS A	0.0	0.3	0.11	0.51	0.11	38.4
East: Charles Street															
4	L2	All MCs	17	0.0	17	0.0	0.024	4.6	LOS A	0.0	0.0	0.00	0.20	0.00	43.1
5	T1	All MCs	29	0.0	29	0.0	0.024	0.0	LOS A	0.0	0.0	0.00	0.20	0.00	47.6
Approach			46	0.0	46	0.0	0.024	1.7	NA	0.0	0.0	0.00	0.20	0.00	46.2
West: Charles Street															
11	T1	All MCs	68	0.0	68	0.0	0.052	0.0	LOS A	0.2	1.1	0.08	0.17	0.08	47.6
12	R2	All MCs	28	0.0	28	0.0	0.052	4.8	LOS A	0.2	1.1	0.08	0.17	0.08	42.9
Approach			97	0.0	97	0.0	0.052	1.4	NA	0.2	1.1	0.08	0.17	0.08	46.4
All Vehicles			161	0.0	161	0.0	0.052	1.9	NA	0.2	1.1	0.06	0.22	0.06	45.5

Table B6: Weekday Priority Intersection Performance of Charles Street with Brighton Road for the PM Peak Hour with seniors living traffic

APPENDIX C

SWEPT PATHS

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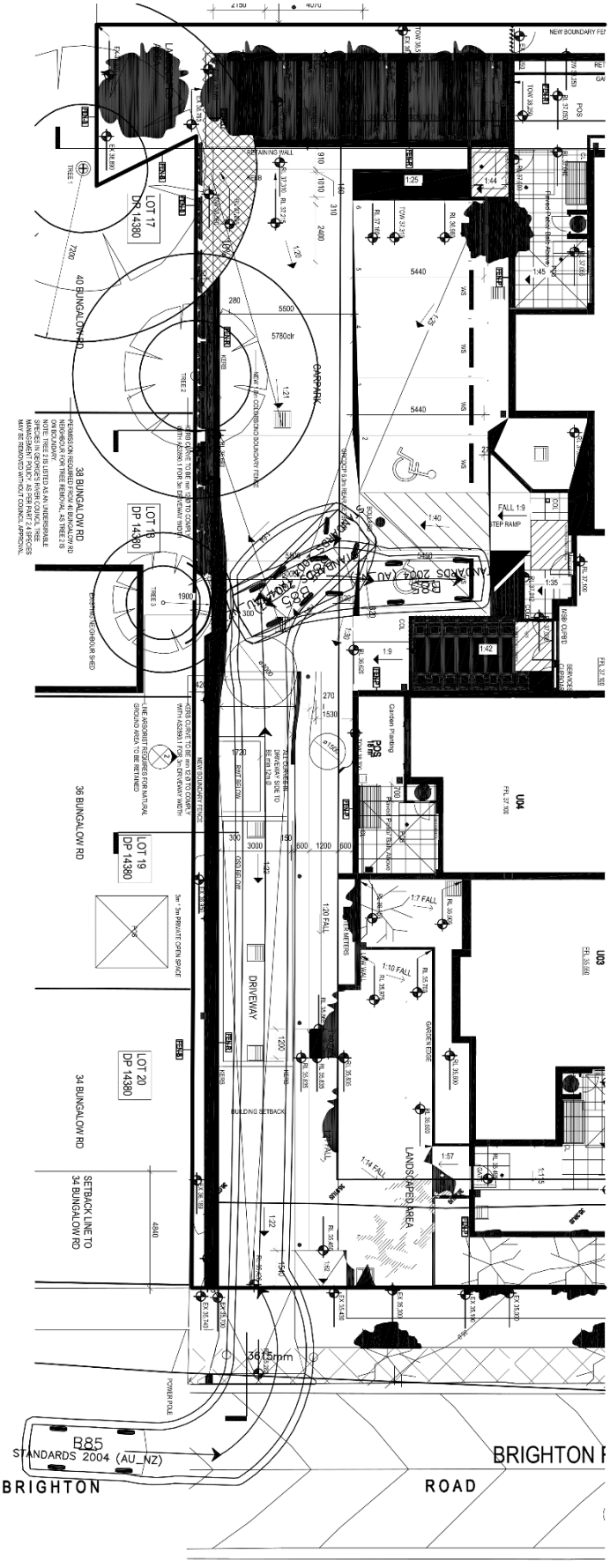
DP 14380
LOT 18
DP 14380
LOT 19
DP 14380
LOT 20
DP 14380
DRIVEWAY
BRIGHTON ROA
NEW BOUNDARY FENCE
RETAINING WALL
GARDEN EDGE
BUILDING SETBACK
SETBACK LINE TO
POWER POLE
STANDARDS 2004 (AU_NZ)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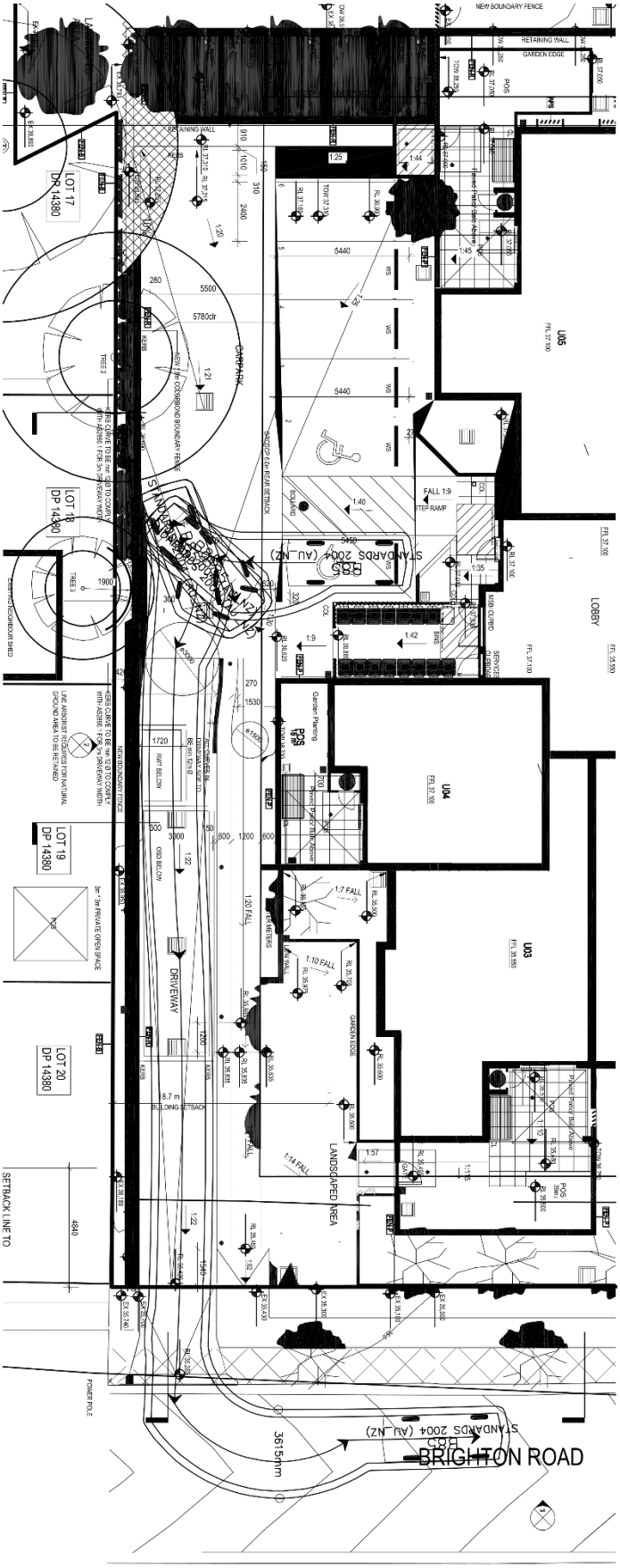
DP 14380
40 BUNGALOW RD
LOT 18
DP 14380
38 BUNGALOW RD
LOT 19
DP 14380
