

Proposed Affordable Housing Residential Development

**4-6 Bigge Street, Warwick Farm**

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**TRAFFIC AND PARKING ASSESSMENT REPORT**

20 May 2019

Ref 19073

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## 1. INTRODUCTION

This report has been prepared on behalf of *Family & Community Services (FACS)* to accompany a development application to Council for a residential development to be located at 4-6 Bigge Street, Warwick Farm (Figures 1 and 2).

The proposed development involves the construction of a new residential apartment building on the site, comprising a total of 52 *affordable rental* dwellings in accordance with the *SEPP (Affordable Rental Housing) 2009* requirements.

Off-street parking is to be provided in a new single-level basement car parking area in accordance with Council and *SEPP (ARH) 2009* requirements. Vehicular access to the car parking facilities is to be provided via a new entry/exit driveway located towards the southern end of the Bigge Street site frontage.

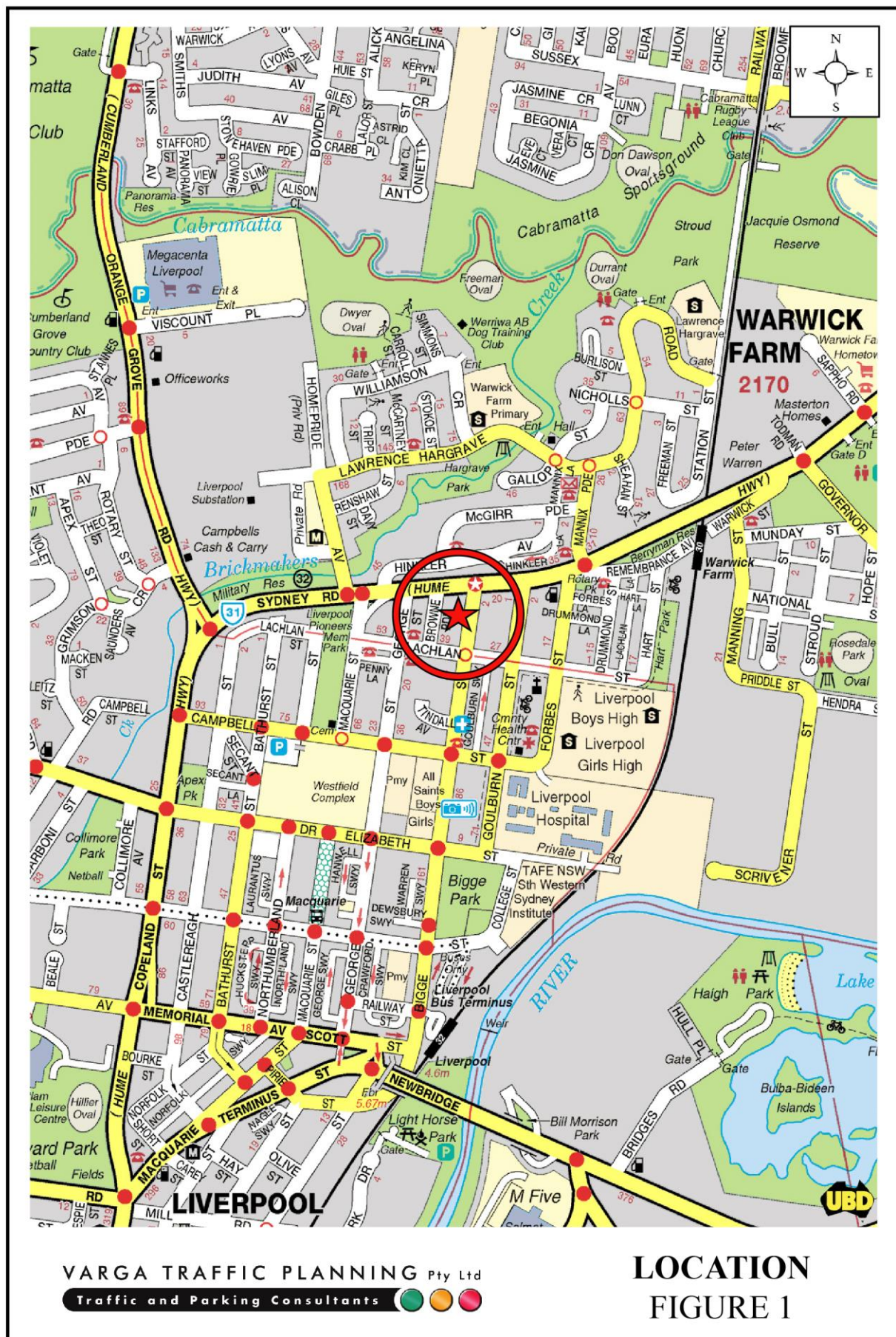
The site is located in close proximity to an excellent range of alternative transport options and shops/services in the Liverpool City Centre as well as being with walking distance to Liverpool TAFE and Liverpool Hospital.

In essence, the site is ideally located to discourage private car ownership and usage, and to encourage greater use of alternate forms of transport such as walking, cycling or public transport. Given the site's proximity to Liverpool TAFE and hospital, the site is considered to be located in a prime location for an affordable housing development given tertiary students and key workers typically have a low car ownership rate.

The purpose of this report is to assess the traffic and parking implications of the development proposal and to that end this report:

- describes the site and provides details of the development proposal
- reviews the road network in the vicinity of the site
- reviews the public transport services in the vicinity of the site

- estimates the traffic generation potential of the development proposal
- assesses the traffic implications of the development proposal in terms of road network capacity
- reviews the geometric design features of the proposed car parking facilities for compliance with the relevant codes and standards
- assesses the adequacy and suitability of the quantum of off-street car parking provided on the site.







## 2. PROPOSED DEVELOPMENT

### Site

The subject site is located on the eastern side of Bigge Street, approximately 50m south of the Hume Highway intersection, and lies within the Liverpool City Centre. The site has a street frontage of approximately 34m in length to Bigge Street and occupies an area of approximately 1,754m<sup>2</sup>.

The subject site is currently vacant, with an existing vehicular crossing provided midway along the Bigge Street site frontage.

A recent aerial image of the site and its surroundings is reproduced below which shows an existing raised central median island located in the vicinity of the Hume Highway intersection, extending just past the site frontage.



### Proposed Development

The proposed development involves the construction of a new *affordable rental housing* residential apartment building on the vacant site. A total of 52 residential apartments are proposed in the new building as follows:

|                          |           |
|--------------------------|-----------|
| 1 bedroom apartments:    | 28        |
| 2 bedroom apartments:    | 24        |
| <b>TOTAL APARTMENTS:</b> | <b>52</b> |

Off-street car parking is proposed for a total of 24 cars (including 6 adaptable spaces), in a new single-level basement car parking area in accordance with *SEPP (Affordable Rental Housing) 2009* requirements. Vehicular access to the car parking facilities is to be provided via a new entry/exit driveway located at the southern end of the Bigge Street site frontage.

