Colston Budd Rogers & Kafes Pty Ltd
as Trustee for C & B Unit Trust
ABN 27 623 918 759

Our Ref: TR/10445/jj

31 July, 2019

Transport Planning
Traffic Studies
Parking Studies

Scentre Limited
PO Box 4004
SYDNEY NSW 2001

Attention: **Jamie Gordon**
Email: **Jamie.Gordon@scentregroup.com**

Dear Sir,

RE: PROPOSED ELP & OFFICE TOWER - LIVERPOOL WESTFIELD
RESPONSE TO COUNCIL RFI

1. As requested we have reviewed the traffic matters raised by Council in its RFI dated 9 April 2019 (including matters raised by RMS) with regards to the proposed Entertainment and Lifestyle Precinct (ELP) and office tower at Westfield Liverpool Shopping Centre. The matters raised are summarised below:

Council

- *Inconsistent information (existing and proposed GLA, number of existing and proposed parking spaces and description of shopping centre access points);*
- *suggested mitigation measures/modifications;*
- *updated traffic assessment including suggested mitigation measures and traffic from other approved developments in the area;*
- *additional information on the impact of the proposed set down/pick up bay on Elizabeth Drive;*
- *parking provision; and*
- *site servicing.*

RMS

- *parking provision;*
- *traffic generation; and*
- *cumulative traffic effects*

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2. We prepared the traffic report that assessed the traffic effects of the proposed ELP and officer tower (Traffic Report for Proposed ELP & Office Tower, Westfield Liverpool Shopping Centre – December 2018).

Inconsistent Information

3. With regards to floor areas and parking numbers, existing and proposed GLA and parking numbers are set out below in Table 1.

Table 1	**Existing and Proposed GLA and Parking Numbers**	
	Existing	Proposed
Shopping Centre GLA	83,607m^2	89,652m^2
Office Tower	N/A	9,827m^2
Car Parking Spaces	3,498 spaces	3,438 spaces*
*Includes 66 for the office tower. These will be available for retail parking on weekends		
Source - Scentre Group – 23 July 2019		

4. With regards to inclusion of all centre access points we note that our traffic report referred to only the car park access points to the shopping centre. As noted by Council we did not include the loading dock access points on George Street and Bathurst Street. Council has requested that traffic using these access points be included in our traffic assessment. We note that the traffic counts at intersections adjacent to the centre (and used to assess the traffic effects of the proposed ELP) included traffic generated by these loading docks and thus loading dock traffic has been included in our traffic assessment.

Suggested Mitigation Measures

5. Council has suggested the following measures to mitigate the traffic effects of the proposed ELP:

- raised threshold across sections of Elizabeth Street and Campbell Street (fronting the main entries to the shopping centre) to highlight the existing 40 km/h high pedestrian zones;
- replacement of the roundabout at the intersection of Campbell Street/Macquarie Street with traffic signals to improve pedestrian safety;
- restricting the George Street car park access to left in/left out; and
- upgrade the parking boom gate control system to a ticketless system to speed up vehicle flows at the entry/exit points to the car park.

6. With regards to Elizabeth Street, three options were considered with Option 3 preferred:

i) Option 1 - provide a raised platform (to the top of kerb) at the pedestrian signals at Macquarie Street. This would allow level travel and improved visual connectivity between the mall and the shopping centre, and slow traffic passing through the signals. We understand that this option was previously considered by RMS and not supported on safety grounds;
ii) Option 2 – provide raised thresholds/speed humps either side of the pedestrian signals at Macquarie Street. These would be limited in height as Elizabeth Street is a bus route and thus the impact on vehicle speeds would be reduced. Also they would not provide any improved visual connectivity between the mall and the shopping centre; and
iii) Option 3 - provide contrasting pavement or cross hatching at the pedestrian signals at Macquarie Street. This would provide improved visual connectivity between the mall and the shopping centre, provide a visual to drivers that they are in a low speed environment and deter drivers from queuing through the traffic signals.

7. With regards to the intersection of Campbell Street/Macquarie Street, this intersection is roundabout controlled with pedestrian crossings located on the eastern and northern approaches to the intersection. The crossing on the northern approach is a raised crossing. The roundabout functions as traffic calming device to slow traffic through the intersection so its replacement with traffic signals is unlikely to reduce vehicle speed through the intersection. With regards to pedestrian safety at the intersection, a review of the most recent 5 year crash history found 6 crashes occurred at, or in the vicinity, of the intersection, one of which involved a pedestrian (minor injury). This does not suggest that improvements to pedestrian safety are required at the intersection. Nonetheless, as a contribution to improving pedestrian safety in the area (as part of the ELP), we suggest that the existing pedestrian crossing on the eastern approach to the intersection be raised as per the crossing on the northern approach. This would also slow traffic on Campbell Street.

8. With regards to the George Street car park access, Figure 4 in our traffic report identified suggested modifications to address conflicts between vehicles accessing the shopping centre and adjacent commercial development. As discussed with Council's traffic manager, we suggest that these measures be trialled before access is limited to left in/left out. As part of an approval for the ELP, a condition could be included for the trial of the measures in Figure 4 for 12 months with a bond for the cost of the works to make the access left in/left in left out if the measures are not successful.

9. With regards to the introduction of ticketless parking, we understand that Scentre Group would introduce it concurrently with the construction of the ELP. We have prepared a report on the introduction of ticketless parking (Westfield Liverpool Shopping Centre – Proposed Ticketless Parking Control System – December 2017). A copy of the report is attached. As discussed with Council's traffic manager, as part of an approval for the ELP, a condition

could be included requiring the implementation of ticketless parking as per this report.

Updated Traffic Assessment

10. As requested by Council we have updated the traffic assessment to take into account future developments (at 22-26 Elizabeth Street and Liverpool Hospital), left in/left out at the George Street car park access and our suggested modifications to the Bathurst Street/Secant Street/site access intersection. The SIDRA network model was rerun with results summarised in Table 2. The analysis found that under base traffic flows (existing plus other developments) the intersections operate at a satisfactory level of service (LOS D) or better in the Thursday afternoon and Saturday midday peak periods. With development traffic added to base flows and the changes in site access, there is no change in in LOS and only minimal increases in average delays. The exception is the Campbell Street (east) car park access where delays have increased and the LOS has fallen from B to C. This is due to the majority of traffic that previously turned right out at the George Street access relocating to turn right out at this access.

11. Thus the updated traffic assessment found that traffic from the proposed ELP results in minimal change to operation of the surrounding road network.

Elizabeth Drive Set Down/Pick Up Bay

12. Council has requested additional information on the proposed set down pick up bay on the northern side Elizabeth Drive, and in particular whether it will adversely impact on the existing bus zone.

13. The proposed set down/pick up bay (2 car spaces long) is located on the northern side of Elizabeth Drive (just west of Macquarie Street). The area is currently used as a bus zone (between Macquarie Street and Northumberland Street) some 70 metres long. The provision of the indented bay would reduce the length of the bus zone by some 20 metres (to 50 metres). The reduced bus zone would have capacity for 3 buses to use the bus zone independently. Surveys and observations of the existing bus zone in the weekday afternoon (3.00pm to 6.00pm) and Saturday midday (10.30am to 1.30pm) peak periods found the following:

Weekday PM peak Period (3.00pm to 6.00pm)

- 40 buses stopped at the bus stop
- Average bus dwell time was 22 seconds
- Maximum number of buses in the at one time was 2 (occurred 6 times)
- 8 cars stopped in the bus zone to drop off/pick up passengers

Table 2: Updated Westfield Liverpool Sidra Analysis - Base (Existing + Other Developments) and With Development (Plus Road Network Changes)

Intersection	Network ID							
	Thursday Afternnon				Saturday Midday			
	Base		With Development		Base		With Development	
	Average Delay	LOS	Average Delay	LOS	Average Delay	LOS	Average Delay	LOS
Elizabeth St / Bathurst Street	44	D	44	D	43	D	43	D
Elizabeth St / Northumberland St	30	C	30	C	30	C	30	C
Elizabeth St Crossing	4	A	4	A	4	A	4	A
Elizabeth St / George St	30	C	30	C	26	B	26	B
George St / Site Access	3	A	3	A	3	A	3	A
George St Crossing	4	A	4	A	5	A	5	A
Campbell St / George St	33	C	33	C	32	C	34	C
Campbell St / Site Access East	17	B	19	B	27	B	34	C
Campbell St / Macquarie St / Loading Dock	6	A	6	A	5	A	6	A
Campbell St / Northumberland St / Westfield Access	23	B	25	B	22	B	23	B
Campbell St / Site Access West	3	A	3	A	3	A	3	A
Campbell Street / Bathurst St	18	B	17	B	20	B	19	B
Bathurst St / Site Access North	14	A	14	A	11	A	12	A
Bathurst St / Secant St / Site Access South	14	A	12	A	15	B	15	B

- Average car dwell time was 12 seconds
- Maximum number of cars at one time was one

Saturday Midday peak Period (10.30am to 1.30pm)

- 33 buses stopped at the bus stop
- Average bus dwell time was 30 seconds
- Maximum number of buses in the at one time was 1
- 10 cars stopped in the bus zone to drop off/pick up passengers
- Average car dwell time was 97 seconds (this was skewed by one car being parked there for 10 minutes)
- Maximum number of cars at one time was two (occurred once when the car was parked there for 10 minutes)

14. Based on the above provision of an indented set down/pick up bay (capacity 2 cars) would not impact on existing bus operations, provide a facility to meet demand, separates bus and car set down/pick up and allows capacity for future demand for buses.

Parking Provision

15. In response to concerns raised by Council a revised parking assessment has been undertaken using the most recent 12 month parking data for the shopping centre. We have also calculated parking required under Clause 7.3 of Liverpool LEP 2008.

16. Clause 7.3 of Liverpool LEP 2008 sets out car parking requirements within Liverpool CBD at the following rates:

- *at least one car parking space is provided for every 200 square metres of any new gross floor area that is on the ground floor level of the building, and*

- *in respect of any other part of the building:*
  (i) at least one car parking space is provided for every 100 square metres of any new gross floor area that is to be used for the purposes of retail premises, and
  (ii) at least one car parking space is provided for every 150 square metres of any new gross floor area that is to be used for any other purpose.

17. Applying these rates, based on incremental GFA, the LEP requires an additional 80 spaces for the ELP. Under the proposal, retail car spaces for the centre are being reduced by 126 spaces. However, when applied to the centre as a whole, following completion of ELP and office tower, Liverpool Westfield shopping

centre (with 116,907m^2 retail GFA and 9,827m^2 commercial GFA) would require at least 1,169 retail spaces (based on 1 space/100m^2 GFA) and 66 commercial spaces (based on 1 space/150m^2). The proposed provision of 3,438 spaces satisfies this requirement.

18. As set out in our traffic report parking for the proposed ELP has been based on an analysis of existing parking demand at the shopping centre. Section 5.7.1 of the RMS Guide to Traffic Generating Developments (2002) notes that the 85th percentile level of parking demand should be considered for shopping centres. A review of the most recent 12 months of car park data found that the 85th percentile level of parking demand (between 9am and 6pm) was 2,847 spaces or 3.4 spaces per 100m^2 GLA. The review found that peak parking demand occurred during the Saturday midday period with the corresponding weekday midday parking demand some 10% lower.

19. By comparison, the RMS has undertaken parking demand surveys of a number of shopping centres (as part of TDT 2013/04). These included Westfield Liverpool shopping centre. For Liverpool the surveys found the following peak parking demands:

- Thursday – 3.0 spaces/100m^2 GLA;
- Friday – 2.7 spaces/100m^2;
- Saturday – 3.3 spaces/100m^2 GLA; and
- Sunday – 2.9 spaces/100m^2 GLA

20. The most recent car park data at Liverpool found an 85th percentile parking demand of 3.4 spaces/100m^2 GLA. This is slightly higher than the RMS peak weekend parking demand of 3.3 spaces/100m^2. We note that the RMS surveys also found that peak weekday parking demand was some 10% lower than peak weekend parking demand.

21. In large shopping centre car parks, it is important to retain a surplus of spaces so that customers avoid unnecessarily long searches for available parking. The parking guidance system within the Westfield Liverpool car park provides efficiencies for the use of parking at the centre, such that customers are alerted to the number of available spaces in each area, and each space is identified as occupied or unoccupied. These efficiencies mean that customers spend less time searching for an available parking space. Typically, these efficiencies are equivalent to an effective increase in the parking supply at a centre of at least some five per cent. Experience suggests that with the introduction of controlled parking, the desirable surplus can be reduced to some three to five per cent above peak demand.

22. Table 3 below sets out weekday and weekend parking requirements at Westfield Liverpool following completion of the ELP and office tower based on the following rates:

- existing and ELP GLA (weekday) - 3.2 spaces per 100m^2 (85th percentile minus 5%)
- existing and ELP GLA (Saturday) – 3.6 spaces per 100m^2 (85th percentile plus 5%)
- proposed office tower (weekday) – 1/150m^2 (LEP rate)
- proposed office tower (Saturday) - nil

Table 3 – Summary of ELP Parking Requirements

Component	Size	Weekday		Saturday	
		Rate	Spaces	Rate	Spaces
Existing	83,607m^2	3.2/100m^2	2,675	3.6/100m^2	3,010
ELP	6,045m^2	3.2/100m^2	193	3.6/100m^2	218
Office Tower	9,827m^2	1/150m^2	66	nil	0
Total			2,934		3,228

23. Based on the above, the shopping centre, following the completion of the proposed ELP and office tower, would require 3,228 parking spaces. The proposed provision of 3,438 spaces satisfies this requirement.