36 BUNGALOW RD
LOT 20
DP 14380
34 BUNGALOW RD
DRIVEWAY
CARPARK
SETBACK LINE TO
34 BUNGALOW RD
LANDSCAPED AREA
BUILDING SETBACK
B85
STANDARDS 2004 (AU_NZ)
BRIGHTON
ROAD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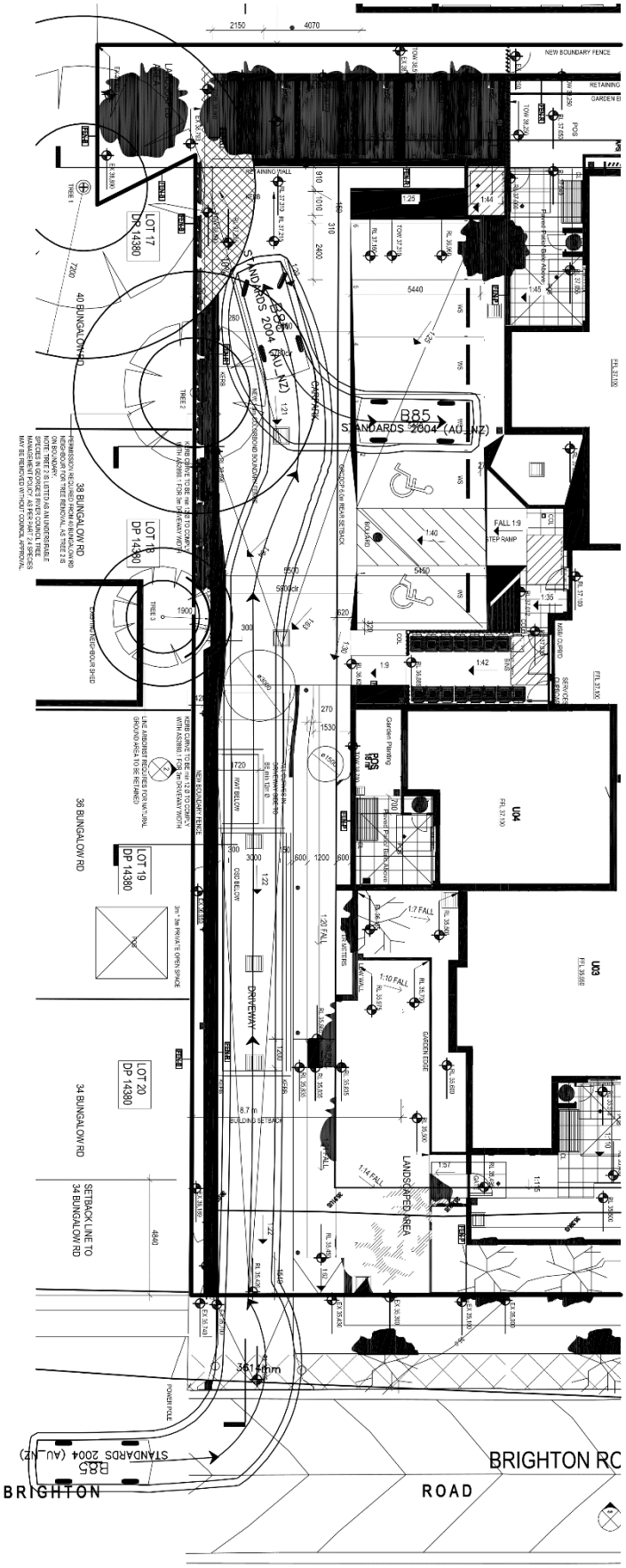
RETAINING WALL
GARDEN EDGE
POS
LOT 17 DP 14380
LOT 18 DP 14380
LOT 19 DP 14380
LOT 20 DP 14380
U05
U04
U03
LOBBY
DRIVEWAY
LANDSCAPED AREA
STANDARDS 2004 (AU_NZ)
BRIGHTON ROAD
SETBACK LINE TO
POWER POLE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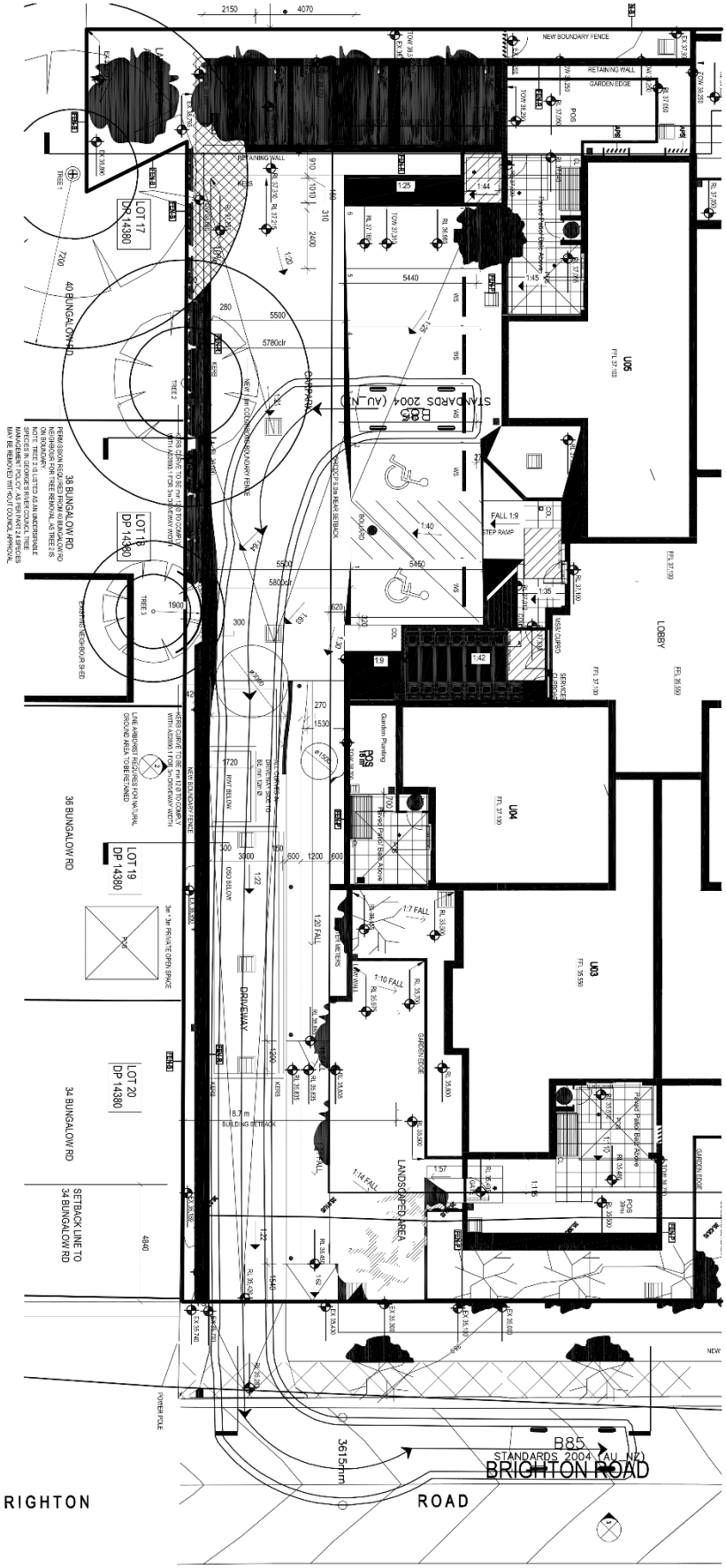
RETAINING
LOT 17 DP 14380
40 BUNGALOW RD
B85 STANDARDS 2004 (AU_NZ)
CROSSOVER
LOT 18 DP 14380
39 BUNGALOW RD
NEIGHBOUR SHED
LOT 19 DP 14380
36 BUNGALOW RD
DRIVEWAY
LOT 20 DP 14380
34 BUNGALOW RD
SETBACK LINE TO 34 BUNGALOW RD
8.7 m BUILDING SETBACK
LANDSCAPED AREA
U04
U03
BRIGHTON
ROAD
BRIGHTON RD


RIGHTON ROAD
BRIGHTON ROAD
STANDARDS 2004 (AU_NZ)
B85
STANDARDS 2004 (AU_NZ)
B85
LOT 17 DP 14380
LOT 18 DP 14380
LOT 19 DP 14380
LOT 20 DP 14380
40 BUNGALOW RD
38 BUNGALOW RD
36 BUNGALOW RD
34 BUNGALOW RD
SETBACK LINE TO 34 BUNGALOW RD
DRIVEWAY
LANDSCAPED AREA
LOBBY
U05
U04
U03
8.7 m BUILDING SETBACK
NEW BOUNDARY FENCE
RETAINING WALL
GARDEN EDGE
POS
3615mm