In this regard, it is noted that in the pre-DA minutes (PL-15/2019), Council previously advised the extension of the existing concrete median located along Bigge Street fronting the site, “*to deter right turn movements out of the development into Bigge Street*”.

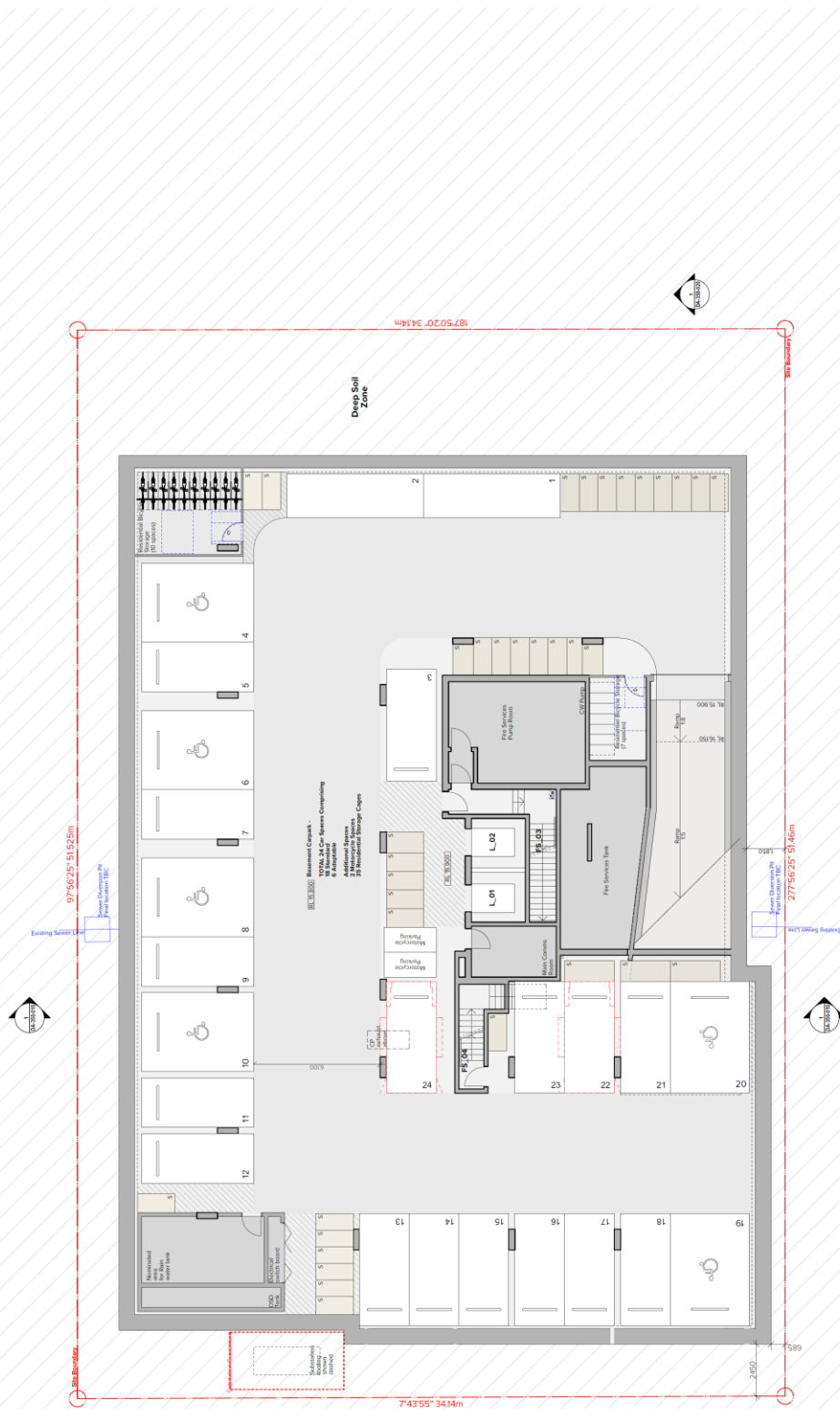
Notwithstanding, it is also noted the central median island currently extends past the proposed site access driveway, as shown on the aerial image above, by approximately 5m in length. As such, no further extension of the concrete island is considered necessary.

Garbage collection for the proposed development is to be undertaken by Council’s waste contractor, using a garbage truck size comprising 9.9m in length. The garbage truck will reverse off Bigge Street onto the top of the proposed driveway area, where they will be loaded, as per Council’s pre-DA recommendations. Once loaded, the trucks will be able to leave the site in a forward direction. The bin storage area is located on the ground floor level, adjacent the entry ramp, where it is easily accessible.

‘No Parking’ sign-posted restrictions will be implemented on either side of the driveway access to deter parking along the Bigge Street site frontage for about 12m on either side, as per Council’s recommendation.

Plans of the proposed development have been prepared by *Turner* and are reproduced in the following pages.





0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 10



### 3. TRAFFIC ASSESSMENT

#### Road Hierarchy

The road hierarchy allocated to the road network in the vicinity of the site by the Roads and Maritime Services is illustrated on Figure 3.

