Item 6.1 - Traffic - 20/03/20

N O R T H S Y D N E Y C O U N C I L

To the General Manager

Attach:
1. Addendum TMP 200226
2. KDCA Report

SUBJECT: (6.1) 390-394 Military Road, Cremorne - Construction Traffic Management Plan

AUTHOR: Report of Traffic & Transport Engineer, Iman Mohammadi

DESCRIPTION/SUBJECT MATTER:

The current Construction Traffic Management Plan (CTMP) of the development at 390-394 Military Road, Cremorne (Development Consent 142/19) was approved under Delegated Authority (TDA 20/008)

Council has received a new CTMP prepared by Varga Traffic Planning Pty Ltd, dated 17 February 2020 for the approved development at 390-394 Military Road, Cremorne (Development Consent 142/19) proposing to use truck and dog trailers instead of medium rigid vehicles. The CTMP is accompanied by a report by K D Cowell & Associates (KDCA) dated 20 December 2019, titled *"Spoil Removal at 89 Parraween Street, Cremorne and Selection of Suitable Spoil Removal Vehicle"*.

The proposed development involves the demolition of the existing buildings on the site and the construction of a new mixed-use development, with a single-level basement car parking area. The site will be served by a new single entry/exit driveway located towards the western end of the Parraween Street site frontage.

Condition B2 of the development consent 149/19 states:

Construction Management Program – Local Traffic Committee Approval

B2. Prior to issue of any Construction Certificate, a Construction and Traffic Management Plan must be prepared.

The applicant's Construction Traffic Management Plan is discussed in the report overleaf.

RECOMMENDATION:

1. THAT the Traffic Committee adopts one of the following recommendations (a or b):

a) **THAT** the proposed use of Truck and Dog trailers for 390-394 Military Road, Cremorne is not approved due to the following concerns:

- The proposal possibly requires removal of two (2) spaces in Parraween Street in addition to removal of approximately one (1) space to widen the existing driveway to accommodate the use of Truck and Dog into the site. Cremorne is one of the highest on street parking demand areas in North Sydney LGA and as such the proposed removal of parking spaces to accommodate the use of Truck and Dog is not supported by Council.

- The Truck and Dog passes through three (3) highly used pedestrian crossings in Military Rd (at Macpherson Street) and Parraween Street (2 crossings) on the route to and from the site. This is a potential pedestrian safety issue.

- The use of Truck and Dog will only reduce the number of truck movements during excavation by 10 truck movements per day (30 total truck movements per day compared to the approved number of MRV of 40 truck movements per day.

- The number of truck movements during Demolition Stage does not change compared to the approved MRV of approx. 15 truck movements per day.

b) **THAT** should the Traffic Committee approve the use of truck and dog trailers, the approval be subject to the attached conditions.

DETAIL

Standard or Guideline Used: RMS Traffic Control at Work Sites Manual, AS 1742.3
Signs & Lines Priority: N/A
Precinct and Ward: Harrison/Brightmore, Tunks
Impact on Bicycles: Nil
Impact on Pedestrians: Safety concerns over truck and dogs traveling over the existing Pedestrian Crossings in Military Rd (at McPherson St) and Parraween Street (2 crossings).
Impact on Parking: No change to approved MRV CTMP. Work Zone proposed fronting the site (Loss of 2-3 Loading Zone spaces).

Condition B2 of the development consent states:

B2. Prior to issue of any Construction Certificate, a Construction and Traffic Management Plan must be prepared. The following matters must be specifically addressed in this Plan:

a. A plan view (min 1:100 scale) of the entire site and frontage roadways indicating:
    i. Dedicated construction site entrances and exits, controlled by a certified traffic controller, to safely manage pedestrians and construction related vehicles in the frontage roadways,
    ii. Signage type and location to manage pedestrians in the vicinity
    iii. The locations of any proposed Work Zones in the frontage roadways,
    iv. Locations and type of hoardings proposed,
    v. Area of site sheds and the like,
    vi. Location of any proposed crane standing areas,
    vii. A dedicated unloading and loading point within the site for all construction vehicles, plant and deliveries,

viii. Material, plant and spoil bin storage areas within the site, where all materials are to be dropped off and collected.

ix. The provision of an on-site parking area for employees, tradesperson and construction vehicles as far as possible.

b. A Traffic Control Plan(s) for the site incorporating the following: -

i. Traffic control measures proposed in the road reserve that are in accordance with the RMS publication "Traffic Control Worksite Manual" and designed by a person licensed to do so (minimum RMS 'red card' qualification).

ii. The main stages of the development requiring specific construction management measures are to be identified and specific traffic control measures identified for each.

c. A detailed description and map of the proposed route for vehicles involved in spoil removal, material delivery and machine floatage must be provided detailing light traffic roads and those subject to a load or height limit must be avoided at all time. A copy of this route is to be made available to all contractors and must be clearly depicted at a location within the site.

d. A Waste Management Plan in accordance with the provisions of Part B Section 19 of the North Sydney DCP 2013 must be provided. The Waste Management Plan must include, but not be limited to, the estimated volume of waste and method of disposal for the construction and operation phases of the development, design of on-site waste storage and recycling area and administrative arrangements for waste and recycling management during the construction process;

e. Evidence of RMS concurrence where construction access is provided directly or within 20 m of an Arterial and/or Classified Road;

f. A schedule of site inductions to be held on regular occasions and as determined necessary to ensure all new employees are aware of the construction management obligations. These must specify that construction-related vehicles to comply with the approved requirements; and

g. For those construction personnel that drive to the site, the Site Manager shall attempt to provide on-site parking so that their personnel's vehicles do not impact on the current parking demand in the area.

A suitably qualified and experienced traffic engineer or consultant must prepare the Construction and Traffic Management Plan. A copy of the approved Construction and Traffic Management Plan must be kept on the site at all times and be made available to any officer of the Council on request. As this plan has a direct impact on the local road network, it must be submitted to and reviewed by Council prior to the issue of any Construction Certificate. A certificate of compliance with this condition from Council's Development Engineers as to the result of this review must be obtained and must be submitted as part of the supporting documentation lodged with the Certifying Authority for approval of the application for a Construction Certificate.

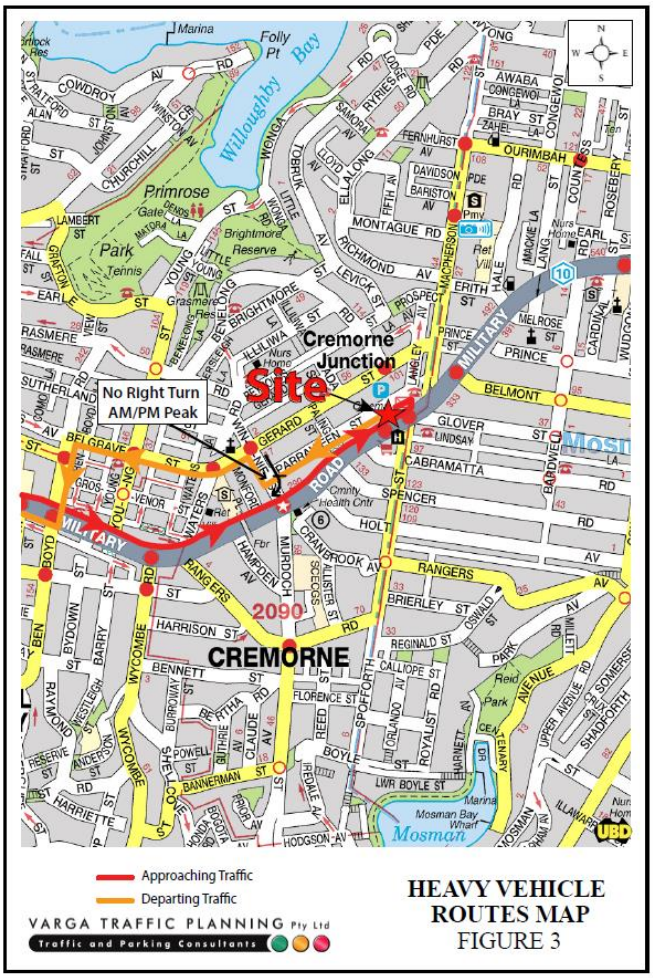
The construction management measures contained in the approved Construction and Traffic Management Plan must be implemented prior to the commencement of, and during, works onsite.

All works must be undertaken in accordance with the approved Construction and Traffic Management Plan. A copy of the approved Construction and Traffic Management Plan must be kept on the site at all times and be made available to any officer of the Council on request.

Notes:
1) North Sydney Council's adopted fee for certification of compliance with this condition shall be payable on lodgement, or in any event, prior to the issue of the relevant approval.
2) Any use of Council property will require appropriate approvals and demonstration of liability insurances prior to such work commencing.
3) Failure to provide complete and detailed information may result in delays. It is recommended that your Construction Management Plan be lodged with Council as early as possible.
4) Dependent on the circumstances of the site, Council may request additional information to that detailed above.

Access and egress

The report states that
"…All heavy vehicles involved in the demolition, excavation and construction of the proposed development would approach and depart the site as indicated on the approved route map on Figure 3.
The final destination for demolition and excavation trucks are:
1. Blacktown for Commercial Waste,
2. Camellia for Concrete Recycling, or
3. Vineyard for General Landfill.
The site manager will ensure that the route map is prominently displayed on the site and that all contractors and employees are given a copy of the route map and understand their obligations as part of their site induction procedure.
Light traffic roads and those subject to load or height limits will be avoided as well as minimising heavy vehicle movements during school peak periods.


Cremorne Junction
Site
No Right Turn AM/PM Peak
MILITARY ROAD
CREMORNE
2090
Approaching Traffic
Departing Traffic
VARGA TRAFFIC PLANNING Pty Ltd
Traffic and Parking Consultants
HEAVY VEHICLE ROUTES MAP
FIGURE 3

Through traffic

The report states that:

"…two-way traffic in Parraween Street should generally be maintained at all times, unless traffic controllers are in place."

Access to neighbouring properties

The report states that:

"All neighbouring properties are to have their access maintained at all times. All nearby residents and businesses will be updated on a regular basis and at key construction stages with respect to the construction process, particularly in relation to construction vehicles movements, and be provided with a phone number to contact the site manager."

Pedestrian management

"…All truck movements will be undertaken with the assistance of RMS-accredited traffic controllers. The traffic controllers will also monitor pedestrian activity in the vicinity of the construction access driveway to ensure there are no conflicts with heavy vehicles."

Construction phases

CONSTRUCTION PROGRAM – APPROXIMATE DURATIONS		
Stage	**Work**	**Duration**
1	Demolition & Site Establishment	2 weeks*
2	Excavation & Piering	2 months*
3	Construction	15 months

*if truck & dogs were used

Neighbour notification

The report states that

"The site manager must liaise with the site managers of any nearby construction sites, including the adjoining site located at No. 398-400 Military Road where a mixed use development is currently under construction, to ensure that appropriate measures are in place to prevent the combined impact of construction activities. A minimum seven (7) days notification should be provided to adjoining property owners and businesses prior to the implementation of any temporary traffic control measures. In this regard, the recent aerial image below indicates that there is only one major construction site located within a 250m radius of the site, which includes the adjoining site located at No. 398-400 Military Road, just east of the site, with construction of the ground floor level nearing completion."

Loading and unloading equipment and materials

The report states that:

"All building materials & waste will typically be stored wholly within the site. From time to time, the Works Zone will be used (temporarily) to transfer materials to the

site. A Franna – i.e. forklift – will be used to transfer material into the basement, whilst a tower crane will be used to transfer material from the Works Zone to the loading platforms located within the site, fronting Parraween Street. In this regard, the forklift if used, will be located wholly within the site. Separate permits and approvals are required on each occasion including, but not limited to, a Building Materials on Footpath Permit from Council if the forklift/crane is to occupy any part of Council's property."

Site crane

The report states that:

"A tower crane will be used to transfer material from the Works Zone to the loading platforms located within the site, fronting Parraween Street."

Storage of equipment and materials

The report states that:

"All materials are to be stored on site. At no time are materials to be stored on Parraween Street, Military Road or any other road or Council property. The site manager will ensure that multiple deliveries do not occur at the same time, unless they can all be accommodated on site or within the Works Zone.".

Works Zone

The report states that:

"A plan has been prepared which illustrates a 14m long Works Zone along the Parraween Street site frontage. The Works Zone will be long enough to accommodate two trucks simultaneously, such as a concrete pump and a concrete truck. The Works Zone parking restrictions are to apply during construction hours only which are specified above and are provided specifically for the set down and pick up of materials, not for the parking of private vehicles associated with the site. It should be noted that the installation of the Works Zone is subject to the approval of the North Sydney Local Traffic Committee, as per consent condition No. C14. All costs associated with removal/relocating the metered parking including all sign changes, parking bay line markings must be paid in full to North Sydney Council prior to issue of any Construction Certificate."

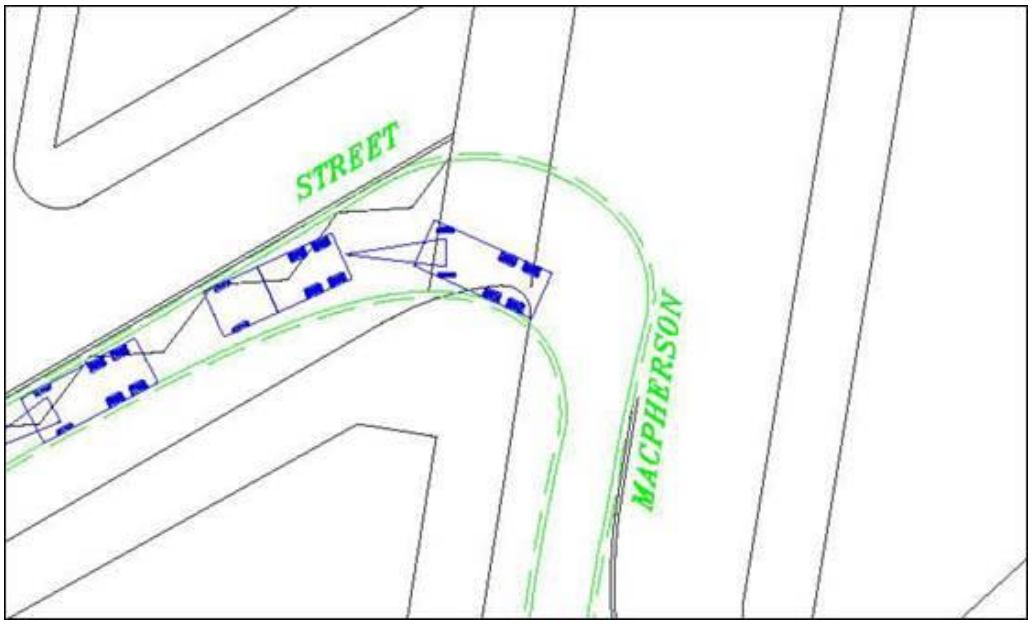
Staff Parking

The report states that

"The site manager will ensure that there is adequate on-site parking available for employee, tradesperson and construction vehicles, where practical. Parking shall be provided in the basement car parking area as soon as is practicable. In addition, staff will be encouraged to carpool and utilise public transport which will minimise traffic and parking impacts as a consequence of the construction process. In this regard it is noted that there is an extensive network of bus services which operate along Military Road."

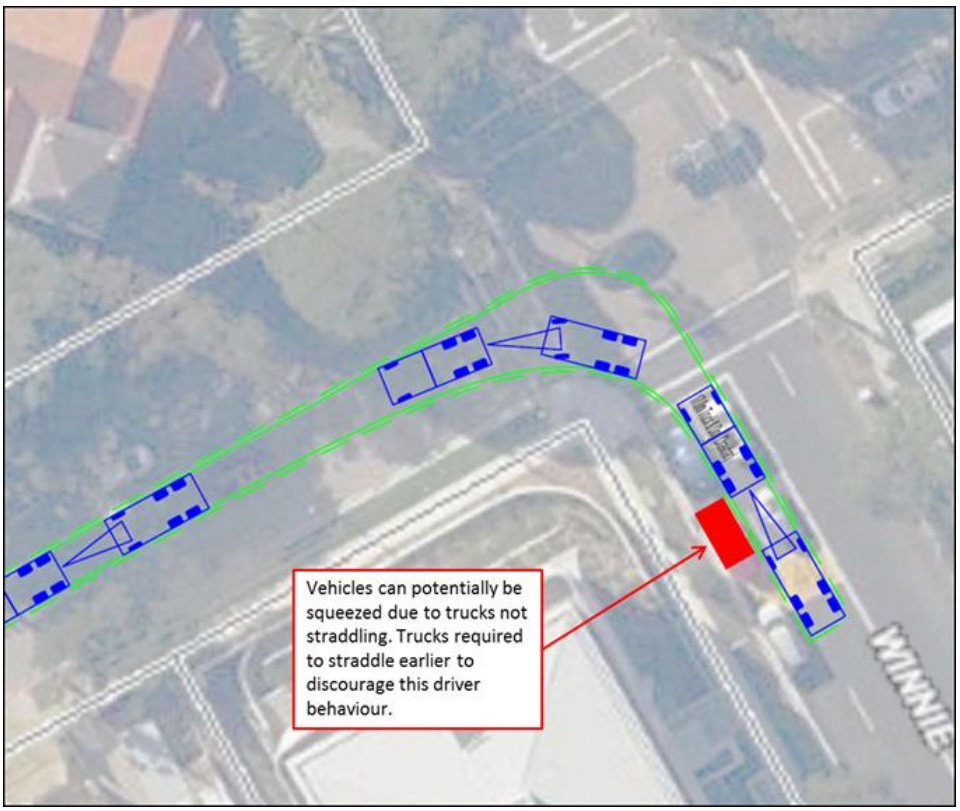
Comments from Transport for NSW

- The turnpaths provided for the truck and dog in the KDCA report at the intersection of Macpherson Street and Parraween Street seem to be tracking over the kerb. It should be noted that the turnpaths provided in the report do not match turnpaths provided in the amended CTMP.



(truck and dog turnpath from KDCA report)

- Please see potential straddling issue at the intersection of Winnie Street and Gerard Street with 17m truck and dogs. Vehicles can get squeezed whilst in lane one on Winnie Street.



- As stated in the original CTMP round of comments, TfNSW does not support the proposed reversing manoeuvre of trucks on Parraween Street during the demolition and excavation stages due to potential safety concerns. Although that is our position, as Parraween Street is a local road, it is ultimately Councils decision whether to approve the proposed arrangement or pursue alternative options.