24. The requirements for accessible spaces, motorcycle and bicycle parking;

- motorcycle parking – 1 space per 20 parking spaces;
- 2% of parking to be allocated as accessible spaces; and
- bicycle parking – 1 space per 200m^2.

25. Applying these rates, the proposed ELP and office tower would require five accessible spaces, 13 motorcycle spaces and 79 bicycle spaces. The proposed development will provide motorcycle, accessible and bicycle parking in accordance with these requirements.

26. We note that if the Level 4 car park was not constructed a total of 3,275 spaces would be provided satisfying the required 3,228 spaces. Thus consideration could be given to staging the construction of the L4 car park until after the completion of the ELP to determine whether additional parking is required.

Servicing

27. Council has requested additional information to confirm that the existing loading docks on Bathurst Street and Campbell Street (Docks 1 and 5) have

spare capacity to accommodate the service requirements of the proposed ELP and office tower. Surveys of dock utilisation for docks 1 and 5 were undertaken from 7.30am to 4.30pm on Friday 31 May. These are the 2 docks that will be used to service the office tower and ELP. The surveys of the loading docks found the following:

Dock 5

- Capacity 17 vehicles
- 85th% demand –14 vehicles

Dock 1

- Capacity 14 vehicles
- 85th% demand – 9 vehicles

28. The surveys found that demand varied over the day with periods of high demand in Dock 1 between 9.30 am and 11.00am (10 or more vehicles) and in Dock 5 between 10.30am and 2.00pm (14 or more vehicles). Thus the surveys found that both docks have spare capacity to accommodate additional demand from the office tower and ELP. To improve dock operations it is suggested that Scentre group introduce a booking system for regular deliveries to occur outside of these peak periods where possible.

29. In addition to deliveries to the office tower and ELP via Docks 1 and 5, it is likely that deliveries by cars/vans/couriers are also likely to occur via the roof top car park as a matter of convenience. To accommodate this it is suggested that one space in the vicinity of the entry to the office tower and two spaces in the vicinity of the entry to the ELP (total 3 spaces on the roof top car park) be allocated as loading bays.

RMS

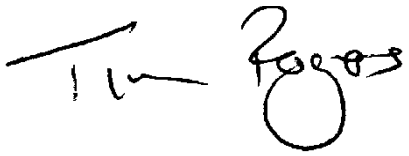
30. The matters raised by RMS with respect to parking and cumulative effects have been addressed in our response to matters raised by Council. With respect to traffic generation this was addressed in our traffic report and is repeated below:

The existing shopping centre was found to generate some 2,520 and 3,140 vehicles per hour (two way) in the Thursday afternoon and Saturday midday peak hours. With the existing centre having some 83,307m^2 GLA, this equates to generation rates of 1 vehicle per hour (two way) per 33m^2 GLA and 26m^2 GLA in the Thursday afternoon and Saturday midday peak hours respectively. Using these rates the ELP,

with some 6,045m^2 GLA, would generate some 185 and 230 vehicles per hour in the Thursday afternoon and Saturday midday peak hours respectively

31. In summary the traffic and parking matters raised by Council have been addressed and found to be satisfactory. We trust the above provides the information you require. . Finally, if you should have any queries, please do not hesitate to contact us.

Yours faithfully,
COLSTON BUDD ROGERS & KAFES PTY LTD



T. Rogers
Director

ATTACHMENT A

TICKETLESS PARKING REPORT

SCENTRE GROUP DESIGN AND CONSTRUCTION PTY LTD

WESTFIELD LIVERPOOL SHOPPING CENTRE

PROPOSED TICKETLESS CAR PARK CONTROL SYSTEM

DECEMBER 2017

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1. INTRODUCTION

1.1 Colston Budd Rogers & Kafes Pty Ltd has been commissioned by Scentre Group Design and Construction Pty Ltd to prepare a report on the introduction of a ticketless car park control system for Westfield Liverpool Shopping Centre. The proposed ticketless car park controls will be similar to the existing car park control system, without the need for boom gates at the entry driveways to the car park.

1.2 The shopping centre is within the Liverpool CBD and is bounded by Elizabeth Drive, Bathurst Street, Campbell Street and George Street, as shown on Figure 1.

1.3 The proposed ticketless car park control system is set down in the following chapter.

2. PROPOSED TICKETLESS CAR PARK CONTROL SYSTEM

2.1. Westfield Liverpool Shopping Centre is located within the Liverpool CBD. The shopping centre is bounded by Elizabeth Drive, Bathurst Street, Campbell Street and George Street, as shown on Figure 1.

2.2. It is proposed to modify the existing car park control system to a ticketless system. The ticketless car park control system is presented through the following sections:-

- access arrangements;
- ticketless car park control system;
- car park guidance system;
- modifications to access control lane configurations;
- staff parking; and
- summary.

Access Arrangements

2.3. Vehicular access to the shopping centre car park will be unchanged, with access driveways from Bathurst Street, Campbell Street and George Street.

Ticketless Car Park Control System

2.4. The proposed ticketless car park controls will be similar to the existing car park control system, without the need for boom gates at the entry driveways to the car park.

2.5. The system will incorporate an automatic number plate recognition system, which would be installed at each of the entries and exits to the car park. The system would operate together with automatic pay stations situated strategically about the centre to validate and pre-pay for parking, prior to customers returning to their vehicle and exiting the car park.

2.6. The transaction can also be completed at the exit to the car park, which will be controlled by boom gates (similar to the existing car park control system). These controls would be located immediately within the perimeter of the centre having regard to the need to provide for vehicle queuing.

2.7. The ticketless car park control system has the following advantages:-

- improved ease of access for customers, eliminating the need for entry controls;
- increased capacity at the entry driveways to the centre, resulting in no delay to customers on entry;
- eliminate the need for car park tickets, eliminating the potential for lost tickets;
- reduction in the number of boom gates required for the car park, resulting in improved car park efficiency;
- improved egress for customers exiting the centre, particularly for those customers who stay less than the period of free parking or customers who validate/pre-pay parking at the automatic pay stations.

2.8. A central car park management office will be provided within the centre to cater for customer queries and to manage the overall operation of the car park. A CCTV and intercom network will also be utilised at the entry and exit controls linked back to the central control station. This will allow constant surveillance of the car park and also provide customer assistance.

2.9. On arrival customers will drive directly into the car park and the car park control system will register the number plate of the vehicle. On leaving the car park, if the customer has stayed less than the period of free parking, then they are not required to go to a pay station. The number plate recognition system will complete sensing and open the boom gate for the customer to exit. If the customer has stayed longer than the period of free parking, then they have the choice of either pre-paying for parking at an automatic pay station prior to exiting the car park or completing the transaction at the exit to the car park, via the use of a credit/debit card.

2.10. Staff/tenants will be accommodated within designated staff parking areas which will be controlled by a number plate recognition system. Staff/tenants will be required to register their vehicle with the car park operator in order to gain access to the staff parking areas. The main staff parking area will be located on the rooftop level, with cameras located on the internal ramps accessing the rooftop area. The cameras will allow staff/tenants to access the staff parking area at a concessional rate.

2.11. The proposed ticketless car park control system will provide a convenient and practical system for casual parkers/customers and staff/tenants.

Car Park Guidance System

2.12. The existing car park guidance system provided within the car park will be upgraded and linked to the proposed ticketless car park control system. The existing guidance system includes internal aisle signage and individual bay availability indicators. In association with the car park modifications, the guidance system will be upgraded to include external traffic guidance, car park entry information boards and internal wayfinding signage.

2.13. The external traffic guidance signs will be located on approach to the centre, within the boundaries of the shopping centre and at the access driveways to the various car parking areas. These signs will include a mix of static and dynamic information boards indicating the location of the car park areas and the availability of parking bays within the various parking areas.

2.14. The external guidance signs will:-

- display parking availability information within the shopping centre prior to entry to the car park, allowing informed parking choices;
- divert entering traffic to alternative entry locations accessing underutilised parking areas;
- guide entering traffic to the nearest available parking areas.

2.15. The car park entry information boards and the internal wayfinding signage will guide motorists directly to a parking area with the most available parking spaces, without traversing all parking levels in search of a parking space. Aisle signage will indicate the availability of parking bays.

2.16. The existing parking bay indicators display the availability of individual bays and provide information to the overall car park management system. Information relating to the occupancy of the various parking areas can then be displayed on the external and internal dynamic signage system.

2.17. The car park guidance system will have the following benefits:-

- reduce traffic delays and internal travel times;
- improve traffic management efficiencies;
- improve internal circulation and efficiencies in relation to internal queuing;
- improve utilisation of parking areas;
- identify long stay parking and reduce the length of stay within prime customer parking areas.

Modifications to Access Control Lane Configurations

2.18. The existing access controls and lane configurations for the car park will be modified in order to introduce ticketless parking. The proposed modifications will result in improvements to vehicular access arrangements and internal circulation within the existing car park. Access points have been separated to ensure maximum storage for the queuing of vehicles entering and exiting the car park and also to discourage vehicles exiting via the entry driveways.

2.19. The proposed modifications to the access control lane configurations will include the following:-

- Location 1 – Figure 3

  Located at the north-western corner of the centre, location 1 provides access to level P1 of the western multi-deck car park with left in/left out access via a single entry and exit driveway crossover onto Campbell Street.

  The access controls at location 1 include the following:-

  - maintain the existing single entry lane and single exit lane onto Campbell Street. Ticketless car park controls and number plate recognition system to be implemented;

  - modification to driveway crossover and kerbs at the entry lane to improve vehicle access and circulation into the car park;

  - speed humps will be located on the entry and exit lanes to control vehicle travel speeds;

  - raised kerbs/medians and line marking will be used to channelise traffic within the car park.

- Location 2 – Figures 4 and 4a

  Located at the north-western corner of the centre, location 2 provides access to level P2 of the western multi-deck car park with left in/left out access via a single entry and exit driveway crossover onto Bathurst Street.

The access controls at location 2 include the following:-

- remove the existing entry boom gate from the internal vehicular ramp and provide new entry controls within existing entry lane on Level P1. Ticketless car park controls and number plate recognition system to be implemented;

- modify and reconfigure the existing exit lanes to maintain the existing two exit controls. Modify kerb arrangements to improve accessibility and circulation on approach to the exit controls;

- modify internal car park circulation and close the access to the Level P3 car park from the existing internal vehicular ramp, as shown on Figure 4a;

- speed humps will be located on the entry and exit lanes to control vehicle travel speeds;

- raised kerbs/medians and line marking will be used to channelise traffic within the car park.

- Location 3 – Figure 5

Located at the western end of the centre, location 3 provides access to level P1 of the western multi-deck car park with access via separate entry and exit driveways onto the signalised intersection of Bathurst Street and Secant Street.

The access controls at location 3 include the following:-

- remove the existing entry boom gate from the internal vehicular ramp and provide new entry controls within existing entry lane on Level P1. Ticketless car park controls and number plate recognition system to be implemented;

- modify and reconfigure the existing exit lanes to maintain the existing two exit controls. Modify kerb arrangements and internal circulation to improve accessibility and circulation within the car park;

- speed humps will be located on the entry and exit lanes to control vehicle travel speeds;

- restrict exit manoeuvres to left out only onto Bathurst Street and extension of central median in Bathurst Street across exit driveway.

- Location 4 – Figure 6

Location 4 provides access to level P2 of the western multi-deck car park. Access is provided via an internal service road which forms the southern leg of the signalised intersection of Campbell Street and Northumberland Street.

The access controls at location 4 include the following:-

- remove the existing entry boom gate and provide new entry controls within existing entry lane on Level P2. Ticketless car park controls and number plate recognition system to be implemented;

- reconfigure the exit lanes to maintain the existing two exit controls. Modify the location of the existing exit controls to maximise the queue lengths for vehicles exiting the car park;

- speed humps will be located on the entry and exit lanes to control vehicle travel speeds;

- raised kerbs/medians and line marking will be used to channelise traffic within the car park.

- Location 5 – Figure 7

  Located at the north-eastern corner of the centre, location 5 provides access to staff parking within the basement level of the eastern multi-deck car park. Access is provided via a single entry lane and single exit lane from the Campbell Street service vehicle access driveway (Loading Dock No. 6).

  The access controls at location 5 include the following:-

  - modify and reconfigure the existing kerb arrangements to maintain the existing single lane entry and exit controls. Ticketless car park controls and number plate recognition system to be implemented;

  - maintain the existing entry and exit boom gate controls to the basement car park;

  - modify the kerb splay at the base of the ramp to improve vehicular access to car park;

- speed humps will be located on the entry and exit lanes to control vehicle travel speeds;

- raised kerbs/medians and line marking will be used to channelise traffic within the car park.

- Location 6 – Figure 8

Located at the north-eastern corner of the centre, location 6 provides access to level P4 of the eastern multi-deck car park with access provided via separate entry and exit driveways onto Campbell Street.

The access controls at location 6 include the following:-

- remove the existing entry boom gate and provide new entry controls within existing entry lane on Level P4. Ticketless car park controls and number plate recognition system to be implemented;

- reconfigure the exit lanes to maintain the existing two exit controls. Modify internal kerbs and locate the existing exit controls to maximise the queue lengths for vehicles exiting the car park;

- speed humps will be located on the entry and exit lanes to control vehicle travel speeds;

- raised kerbs/medians and line marking will be used to channelise traffic within the car park;

- channelise traffic into a single exit lane and restrict exit manoeuvres to left out only onto Campbell Street.