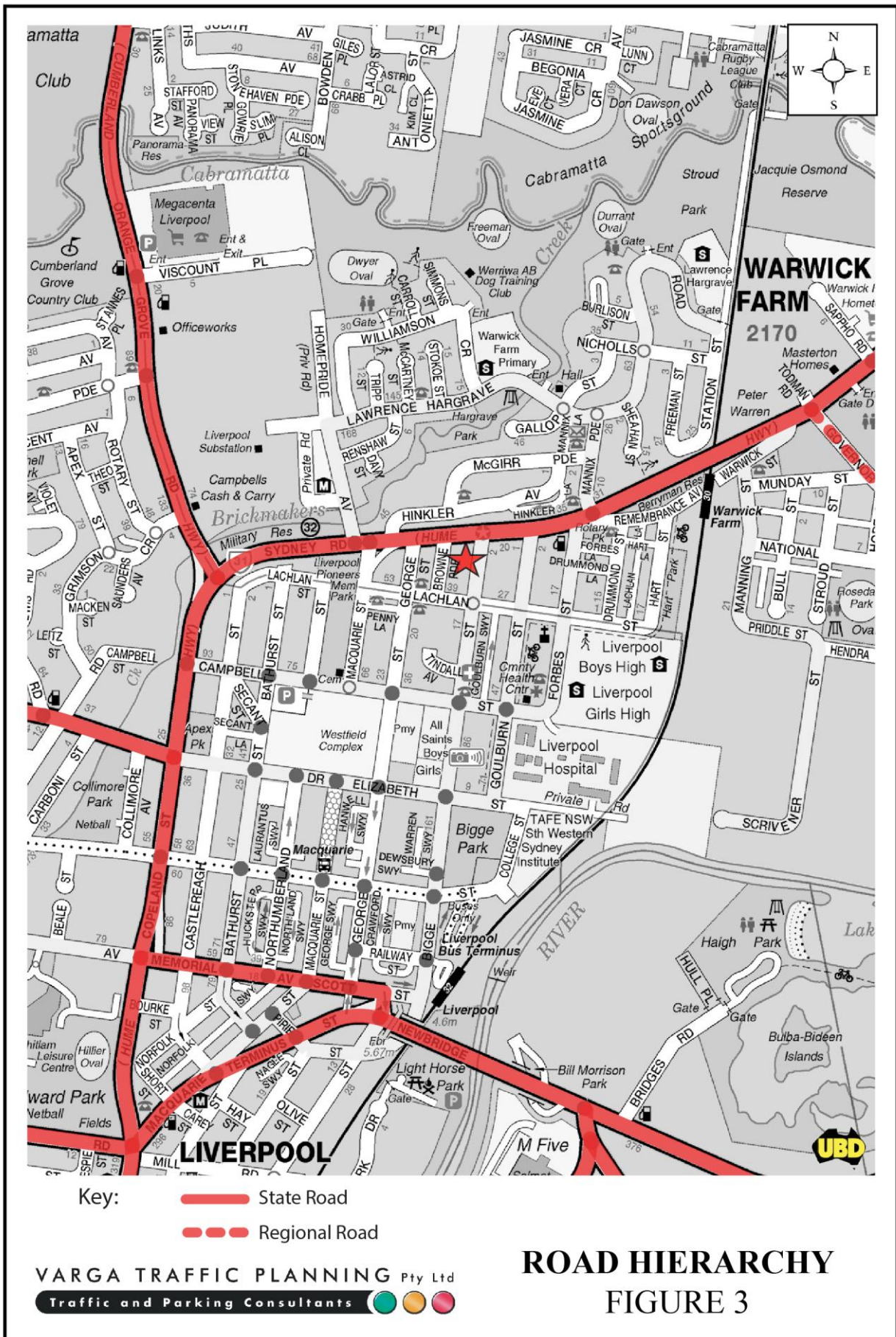
Cumberland Highway is classified by the RMS as a *State Road* and provides the key north-south road link in the area, linking Hume Highway and the M4 Western Motorway. It typically carries two traffic lanes in each direction in the vicinity of the site, with opposing traffic flows separated by a central median island. Clearway restrictions apply along both sides of the road.

Hume Highway is also classified by the RMS as a *State Road* and provides the key east-west road link in the area, linking Orange Grove Road and the Parramatta Road. It typically carries three traffic lanes in each direction in the vicinity of the site, with opposing traffic flows separated by a central median island. Clearway restrictions apply along both sides of the road, with turning bays provided at key locations.

Elizabeth Drive (west of Hume Highway) is also classified by the RMS as a *State Road* and provides another key east-west road link in the area, linking Liverpool and Kemps Creek. It typically carries three traffic lanes in each direction in the vicinity of the site, with opposing traffic flows separated by a central median island. Clearway restrictions apply along both sides of the road, with turning bays provided at key locations.

Bigge Street is a local, unclassified road which is primarily used to provide vehicular and pedestrian access to frontage properties. Kerbside parking is generally permitted along both sides of the road, subject to sign-posted restrictions.





### **Existing Traffic Controls**

The existing traffic controls which apply to the road network in the vicinity of the site are illustrated on Figure 4. Key features of those traffic controls are:

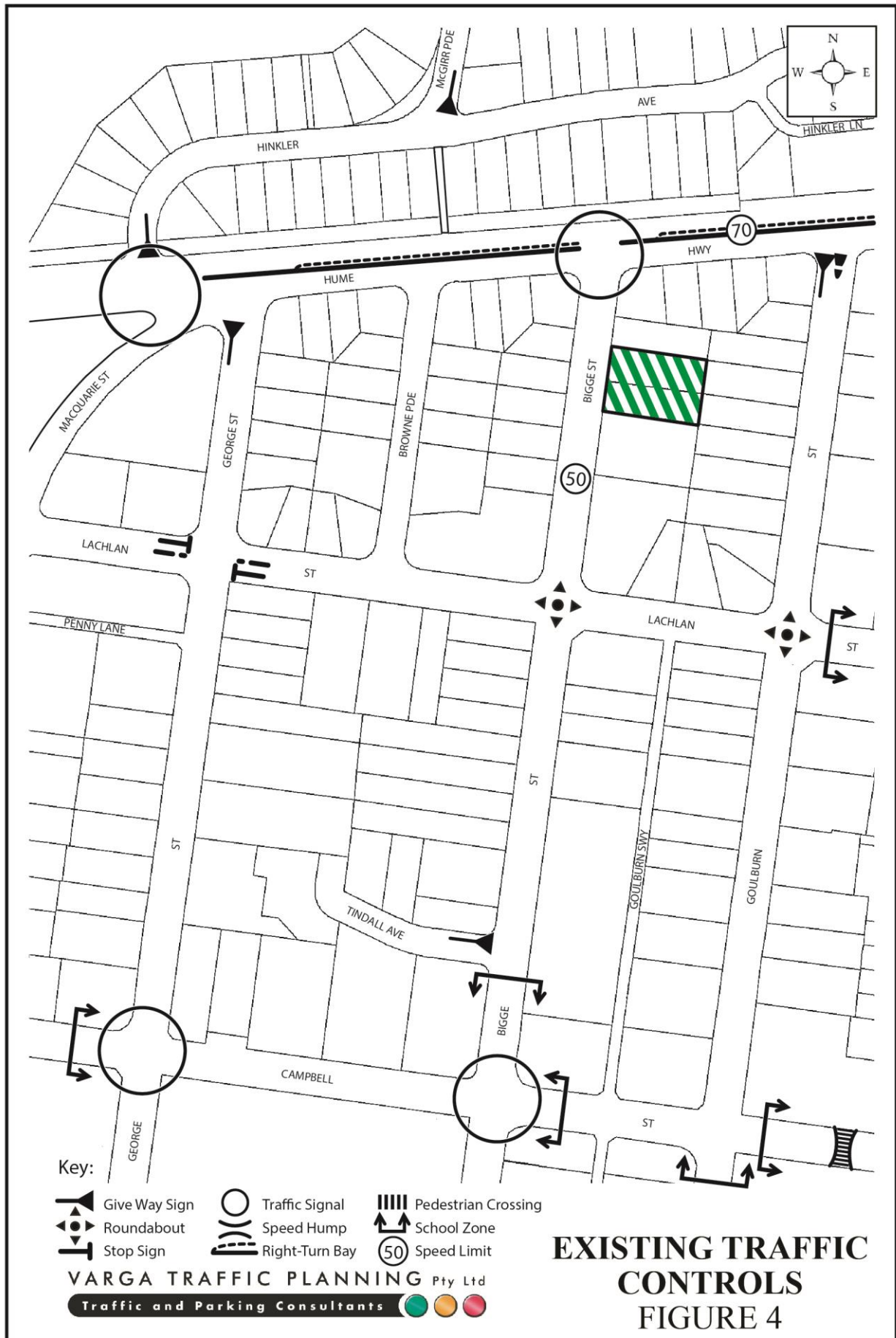
- a 70 km/h SPEED LIMIT which applies to the Hume Highway
- a 50 km/h SPEED LIMIT which applies to Bigge Street and all other local roads in the area
- a 40km/h SCHOOL ZONE SPEED LIMIT which applies to Campbell Street, Bigge Street and also George Street in the vicinity of the All Saints Catholic College
- a 40km/h SCHOOL ZONE SPEED LIMIT which applies to Lachlan Street and also Forbes Street in the vicinity of the Liverpool Boys' / Girls' High School
- TRAFFIC SIGNALS in the Hume Highway where it intersects with Bigge Street, Mannix Parade/Remembrance Avenue and also Macquarie Street/Hinkler Avenue
- ROUNDABOUTS in Lachlan Street where it intersects with Bigge Street and also Goulburn Street
- STOP SIGNS in Lachlan Street where it intersects with George Street
- GIVE WAY SIGN in Goulburn Street where it intersects with the Hume Highway.