CONDITIONS OF APPROVAL

1. All works on any public road are to be undertaken in accordance with AS 1742.3.
2. Use of truck and dog trailers may only be commenced after the existing driveway is widened by the applicant to accommodate truck and dog movement to and from the site as shown on the CTMP.
3. Temporary construction site driveway entrances and exits are subject to separate Temporary Driveway Crossing approval by Council's Development Engineer to accommodate the maximum truck size accessing the site as proposed and approved in this CTMP.
4. If the removal of parking meters and/or in-ground sensors is deemed necessary by Council to protect the infrastructure or for public safety, the applicant shall pay for the cost of removal.
5. Any changes required to parking restrictions in association with the development site shall be subject to approval by the North Sydney Traffic Committee and all costs shall be borne by the applicant.
6. GPS tracking and under-guards be considered for truck and dog trailers engaged at 390-394 Military Road as a safety enhancement measure.
7. Installation of any Work Zone is subject to the applicant paying all appropriate Council advertised fees and charges, including the cost of the signage, and is subject to separate approval from the North Sydney Traffic Committee.
8. The existing layback within the proposed work zone must be removed and reinstate to full kerb by the applicant and at the applicant's expense to satisfaction of Council, prior to the Work Zone sings being installed by Council.
9. Construction traffic movements and site material deliveries are not to be carried out during morning student drop-off (8.30am-9.30am) and afternoon student pick-up times (2.30pm-3.30pm). This condition only applies to school days.
10. No convex mirrors may be installed within the public road reserve.
11. Installation of any Hoarding is subject to the applicant paying all appropriate Council advertised fees and charges, including the cost of the signage, and is subject to separate approval from the North Sydney Council and in conjunction with recommendations from the Council's Manager of Parking Meters, in relation to the location of the Parking Meter.
12. Trucks may enter the construction site in a reverse direction only without any impacts on the traffic flow and under the direct supervision of minimum of two RMS accredited traffic controllers, two to direct heavy vehicle movement into the site and one to ensure no pedestrian enters the path of a heavy vehicle. Trucks must leave the site in a forward direction.
13. Access to adjoining residents and businesses are to be maintained at all times.
14. The adjoining residents and businesses are to be updated on a monthly basis and at key construction stages, particularly in relation to construction vehicle movements, and be provided with a phone number to contact the site manager.
15. The applicant shall provide monthly updates and notices at key stages of development particularly in relation to heavy vehicle movements and traffic changes, including monthly updates posted in a prominent position on the site hoarding including contact details of the site manager.
16. At no time shall Parraween Street or any other roads within the North Sydney LGA be blocked by any vehicle or works associated with the construction of the proposed development. Through traffic is to be maintained at all times.
17. Parraween Street or any other roads within the North Sydney LGA are <u>not</u> to be used as a waiting area for trucks delivering to or awaiting pick up of materials etc. from the proposed development.

18. Construction vehicles are not to queue in Parraween Street or any other roads within the North Sydney LGA.
19. Materials are to be stored on-site. At no time, are materials to be stored on any public road or any Council property.
20. Tower cranes shall be located wholly on-site.
21. Mobile cranes shall be located wholly on-site or with an approved Stand Plant Permit.
22. Concrete pumps shall be located wholly on-site or with an approved Stand Plant Permit, unless the pump and trucks can stand wholly within the signposted Work Zone.
23. All pump lines crossing Council footpaths must be ramped over to allow safe pedestrian/ wheelchair traffic at all times.
24. Pedestrian access on Parraween Street must be maintained at all times.
25. Pedestrian access and the diversion of pedestrians shall be carried out in accordance with Australian Standard 1742.3 and 1742.10.
26. If pedestrians are diverted, pram ramps must be provided in accordance with Australian Standard 1428.1.
27. If a Permit to Stand Plant or Temporary Road Closure is required, application must be made to NSW Police, North Shore Local Area command.
28. If a Permit to Stand Plant is required, application must be made to Council a minimum of two business days prior to any proposed works or 3 business days prior to any proposed out of hours works.
29. If a Temporary Road Closure is required, application must be made to Council a minimum of four weeks prior to any proposed works.
30. A traffic route map and conditions are to be made available to truck drivers engaged for this development.
31. A list of truck drivers' names with their licences and vehicle plate numbers and conditions are to be kept on-site by the applicant at all times, and be made available for inspection by Council Officers, Police Officers and Council Rangers.
32. Repeated failure to comply with these conditions will result in removal of any Work Zone under notice.
33. All Traffic Management Plans and Traffic Control Plans must be endorsed with the name of the person preparing the plan along with their level of certified qualification and certificate number. Only persons with current "Select/Modify Traffic Control Plans" or "Design Audit Traffic Control Plans" tickets are qualified to develop and endorse Traffic Management Plans and Traffic Control Plans.

Please note the construction management program is a condition that forms part of the development application for the site. Therefore, any non-compliance with these construction management program conditions of approval constitutes a breach of the conditions of approval for the development application.

VARGA TRAFFIC PLANNING Pty Ltd
Transport, Traffic and Parking Consultants
ACN 071 762 537 ABN 88 071 762 537

26 February 2020
Ref 19227 (Rev 2)

The General Manager
North Sydney Council
P.O. Box 12
NORTH SYDNEY NSW 2059

E: council@northsydney.nsw.gov.au

Dear Mr Ken Gouldthorp,

D142/19
PROPOSED MIXED USE REDEVELOPMENT
390-394 MILITARY ROAD, CREMORNE
ADDENDUM CONSTRUCTION & TRAFFIC MANAGEMENT PLAN

Introduction

Council has previously approved a Construction Traffic Management Plan (prepared by *Varga Traffic Planning*, dated 31 January 2020), subject to conditions, which reviewed the traffic and parking arrangements to be implemented during the construction of the abovementioned mixed use development, as required by DA consent condition Nos B1 (5) & B2 for D142/19.

This addendum Construction Traffic Management Plan (CTMP) seeks permission for the use of truck and dog trailers in order to reduce the overall program length, number of truck movements as well as the associated costs throughout the demolition and excavation stages of the project. The previously approved concrete pour & construction stage of the project remains *unchanged*.

A report prepared by *KD Cowell and Associates (KDCA)*, dated 20 December 2019, investigates the safety implications associated with various spoil removal vehicles, ranging from single rigid truck to truck & dog trailers, and is attached.

All correspondence on this matter must be addressed to The Applicant's representative:

Alex Revay
Platino Properties
11/20 Young Street
Neutral Bay NSW 2089
P: 8968 1909
E: alex@platino.com.au

It should be noted that *Varga Traffic Planning* accepts full responsibility for the preparation of this Construction Traffic Management Plan, but does not accept any responsibility for its implementation which is to be undertaken by others.

Site

The subject site is located on the northern side of Military Road, directly opposite the Spofforth Street intersection, and extends through to Parraween Street (Figures 1 and 2). The site has a street frontage of approximately 16m in length to both Military Road and Parraween Street and occupies a site area of 528m^2.

The site is currently occupied by three separate shop-top buildings; a part one/part three-storey building is located on the western portion of the site, whilst two part one/part two-storey buildings are located on the eastern portion.

Off-street parking is currently provided for No.392 Military Road only, within a rear at-grade hardstand area. Vehicular access to the site is provided via a single driveway located off Parraween Street.

Parraween Street has a pavement width of approximately 12.8m wide with one traffic lane in each direction. Time-restricted 90° angled and parallel metered parking is generally permitted along both sides of the road, including along the eastern portion of the site frontage. A Loading Zone restriction applies along the western portion of the site, extending approximately 33m west of the site.

A recent aerial image of the site and its surroundings is reproduced below, indicating that the neighbouring construction site located at No.398-400 Military Road is currently under construction, with the ground floor slab recently being completed.

Proposed Development

The proposed development involves the demolition of the existing buildings on the site and the construction of a new mixed use development, with a single-level basement car parking area.

The site will be served by a new single entry/exit driveway located towards the western end of the Parraween Street site frontage.

Construction Schedule

The construction activities are expected to be undertaken over a duration of approximately 18 months as set out on the following page. Building construction hours are restricted to between 7:00am to 5:00pm Monday to Friday and 8:00am to 1:00pm on Saturday as per consent condition No. E14. No work is to be carried out on Sundays or Public Holidays.

Notwithstanding, demolition and excavation works however are restricted to between the hours of 8:00am to 5:00pm Monday to Friday only.

Where possible, truck movements will be restricted during school drop-off/pick-up periods, between 8:00am to 9:30am and 2:30pm to 4:30pm.

CONSTRUCTION PROGRAM – APPROXIMATE DURATIONS		
Stage	**Work**	**Duration**
1	Demolition & Site Establishment	2 weeks*
2	Excavation & Piering	2 months*
3	Construction	15 months

*if truck & dogs were used

Demolition & Excavation Stage

All demolition and excavated spoil material will be loaded *wholly* within the site using a variety of truck types and sizes including bogeys and truck and dog trailers.

As per the approved CTMP, the initial demolition stage will be undertaken using medium bogey trucks typically 8.8m in length, as detailed on the attached TCP No.1. Trucks will reverse onto the rear at-grade hardstand area of No.392 Military Road, using the existing driveway off Parraween Street.

As the demolition progresses, small truck and dog trailers will then be used for the remainder of the demolition and excavation stages once the rear of No.394 is cleared. The existing driveway will need to be temporarily widened by approximately 3.3m to the east in order to accommodate the turning manoeuvres, as illustrated on the attached TCP No.2 and the *swept turning path* diagram. Once loaded, the truck can exit the site in a forward direction.

The truck & dog trailers (typically up to 17m in length) are proposed in order to reduce the overall demolition/excavation period and to minimise disruption to the local residents and businesses.

All truck movements will be undertaken with the assistance of RMS-accredited traffic controllers. The traffic controllers will also monitor pedestrian activity in the vicinity of the construction access driveway to ensure there are no conflicts with heavy vehicles.

Concrete Pour & Construction Stages

As the building will be built-to-boundary, material deliveries, including concrete pumping, will be undertaken from within the Works Zone along the Parraween Street site frontage, as per the *approved* CTMP.

Material deliveries will typically be undertaken using rigid trucks up to 8.8m in length. A tower crane will be installed to transfer materials onto site. Once the basement and ground floor are complete, smaller deliveries can also load and unload within the basement parking area.

RMS-accredited traffic controllers will again be present at all times during truck movements to assist with truck manoeuvring and pedestrian safety.

All materials are to be stored on site. At no time are materials to be stored on Parraween Street, Military Road or any other road or Council property. The site manager will ensure that multiple deliveries do not occur at the same time, unless they can all be accommodated on site or within the Works Zone.

Loading and Unloading of Materials to Site

All building materials & waste will typically be stored *wholly* within the site. From time to time, the Works Zone will be used (temporarily) to transfer materials to the site.
A Franna – i.e. forklift – will be used to transfer material into the basement, whilst a tower crane will be used to transfer material from the Works Zone to the loading platforms located within the site, fronting Parraween Street.

In this regard, the forklift if used, will be located *wholly* within the site. Separate permits and approvals are required on each occasion including, but not limited to, a *Building Materials on Footpath Permit* from Council if the forklift/crane is to occupy any part of Council's property.

Works Zone

A plan has been prepared which illustrates a 14m long Works Zone along the Parraween Street site frontage.

The Works Zone will be long enough to accommodate two trucks simultaneously, such as a concrete pump and a concrete truck. The Works Zone parking restrictions are to apply during construction hours only which are specified above and are provided specifically for the set down and pick up of materials, not for the parking of private vehicles associated with the site.

It should be noted that the installation of the Works Zone is subject to the approval of the North Sydney Local Traffic Committee, as per consent condition No. C14.

All costs associated with removal/relocating the metered parking including all sign changes, parking bay line markings must be paid in full to North Sydney Council prior to issue of any Construction Certificate.

Neighbouring Properties

All neighbouring properties are to have their access maintained at all times. All nearby residents and businesses will be updated on a regular basis and at key construction stages with respect to the construction process, particularly in relation to construction vehicles movements, and be provided with a phone number to contact the site manager.

Consultation Strategy

The site manager must liaise with the site managers of any nearby construction sites, including the adjoining site located at No. 398-400 Military Road where a mixed use development is currently under construction, to ensure that appropriate measures are in place to prevent the combined impact of construction activities.

A minimum seven (7) days notification should be provided to adjoining property owners and businesses prior to the implementation of any temporary traffic control measures.

In this regard, the recent aerial image below indicates that there is only one major construction site located within a 250m radius of the site, which includes the adjoining site located at No. 398-400 Military Road, just east of the site, with construction of the ground floor level nearing completion.

Hoarding & Site Amenities

In order to protect Council and adjoining properties, as well as the general public, B-Class hoarding will be installed along the entire Military Road and Parraween Street site frontages prior to the commencement of works, as required by consent condition No. F8(1).

In this regard, the work site must be kept lit between sunset and sunrise if it is likely to be hazardous to persons in the public place, as per consent condition No. F8(3).

Furthermore, separate permits are required to erect Class A and Class B hoarding, as per consent condition No. E13(2). If an 'A' Class hoarding is to alienate a section of Council's property, that section will require a permit for the occupation of Council's property.

Amenities and site sheds will be located on top of the B-Class hoarding – i.e. during demolition and excavation stages. Once the ground floor slab has been constructed, the site sheds will be relocated into the basement parking areas.

Construction Truck Routes

All heavy vehicles involved in the demolition, excavation and construction of the proposed development would approach and depart the site as indicated on the *approved* route map on Figure 3.

The final destination for demolition and excavation trucks are:

1. Blacktown for Commercial Waste,
2. Camellia for Concrete Recycling, or
3. Vineyard for General Landfill.

The site manager will ensure that the route map is prominently displayed on the site and that all contractors and employees are given a copy of the route map and understand their obligations as part of their site induction procedure.

Light traffic roads and those subject to load or height limits will be avoided as well as minimising heavy vehicle movements during school peak periods.

Truck Movements

The proposed development is expected to generate the following truck movements during demolition, excavation and construction:

1. Demolition - approximately 4 to 5 trucks carrying out approximately 2 to 3 loads per day. This would not be every day as they would not be loading out every day of the demolition period.

2. Excavation - approximately 5 to 6 trucks carrying out approximately 5 to 6 trips per day – i.e. 30 truck movements per day. This would not occur every day as they would not be loading out every day of the construction period.

3. Large Concrete Pours - there are approximately 6 major concrete pours and a similar number of minor pours. Major pours would take approximately 8 hours to pour with 6 trucks per hour or 40 to 50 truck movements per day. Smaller pours would have a similar amount of truck movements per hour however the duration would be a lot shorter say 3 to 4 hours maximum.

4. General Deliveries - these would occur intermittently throughout the project with the major deliveries being reinforcing steel, plasterboard and bricks. The remainder would generally comprise smaller truck deliveries.

Traffic Control Plans

Three Traffic Control Plans have been prepared to facilitate the demolition, excavation and construction activities on the subject site. It is noted that these TCPs are identical to the previously *approved* TCPs.

The first & second Traffic Control Plans (No.1 & No.2) illustrates the traffic arrangements to be implemented during the demolition & excavation phases of the project when trucks are loading out on-site. Key features of the Traffic Control Plan are:

- advance warning signs alerting approaching traffic of the presence of possible road works and traffic controllers ahead

- B-Class Hoarding above the entire length of the footpath area along the Parraween Street and also the Military Road site frontages which will allow for the footpath to remain open at all times
- warning signs alerting pedestrians to watch their step as they walk along the southern side of Parraween Street along the site frontage

- two traffic controllers situated outside the construction access driveway in Parraween Street who will have three primary responsibilities during the demolition and excavation phases of the project:

    1. to ensure the safety of pedestrian movements along the Parraween Street site frontage so that no pedestrian enters the path of a heavy vehicle,

    2. to control vehicle movements into and out of the site. The traffic controllers should wait for a safe gap in the passing traffic and pedestrian flows on Parraween Street before allowing the vehicle to exit the site, and

    3. to momentarily control local traffic and pedestrian movements along Parraween Street when trucks are entering and/or exiting the site.

The third Traffic Control Plan (No. 3) illustrates the traffic arrangements to be implemented during the construction & concrete pouring phases of the project when trucks are loading/unloading from the kerbside lane along the Parraween Street site frontage. Key features of the Traffic Control Plan are:

- advance warning signs alerting approaching traffic of the presence of possible road works and traffic controllers ahead

- B-Class Hoarding above the entire length of the footpath area along the Parraween Street and also the Military Road site frontages which will allow for the footpath to remain open at all times

- a kerbside loading/unloading area which is detailed above

- two-way traffic in Parraween Street should generally be maintained at all times, unless traffic controllers are in place

- a concrete line across the footpath onto the site, covered with a pram ramp to ensure the footpath remains open to pedestrians

- traffic controllers situated outside the kerbside loading/unloading area who will encourage westbound drivers to slow down as they drive past an unloading truck in the kerbside area, or momentarily stop westbound traffic whilst material is craned off the truck onto site.

The Traffic Control Plans have been prepared generally in accordance with the RMS's publication *Traffic Control at Works Sites (2018), version 5.0* and the Standards Australia publication *AS1742.3: Traffic Control Devices for Work Sites on Road.*

Furthermore, it should be noted that a separate Application may be required to the Transport Management Centre for a Road Occupancy Licence (for any works which may affect the traffic flow along the Military Road) when the precise time and dates of the proposed works are known.

Tradesmen and Contractor Parking

The site manager will ensure that there is adequate on-site parking available for employee, tradesperson and construction vehicles, where practical. Parking shall be provided in the basement car parking area as soon as is practicable.

In addition, staff will be encouraged to carpool and utilise public transport which will minimise traffic and parking impacts as a consequence of the construction process.

In this regard it is noted that there is an extensive network of bus services which operate along Military Road.

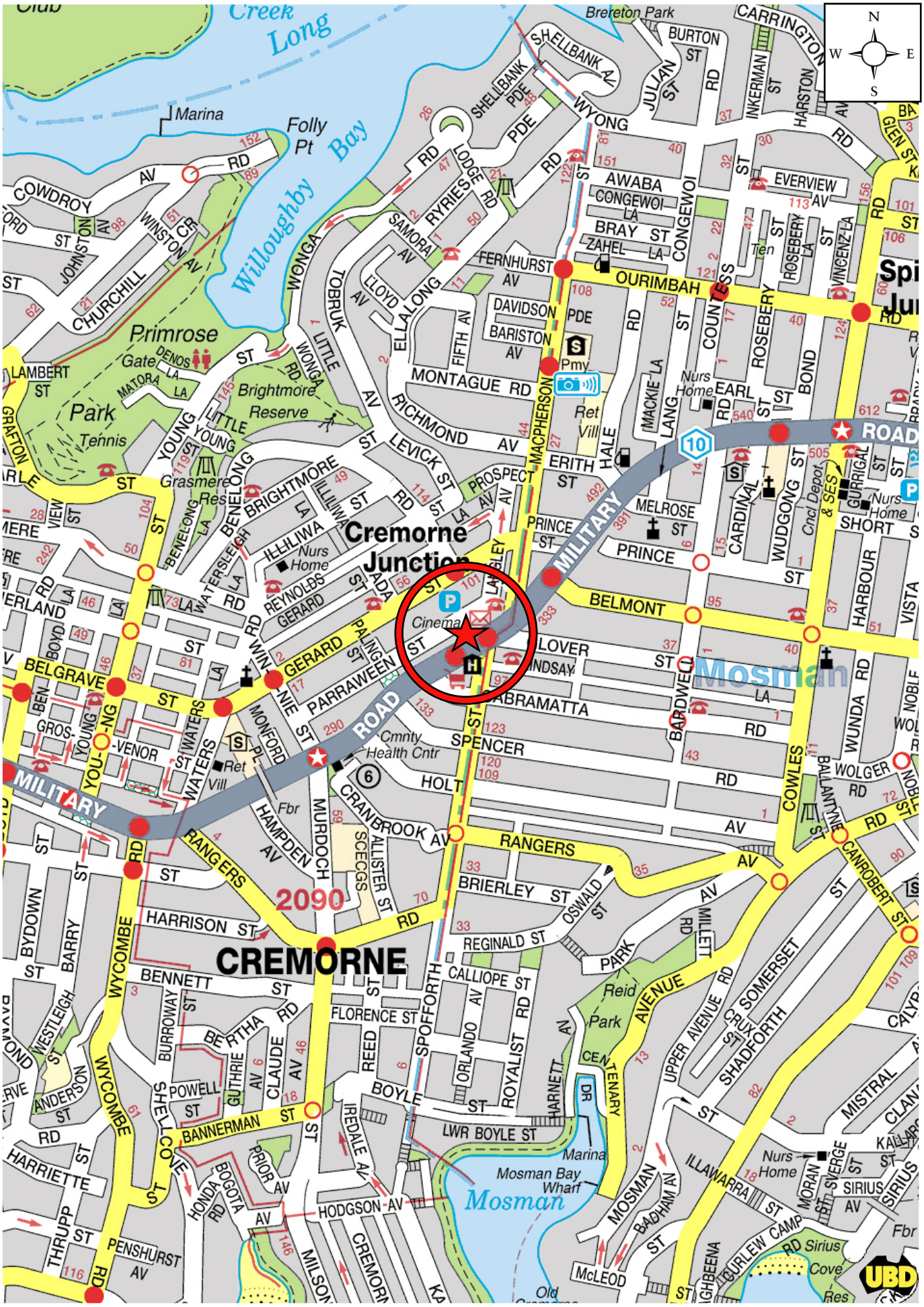
Site Inductions

The requirements of this Construction Traffic Management Plan must be followed by the demolition, excavation and construction contractors, builders, owner and any subcontractors. The site manager will ensure that site inductions occur on a regular basis or as deemed necessary.