- Location 7 – Figure 9

  Located at the south-eastern corner of the centre, location 7 provides access to level P5 of the eastern multi-deck car park with access provided via the combined entry/exit driveway onto George Street.

  The access controls at location 7 include the following:-

  - remove the existing entry boom gate and provide new entry controls within existing entry lane on Level P5. Ticketless car park controls and number plate recognition system to be implemented;

  - reconfigure the exit lane to maintain the existing single exit controls. Modify the location of the existing entry and exit controls to improve accessibility and circulation within the car park;

  - speed humps will be located on the entry and exit lanes to control vehicle travel speeds;

  - raised kerbs/medians and line marking will be used to channelise traffic within the car park;
  - modify kerbs to accommodate relocated access controls.

- Locations 8 and 9 – Figure 10

  Located at the north-western corner of the centre, locations 8 and 9 provide access to staff parking on the rooftop level of the western multi-deck car park. The access controls and cameras will be located on the internal ramps

accessing the rooftop area. The cameras will allow staff/tenants to access the staff parking area at a concessional rate.

The access controls at locations 8 and 9 include the following:-

- remove the existing boom gate controls on level P6 and replace with boom gate controls at the base of the ramp on Level P5, as shown on Figure 10. Cameras and number plate recognition system to be implemented at the boom gate controls and on the vehicular ramps to the rooftop staff parking area;

- raised kerbs/medians, removable bollards and line marking will be used to channelise traffic within the car park and to manage staff parking areas.

- Location 10 – Figure 11

Located on the rooftop level of the western multi-deck car park, location 10 provides access to the nested rooftop staff parking area.

The access controls at location 10 include the following:-

- relocate the existing boom gate controls on level P6, as shown on Figure 11. Cameras and number plate recognition system to be implemented on the access ramp and at the boom gate controls to the rooftop staff parking area;

- provide a single entry lane and a single exit lane to/from the nested staff parking area;

- modify car park layout and circulation on level P6 to improve accessibility and circulation within the car park;

- speed humps will be located on the entry and exit lanes to control vehicle travel speeds;

- raised kerbs/medians and line marking will be used to channelise traffic within the car park.

Staff Parking

2.20. Staff/tenants will be accommodated within designated staff parking areas provided within the basement and rooftop parking areas. The parking areas will be controlled by a number plate recognition system. Staff/tenants will be required to register their vehicle with the car park operator in order to gain access to the staff parking areas. The main staff parking area will be located on the rooftop level, with cameras located on the internal ramps accessing the rooftop area. The cameras will allow staff/tenants to access the staff parking area at a concessional rate.

2.21. Anti-pass back lag-time readers will be provided to allow staff/tenants to access the staff parking areas within a designated time period. Intercoms will be located at the exit controls, in the event that staff have not registered their vehicle or the boom gate does not open.

Summary

2.22. In summary, the introduction of a ticketless car park control system for the centre will:-

- improve access arrangements for customers, eliminating the need for entry boom gate controls;
- increase capacity at the entry driveways to the centre, resulting in reduced delays for entering traffic;
- eliminate the need for car park tickets, eliminating the potential for lost tickets;
- improve egress arrangements for customers, particularly for those customers who stay less than the period of free parking or customers who validate/pre-pay parking at the automatic pay stations;
- reduce the number of boom gates required for the car park, resulting in improved efficiency and reduced potential for equipment failure.

2.23. The ticketless car park control system will be designed to be compatible with the existing car park guidance system. The ticketless system is similar to the existing car park control system, without the need of boom gates at the entry driveways to the car park.

2.24. The system will incorporate an automatic number plate recognition system, which would be installed at each of the entries and exits to the car park. The system would operate together with automatic pay stations situated strategically about

the centre to validate and pre-pay for parking prior to customers returning to their vehicle and exiting the car park. The transaction can also be completed at the exit to the car park, which will be controlled by boom gates (similar to the approved car park control system). These controls would be located immediately within the perimeter of the centre having regard to the need to provide for vehicle queuing.

2.25. Staff/tenants will be accommodated within designated staff parking areas provided within the basement and rooftop parking areas at a concessional rate.

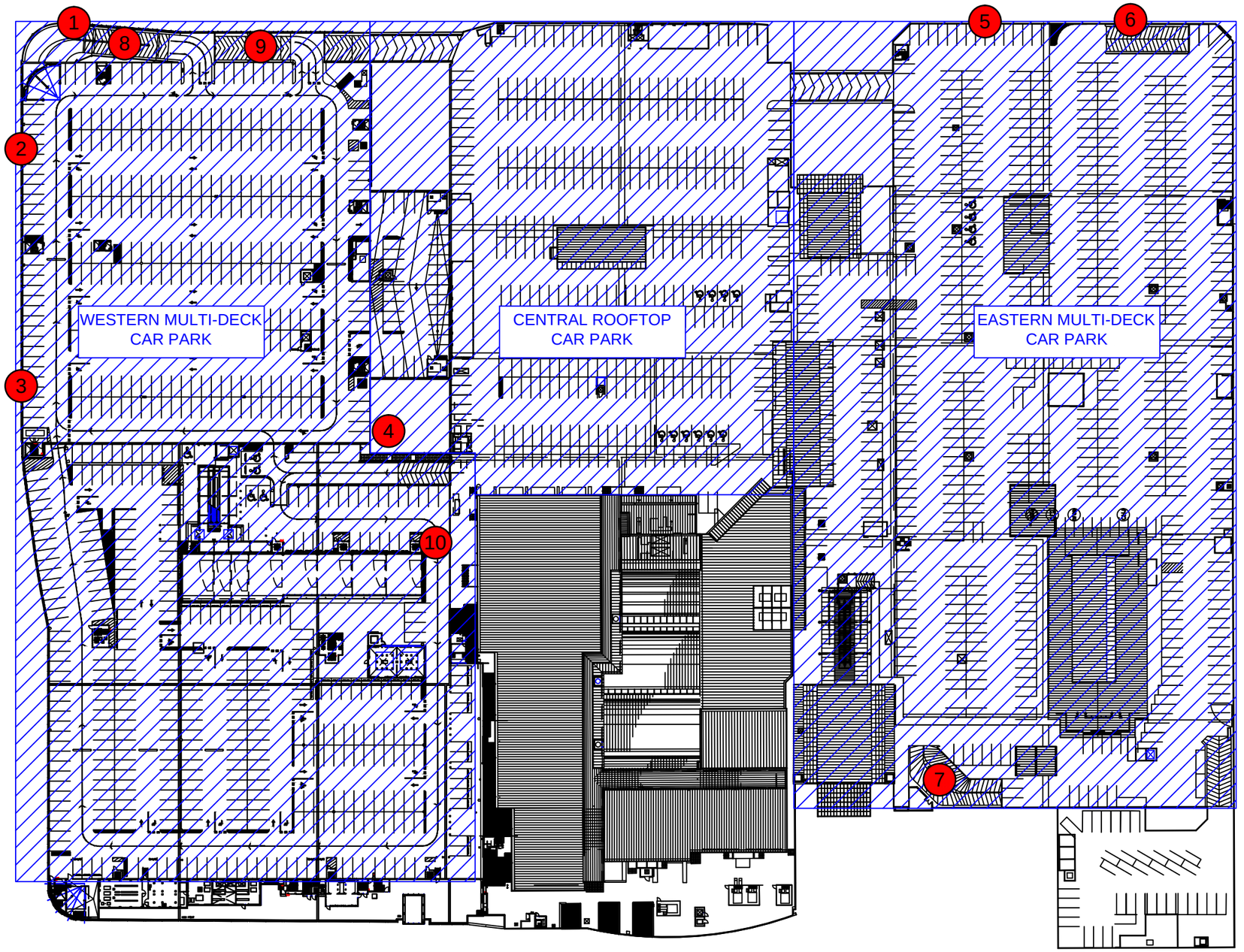
2.26. The proposed ticketless car park control system for the shopping centre will provide a convenient and practical system for casual parkers/customers and staff/tenants.

Location Plan

Colston Budd Rogers & Kafes Pty Ltd

DRAWN BY CBHK Pty Ltd_mr Ref: 10682 6 December 2017

Figure 1



NOTE:
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WESTFIELD LIVERPOOL TICKETLESS ACCESS CONTROL LOCATIONS

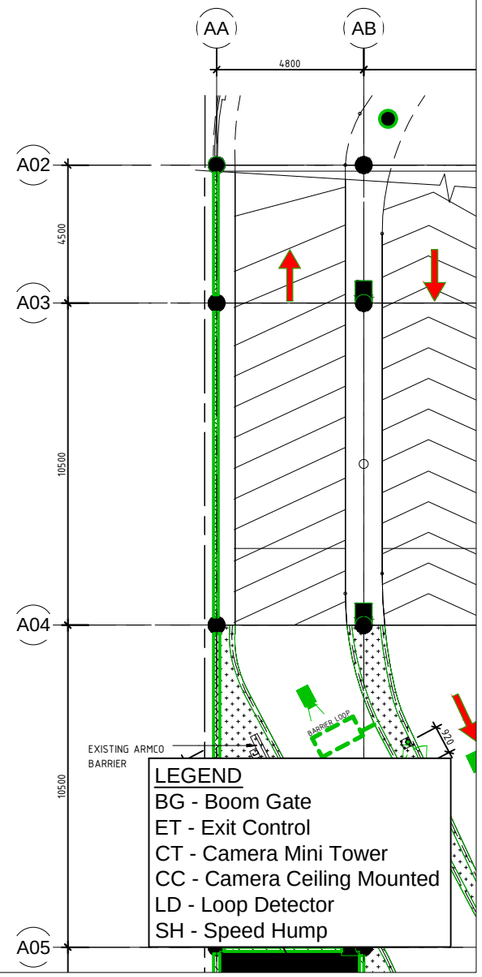
DRAWN BY CBRK Pty Ltd_mr Ref: 10682 6 December 2017

2

MODIFY DRIVEWAY/KERB TO
IMPROVE ACCESS

LOCATE BOOM GATE
AT ENTRY

MODIFY KERB (AS SHOWN)
TO ACCOMMODATE
VEHICLE SWEPT PATHS



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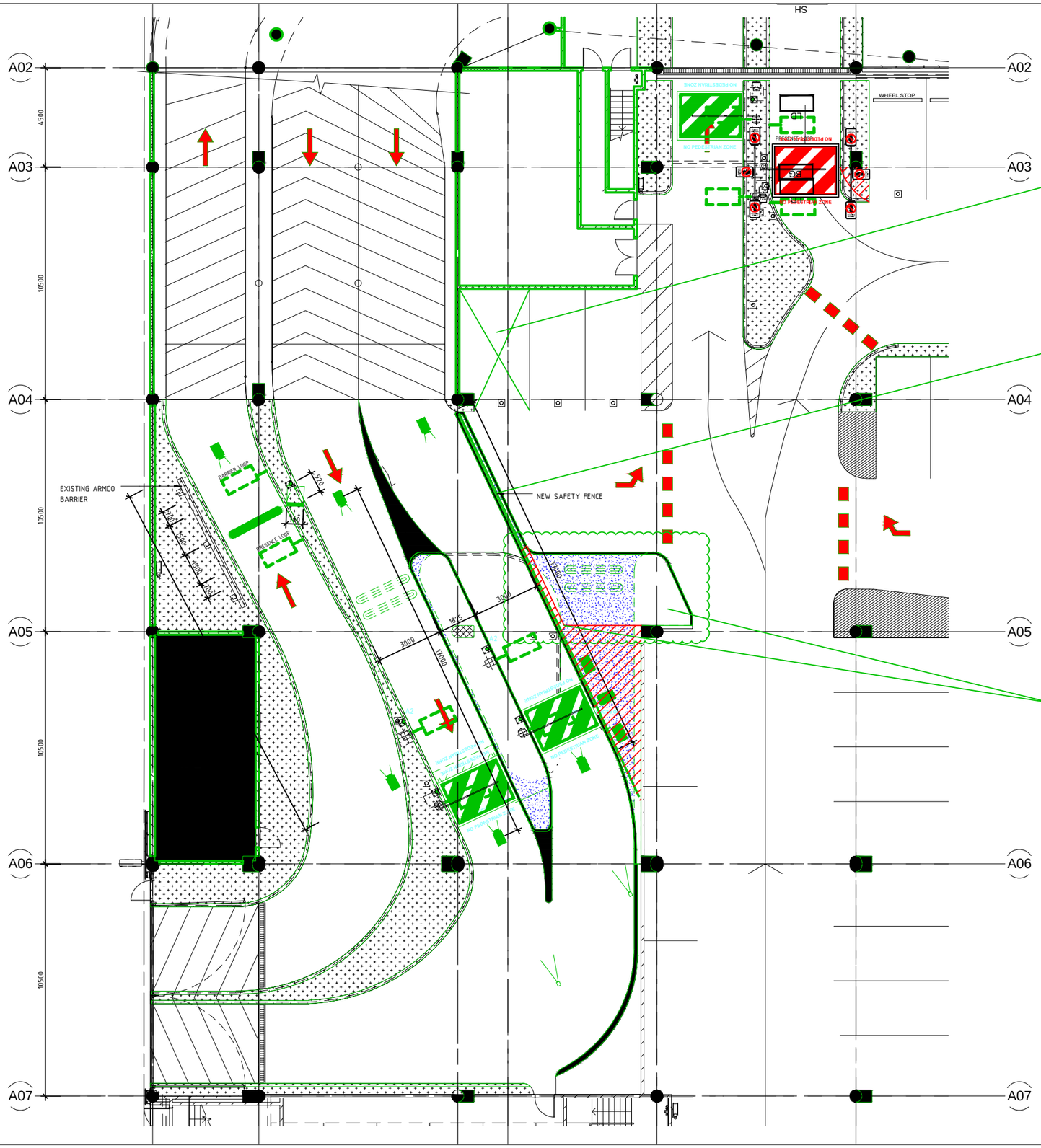
TICKETLESS CONTROLS
- LOCATION 1
- LEVEL P1