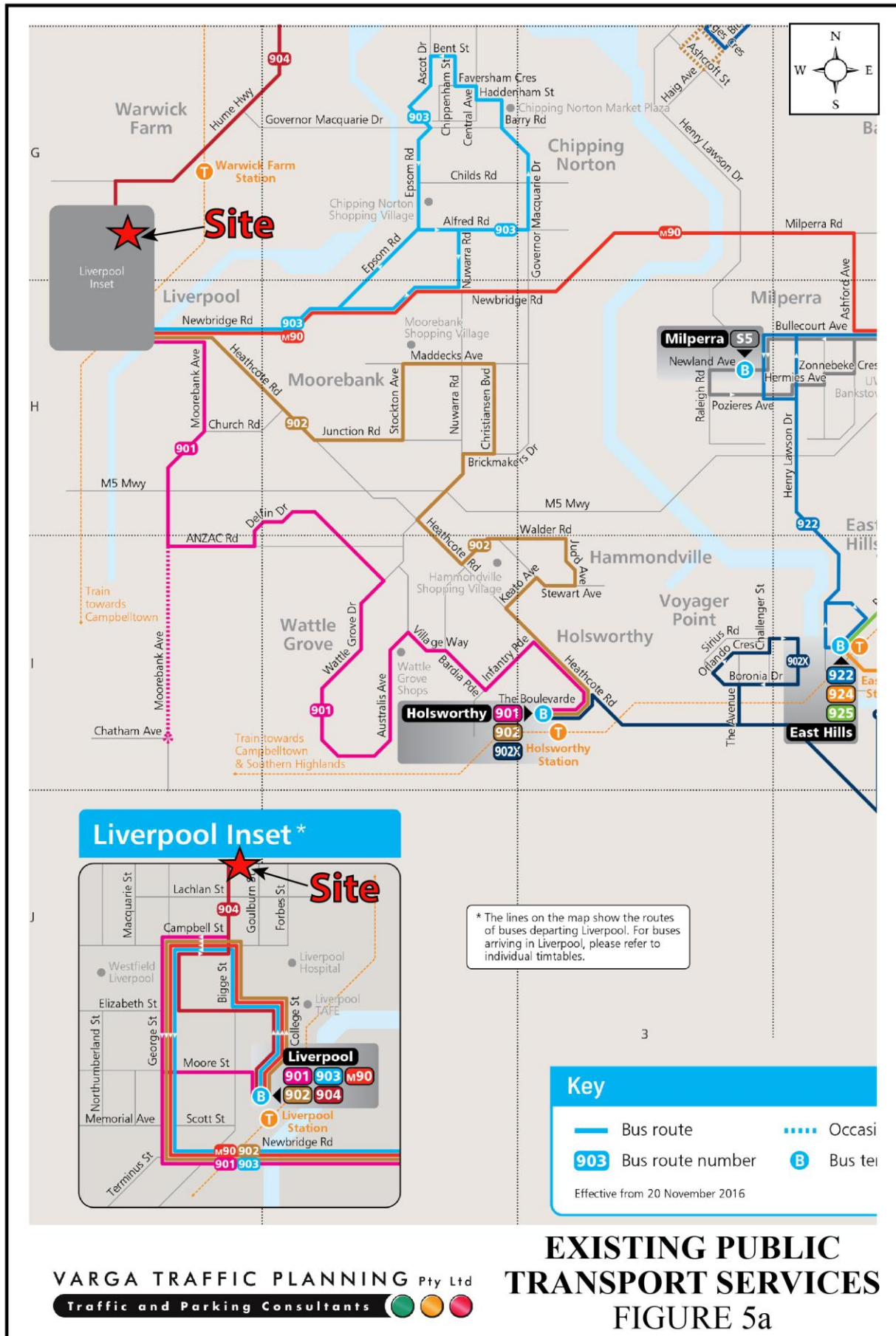
### **Existing Public Transport & Essential Services**

The existing public transport services available in close proximity to the site are illustrated on Figure 5a and 5b.