I trust this advice satisfies your requirements. Please do not hesitate to contact me on telephone 9904 3224 should you wish to discuss any aspect of the above.

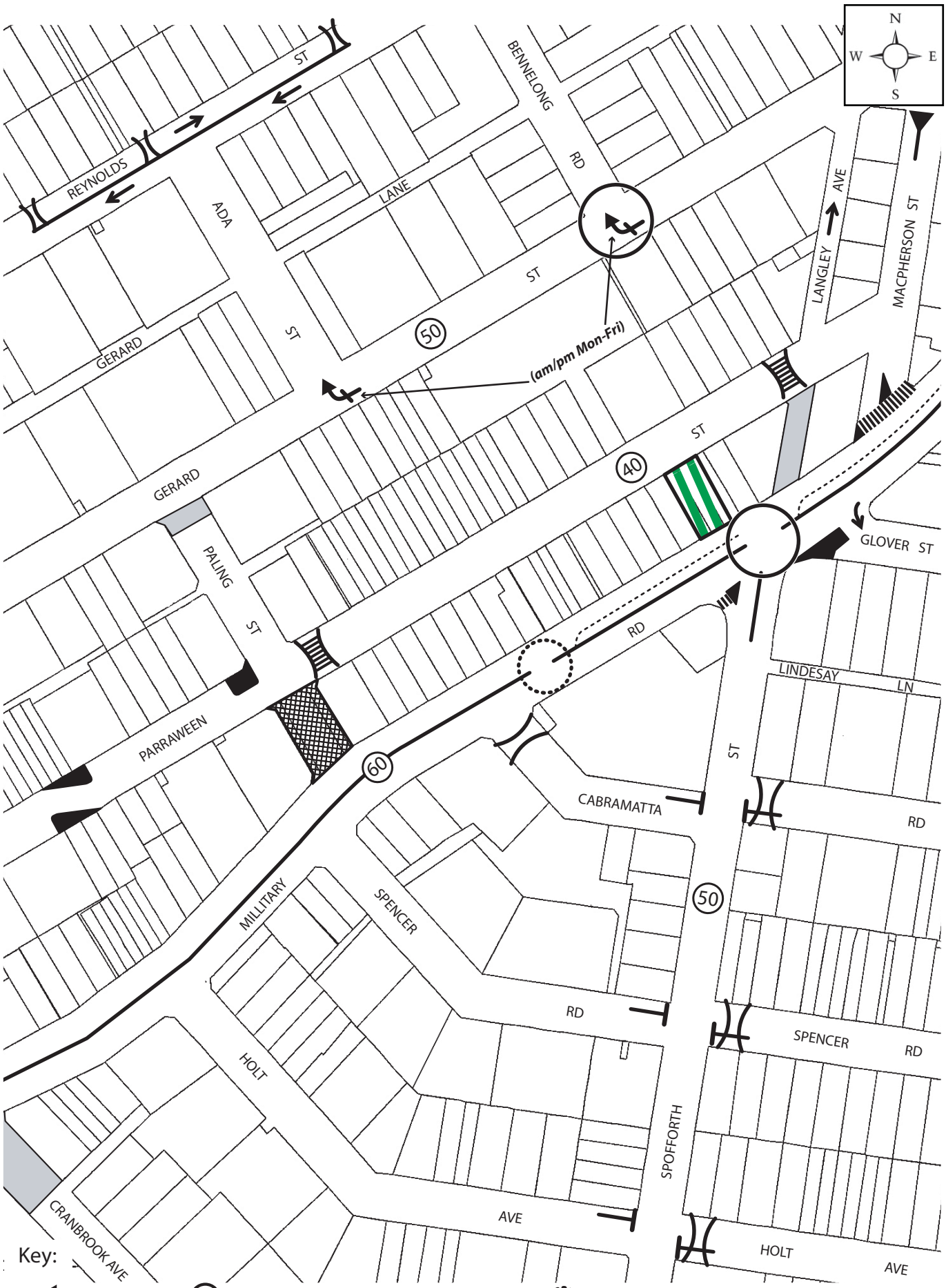
Yours sincerely

Chris Palmer
Traffic Engineer B.Eng (Civil)
Varga Traffic Planning Pty Ltd



VARGA TRAFFIC PLANNING Pty Ltd
Traffic and Parking Consultants

LOCATION
FIGURE 1



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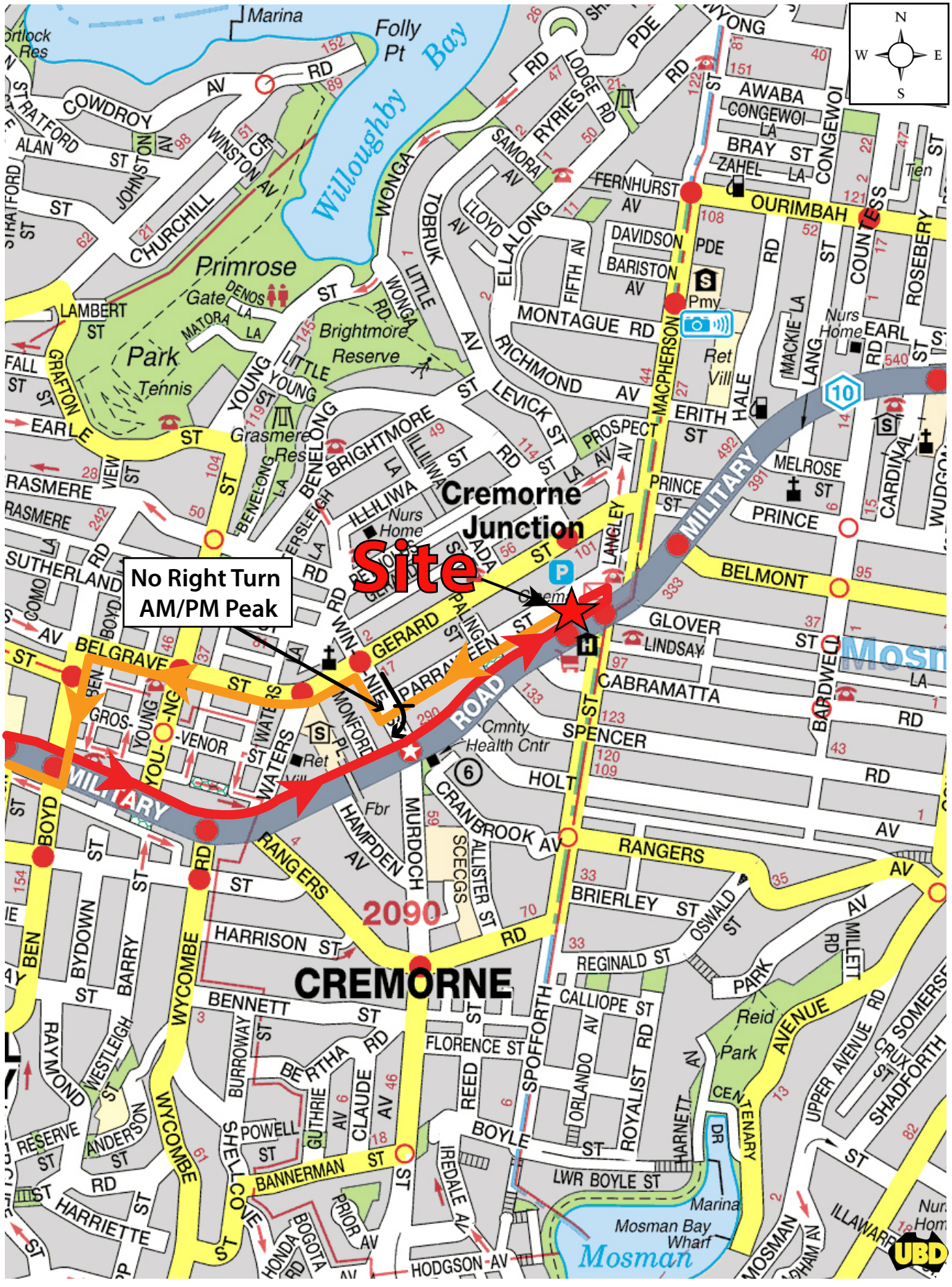
SITE & EXISTING TRAFFIC CONTROLS

FIGURE 2



Approaching Traffic

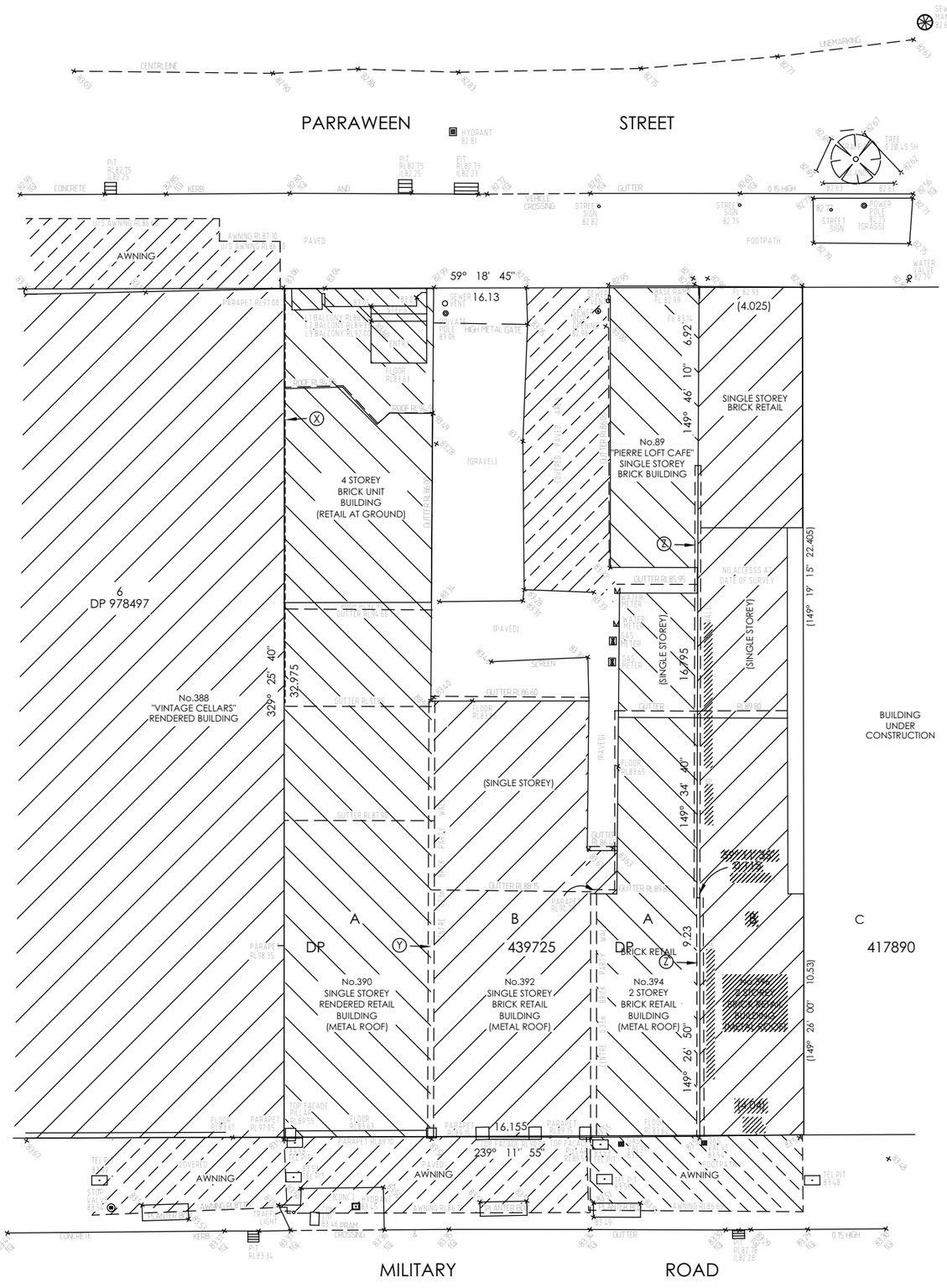
Departing Traffic

VARGA TRAFFIC PLANNING Pty Ltd

Traffic and Parking Consultants

HEAVY VEHICLE ROUTES MAP

FIGURE 3



SURVEY
1:200

General Notes
The Builder shall check all dimensions and levels on site prior to construction.
Notify any errors, discrepancies or omissions to the architect.
Drawings shall not be used for construction purposes until issued for construction.
Do not scale drawings.
All boundaries and contours subject to survey

FILE PATH: Z:\MIL390-394\MIL390-394 DA\MIL390-394 3.pln

Printed 23-May-19

ISSUE	REVISIONS	COUNCIL	BUILDER	OTHERS	DATE
A	ORIGINAL ISSUE FOR DA				23.05.19

PROJECT:

MIXED USE DEVELOPMENT
390-394 MILITARY ROAD CREMORNE 2090

SURVEY

SCALE: AS SHOWN

P A STUDIO
LEVEL 2, 20 YOUNG ST. NEUTRAL BAY, NSW 2089
TEL: 8968 1900 FAX: 8968 1999 ACN: 603 389 288

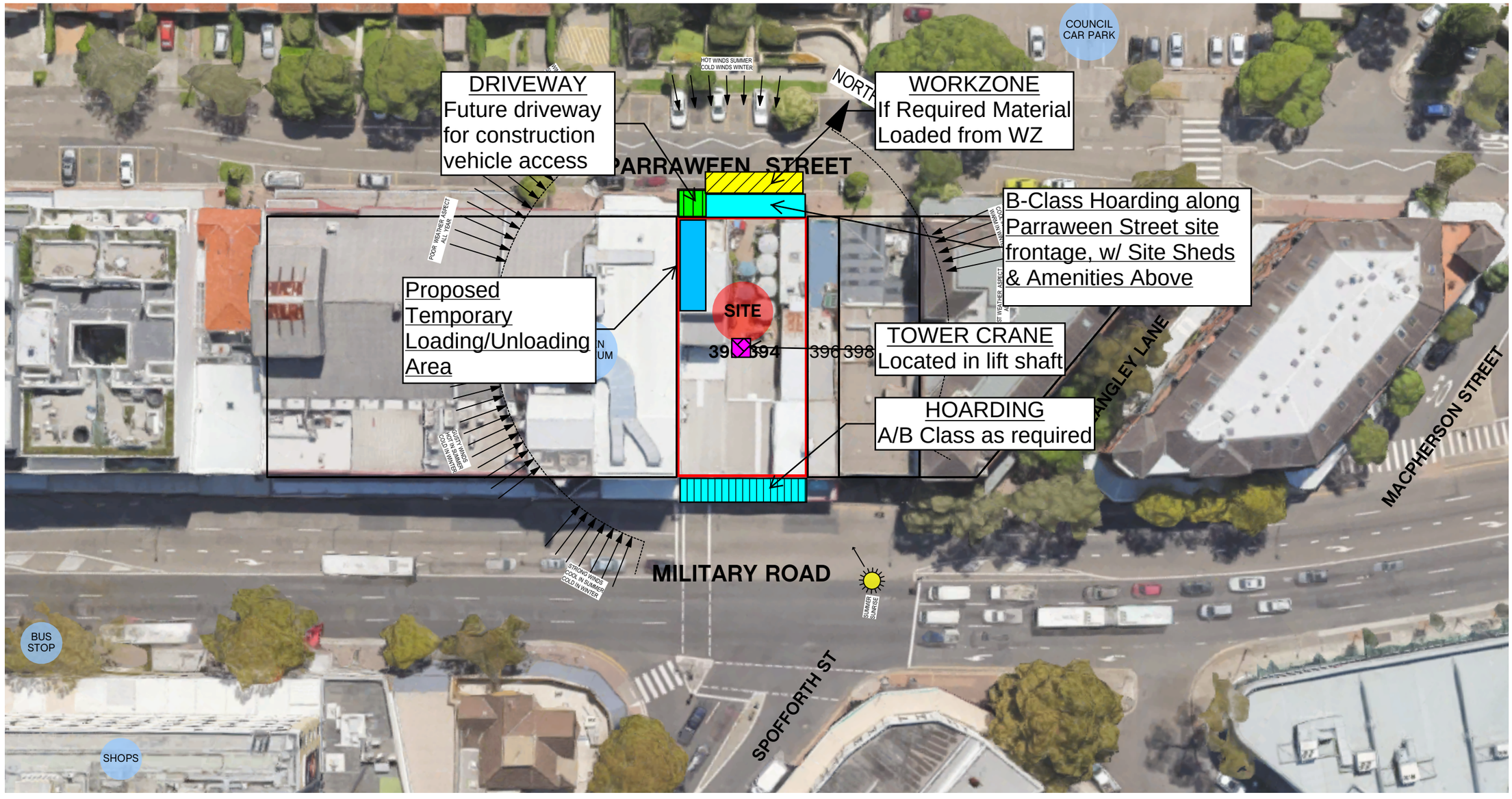
DRAWING SET ID:
SUBSET: SITE AND LOCATION
DRAWN BY: WH/FK
FILE: MIL390-394 3.pln

DA 002

ISSUE A

STREET VIEW ALONG MILITARY ROAD

STREET VIEW ALONG PARRAWEEN STREET



SITE PLAN 1:500

General Notes
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Printed 23-May-19