DRAWN BY CBRK Pty Ltd_mr Ref: 10682 15 December 2017

3



LEGEND
BG - Boom Gate
ET - Exit Control
CT - Camera Mini Tower
CC - Camera Ceiling Mounted
LD - Loop Detector
SH - Speed Hump

7. KERB SETOUT DIMENSIONS ARE TO THE INVERT OF THE KERB.
8. WHERE EXISTING MANHOLE COVERS, GRATED DRAINS, ELECTRICAL AND

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TICKETLESS CONTROLS
- LOCATION 2
- LEVEL P1

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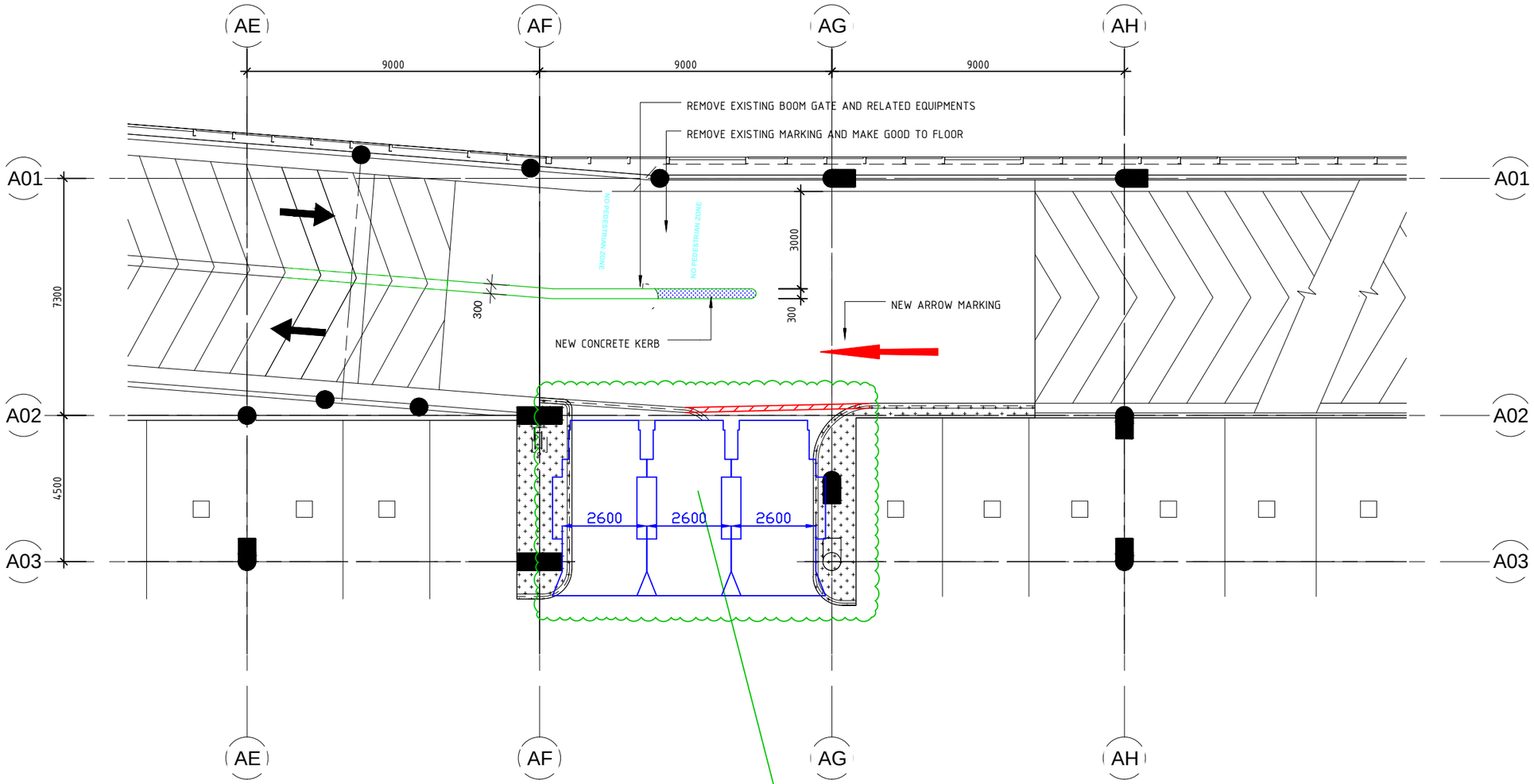
4



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TICKETLESS CONTROLS
- LOCATION 2
- LEVEL P3

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4a

BATHURST STREET

ACCESS 3

PROVIDE SINGLE, LEFT TURN ONLY EXIT (AS SHOWN)

MODIFY ACCESS (AS SHOWN) TO IMPROVE CIRCULATION AND REDUCE CONGESTION NEAR ACCESS

MODIFY STRUCTURE (WALL) TO PROVIDE LANE TO EXIT CONTROLS

ONLY

ON BATHURST STREET

KEEP CLEAR

GIVE WAY

R1-2

LEGEND
BG - Boom Gate
ET - Exit Control
CT - Camera Mini Tower
CC - Camera Ceiling Mounted
LD - Loop Detector
SH - Speed Hump

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TICKETLESS CONTROLS
- LOCATION 3
- LEVEL P1

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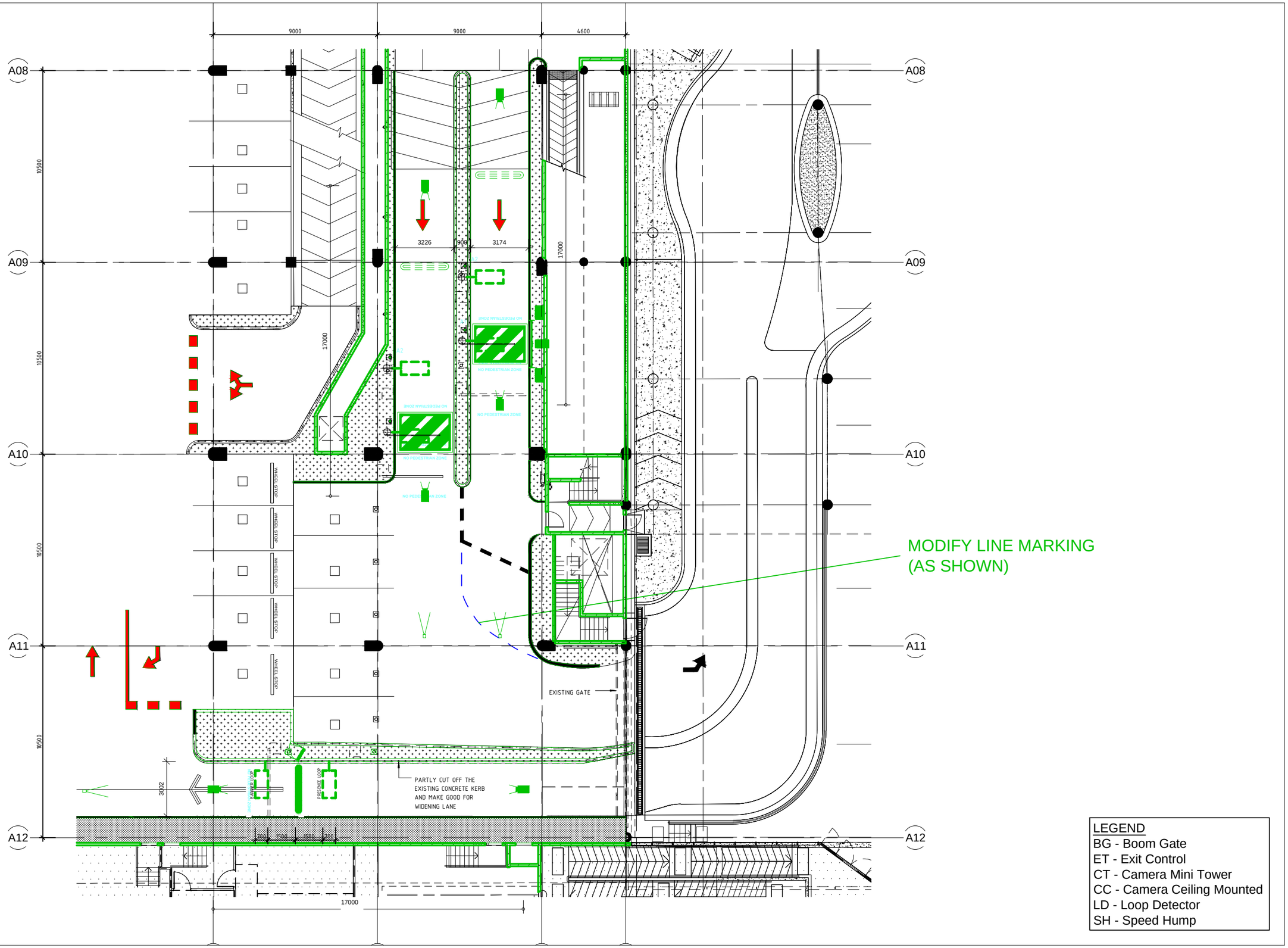

LEGEND
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ET - Exit Control
CT - Camera Mini Tower
CC - Camera Ceiling Mounted
LD - Loop Detector
SH - Speed Hump

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TICKETLESS CONTROLS
- LOCATION 4
- LEVEL P2

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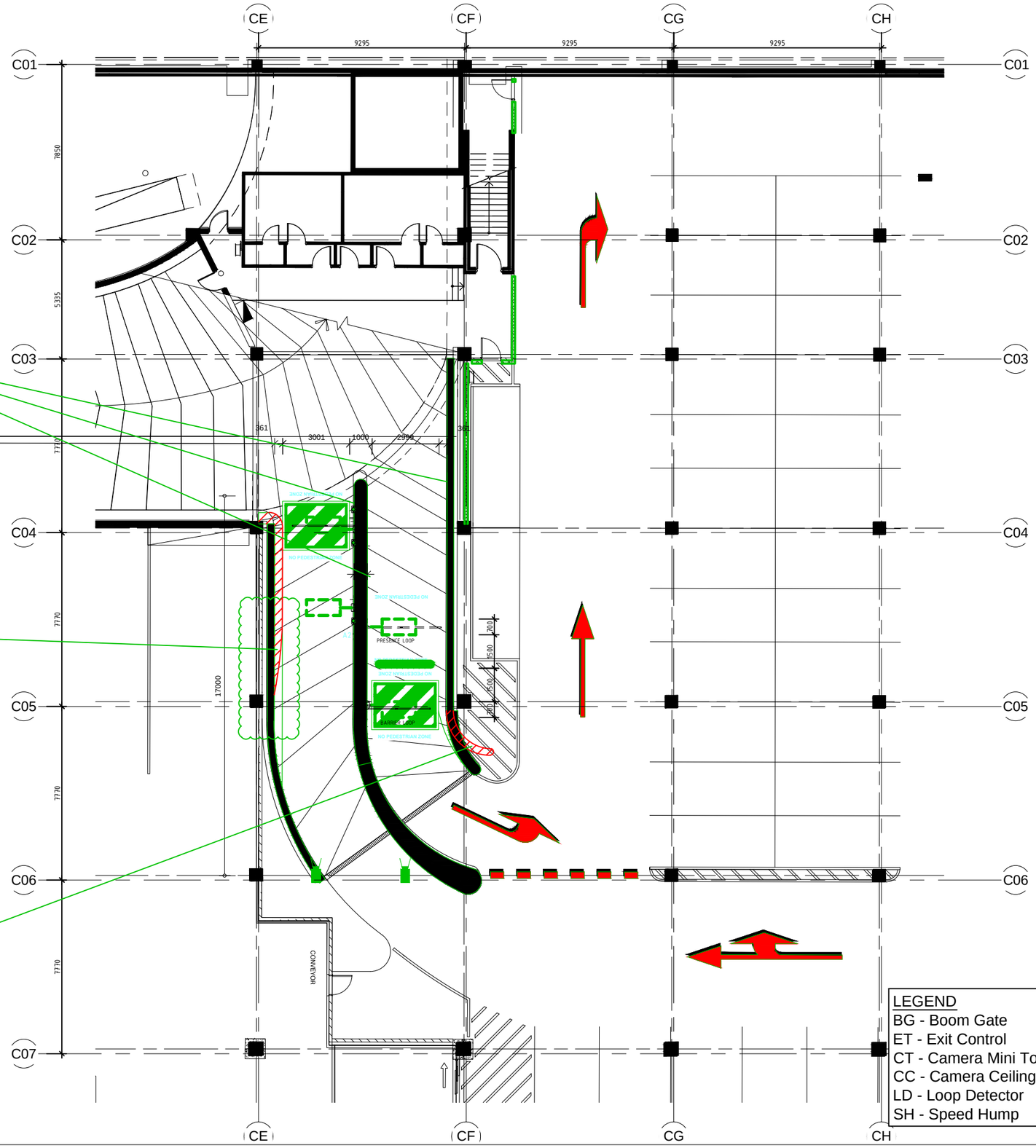
6