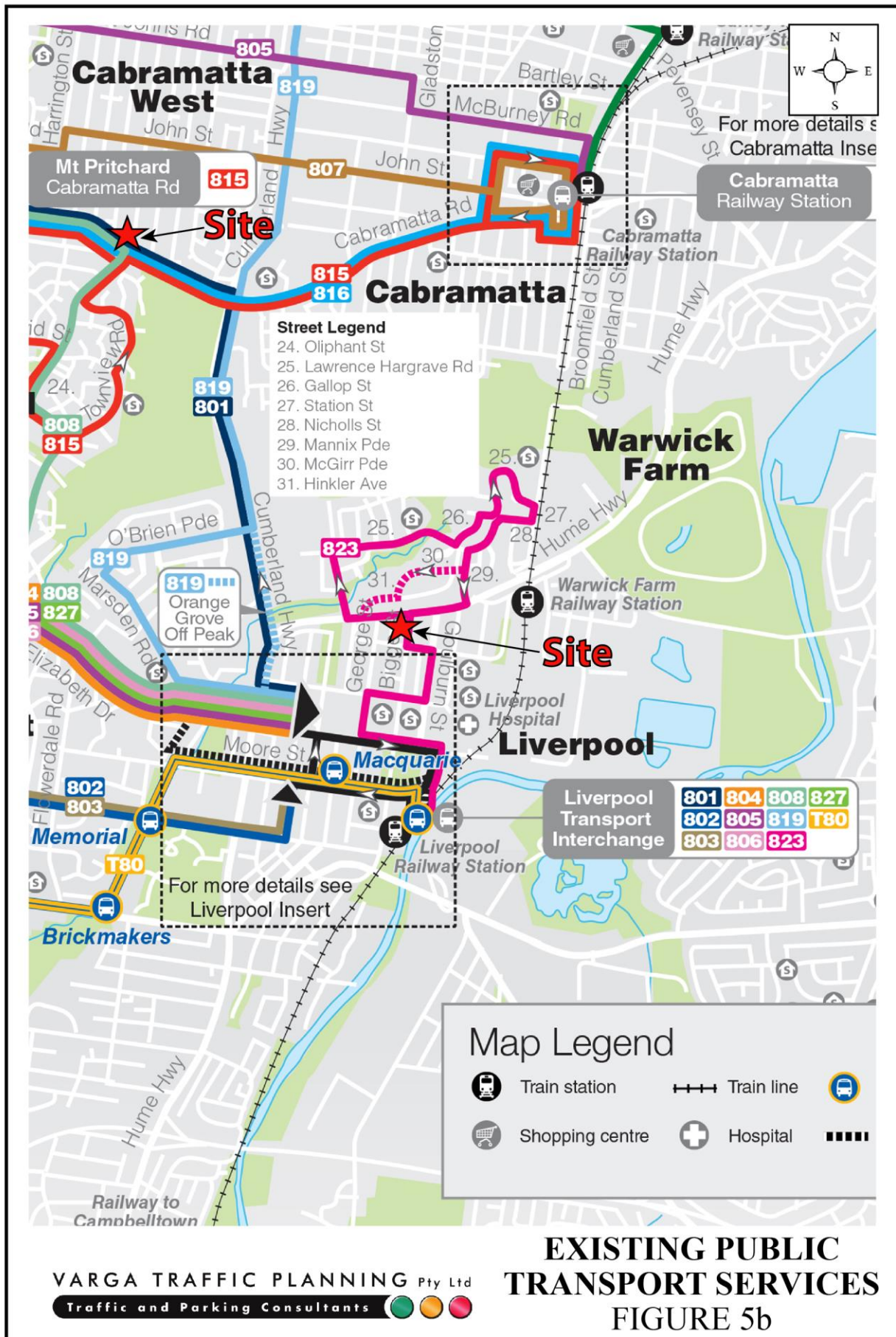
There are currently two bus routes which traverses along Bigge Street, in the immediate vicinity of the site frontage, *plus* a further five bus routes which operate along Campbell Street which are located within 400m walking distance of the site.











These bus services include the high-frequency intra-regional *Metrobus M90* which operates between Liverpool and Burwood via Moorebank, UWS Milperra, Bankstown, Greenacre, Chullora and Strathfield. The *Metrobus* services operate seven days per week with weekday services every 15 minutes (every 10 minutes during the morning and afternoon peak) and weekend services every 20 minutes.

A summary of those bus services is provided in the table below, revealing that there are more than 310 services operating in the vicinity of the site on weekdays, reducing to approximately 180 services per day on Saturdays and approximately 130 services per day on Sundays and public holidays.

| <b>Bus Routes and Frequencies</b> |                                     |                |            |                 |            |               |            |
|-----------------------------------|-------------------------------------|----------------|------------|-----------------|------------|---------------|------------|
| <b>Route No.</b>                  | <b>Route</b>                        | <b>Weekday</b> |            | <b>Saturday</b> |            | <b>Sunday</b> |            |
|                                   |                                     | <b>In</b>      | <b>Out</b> | <b>In</b>       | <b>Out</b> | <b>In</b>     | <b>Out</b> |
| 823                               | Liverpool to Warwick Farm (Loop)    | 17             | 18         | 10              | 9          | 7             | 7          |
| 901                               | Holsworthy to Liverpool             | 21             | 20         | 12              | 10         | 10            | 9          |
| 902                               |                                     | 23             | 16         | 13              | 13         | 9             | 10         |
| 902X                              | Sandy Point to Holsworthy           | 2              | 2          | -               | -          | -             | -          |
| 903                               | Liverpool to Chipping Norton (Loop) | 18             | 14         | 12              | 12         | 5             | 5          |
| 904                               | Fairfield to Liverpool              | 15             | 17         | 9               | 9          | -             | -          |
| M90                               | Burwood to Liverpool                | 79             | 50         | 39              | 32         | 37            | 29         |
| <b>TOTAL</b>                      |                                     | <b>175</b>     | <b>137</b> | <b>95</b>       | <b>85</b>  | <b>68</b>     | <b>60</b>  |

Liverpool Shopping Centre is also located approximately 650m walking distance south-west of the site which includes a large range of essential shops and services including a Coles supermarket, pharmacy, Anytime Fitness, dry cleaners, bank, post office, pharmacy, café and other small shops.

Furthermore, Warwick Farm railway station is located approximately 700m walking distance east of the site and Liverpool railway station is located approximately 1km walking distance south of the site. The Warwick Farm and Liverpool Railway Station both services the T2 Inner West & Leppington Line, the T3 Bankstown Line and also the T5 Cumberland Line.

These services typically operate at a frequency of less than 10 minutes and commuter wait times are expected to be minimal throughout the day.

The site is therefore considered to be highly accessible to essential services and public transport options and given the site's proximity to Liverpool TAFE and Liverpool Hospital, the site is considered to be located in a prime location for an *affordable housing* development.

### **Projected Traffic Generation**

An indication of the traffic generation potential of the development proposal is provided by reference to the Roads and Maritime Services publication *Guide to Traffic Generating Developments, Section 3 - Landuse Traffic Generation (October 2002)* and the updated traffic generation rates in the recently published RMS *Technical Direction (TDT 2013/04a)* document.

The *TDT 2013/04a* document specifies that it replaces those sections of the RMS *Guidelines* indicated, and that it must be followed when RMS is undertaken trip generation and/or parking demand assessments.