ISSUE	REVISIONS	COUNCIL / BUILDER / OTHERS	DATE
A	ORIGINAL ISSUE FOR DA		23.05.19

PROJECT:
MIXED USE DEVELOPMENT
390-394 MILITARY ROAD CREMORNE 2090

SITE PLAN

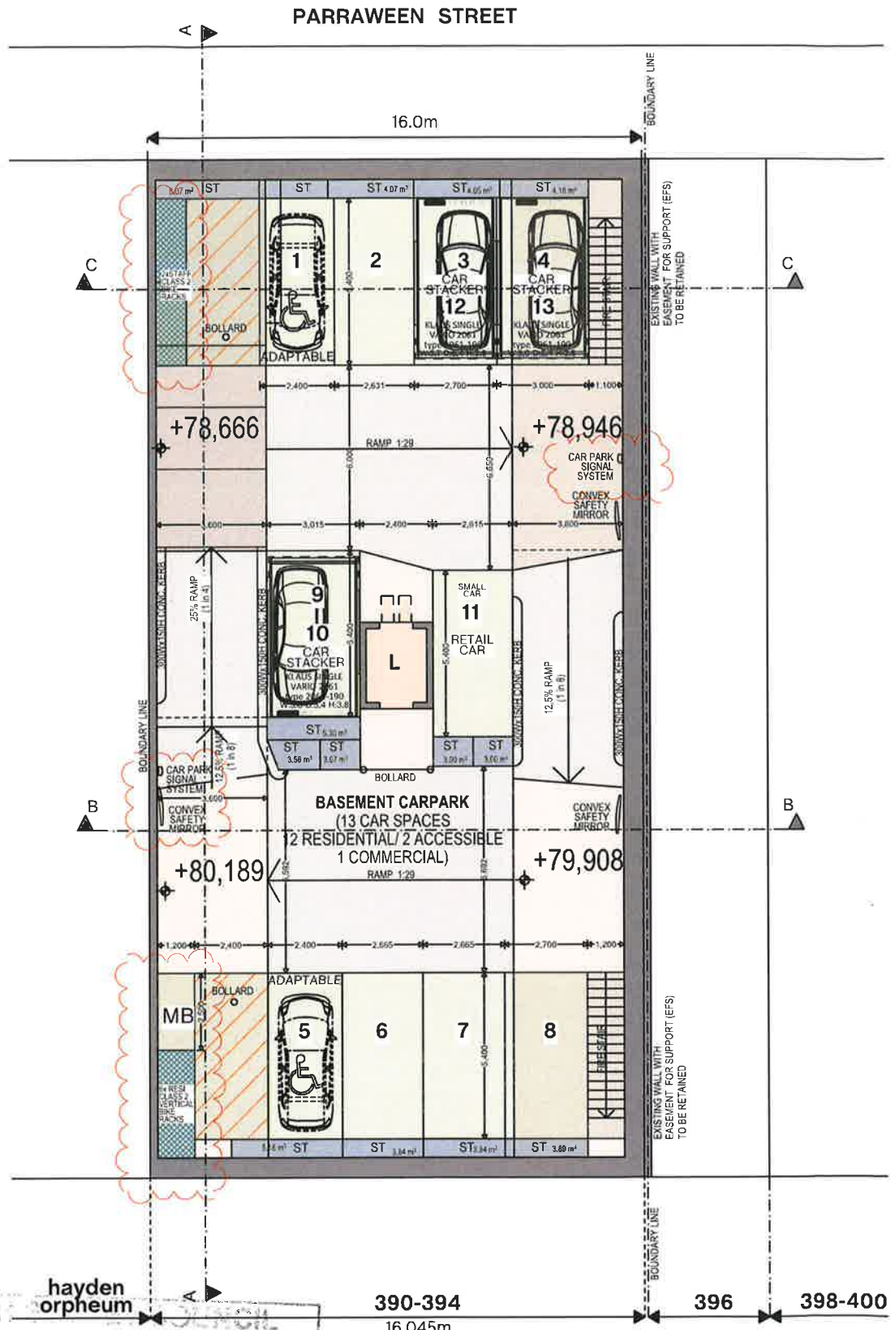
SCALE: AS SHOWN

PA STUDIO
LEVEL 2, 20 YOUNG ST. NEUTRAL BAY, NSW 2089
TEL: 8968 1900 FAX: 8968 1999 ACN: 603 389 288

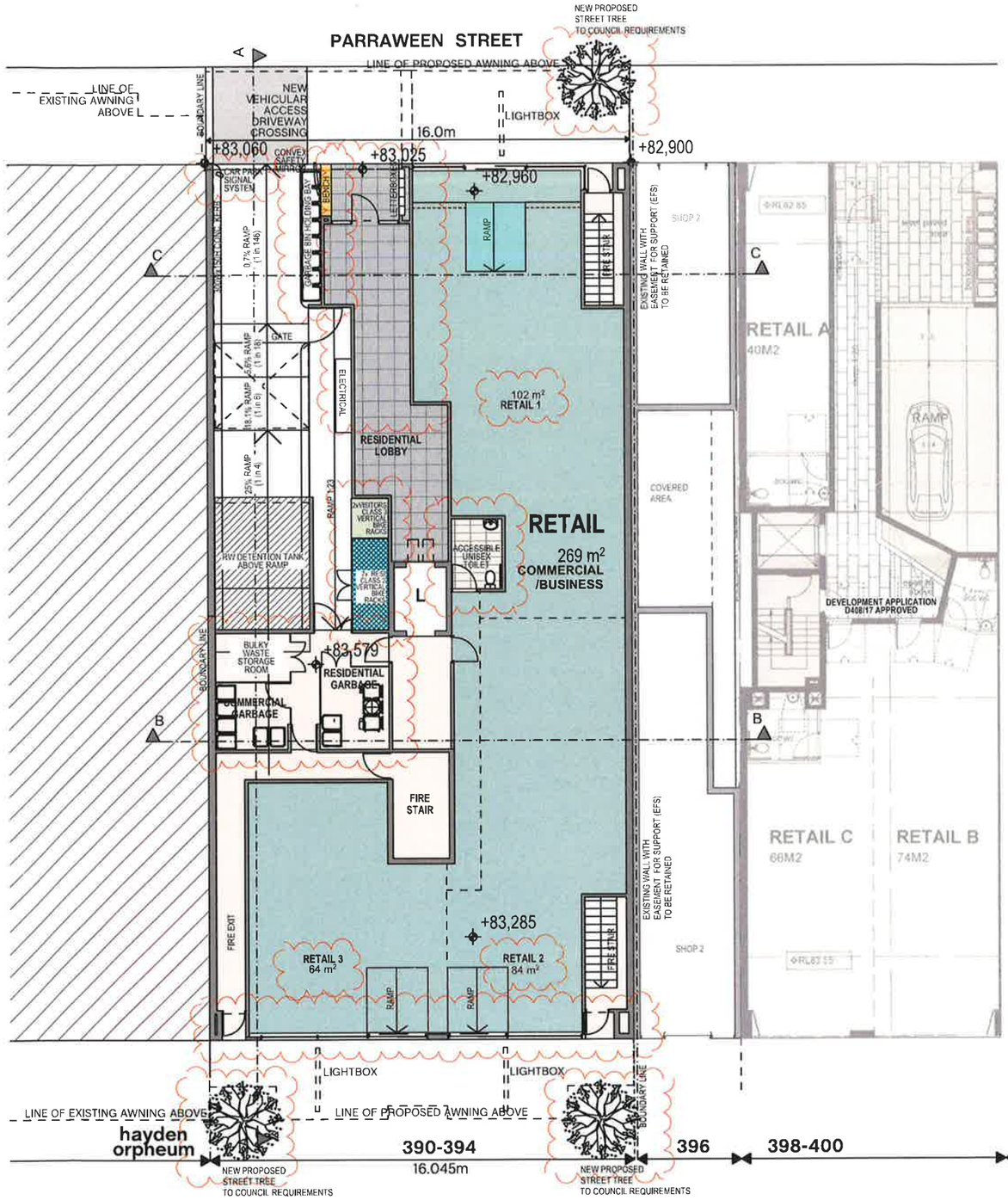
DRAWING SET ID:
SUBSET: SITE AND LOCATION
DRAWN BY: WH/FK
FILE: MIL390-394 3.pln

DA 001

ISSUE B



BASEMENT 1:200



GROUND FLOOR 1:200

NORTH SYDNEY COUNCIL
THIS IS THE PLANS REFERRED TO IN NOTICE OF DETERMINATION OF DEVELOPMENT APPLICATION
No. 142/19
DATE 4/09/19
SIGNED

General Notes
The Builder shall check all dimensions and levels on site prior to construction.
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FILE PATH: Z:\MIL390-394\MIL390-394 DA\MIL390-394 4.pln

Printed 01-Aug-19

ISSUE	REVISIONS	COUNCIL / BUILDER / OTHERS	DATE
C	UPDATES AS REQUESTED BY COUNCIL		01.08.19
B	UPDATES AS REQUESTED BY COUNCIL		12.06.19
A	ORIGINAL ISSUE FOR DA		23.05.19

PROJECT:
MIXED USE DEVELOPMENT
390-394 MILITARY ROAD CREMORNE 2090

FLOOR PLANS BASEMENT AND GF

SCALE: AS SHOWN

P A STUDIO
LEVEL 2, 20 YOUNG ST., NEUTRAL BAY, NSW 2089
TEL: 8968 1900 FAX: 8968 1999 ACN: 603 389 288

DRAWING SET ID:
SUBSET: DA PLANS
DRAWN BY: WH/FK
FILE: MIL390-394 4.pln

DA 100

ISSUE C

1ST FLOOR 1:200

2ND FLOOR 1:200

NORTH WEST DOCKS

THIS IS THE PLANS REFERRED TO IN NOTICE OF DETERMINATION OF DEVELOPMENT APPLICATION

No. 142/19

DATE 4/09/19

SIGNED

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Printed 01-Aug-19

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C	UPDATES AS REQUESTED BY COUNCIL		01.08.19
B	UPDATES AS REQUESTED BY COUNCIL		12.06.19
A	ORIGINAL ISSUE FOR DA		23.05.19

PROJECT:
MIXED USE DEVELOPMENT
390-394 MILITARY ROAD CREMORNE 2090

FLOOR PLANS 1ST &2ND

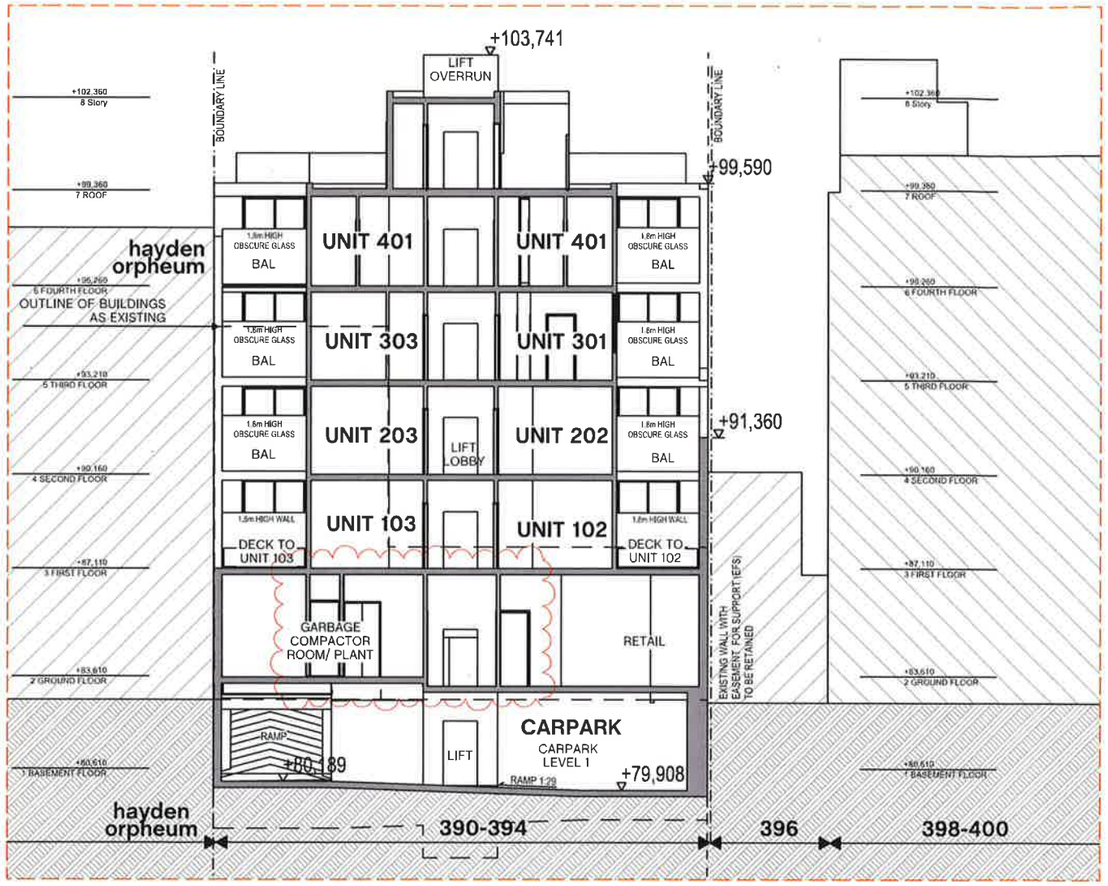
SCALE: AS SHOWN

P A STUDIO
LEVEL 2, 20 YOUNG ST. NEUTRAL BAY, NSW 2089
TEL: 8968 1900 FAX: 8968 1999 ACN: 603 389 288

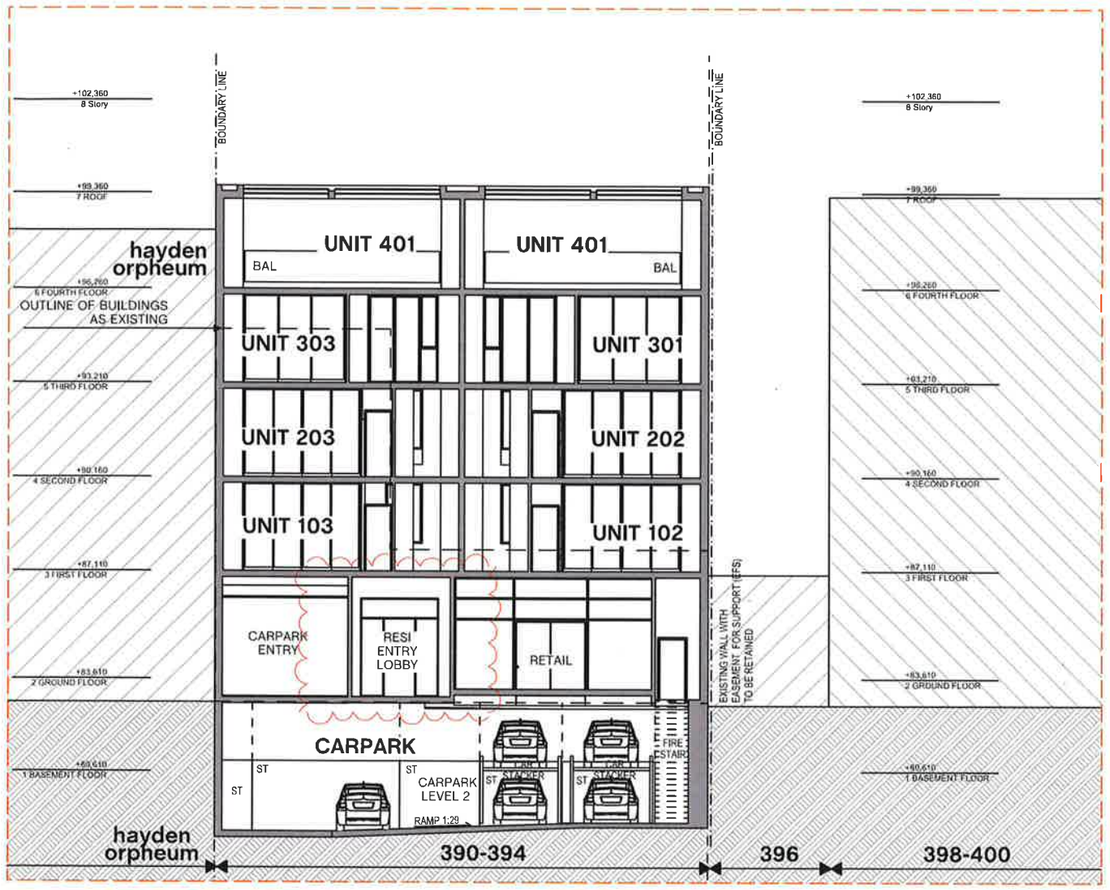
DRAWING SET ID:
SUBSET: DA PLANS
DRAWN BY: WH/FK
FILE: MIL390-394 4.pln

DA 101

ISSUE C



SECTION B-B 1:200



SECTION C-C 1:200

NORTH SYDNEY COUNCIL
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No. 142/19
DATE 4/09/19
SIGNED

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Printed 05-Aug-19

ISSUE	REVISIONS	COUNCIL	BUILDER	OTHERS	DATE
C	UPDATES AS REQUESTED BY COUNCIL				01.08.19
B	UPDATES AS REQUESTED BY COUNCIL				12.06.19
A	ORIGINAL ISSUE FOR DA				12.06.19

PROJECT:
MIXED USE DEVELOPMENT
390-394 MILITARY ROAD CREMORNE 2090

SECTIONS B-B & C-C

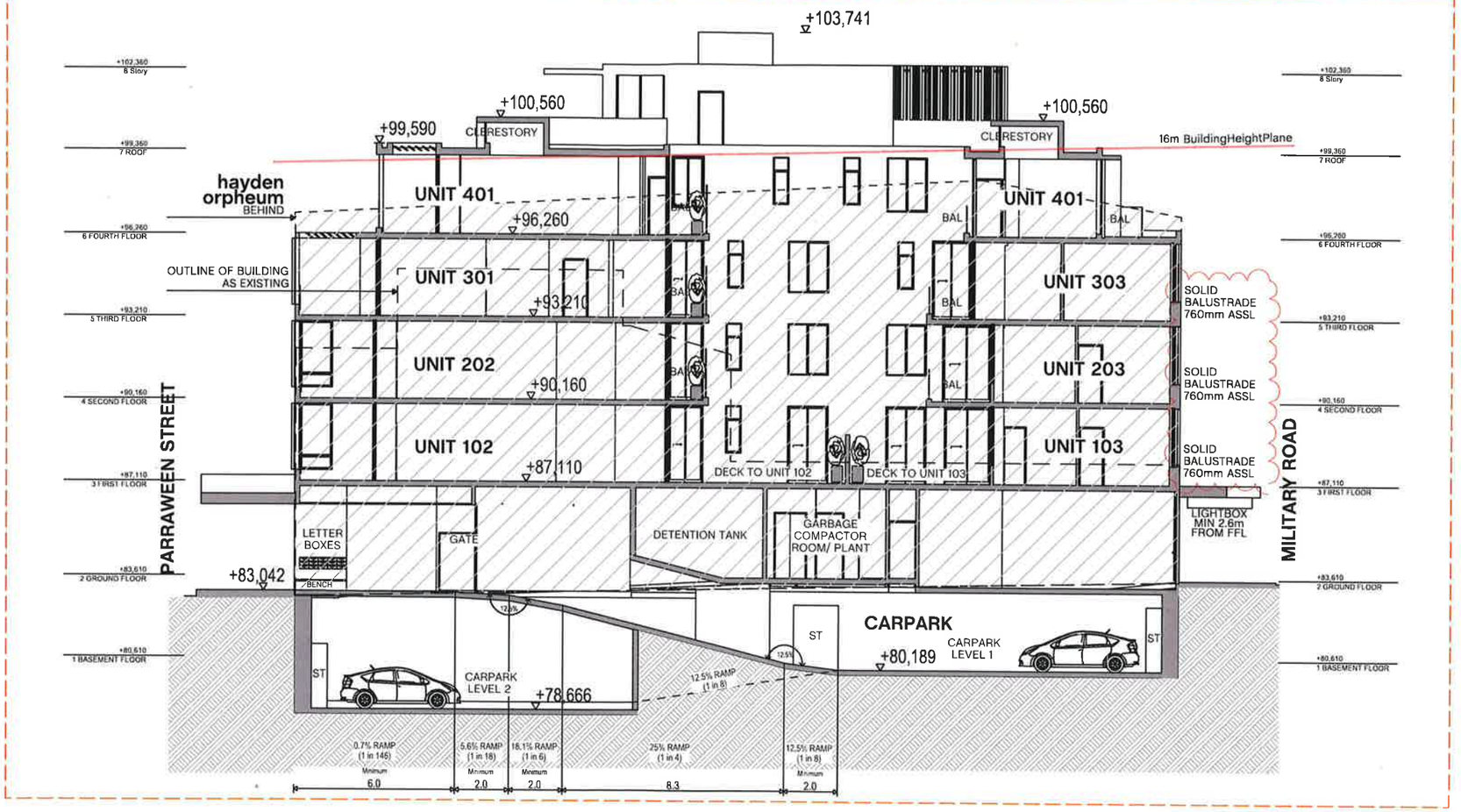
SCALE: AS SHOWN

PA STUDIO
LEVEL 2, 20 YOUNG ST. NEUTRAL BAY, NSW 2089
TEL: 8968 1900 FAX: 8968 1999 ACN: 603 389 288

DRAWING SET ID:
SUBSET: DA SECTIONS
DRAWN BY: WH/FK
FILE: MIL390-394 4.pln

DA 201

ISSUE C



SECTION A-A 1:200

General Notes
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Do not scale drawings.
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FILE PATH: Z:\MIL390-394\MIL390-394 DA\MIL390-394 4.pln