MAINTAIN EXISTING MEDIAN/KERB, AVOID FURTHER NARROWING OF CONTROL LANES

MODIFY PROPOSED KERB (AS SHOWN) TO ACCOMMODATE VEHICLE SWEPT PATHS

MODIFY KERB TO IMPROVE ACCESS AND CIRCULATION



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ET - Exit Control
CT - Camera Mini Tower
CC - Camera Ceiling Mounted
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TICKETLESS CONTROLS
- LOCATION 5 (STAFF PARKING)
- LEVEL P2

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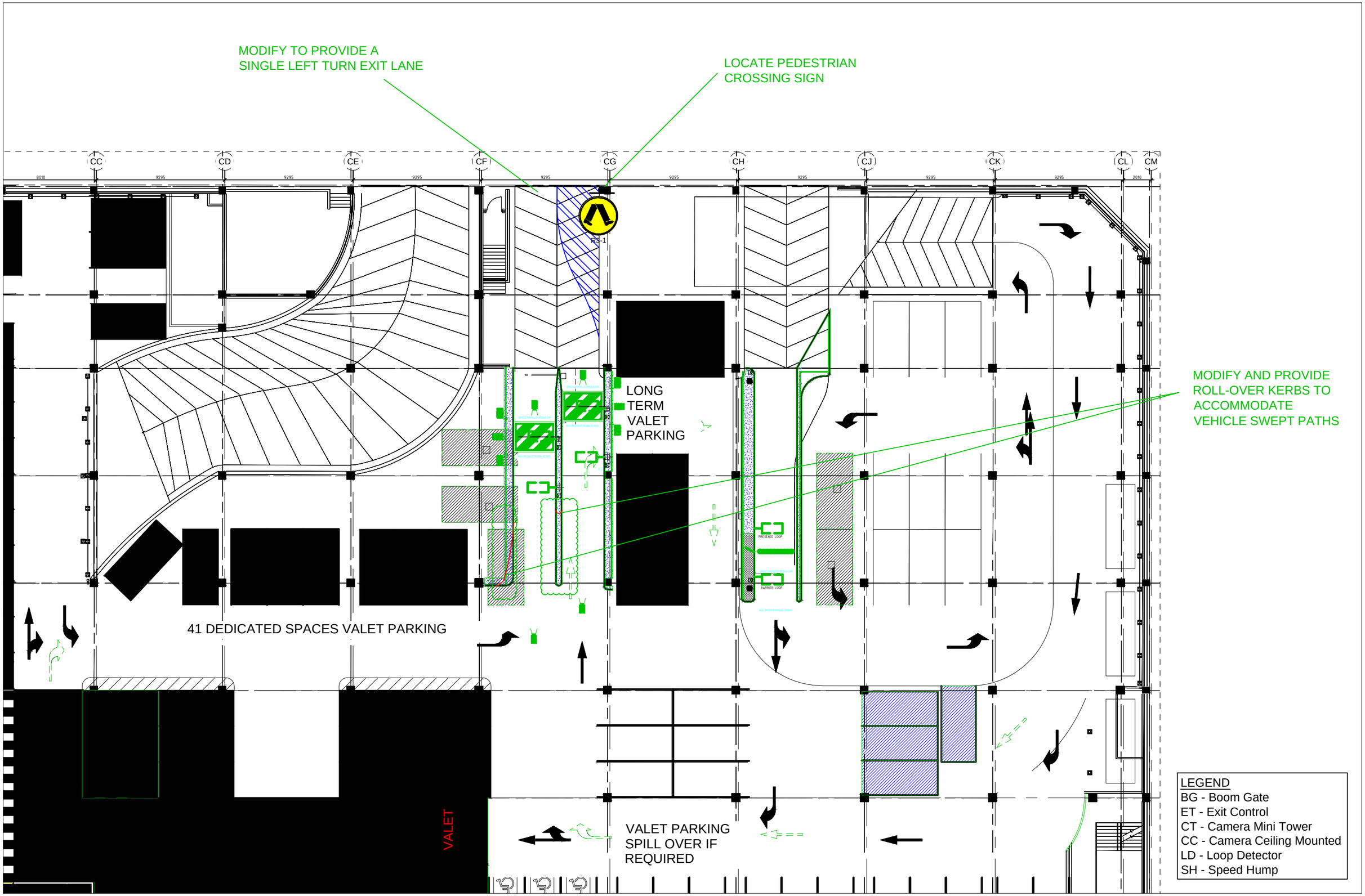

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TICKETLESS CONTROLS
- LOCATION 6
- LEVEL P4

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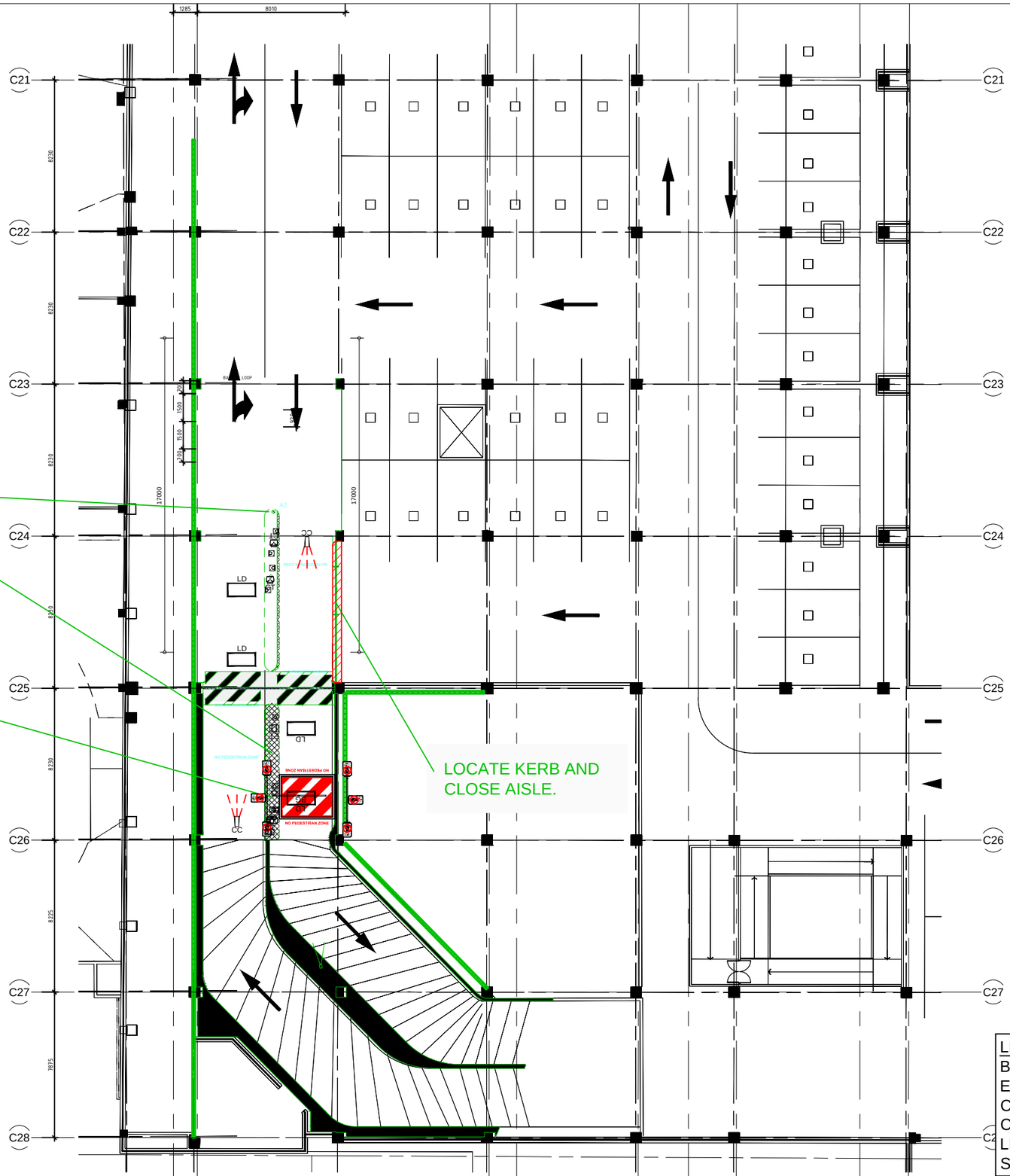
8

REMOVE PROPOSED
MEDIAN/KERBS AND
MAINTAIN EXISTING.

LOCATE CONTROLS CLOSER TO
THE RAMP (AS SHOWN).
TO ACCOMMODATE VEHICLE
SWEPT PATHS AND MAINTAIN
EXISTING CIRCULATION.

LOCATE KERB AND
CLOSE AISLE.



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ET - Exit Control
CT - Camera Mini Tower
CC - Camera Ceiling Mounted
LD - Loop Detector
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TICKETLESS CONTROLS
- LOCATION 7
- LEVEL P5

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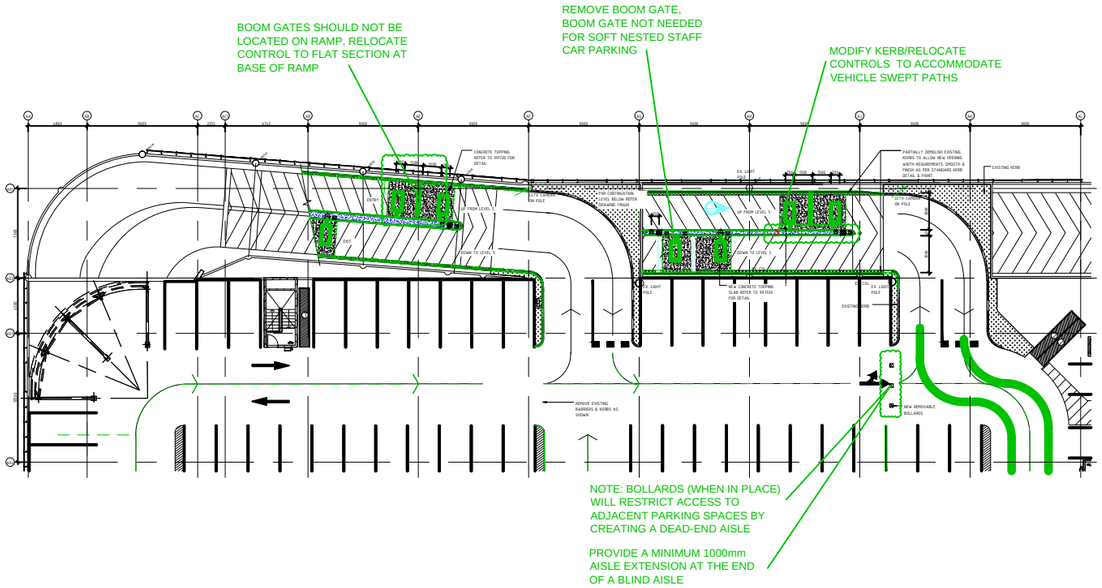

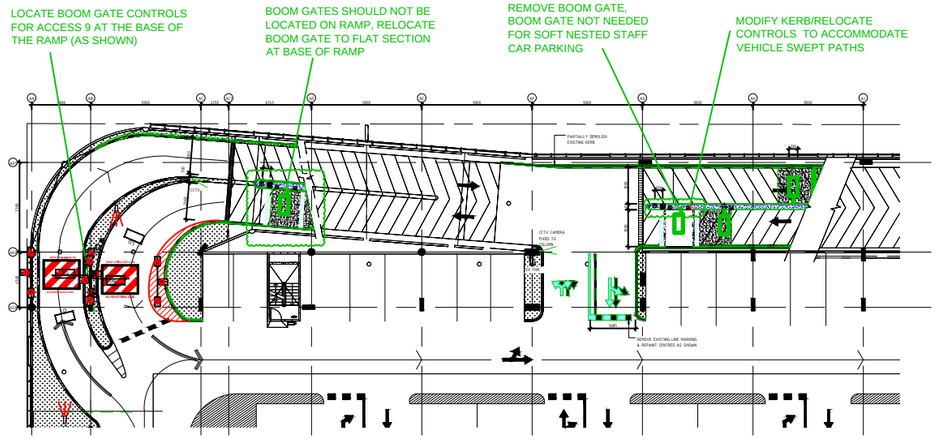

LEGEND
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ET - Exit Control
CT - Camera Mini Tower
CC - Camera Ceiling Mounted
LD - Loop Detector
SH - Speed Hump