The RMS *Guidelines* and the updated *TDT 2013/04a* are based on extensive surveys of a wide range of land uses and nominate the following traffic generation rates which are applicable to the development proposal:

#### **High Density Residential Flat Dwellings**

AM: 0.19 peak hour vehicle trips/unit

PM: 0.15 peak hour vehicle trips/unit

The RMS *Guidelines* also make the following observation in respect of high density residential flat buildings:

#### **Definition**

A *high density residential flat building* refers to a building containing 20 or more dwellings. This does not include aged or disabled persons housing. *High density residential flat buildings* are usually more than 5 levels, have basement level car parking and are located in close proximity to public transport services. The building may contain a component of commercial use.



**Factors**

The above rates include visitors, staff, service/delivery and on-street movements such as taxis and pick-up/set-down activities.

Application of the above traffic generation rates to the 52 residential apartments outlined in the development proposal yields a traffic generation potential of approximately 10 vehicle trips per hour (vph) during the AM commuter peak period and approximately 8 vph during the PM commuter peak period.

Notwithstanding, the above traffic generation rates are based on regular apartments. The proposed development however is an *affordable housing* development which has *lower* parking requirements due to the site's proximity to public transport services and tenants who traditionally have a lower car ownership rate.

As such, the traffic generation of the proposed development is expected to be even lower than the figures suggested in the above assessment.

In any event, that projected increase in traffic activity as a consequence of the development proposal is *minimal*, consistent with the R4 zoning objectives of the site and will clearly not have any unacceptable traffic implications in terms of road network capacity.

## **4. PARKING IMPLICATIONS**

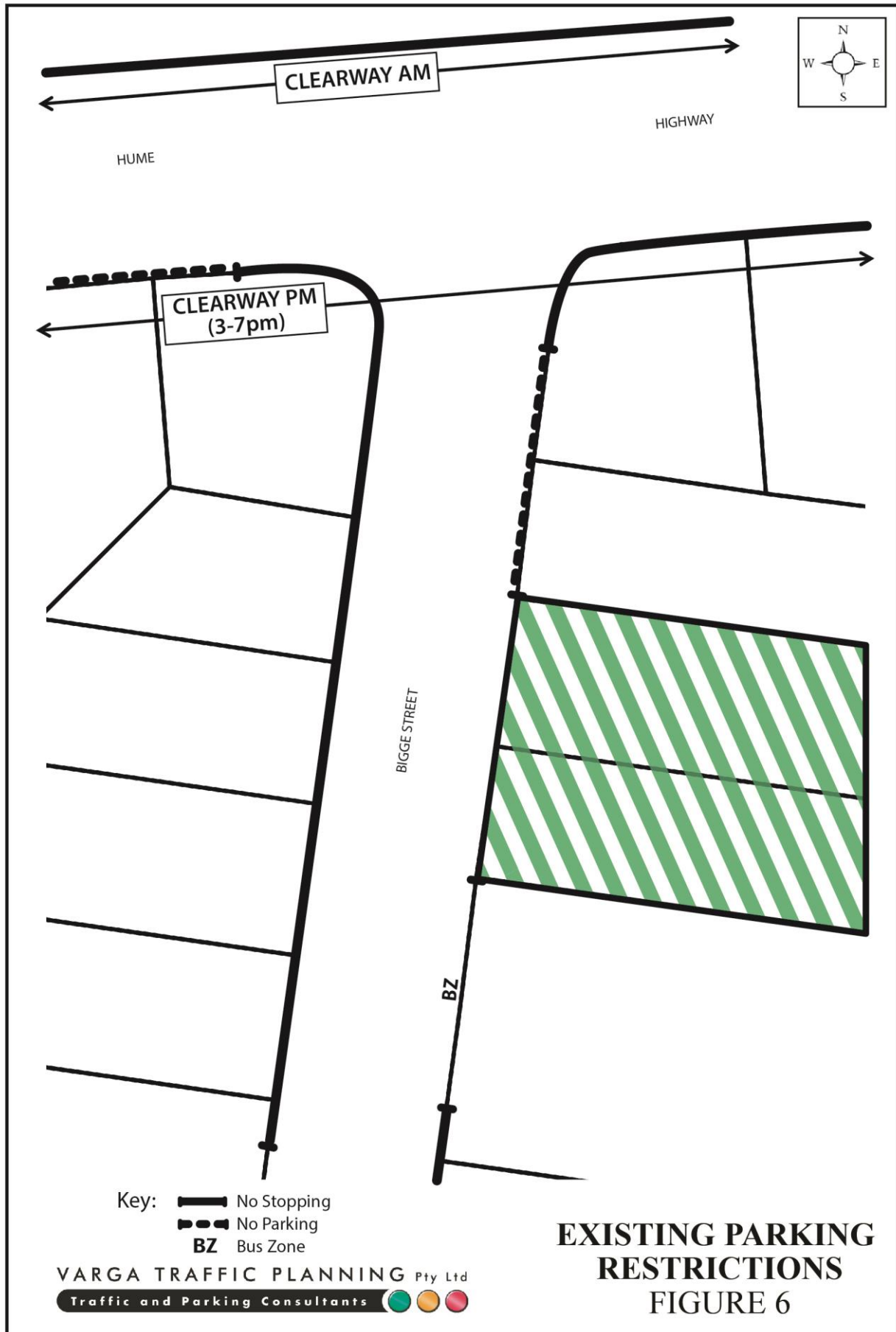
### **Existing Kerbside Parking Restrictions**

The existing kerbside parking restrictions which apply to the road network in the vicinity of the site are illustrated on Figure 6 and comprise:

- CLEARWAY restrictions along the northern side of the Hume Highway during the *morning* commuter peak period
- CLEARWAY restrictions along the southern side of Hume Highway during the *afternoon* commuter peak period
- NO STOPPING / NO PARKING restrictions along both sides of the Hume Highway at all other times
- NO STOPPING / NO PARKING restrictions along both sides of Bigge Street in the vicinity of the Hume Highway intersection
- UNRESTRICTED kerbside parking along the eastern side of Bigge Street, along the site frontage
- BUS ZONES located at regular intervals along both sides of Bigge Street, including immediately south of the site frontage
- generally UNRESTRICTED kerbside parking permitted elsewhere along both sides of Bigge Street and throughout the surrounding local area.

### **Off-Street Car Parking Provisions**

The off-street parking requirements applicable to the development proposal are specified in *State Environmental Planning Policy (Affordable Rental Housing) 2009* in the following terms:



**Division 1 In-fill affordable housing**

## 14 Standards that cannot be used to refuse consent

## (2) General

A consent authority must not refuse consent to development to which this Division applies on any of the following grounds:

(a) **parking**

if:

- (i) in the case of a development application made by a social housing provider for development on land in an accessible area, at least 0.4 parking spaces are provided for each dwelling containing 1 bedroom, at least 0.5 parking spaces are provided for each dwelling containing 2 bedrooms and at least 1 parking space is provided for each dwelling containing 3 or more bedrooms, or
- (ii) in any other case-at least 0.5 parking spaces are provided for each dwelling containing 1 bedroom, at least 1 parking space is provided for each dwelling containing 2 bedrooms and at least 1.5 parking spaces are provided for each dwelling containing 3 or more bedrooms.