Printed 05-Aug-19

ISSUE	REVISIONS	COUNCIL / BUILDER / OTHERS	DATE
C	UPDATES AS REQUESTED BY COUNCIL		01.08.19
B	UPDATES AS REQUESTED BY COUNCIL		12.06.19
A	ORIGINAL ISSUE FOR DA		23.05.19

PROJECT:
MIXED USE DEVELOPMENT
390-394 MILITARY ROAD CREMORNE 2090

SECTION A-A

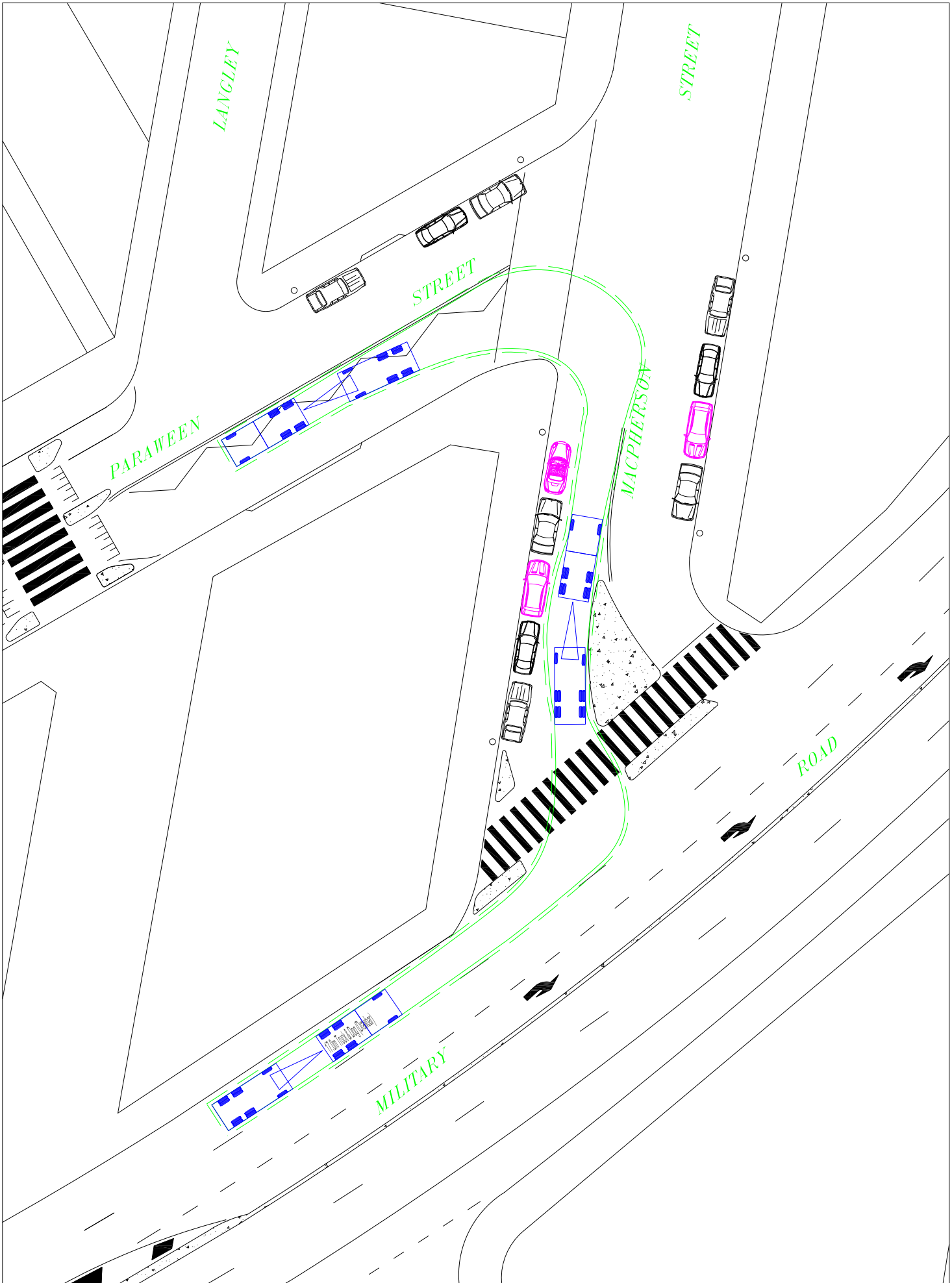
SCALE: AS SHOWN

PA STUDIO
LEVEL 2, 20 YOUNG ST. NEUTRAL BAY, NSW 2089
TEL: 8968 1900 FAX: 8968 1999 ACN: 603 389 288

DRAWING SET ID:
SUBSET: DA SECTIONS
DRAWN BY: WH/FK
FILE: MIL390-394 4.pln

DA 200

ISSUE C



VARGA TRAFFIC PLANNING Pty Ltd
ABN 88 071 762 537
Suite 6, Level 1
20 Young Street
Neutral Bay, NSW 2089

Phone +61 2 9904 3224
PO Box 1868
Neutral Bay, NSW 2089
www.vargatraffic.com.au
Sydney, Australia

PROJECT
MIXED USE DEVELOPMENT

N

DRAWING TITLE
17M LONG TRUCK & DOG TURNING PATH
Entering Paraween Street from Military Road

1:400 @ A4

ADDRESS
390-394 Military Road, Cremorne

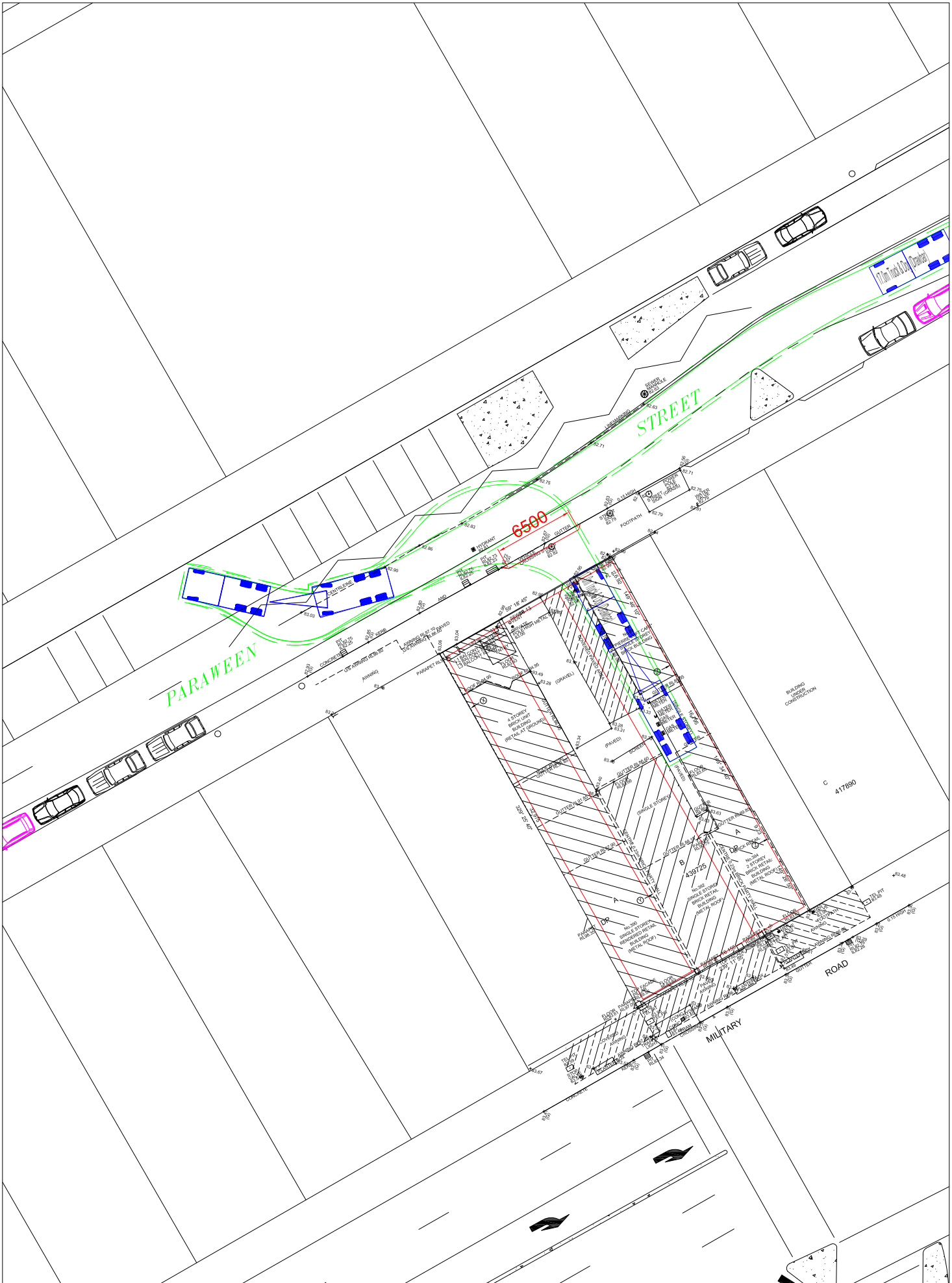
PROJECT NO.
19227

DATE DRAWN
2020-2-26

REVIEWED
CHRIS PALMER

PREPARED
DONALD LEE

VARGA TRAFFIC PLANNING Pty Ltd
Transport, Traffic and Parking Consultants



VARGA TRAFFIC PLANNING Pty Ltd
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20 Young Street
Neutral Bay, NSW 2089

Phone +61 2 9904 3224
PO Box 1868
Neutral Bay, NSW 2089
www.vargatraffic.com.au
Sydney, Australia

PROJECT
MIXED USE DEVELOPMENT

N

DRAWING TITLE
17M LONG TRUCK & DOG TURNING PATH
Entering On-site Loading Area

1:400 @ A4

ADDRESS
390-394 Military Road, Cremorne

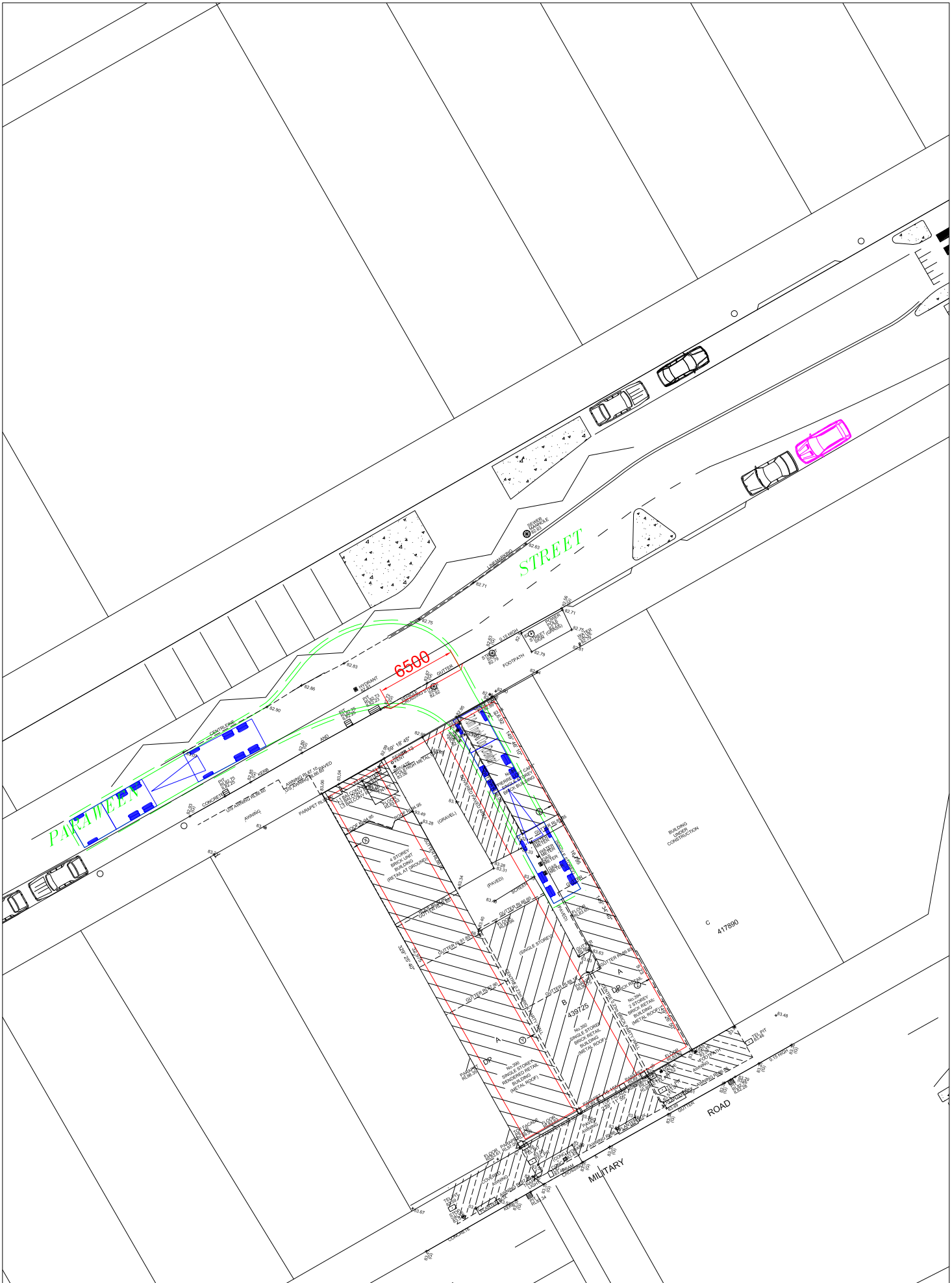
PROJECT NO.
19227

DATE DRAWN
2020-2-26

REVIEWED
CHRIS PALMER

PREPARED
DONALD LEE

VARGA TRAFFIC PLANNING Pty Ltd
Transport, Traffic and Parking Consultants



VARGA TRAFFIC PLANNING Pty Ltd
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Suite 6, Level 1
20 Young Street
Neutral Bay, NSW 2089

Phone +61 2 9904 3224
PO Box 1868
Neutral Bay, NSW 2089
www.vargatraffic.com.au
Sydney, Australia

PROJECT
MIXED USE DEVELOPMENT

N

DRAWING TITLE
17M LONG TRUCK & DOG TURNING PATH
Exiting Site onto Parraween Street

1:400 @ A4

ADDRESS
390-394 Military Road, Cremorne

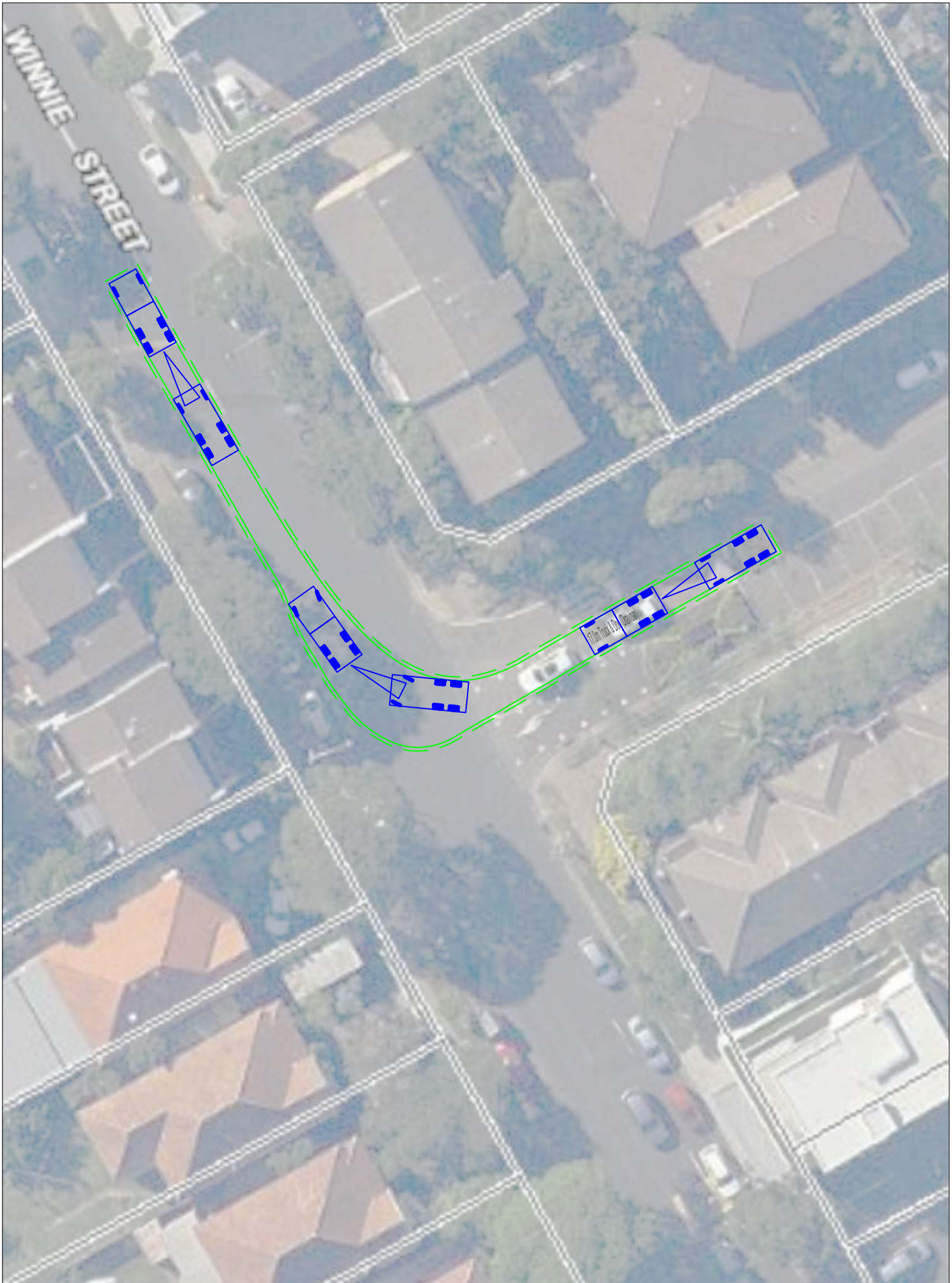
PROJECT NO.
19227

DATE DRAWN
2020-2-26

REVIEWED
CHRIS PALMER

PREPARED
DONALD LEE

VARGA TRAFFIC PLANNING Pty Ltd
Transport, Traffic and Parking Consultants



VARGA TRAFFIC PLANNING Pty Ltd
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20 Young Street
Neutral Bay, NSW 2089

Phone +61 2 9904 3224
PO Box 1868
Neutral Bay, NSW 2089
www.vargatraffic.com.au
Sydney, Australia

PROJECT
MIXED USE DEVELOPMENT

N

DRAWING TITLE
17M LONG TRUCK & DOG TURNING PATH
Entering Winnie Street from Parraween Street