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TICKETLESS CONTROLS
- LOCATIONS 8 & 9 (STAFF PARKING)
- LEVEL P5/P6

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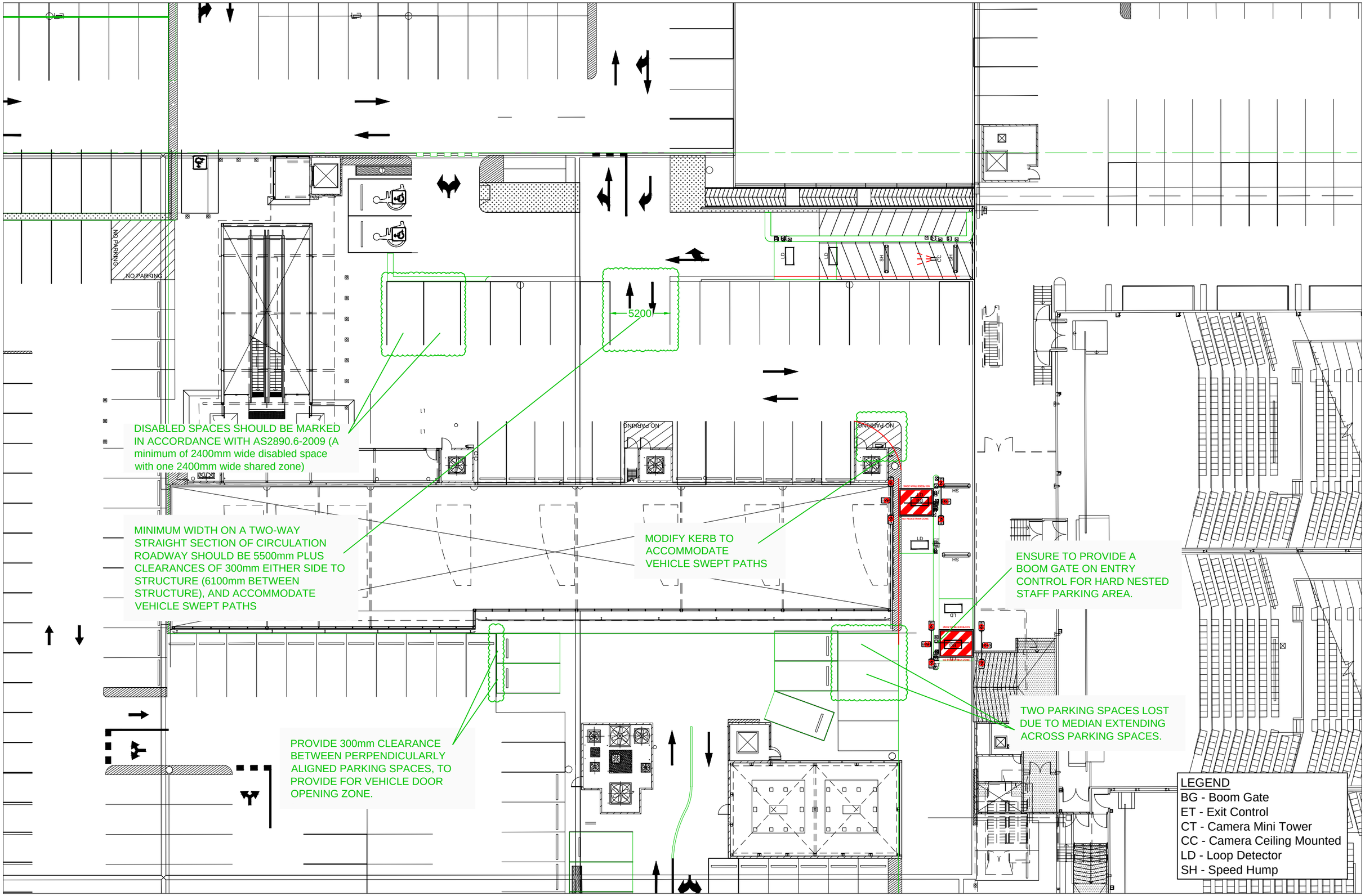
10



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TICKETLESS CONTROLS
- LOCATION 10 (STAFF PARKING)
- LEVEL P6

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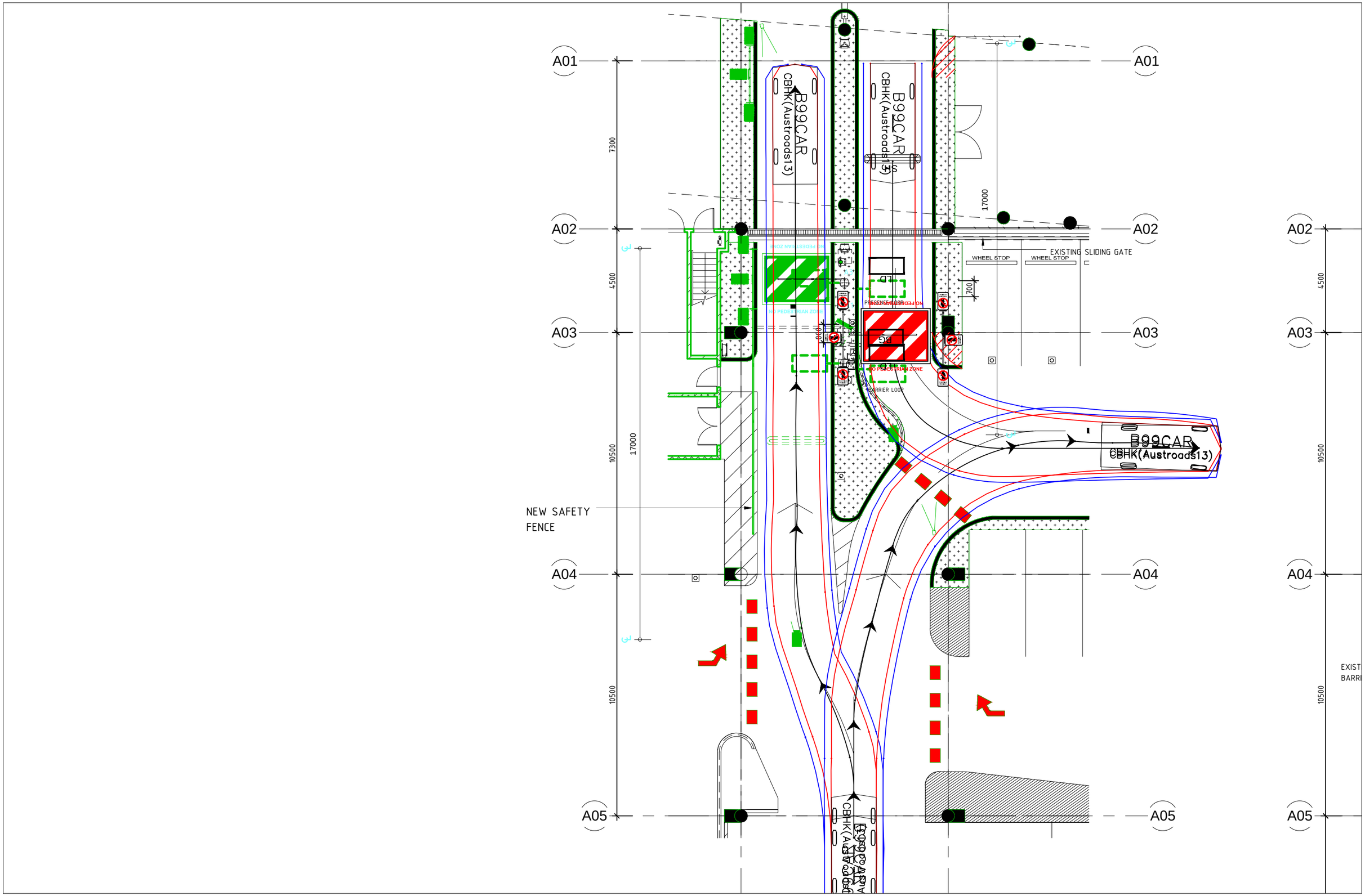
APPENDIX A

Vehicle Swept Paths



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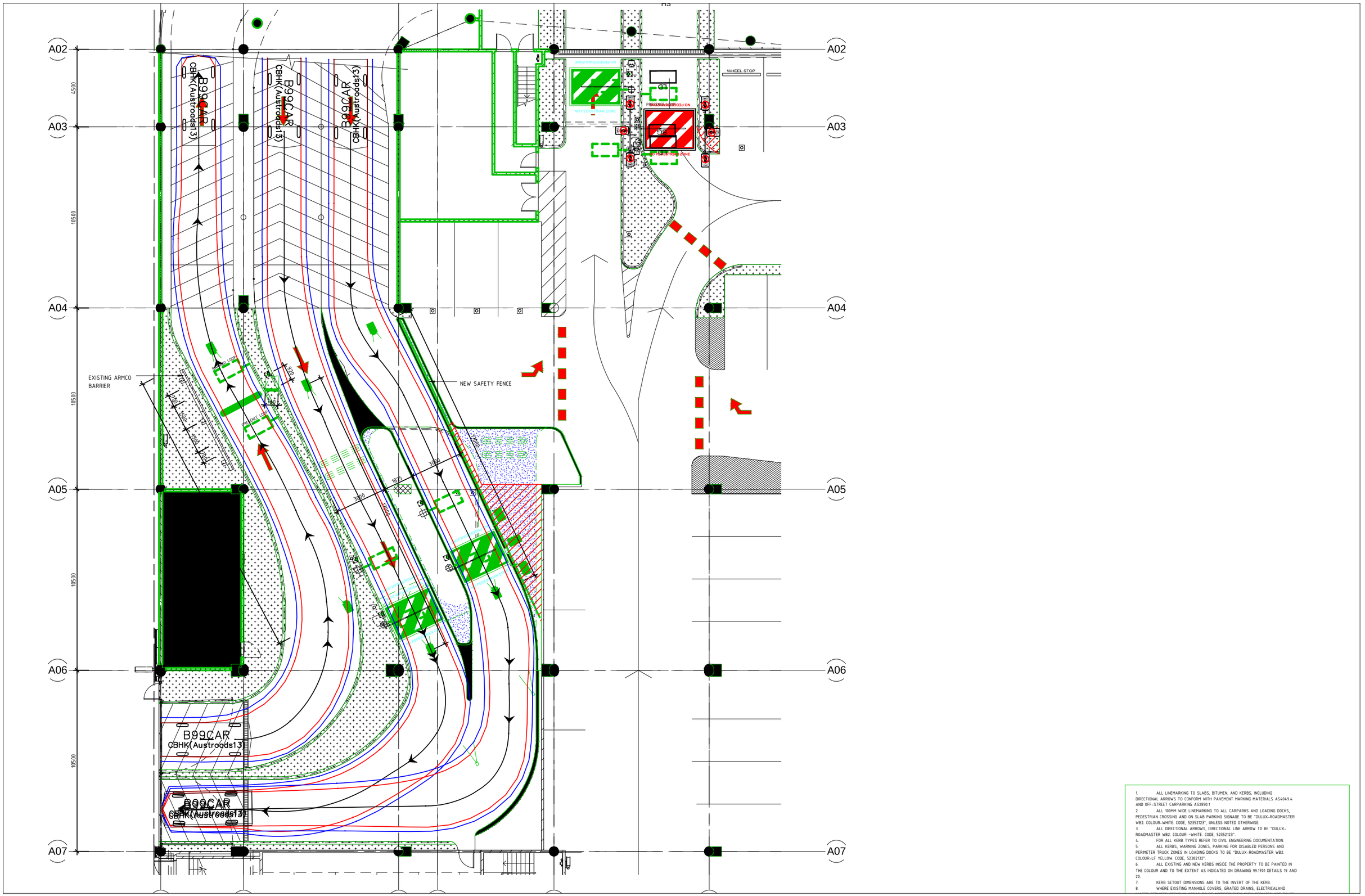
Swept Path of Vehicle Body
Swept Path of Clearance to Vehicle Body

B99 VEHICLE SWEPT PATHS
- LOCATION 1
- LEVEL P1

DRAWN BY CBRK Pty Ltd_mr Ref: 10682 15 December 2017

A1



1. ALL LINEMARKING TO SLABS, BITUMEN, AND KERBS, INCLUDING DIRECTIONAL ARROWS TO CONFORM WITH PAVEMENT MARKING MATERIALS AS4049.4 AND OFF-STREET CARPARKING AS2890.1
2. ALL 100MM WIDE LINEMARKING TO ALL CARPARKS AND LOADING DOCKS, PEDESTRIAN CROSSING AND ON SLAB PARKING SIGNAGE TO BE "DULUX-ROADMASTER WB2. COLOUR-WHITE. CODE, 52352123", UNLESS NOTED OTHERWISE.
3. ALL DIRECTIONAL ARROWS, DIRECTIONAL LINE ARROW TO BE "DULUX-ROADMASTER WB2. COLOUR -WHITE. CODE, 52352123".
4. FOR ALL KERB TYPES REFER TO CIVIL ENGINEERING DOCUMENTATION.
5. ALL KERBS, WARNING ZONES, PARKING FOR DISABLED PERSONS AND PERIMETER TRUCK ZONES IN LOADING DOCKS TO BE "DULUX-ROADMASTER WB2. COLOUR-LF YELLOW. CODE, 52382132".
6. ALL EXISTING AND NEW KERBS INSIDE THE PROPERTY TO BE PAINTED IN THE COLOUR AND TO THE EXTENT AS INDICATED ON DRAWING 99.1701 DETAILS 19 AND 20.
7. KERB SETOUT DIMENSIONS ARE TO THE INVERT OF THE KERB.
8. WHERE EXISTING MANHOLE COVERS, GRATED DRAINS, ELECTRICALAND