Application of the above *SEPP (Affordable Rental Housing) 2009* car parking requirements under Item (i) – i.e. a social housing provider – to the 52 residential apartments outlined in the development proposal yields an off-street car parking requirement of 23 parking spaces.

The proposed development makes provision for a total of 24 off-street parking spaces, including 6 accessible space, thereby satisfying the *SEPP* requirements.

The geometric design layout of the proposed car parking facilities have been designed to comply with the relevant requirements specified in the Standards Australia publication *Parking Facilities Part 1 - Off-Street Car Parking AS2890.1 - 2004* and *Parking Facilities Part 6 - Off-Street Parking for People with Disabilities AS2890.6* in respect of parking bay dimensions, ramp gradients and aisle widths.

Furthermore, swept turning path diagrams have been prepared which demonstrate that two large cars can pass each other at the bottom of the entry ramp into the basement car parking area in a staged arrangement without difficulty and whilst maintaining safe clearances.

In addition, the top section of the entry ramp is 6.1m wide, allowing two cars to easily pass as also demonstrated by the swept turning path diagram.

Further reference is made to *AS2890.1 Clause 3.2.2*, which states that as a guide, *30 or more movements in a peak hour (in and out combined) would usually require the provision for two vehicles to pass on the driveway – i.e. a minimum width of 5.5m.*

As mentioned in the foregoing, the proposed amended development scheme is expected to generate just 10 peak hour vehicle trips (*less* at other times), which is *significantly less* than the 30 vehicles per hour threshold for two-lane ramps. As such, the likelihood of two cars entering and exiting the site at the same moment in time is *statistically insignificant* and a single lane ramp arrangement towards the bottom of the entry ramp is therefore considered acceptable.

Notwithstanding, it is recommended that convex mirrors be installed at the bottom of the ramp as well as installing suitable signage advising drivers to “give way to entering vehicles”.

### **Off-Street Bicycle Parking Provisions**

The off-street bicycle parking requirements applicable to the development proposal are also specified in Council’s *Development Control Plan 2008, Part 4 – Liverpool City Centre* document in the following terms:

#### **Bicycle parking for all development**

1 bicycle space per 200m<sup>2</sup> of gross floor area (GFA). 15% of this requirement is to be accessible to visitors

Application of the above bicycle parking requirements to the cumulative building floor area of approximately 3,905m<sup>2</sup> outlined in the development proposal yields a bicycle parking requirement of 20 spaces.



The proposed development makes provision for a total of 20 off-street bicycle parking spaces, plus one storage cage per residential apartment which is capable of storing a bicycle, thereby satisfying Council's bicycle parking requirements.

### **Off-Street Motorcycle Provisions**

The off-street bicycle parking requirements applicable to the development proposal are also specified in Council's *Development Control Plan 2008, Part 4 – Liverpool City Centre* document in the following terms:

#### **Motorcycle parking for all development**

Provision is to be made for motorcycle parking at the rate of 1 motorcycle space per 20 car spaces

Application of the above rates to the 24 parking spaces within the proposed development yields a motorcycle parking requirement of 1 space.

The proposed development makes provision for a total of 2 motorcycle spaces, thereby satisfying the above requirements.

### **Loading/Servicing Provisions**

Garbage collection for the proposed development is to be undertaken by Council's waste contractor, using a garbage truck size comprising 9.9m in length. The garbage truck will reverse off Bigge Street onto the top of the proposed driveway area, where they will be loaded, as per Council's pre-DA recommendations. Once loaded, the trucks will be able to leave the site in a forward direction.

The service driveway and manoeuvring areas have been designed to accommodate the swept turning path requirements of 11m long HRV trucks, as demonstrated by the attached swept turning path diagrams.

In this regard, 'No Parking' sign-posted restrictions are to be implemented on either sides of the driveway access to deter parking along the Bigge Street site frontage for about 12m on either sides, as per Council's recommendation.

The geometric design layout of the proposed loading facilities have been designed to comply with the relevant requirements specified in the Standards Australia publication *Parking Facilities Part 2 - Off-Street Commercial Vehicle Facilities AS2890.2* in respect of overhead clearances and service area requirements for HRV trucks.

In summary, the proposed parking facilities satisfy the relevant requirements specified in Council's *DCP*, the *SEPP* as well as the Australian Standards and it is therefore concluded that the proposed development will not have any unacceptable parking or loading implications.

Bigge Street

B95 Vehicle (5.0m radius)

12000

12000

B95 Vehicle (5.0m radius)

B99 Vehicle (6.3m radius)