1:400 @ A4

ADDRESS
390-394 Military Road, Cremorne

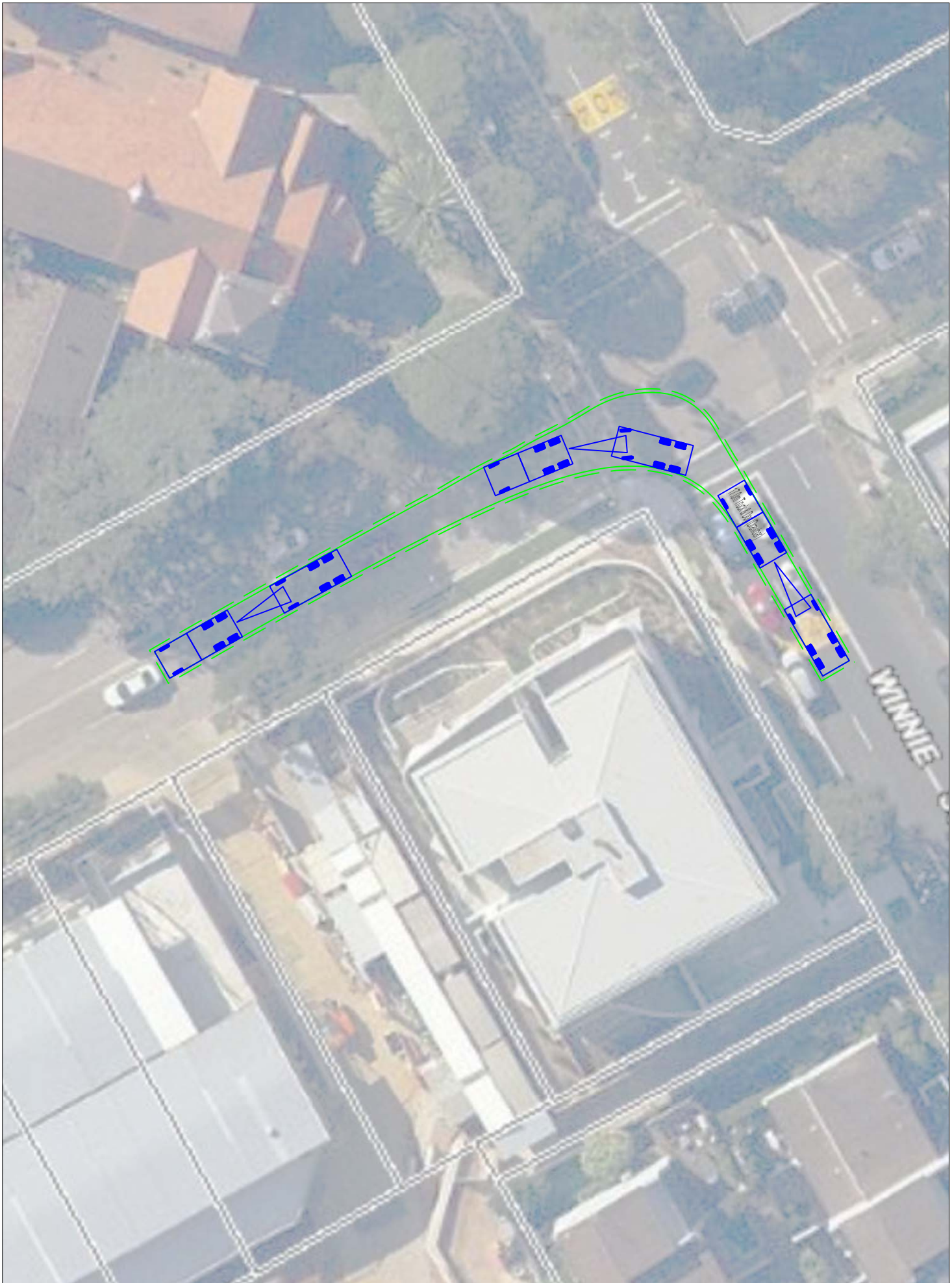
PROJECT NO.
19227

DATE DRAWN
2020-2-17

REVIEWED
CHRIS PALMER

PREPARED
DONALD LEE

VARGA TRAFFIC PLANNING Pty Ltd
Transport, Traffic and Parking Consultants



VARGA TRAFFIC PLANNING Pty Ltd
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20 Young Street
Neutral Bay, NSW 2089

Phone +61 2 9904 3224
PO Box 1868
Neutral Bay, NSW 2089
www.vargatraffic.com.au
Sydney, Australia

PROJECT
MIXED USE DEVELOPMENT

N

DRAWING TITLE
17M LONG TRUCK & DOG TURNING PATH
Entering Gerard Street from Winnie Street

1:400 @ A4

ADDRESS
390-394 Military Road, Cremorne

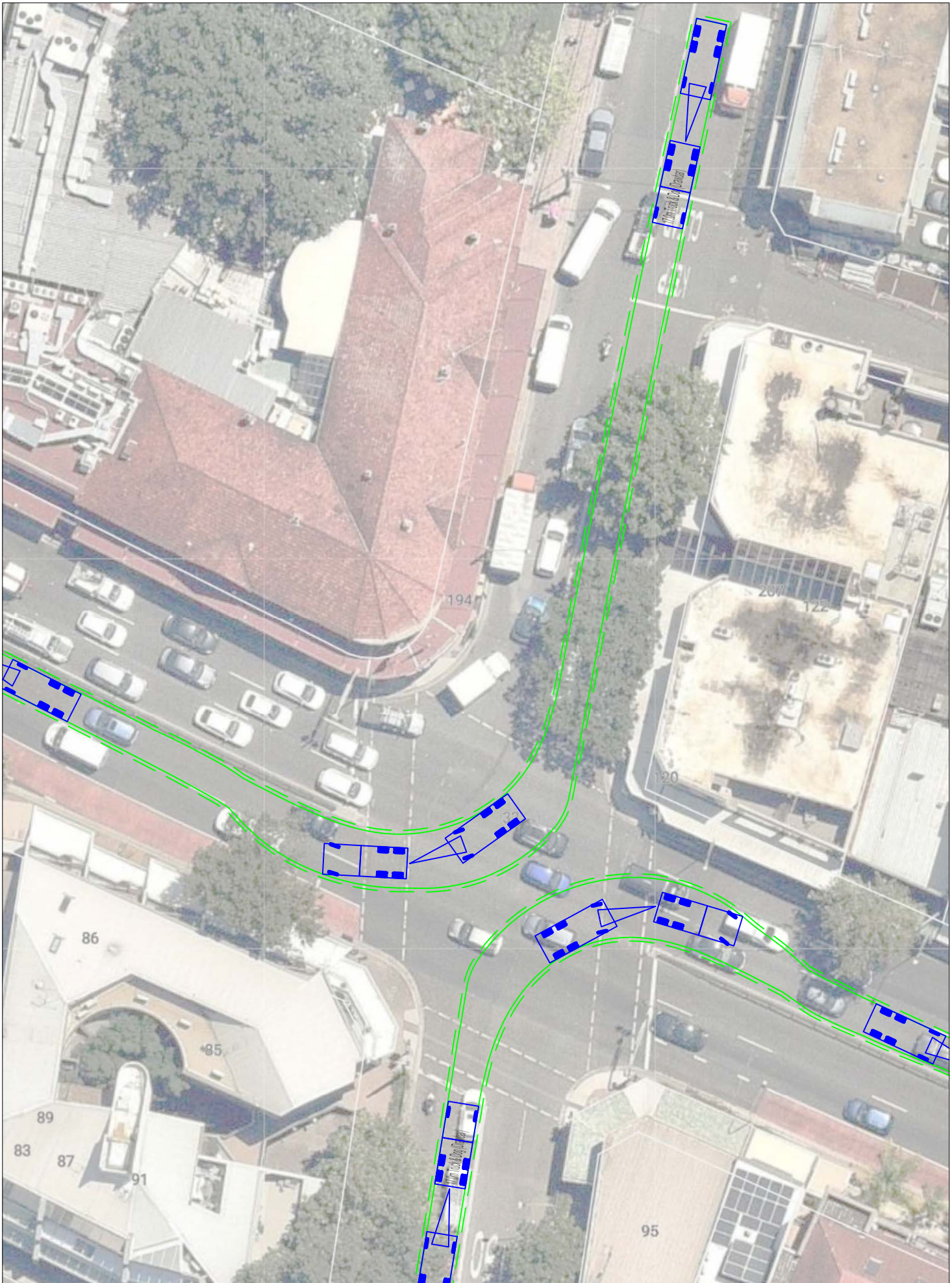
PROJECT NO.
19227

DATE DRAWN
2020-2-17

REVIEWED
CHRIS PALMER

PREPARED
DONALD LEE

VARGA TRAFFIC PLANNING Pty Ltd
Transport, Traffic and Parking Consultants



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Suite 6, Level 1
20 Young Street
Neutral Bay, NSW 2089

Phone +61 2 9904 3224
PO Box 1868
Neutral Bay, NSW 2089
www.vargatraffic.com.au
Sydney, Australia

PROJECT
MIXED USE DEVELOPMENT

N

DRAWING TITLE
17M LONG TRUCK & DOG TURNING PATH
Entering Military Road from Ben Boyd Road

1:400 @ A4

ADDRESS
390-394 Military Road, Cremorne

PROJECT NO.
19227

DATE DRAWN
2020-2-17

REVIEWED
CHRIS PALMER

PREPARED
DONALD LEE

VARGA TRAFFIC PLANNING Pty Ltd
Transport, Traffic and Parking Consultants

Notes:

Check regularly that signs are in correct position and clearly visible to approaching traffic.
Check regularly that signs have not been obscured by parked cars.
Signs are to be covered or removed at the end of the working day.
All traffic control works, signs and devices to comply with Australian Standard AS1742.3.
Adjusments to the TCP may be only made by persons holding an RMS "Prepare a Work Zone TMP" ticket.
Signs to be erected so they are visible to motorists and not a hazard to pedestrians.
The position of the signs, traffic controllers and equipment are only suggested locations, amendments to the locations may be required depending on site condition
Tolerances on positioning of signs and devices must be in accordance with AS1742.3 Cl 4.1.6.

LEGEND

Traffic Controller

Single Sided Sign

Entry/exit driveway to public car park

Existing vehicular crossing to be used for initial demolition stage

Future basement built to boundary

B-class hoarding above footpath areas with site sheds, & amenities located above

ADA STREET

GERARD STREET

LANGLEY AVENUE

ONE WAY

MACPHERSON STREET

MILITARY ROAD

PARRAWEEN STREET

GLOVER STREET

SPOFFORTH STREET

LINDSAY LANE

BUS/BUS LANE

AM AM

T1-200

T1-18 PREPARE TO STOP

T1-5

T8-1 PEDESTRIANS WATCH YOUR STEP

30m

25m

20m

40m

Site
No. 390-394

TRAFFIC CONTROL PLAN No. 1

PROPOSED TRAFFIC ARRANGEMENTS DURING INITIAL DEMOLITION STAGE

390-394 Military Road, Cremorne

0m 25m 50m

Scale 1:800 @ A3 Size

"Prepare A Works Zone Traffic Management Plan" No. 0051693984

Notes:

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Check regularly that signs have not been obscured by parked cars.
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Signs to be erected so they are visible to motorists and not a hazard to pedestrians.
The position of the signs, traffic controllers and equipment are only suggested locations, amendments to the locations may be required depending on site condition
Tolerances on positioning of signs and devices must be in accordance with AS1742.3 Cl 4.1.6.

LEGEND

Traffic Controller

Single Sided Sign

Entry/exit driveway to public car park

Existing Vehicular Crossing to be widened and used for late demolition & excavation

ADA STREET

GERARD STREET

LANGLEY AVENUE

ONE WAY

MACPHERSON STREET

PARRAWEEN STREET

MILITARY ROAD

GLOVER STREET

SPOFFORTH STREET

LINDSAY LANE

BUS/BUS LANE

AM AM

T1-5

T1-18 PREPARE TO STOP

T1-200

30m

50m

40m

20m

T8-1 PEDESTRIANS WATCH YOUR STEP

T8-1 PEDESTRIANS WATCH YOUR STEP

Site
No. 390-394

TRAFFIC CONTROL PLAN No. 2

PROPOSED TRAFFIC ARRANGEMENTS DURING DEMOLITION & EXCAVATION STAGES

390-394 Military Road, Cremorne

0m 25m 50m

Scale 1:800 @ A3 Size

"Prepare A Works Zone Traffic Management Plan" No. 0051693984

Notes:

Check regularly that signs are in correct position and clearly visible to approaching traffic.
Check regularly that signs have not been obscured by parked cars.
Signs are to be covered or removed at the end of the working day.
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Signs to be erected so they are visible to motorists and not a hazard to pedestrians.
The position of the signs, traffic controllers and equipment are only suggested locations, amendments to the locations may be required depending on site condition
Tolerances on positioning of signs and devices must be in accordance with AS1742.3 Cl 4.1.6.

LEGEND

Traffic Controller

Single Sided Sign

ADA STREET

GERARD STREET

LANGLEY AVENUE

ONE WAY

MACPHERSON STREET

Entry/exit driveway to public car park

Concrete line with pram ramp over

STREET

20m

30m

T1-5

T1-18 PREPARE TO STOP

T1-200

40m

TRUCKS TRUCKS

PEDESTRIANS WATCH YOUR STEP

T8-1

Site
No. 390-394

T8-1 PEDESTRIANS WATCH YOUR STEP

T1-200

50m

T1-18 PREPARE TO STOP

T1-5

30m

30m

PARRAWEEN STREET

MILITARY ROAD

GLOVER STREET

Tower crane location along future lift shaft

Future building built to boundary

MILITARY ROAD

BUS/BUS LANE

AM AM

SPOFFORTH STREET

LINDSAY LANE

TRAFFIC CONTROL PLAN No. 3

PROPOSED TRAFFIC ARRANGEMENTS DURING CONSTRUCTION & CONCRETE POURS

390-394 Military Road, Cremorne

0m 25m 50m

Scale 1:800 @ A3 Size

"Prepare A Works Zone Traffic Management Plan" No. 0051693984

WORKS ZONE PLAN

390-394 Military Road, Cremorne

Report Prepared for:

Platino Properties Pty Ltd

Alex Revay

Spoil Removal at 89 Parraween Street, Cremorne and selection of suitable Spoil Removal Vehicle

Prepared by:
Ken Cowell
K D Cowell & Associates
Project No. 2472

Unit 11 / No12 Yatala Road
Mount Kuring Gai NSW 2080
P +61 2 9457 7100
M 0411 264 781
E ken@kdcowellassoc.com.au

Document Verification

Project title	Platino Properties - Spoil Removal at Parraween Street, Cremorne	ABN 68 153 364 277
Document title	Selection of Spoil Removal Vehicle	Project number 2472
Description	Research the ideal vehicle for the removal of excavated spoil material from the Proposed Mixed Use Development at 390-394 Military Road, Cremorne (entering via 89 Parraween Street)	
Client Contact	Alex Revay	

	Name	Signature	Issue:	Date
Prepared by	Ken Cowell		A (draft) B (final)	20Dec19
Checked by	Helen Cowell			
Issued by	Ken Cowell			
Filename				

Document History

	Issue A		Issue B			
Issue to:	Date	No. Copies	Date	No. Copies		
Alex Revay	20Dec19	1 pdf				
Alex Revay						

Commercial in Confidence

Disclaimer

ACKNOWLEDGMENTS

K D Cowell & Associates wishes to thank all representing organisations who contributed to the production of this report, including:

Organisation	Name
National Truck Accident Research Centre	Associate Professor Kim Hassall
Civil 1	Andrew Zeait
JD Projects Group	David Mutoka
Varga Traffic Planning	Chris Palmer

EXECUTIVE SUMMARY

Platino Properties has commissioned K.D. Cowell & Associates to research the most suitable vehicle types to remove excavated spoil material from the Proposed Mixed Use Development 390-394 Military Road, Cremorne, entering via 89 Parraween Street, considering the following criteria:

1. Safety in operation in the vicinity of the site
2. Vehicle movements up to 12 per day during demolition
3. Vehicle movements up to 30 per day during excavation
4. Minimal disruption to traffic
5. Overall safety and expected accidents per annum
6. Minimum disturbance to adjacent buildings
7. Energy efficiency
8. Environmental Impact
9. Productivity

Key assumptions and considerations for this report were:

1. Removal of spoil material per day varied according to stages.

2. Stages of work split into 2 stages
   - Stage 1 – Demolition - Approximately 1,500m^3 @ 150m^3 per day
     - Commercial Waste – Blacktown 90km round trip
     - Concrete Recycling – Camellia 72km round trip

   - Stage 2 - Excavation – Approximately 3,500m^3 @ 375m^3 per day
     - General landfill – Vineyard 105km round trip

3. Vehicle safety, maintenance and operation based around operator being enrolled in the National Heavy Vehicle Regulator NHVAS scheme.

Identified vehicle types to evaluate:

- Single rigid 3 axle truck
- Single rigid 4 axle truck "twin steer"
- Articulated semi-trailer
- Rigid truck and 3 axle dog trailer
- Rigid truck and 4 axle dog trailer

The 5 vehicles types were modelled with regards to:

- Required movements for removal of demolition and excavation spoil / day.
- Amount of fuel burn for removal of demolition and excavation spoil to relevant destinations.
- Emissions associated with fuel burn
- Effect on traffic congestion

Swept path consideration was given to only 4 vehicle types as it was clear from the onset that articulated semi-trailer was a poor performer in this area. The dimensions of the vehicles to be utilised are under the maximum vehicle dimensions as stated in Australian Standard 2890.2 for the swept path.

We have also evaluated 2 vehicle types and their expected accidents per annum, using data from National Truck Accident Research Centre.

We have concluded that the following vehicle best satisfies the criteria 1 to 9 above (subject to validation of swept path analysis and traffic management safety mitigation plan) is the 3 axle rigid truck and 3 axle dog trailer.

In our expert opinion, the use of a 3 axle rigid truck and 3 axle dog combination will:

- reduce truck movements by 60%
- reduce accident risk by 81%
- reduce amount of fuel used by up to 42%
- reduce CO_2 emissions by 42%
- reduce distance travelled and road congestion by 55%

when compared to the single 3 axle rigid truck as required by Council.

Other options would also offer improvements in productivity, fuel usage, co2 emissions, but would impact traffic congestion with swept path issues. (Refer Appendix A).

When site infrastructure eg scaffolding, barricades etc are in place and the site is operation ready, a real time evaluation of the swept path performance should be conducted to validate the swept path analysis and traffic management safety mitigation plan.

The safety, productivity and environmental benefits gained over and above the single rigid truck make a compelling case for Council to favourable review the Council's position on this matter.

A more detailed analysis and explanations can be found in the body of the report.

TABLE OF CONTENTS

1.0 INTRODUCTION

Background and Context

Platino Properties has commissioned K.D. Cowell & Associates to research the most appropriate vehicle for the removal of excavated spoil material from the Proposed Mixed Use Development 390-394 Military Road, Cremorne.

It is understood that Platino Properties Project Manager, Alex Revay, has had discussions with North Sydney Council regarding the suitability of the vehicles proposed for the removal of spoil material.

Access to and from the construction site is from Parraween Street.

The Construction Management Program – Traffic Management Plans prepared by Varga Traffic Planning, dated 4 December 2019, envisages that all truck manoeuvres will be undertaken with the assistance of RMS-accredited traffic controllers at the point of entry and exit of vehicles from 89 Parraween Street.