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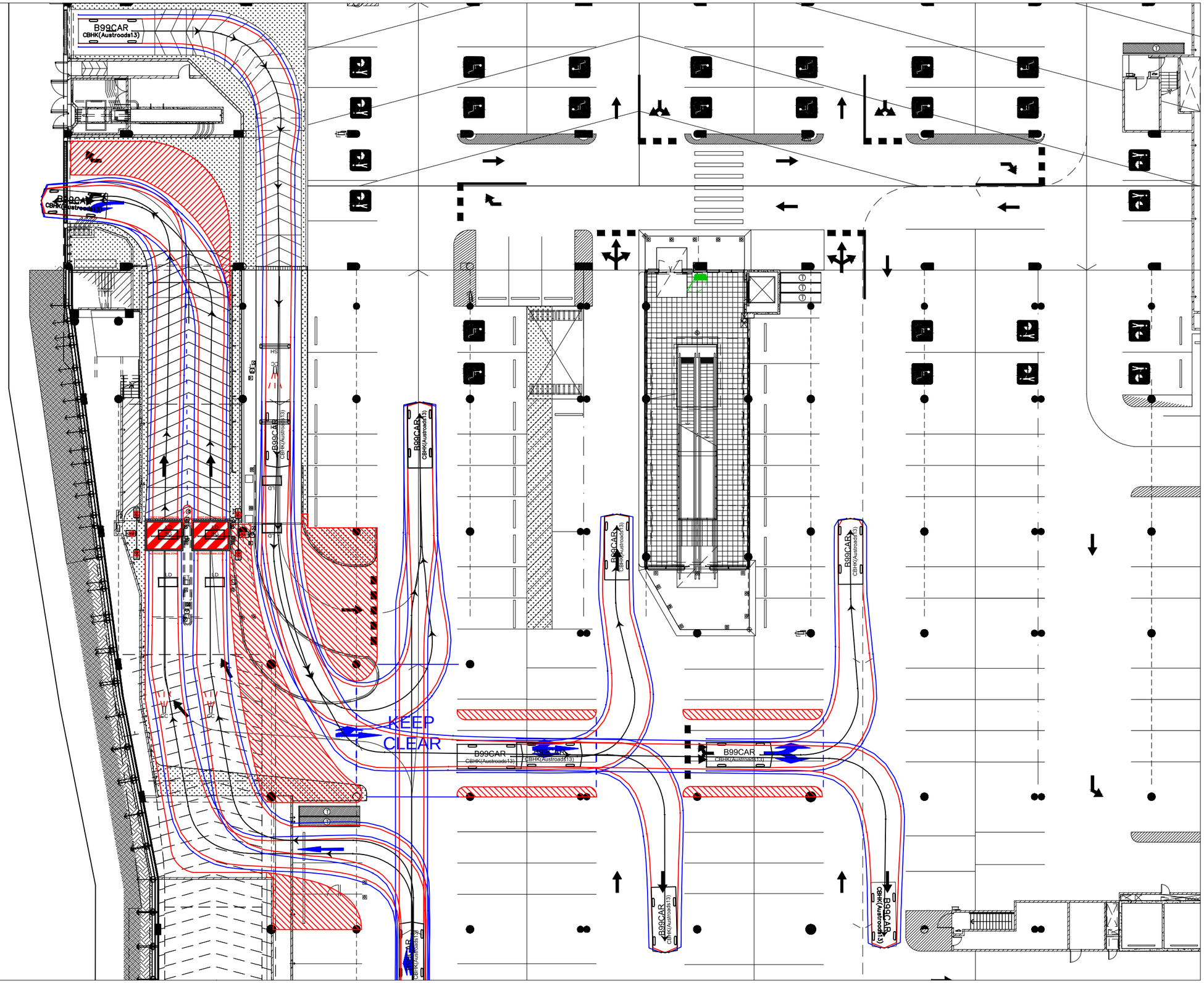
— Swept Path of Vehicle Body
— Swept Path of Clearance to Vehicle Body

B99 VEHICLE SWEPT PATHS
- LOCATION 2
- LEVEL P1

DRAWN BY CBRK Pty Ltd_mr Ref: 10682
15 December 2017
A2

BATHURST

ACCESS 3



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Swept Path of Vehicle Body
Swept Path of Clearance to Vehicle Body

B99 VEHICLE SWEPT PATHS
- LOCATION 3
- LEVEL P1

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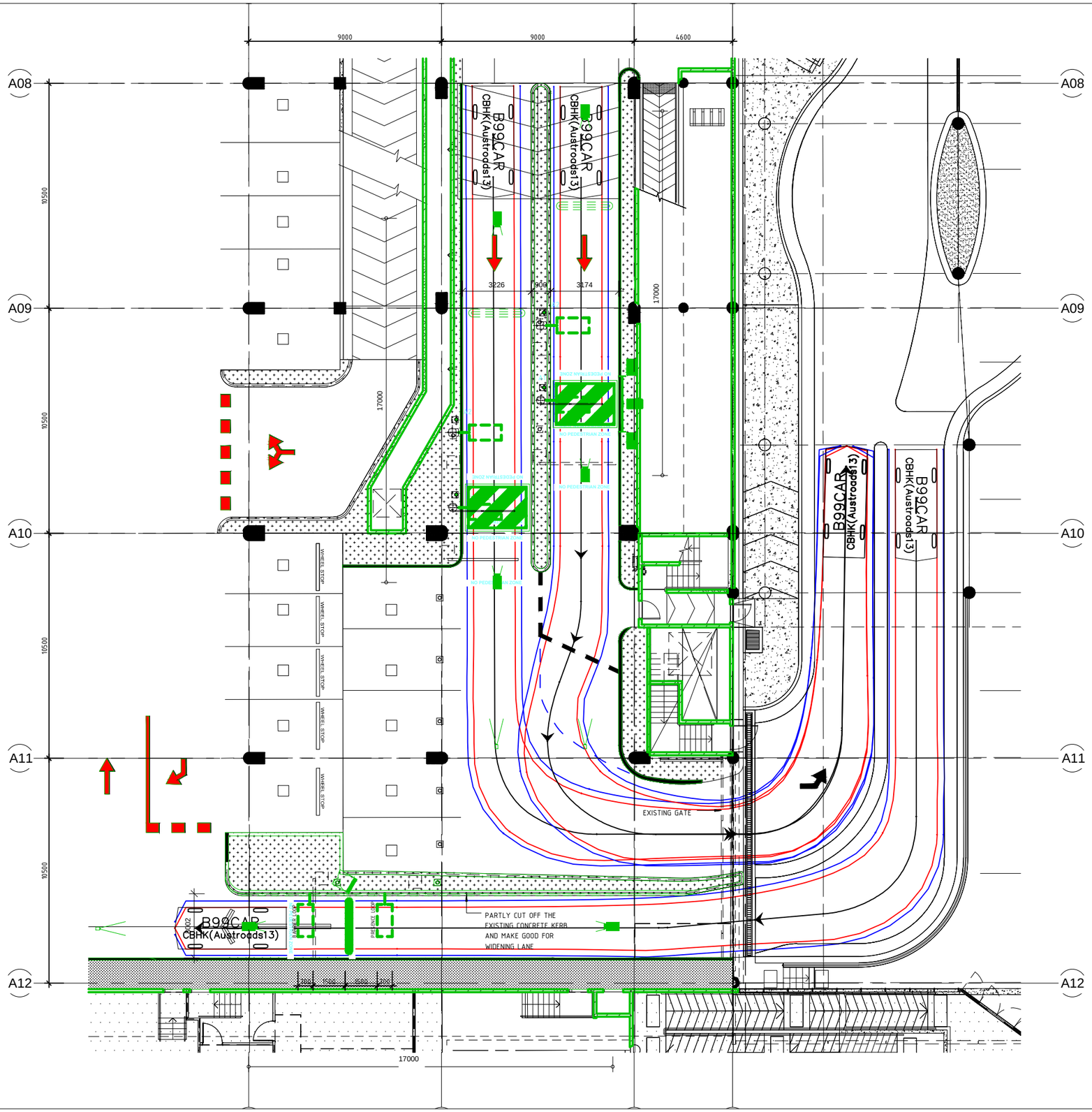
A3



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Swept Path of Vehicle Body
Swept Path of Clearance to Vehicle Body

B99 VEHICLE SWEPT PATHS
- LOCATION 4
- LEVEL P2

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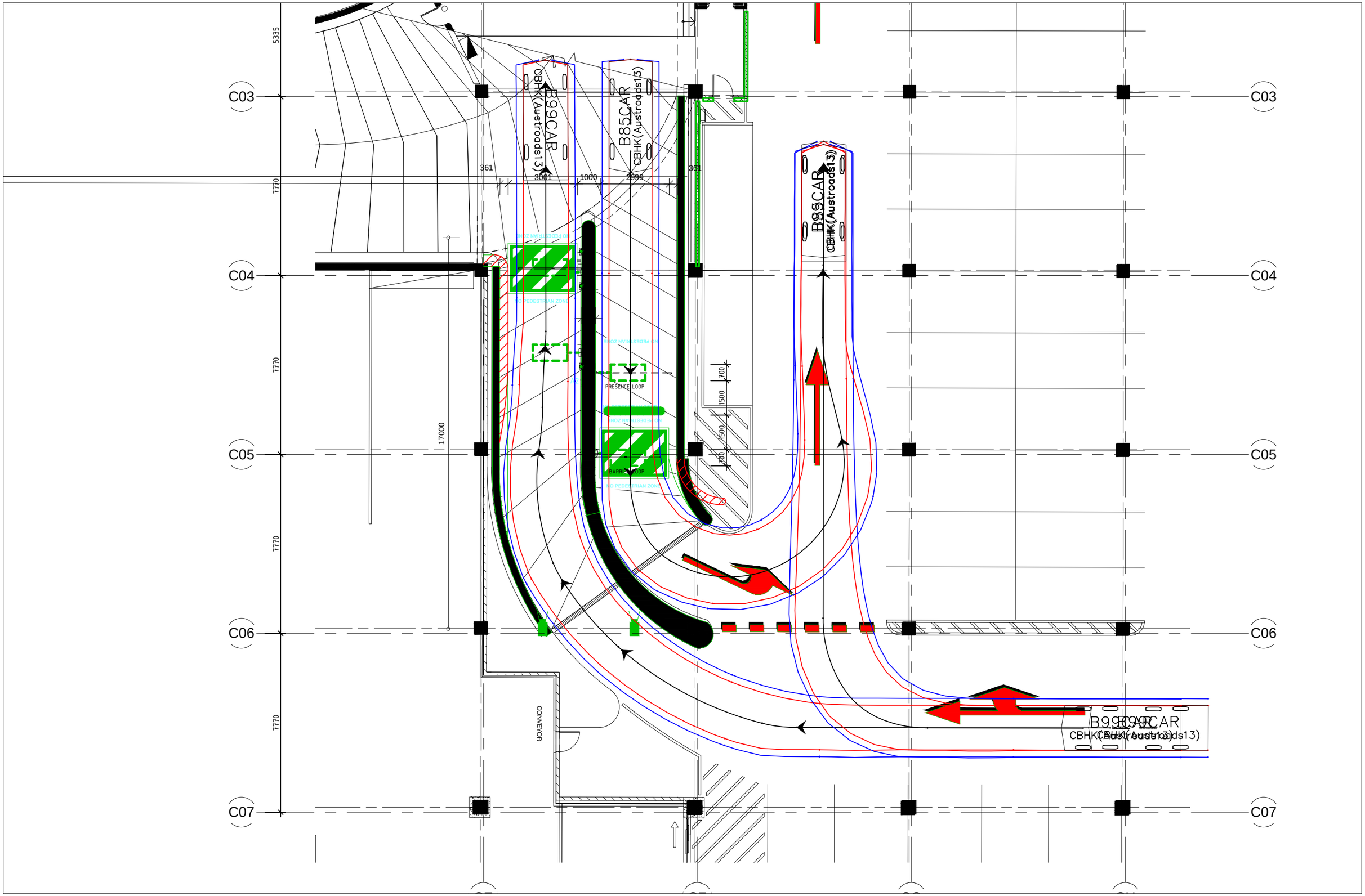
A4



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Swept Path of Vehicle Body
Swept Path of Clearance to Vehicle Body

B99 VEHICLE SWEPT PATHS
- LOCATION 5 (STAFF PARKING)
- LEVEL P2

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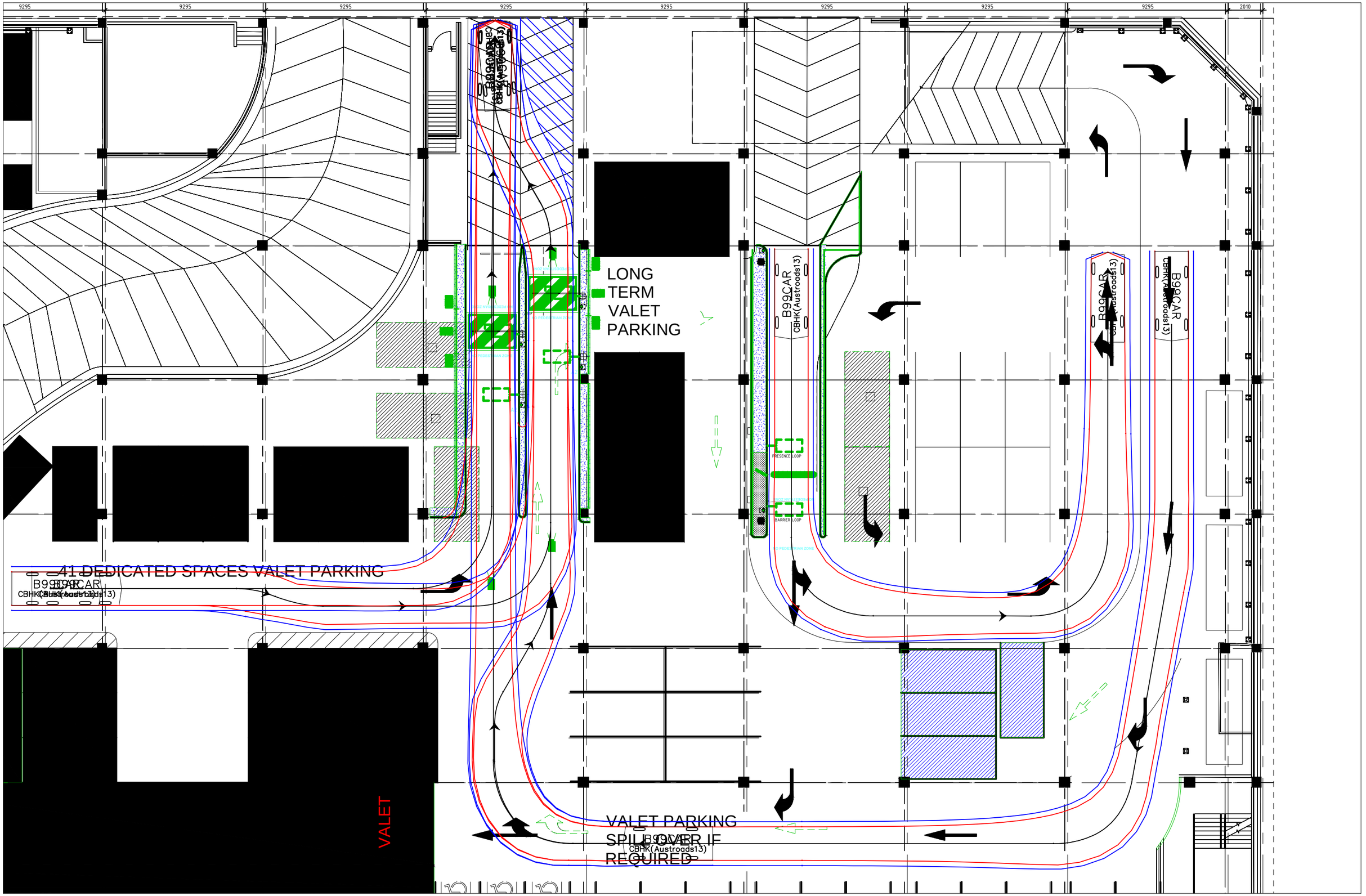
A5