1  
A-350-020

1  
SK-350-020

1  
A-DA50-010



**DRAWING TITLE**  
B99 VEHICLE TURNING PATH  
Entering / Exiting Access Driveway

**ADDRESS**  
4-6 Bigge Street, Warwick

**PROJECT NO.**  
F49073

**REVIEWED**  
CHRIS PALMER

**DATE DRAWN**  
2019-5-17

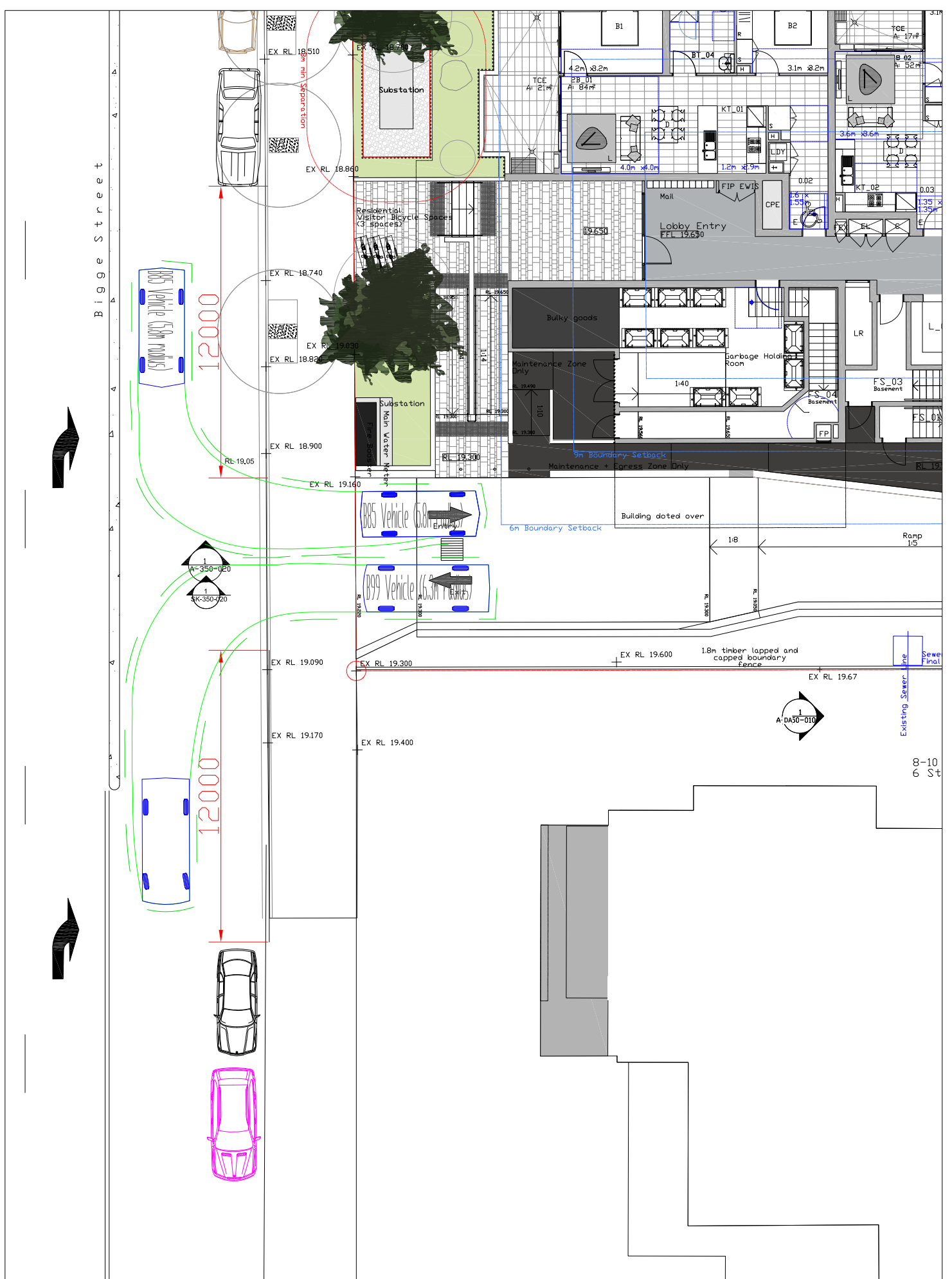
**PREPARED**  
DONALD LEE

**VARGA TRAFFIC PLANNING Pty Ltd**  
Transport, Traffic and Parking Consultants

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Sydney, Australia

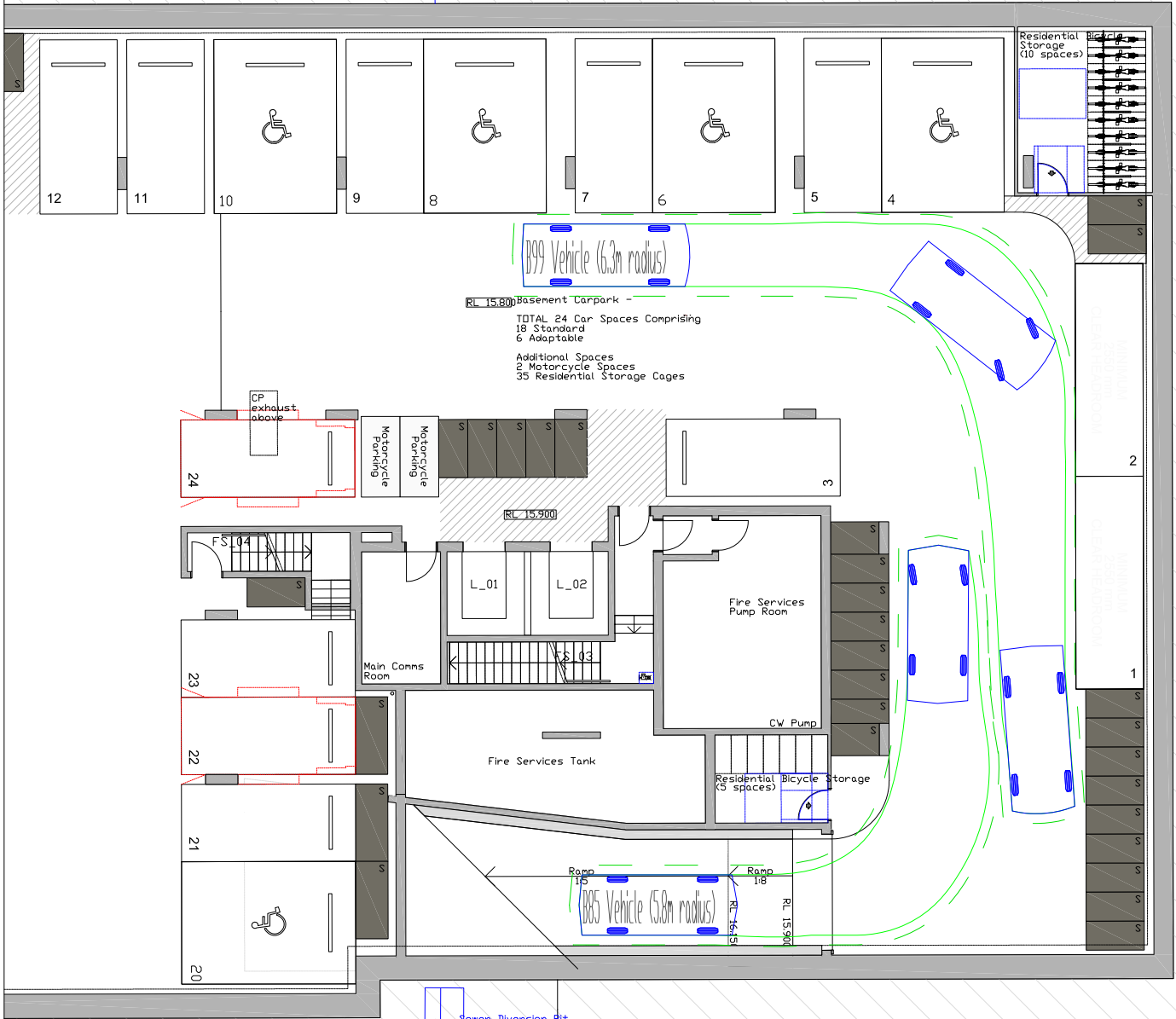
**PROJECT**  
RESIDENTIAL DEVELOPMENT





Existing Sewer Line

Sewer Diversion Pit  
Final location TBC



Existing Sewer Line

Sewer Diversion Pit  
Final location TBC