Objectives

Research the most appropriate vehicle types for the removal of excavated spoil material from the Proposed Mixed Use Development 390-394 Military Road, Cremorne, bearing in mind the following criteria:

1. Safety in operation in the vicinity of the site
2. Vehicle movements up to 12 per day during demolition
3. Vehicle movements up to 30 per day during excavation
4. Minimal disruption to traffic
5. Overall safety and expected accidents per annum
6. Minimum disturbance to adjacent buildings
7. Energy efficiency
8. Environmental Impact
9. Productivity

Scope

Key considerations for this report:

- Removal of 150m^3 spoil material per day in Stage 1 Demolition
- 90 Km round trip Cremorne-Blacktown for Stage 1 Commercial Waste
- 72 Km round trip to Cremorne-Camellia for Stage 1 Concrete Recycling

- Removal of 375m^3 spoil material per day in Stage 2 Excavation
- 105 Km round trip to Cremorne-Vineyard for Stage 2 General Landfill

Identified vehicle types to evaluate:

- Single rigid 3 axle truck
- Single rigid 4 axle truck "twin steer"
- Articulated semi-trailer
- Rigid truck and 4 axle dog trailer
- Rigid truck and 3 axle dog trailer

The 5 vehicles types were modelled with regards to:

- Required movements to remove between 150-375m^3 of spoil / day
- Amount of fuel burn for a round trip of between 72-105 Kms
- Emissions associated with fuel burn

Additionally, a request was made to evaluate the 2 vehicle types and their expected accidents per annum. We were granted access to the National Truck Accident Research Centre's database for this purpose.

Swept path consideration was given to only 4 vehicle types as it was clear from the onset that articulated semi-trailer was a poor performer in this area. This is due to the combination having only one point of articulation compared with two points on the rigid truck and dogs.

2.0 METHODOLOGY

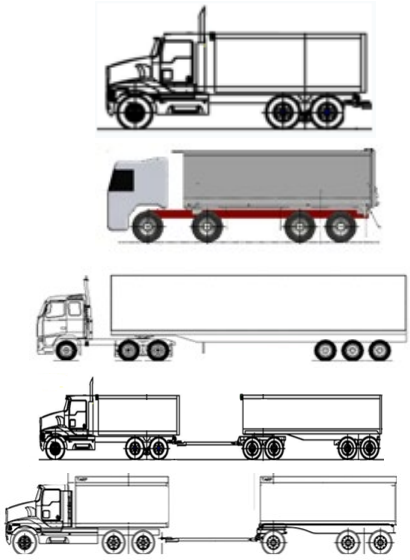
The concept of 'Freight Exposure' is a methodology reflecting a special combination of freight metrics that represent those aspects of freight operations that are observed by the community. Examples of these operations are: truck numbers, truck hours of operation, noise, emissions and accidents. The exposure index is a measure of 'freight in your face' as observed by the community.[1]

5 types of vehicles were evaluated comparing:

- Gross Combination Weight
- Payload
- Overall length
- Road Usage
- Fuel Consumption
- Exhaust Emissions
- Swept Path Analysis

The vehicles evaluated were:

1. Single rigid 3 axle truck
2. Single rigid 4 axle truck "twin steer"
3. Articulated Semi-Trailer
4. Rigid truck & 4 axle dog trailer
5. Rigid truck & 3 axle dog trailer

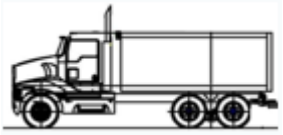


These results are summarised in Appendix A. For the swept path analysis results, refer to the diagrams prepared by Varga Traffic Planning in Appendix B.

[1] Austroads Publication No. AP-R465-14 – Page 43 – 8.3.1

3.0 RESULTS & DISCUSSION

3.1 Single Rigid 3 Axle Truck

Suitability Ranking 2nd	Space on Road	GCW	Payload	Fuel Cons	
	8.50 m	22.50 T	12.50 T	2.9 km/l	

Daily statistics:

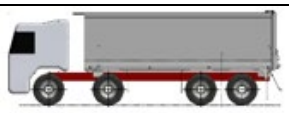
No of trucks	Space on Road	GCW	Payload	Fuel	NOx kg	PM gm	CO_2 tonne
Demolition 12	645m	270T	150T	372.41L	2.61	37.24	0.97
Excavation 30	1560m	675T	375T	1086.21L	7.60	108.62	2.82

When benchmarked against the scope of this report with regards to safety, environment, productivity and traffic congestion this vehicle scored:

Benchmark Sector	Positive	Negative
Environment	✓	
Congestion	✓✓	
Safety		×××
Productivity		×××

- This option had the worst productivity impact of all 5 options.
- The shorter wheelbase compared to the rigid truck and dog effectively improved the swept path performance of this vehicle, and ranked Number 1 for this.
- It has been calculated that this option has an accident risk more than 5 times greater than a PBS rigid truck and 3 axle dog.
- All accident research in Australia is based on a frequency of Rates per 100m km and per 10,000 Vehicles, for our investigation the number of vehicle movements required / day would be proportioned to raising the risk for the task.
- National Transport Insurance data sources shows single rigid trucks have more incidents than rigid truck and dogs. Refer Appendix C.

3.2 Single rigid 4 axle truck "twin steer"

Suitability Ranking 5th	Space on Road	GCW	Payload	Fuel Cons	
	9.50 m	27.50 T	17.0 T	2.6 km/l	

Daily statistics:

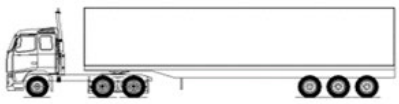
No of trucks	Space on Road	GCW	Payload	Fuel	NOx kg	PM gm	CO_2 tonne
Demolition 9	445.50m	247.50T	153T	311.54L	2.18	31.15	0.81
Excavation 22	1154m	605 T	374T	888.46L	6.22	88.85	2.31

When benchmarked against the scope of this report with regards to safety, environment, productivity and traffic congestion this vehicle type scored:

Benchmark Sector	Positive	Negative
Environment	✓	
Congestion	✓✓	
Safety		××
Productivity		××

- This option ranked 4th in productivity impact of all 5 options.
- The longer wheelbase compared to the rigid truck effectively limits the swept path performance of this vehicle, and ranked Number 5 for this.
- All accident research in Australia is based on a frequency of Rates per 100m km and per 10,000 Vehicles, for our investigation the number of vehicle movements required / day would be proportioned to raising the risk for the task.
- National Transport Insurance data sources shows single rigid trucks have more incidents than rigid truck and dogs. Refer Appendix C.
- When site infrastructure eg scaffolding, barricades etc) are in place and the site is operation ready, a real time evaluation of the swept path performance should be conducted to validate the swept path analysis and traffic management safety mitigation plan.

3.3 Articulated Semi-Trailer

Suitability Ranking 4th	Space on Road	GCW	Payload	Fuel Cons	
	17.50 m	46.0 T	32.0 T	2.1 km/l	

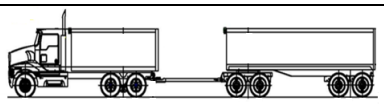
Daily statistics:							
No of trucks	**Space on Road**	**GCW**	**Payload**	**Fuel**	**NOx kg**	**PM gm**	**CO_2 tonne**
Demolition 5	260m	230T	160T	214.29L	1.50	21.42	0.56
Excavation 12	693m	552T	384T	600L	4.20	60.0	1.56

When benchmarked against the scope of this report with regards to safety, environment, productivity and traffic congestion this vehicle type scored:

Benchmark Sector	Positive	Negative
Environment	✓✓	
Congestion		×
Safety		×××
Productivity	✓✓✓	

- This option had similar productivity impact to that of a rigid truck and 3 axle dog.
- It was clear from the onset that the articulated semi-trailer was a poor performer with regards to swept path. This is due the combination having only one point of articulation compared with two on the rigid truck and dogs. It ranked 4th and is deemed not suitable for this application.
- All accident research in Australia is based on a frequency of Rates per 100m km and per 10,000 Vehicles, for our investigation the number of vehicle movements required / day would be proportioned to raising the risk for the task.
- National Transport Insurance data sources shows articulated trucks have more incidents than rigid truck and dogs. Refer Appendix C.
- This combination, whilst requiring less vehicle movements to complete the task, failed the safety criteria due to the issues with swept path.

3.4 Rigid truck and 4 axle dog trailer

Suitability Ranking 3rd	**Space on Road**	**GCW**	**Payload**	**Fuel Cons**	
	18.50m	56.0T	37.0T	1.9 km/l	

Daily statistics:							
No of trucks	**Space on Road**	**GCW**	**Payload**	**Fuel**	**NOx kg**	**PM g**	**CO_2 tonne**
Demolition 4	209m	224T	150T	189.47L	1.33	18.94	0.49
Excavation 10	590m	560T	370T	552.63L	3.87	55.26	1.44

When benchmarked against the scope of this report with regards to safety, environment, productivity and traffic congestion this vehicle type scored:

Benchmark Sector	Positive	Negative
Environment	✓✓✓	
Congestion		x
Safety	✓	
Productivity	✓✓	

- This option ranked 2nd in productivity impact of all 5 options.
- The longer wheelbase compared to the 3 axle rigid truck effectively limits the swept path performance of this vehicle, and ranked 2nd for this.
- All accident research in Australia is based on a frequency of Rates per 100m km and per 10,000 Vehicles, for our investigation the number of vehicle movements required / day would be proportioned to raising the risk for the task.
- It has been calculated that this option is more than 5 times safet than the single rigid with .284 expected incidents/annum. Refer Appendix C for detailed explanation.
- National Transport Insurance data sources shows single rigid trucks have more incidents than rigid truck and dogs. Refer Appendix C.
- When site infrastructure eg scaffolding, barricades etc) are in place and the site is operation ready, a real time evaluation of the swept path performance should be conducted to validate the swept path analysis and traffic management safety mitigation plan.

3.5 Rigid Truck and 3 axle dog trailer

Suitability Ranking	Space on Road	GCW	Payload	Fuel Cons	
1st	18.50 m	48.50 T	32.0 T	2.0 km/l	

Daily statistics:

No of trucks	Space on Road	GCW	Payload	Fuel	NOx kg	PM gm	CO_2 tonne
Demolition 5	265m	242.50T	153T	225.00L	1.58	22.50	0.59
Excavation 12	699m	582T	384T	630L	4.41	63.00	1.64

When benchmarked against the scope of this report with regards to safety, environment, productivity and traffic congestion this vehicle type scored:

Benchmark Sector	Positive	Negative
Environment	✓✓✓	
Congestion		×
Safety	✓✓	
Productivity	✓✓✓	

- This option had a better productivity impact than the single rigids and ranked 1st.
- With two points of articulation the rigid truck and dog, was better than the 3 axle and 4 axle rigids for swept path.
- All accident research in Australia is based on a frequency of Rates per 100m km and per 10,000 Vehicles, for our investigation the number of vehicle movements required / day would be proportioned to raising the risk for the task.
- National Transport Insurance data sources shows rigid truck and dogs have less incidents than single rigid trucks and articulated trucks. Refer Appendix C.
- It has been calculated that this option is more than 5 times safer than the single rigid with 0.067 expected incidents / annum. Refer Appendix C for detailed explanation.
- When site infrastructure eg scaffolding, barricades etc) are in place and the site is operation ready, a real time evaluation of the swept path performance should be conducted to validate the swept path analysis and traffic management safety mitigation plan.

4.0 CONCLUSIONS & RECOMMENDATIONS

It is more appropriate to apply Council's policy to smaller excavated volumes or to sites where there is inadequate space for truck and dog combinations to be accommodated on site, or to safely exit the site onto the public roads system.

As the Swept Path diagrams in Appendix B show, the rigid truck and 3 axle dog trailer can turn into 89 Parraween Street without obstructing traffic.

When site infrastructure eg scaffolding, barricades etc) are in place and the site is operation ready, a real time evaluation of the swept path performance should be conducted to validate the swept path analysis and traffic management safety mitigation plan.

The articulated semi trailer and rigid truck and 4 axle dog is not suitable for use on this construction site due to its much larger swept path as compared to the other vehicles. When turning the vehicle would encroach into areas which would be considered unsafe due to the constrained work zones and public access road environment.

S U M M A R Y	Single Rigid Truck	Rigid Truck & 3 Axle Dog Trailer
Number of vehicle movements per day Demolition Excavation	 12 30	 5 12
Expected Accidents Per Annum	0.284	0.053
CO_2 emissions per day (in tonne) Demolition Excavation	 0.97 2.82	 0.59 1.64
Fuel use per day (in Litres) Demolition Excavation	 372.41L 1086.21L	 225L 630L
Productivity Demolition Excavation	 1.00 baseline	 2.56

It is noted that the use of traffic controllers should significantly reduce the likelihood of accidents at the point where the vehicle exits the site.

It is clear from the results that the rigid truck and 3 axle dog is the ideal combination for the freight task. This vehicle offers significant gains in safety and productivity.

Due to the varying operation conditions for vehicle movements per day, the utilisation of a vehicle with higher productivity capabilities will significantly reduce the overall time required to remove the spoil.

The use of a truck and dog combinations can:

- reduce truck movements by 60%
- reduce accident risk by 81%
- reduce amount of fuel used by 42%
- reduce CO_2 emissions by 42%
- reduce distance travelled and road congestion by 55%

when compared to the single 3 axle rigid truck as required by Council.

When the site is operating at its maximum output to meet permit and time requirements, this combination satisfies the criteria with regards to safety, environmental and traffic benefits. There is no reason that this type of combination could not be utilised in meeting the daily freight demand.

Due to the size of works required at 390-394 Military Road, Cremorne, it would be advantageous (subject to validation of swept path analysis and traffic management safety mitigation plan) to enable the use of a more productive vehicle that will expedite the process of spoil removal from the site, which in turn will minimise the disruption of works to all parties including the general public.

The safety, productivity and environmental benefits gained over and above the single 3 axle rigid truck make a compelling case for Council to favourably review the submission by Platino Properties.

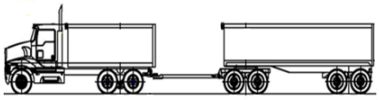
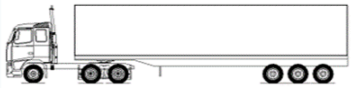
K D Cowell & Associates

20 December 2019

5.0 APPENDIX A

5.1 Payload Comparison – Single Vehicle

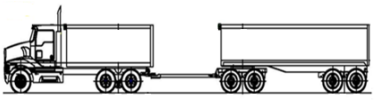
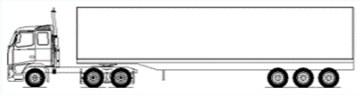
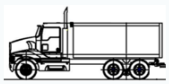
Rigid Truck & 3 Axle Dog Compared to Alternatives

Fuel Cons.	Length	GCW	Payload	Productivity Index	Vehicle Type
2.0 km/l	17.00 m	48.50 t	32.00 t	2.56	
1.9 km/l	18.50 m	56.00 t	37.00 t	2.96	
2.1 km/l	16.50 m	46.00 t	32.00 t	2.56	
2.6 km/l	9.50 m	27.50 t	17.00 t	1.36	 -15.00 t
2.9 km/l	8.50 m	22.50 t	12.50 t	1.00 Baseline	 -19.50 t

5.2 Productivity Comparison – Multi Vehicles

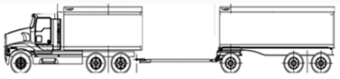
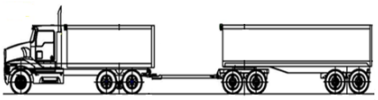
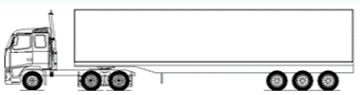
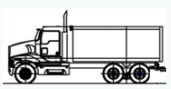
Rigid Truck & 3 Axle Dog Compared to Alternatives

Demolition Spoil Removal - Commercial Waste – Blacktown 90km round trip
Base Line – 12 Vehicle Movements / Day - Target 150m³ / Day

No. of Trucks	Space on Road	GCW	Payload	Vehicle Type
5	265.00 m	242.50 t	153.00 t	
4	209.00 m	224.00 t	150.00 t	
5	260.00 m	230.00 t	160.00 t	
9	445.50 m	247.50 t	153.00 t	
12	645.00 m	270.00 t	150.00 t	

Rigid Truck & 3 Axle Dog Compared to Alternatives

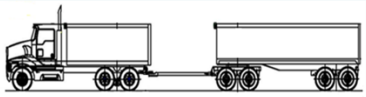
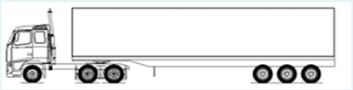
Excavation Spoil Removal - General Landfill – Vineyard 105km round trip
Base Line – 30 Vehicle Movements / Day - Target 375m³ / Day

No. of Trucks	Space on Road	GCW	Payload	Vehicle Type
12	699.00 m	582.00 t	384.00 t	
10	590.00 m	560.00 t	370.00 t	
12	693.00 m	552.00 t	384.00 t	
22	1154.00 m	605.00 t	374.00 t	
30	1560.00 m	675.00 t	375.00 t	

5.3 Emissions Comparison – Multi Vehicles

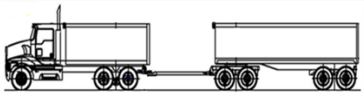
Rigid Truck & 3 Axle Dog Compared to Alternatives

Demolition Spoil Removal - Commercial Waste – Blacktown 90km round trip
Base Line – 12 Vehicle Movements / Day - Target 150m³ / Day

No. of Trucks	Fuel - L	NOx - kg	PM - gm	CO2 - t	Vehicle Type
5	225.00	1.58	22.50	0.59	
4	189.47	1.33	18.94	0.49	
5	214.29	1.50	21.42	0.56	
9	311.54	2.18	31.15	0.81	
12	372.41	2.61	37.24	0.97	

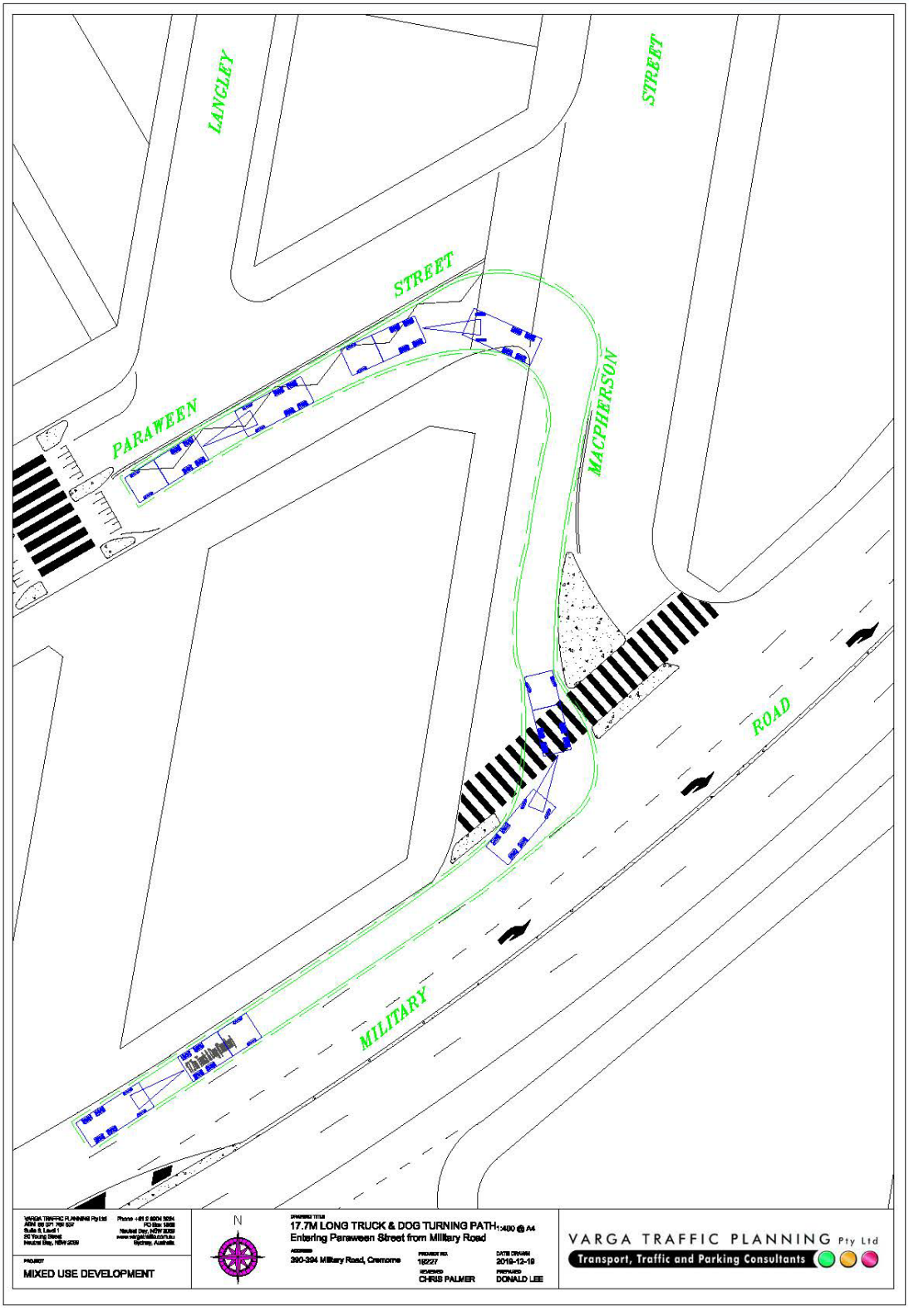
Rigid Truck & 3 Axle Dog Compared to Alternatives