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Swept Path of Vehicle Body
Swept Path of Clearance to Vehicle Body

B99 VEHICLE SWEPT PATHS
- LOCATION 6
- LEVEL P4

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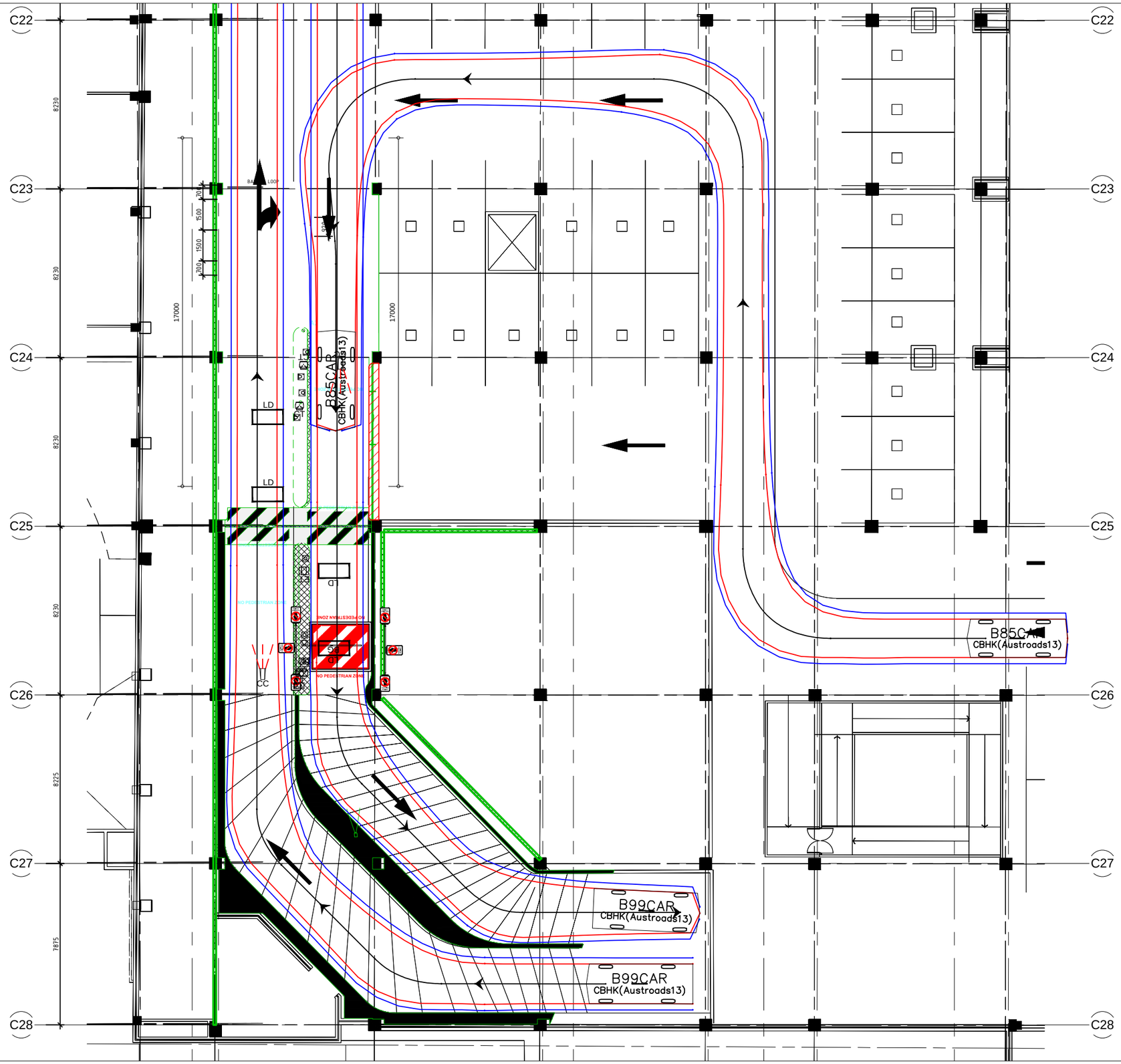
A6



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Swept Path of Vehicle Body
Swept Path of Clearance to Vehicle Body

B99 VEHICLE SWEPT PATHS
- LOCATION 7
- LEVEL P5

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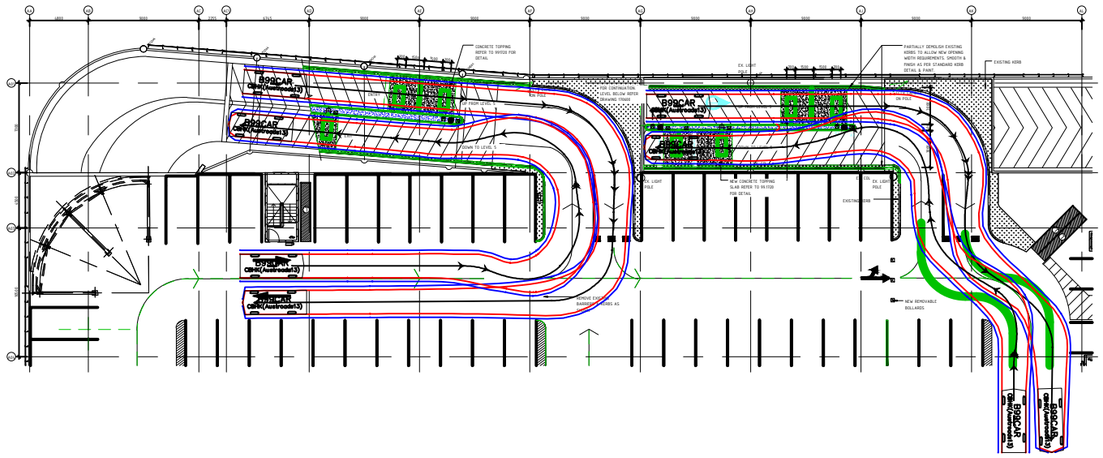
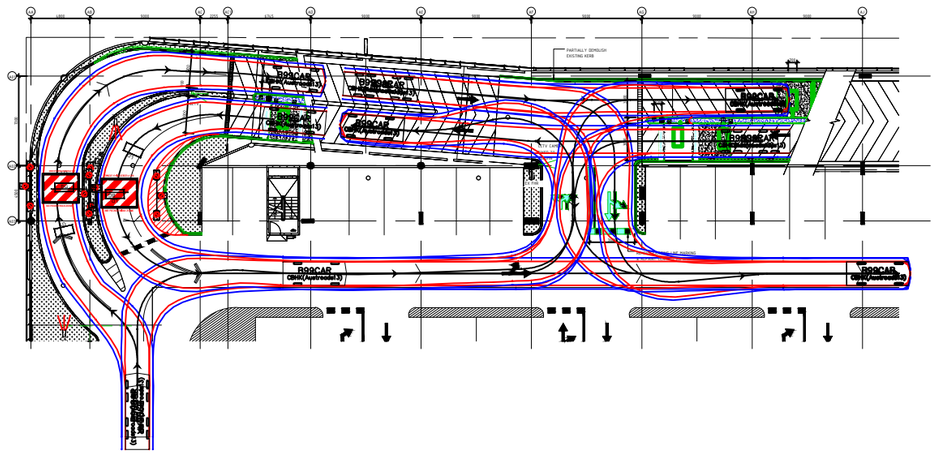
A7





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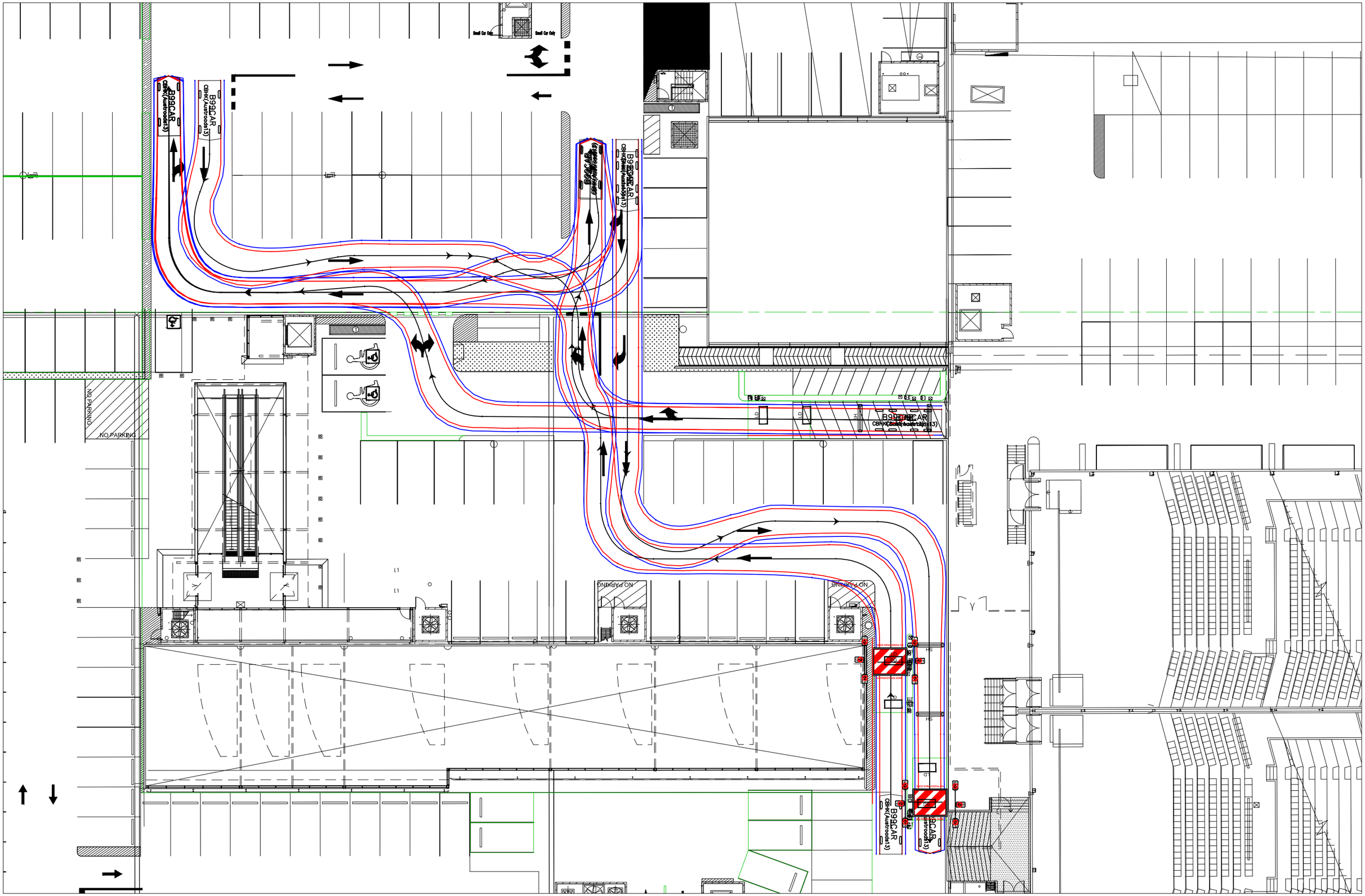
Swept Path of Vehicle Body
Swept Path of Clearance to Vehicle Body

B99 VEHICLE SWEPT PATHS
- LOCATIONS 8 & 9 (STAFF PARKING)
- LEVEL P6

DRAWN BY CBRK Pty Ltd_mr Ref: 10682 15 December 2017

A8



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Swept Path of Vehicle Body
Swept Path of Clearance to Vehicle Body

B99 VEHICLE SWEPT PATHS
- LOCATION 10 (STAFF PARKING)
- LEVEL P6

DRAWN BY CBRK Pty Ltd_mr Ref: 10682 15 December 2017

A9