Excavation Spoil Removal - General Landfill – Vineyard 105km round trip
Base Line – 30 Vehicle Movements / Day - Target 375m³ / Day

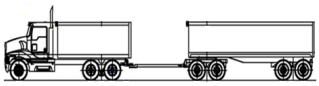
No. of Trucks	Fuel - L	NOx - kg	PM - gm	CO2 - t	Vehicle Type
12	630.00	4.41	63.00	1.64	
10	552.63	3.87	55.26	1.44	
12	600.00	4.20	60.00	1.56	
22	888.46	6.22	88.85	2.31	
30	1,086.21	7.60	108.62	2.82	

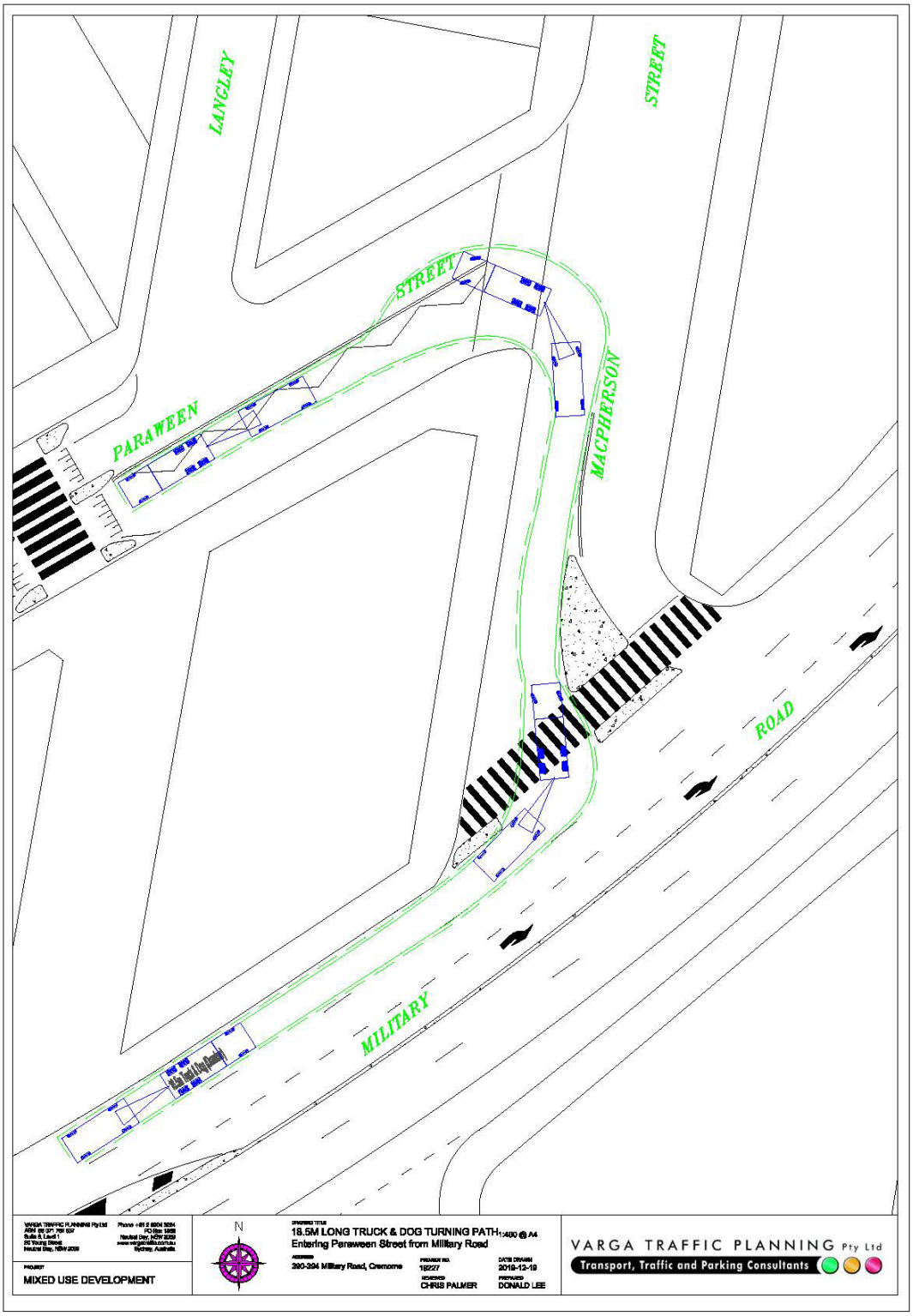
6.0 APPENDIX B

6.1 Swept Path – Rigid Truck & 3 Axle Dog Trailer

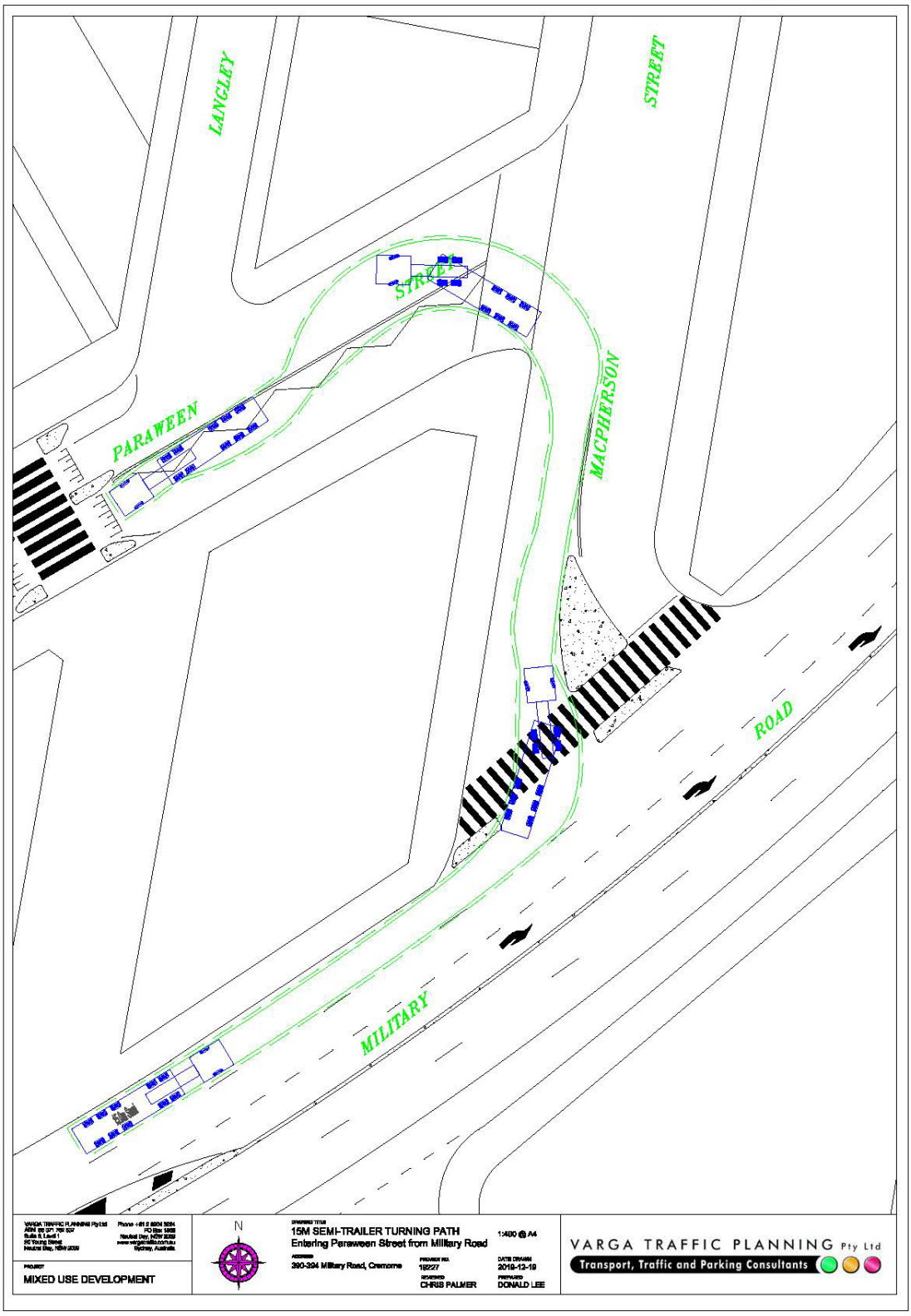


6.2 Swept Path – Rigid truck and 4 axle dog trailer

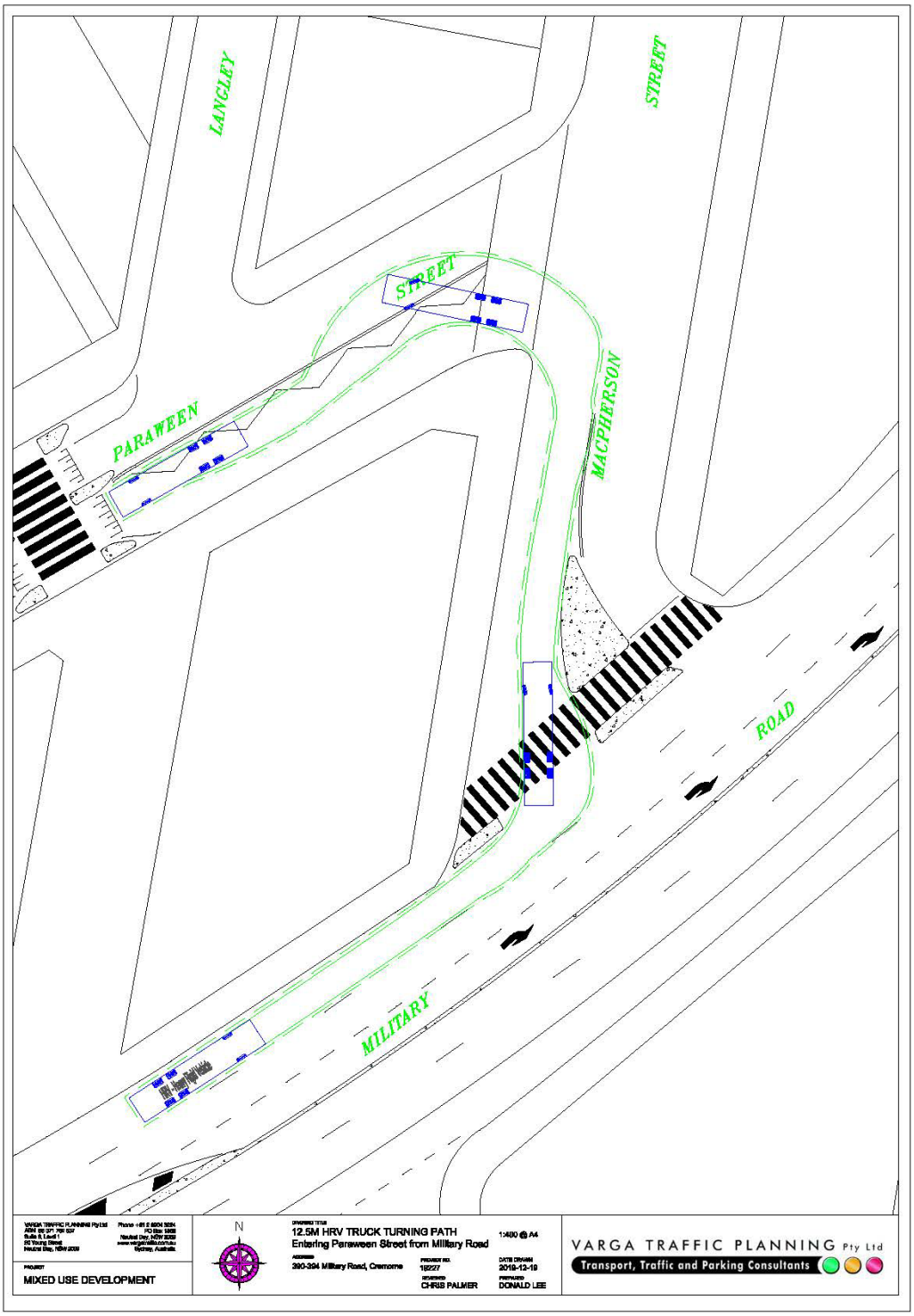




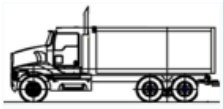
6.3 Swept Path – Articulated Semi-Trailer

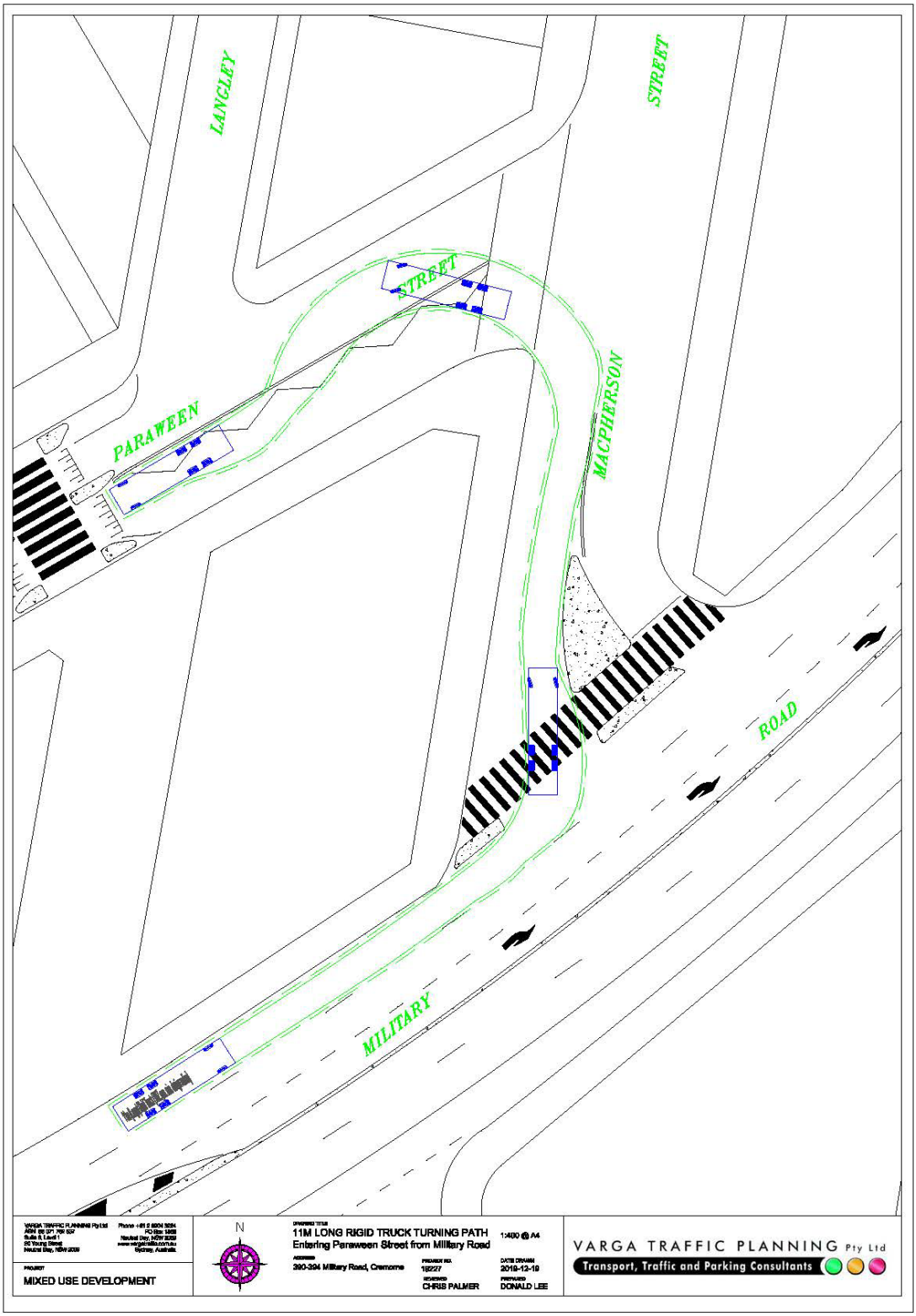


6.4 Swept Path – Single Rigid 4 Axle Truck



6.4 Swept Path – Single Rigid 3 Axle Truck





7.0 APPENDIX C

7.1 Accident Performance Averages

Major and Serious Accidents Expected per 100mill/kms						
Vehicle Type	**Major**	**Serious**	**Total**	**Trips/Day**	**Kms/year**	**Expected Accidents /annum**
PBS Truck & 4A Dog & 3A Dog	7.05	16.92	23.97	10.81081081	219243	0.053
Non PBS Truck & 4A Dog	9.49	20.87	30.36	10.81081081	219243	0.067
Heavy Single Rigid (Tipper)	10.65	33.10	43.75	32	648960	0.284

Accident Performance Averages are drawn from the following two data sources:

- 2017 - Update Quantifying the Benefits of Performance Based Standards Vehicles, by Industrial Logistics Institute for National Transport Commission, Tables 6,7,8

and

- 2014 - Quantifying the Benefits of High Productivity Vehicles, Austroads Report, FS 1805, ISBN 978-1-925037-74-6 , Tables 3.7, 3.8, and 3.9

Single Rigid Truck and combination Rigid Truck with 4 axle dog trailer performance were generated from:

- 2007– 2016, Unpublished National Transport Insurance data sources, used for conventional single rigid vehicles and 4 axle dog trailers in the above 2 reports.

8.0 APPENDIX D

8.1 References

Update Quantifying the Benefits of Performance Based Standards Vehicles, Prepared by Industrial Logistics Institute for National Transport Commission (2017)

Austroads Research Report AP-R465-14, Quantifying the Benefits of High Productivity Vehicles FS 1805, ISBN 978-1-925037-74-6 (2014)