Proposed Mixed Use Development

55 Kalang Road, Elanora Heights

TRAFFIC AND PARKING ASSESSMENT REPORT

14 March 2019

Ref 18507

VARGA TRAFFIC PLANNING Pty Ltd
Transport, Traffic and Parking Consultants

Suite 6, 20 Young Street, Neutral Bay NSW 2089 - PO Box 1868, Neutral Bay NSW 2089 Ph: 9904 3224

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LIST OF ILLUSTRATIONS

1. INTRODUCTION

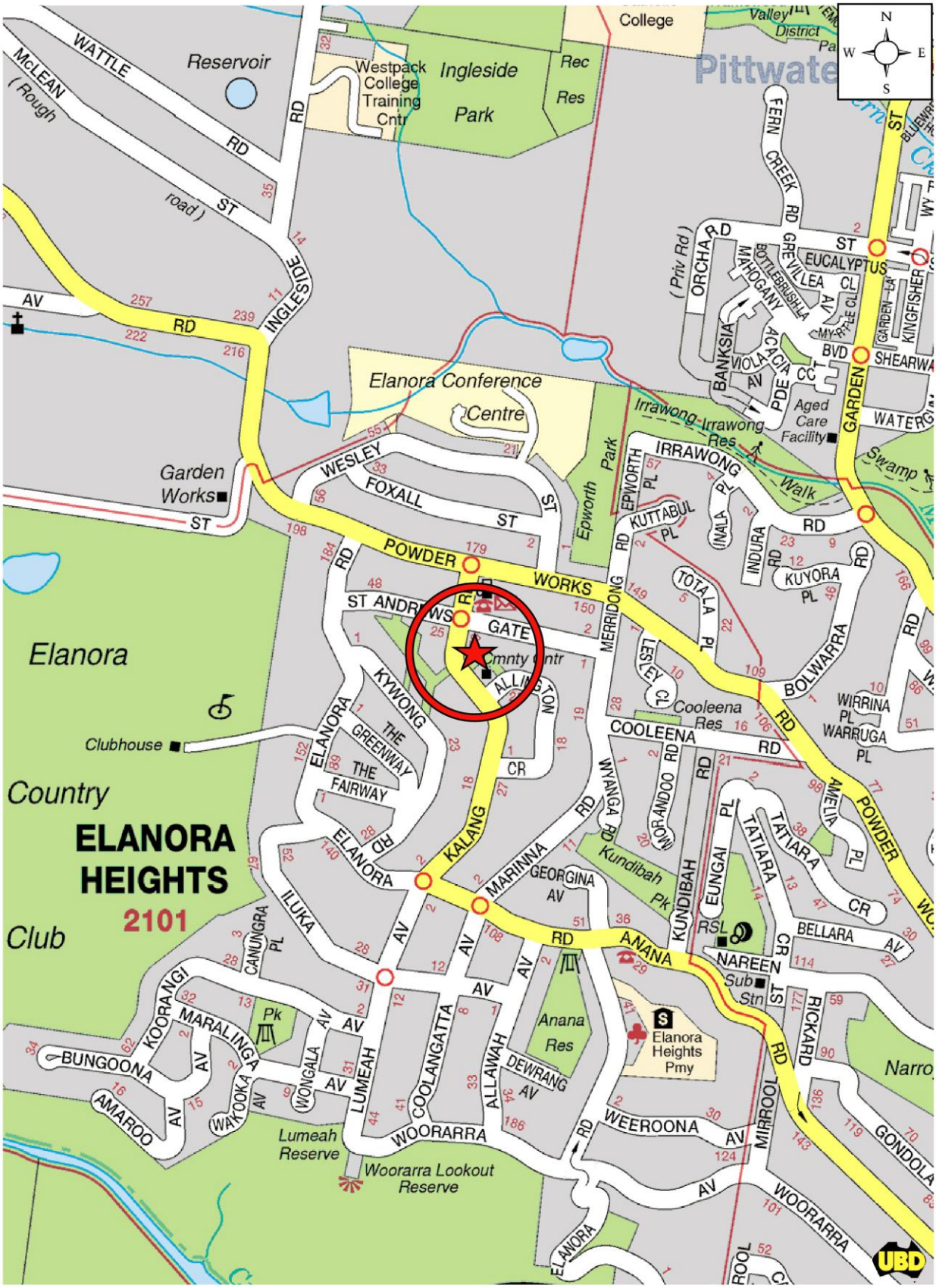
This report has been prepared to accompany a development application to Council for a mixed use development to be located at 55 Kalang Road, Elanora Heights (Figures 1 and 2).

The proposed development involves the demolition of the existing two-storey commercial building on the site to facilitate the construction of a new mixed use residential apartment building with a ground floor commercial component.

Off-street parking is to be provided in a new basement car parking area with vehicular access provided via a right-of-carriageway (ROW) which runs along the northern property boundary out to Kalang Road.

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

- describes the site and provides details of the development proposal
- reviews the road network in the vicinity of the site, and the traffic conditions on that road network
- estimates the traffic generation potential of the development proposal, and assigns that traffic generation to the road network serving the site
- assesses the traffic implications of the development proposal in terms of road network capacity
- reviews the geometric design features of the proposed car parking and loading facilities for compliance with the relevant codes and standards
- assesses the adequacy and suitability of the quantum of off-street car parking and loading provided on the site.



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LOCATION
FIGURE 1

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SITE
FIGURE 2

2. PROPOSED DEVELOPMENT

Site

The subject site is located on the eastern side of Kalang road, approximately 30m south of the St Andrews Gate intersection and is situated within the *B2 Local Centre* zone. The site has a street frontage of approximately 15m in length to Kalang Road and occupies an area of approximately 580m^2.

The subject site is currently occupied by a two-storey building comprising a restaurant tenancy on the ground floor level, fronting Kalang Road with a floor area of approximately 115m^2. A commercial component is also located on the level above, also comprising a floor area of approximately 115m^2.

A hardstand area located at the rear of the building is used to provide up to 8 informal off-street parking spaces for the existing development, with vehicular access provided via a right-of-carriageway (ROW) which runs along the northern property boundary out to Kalang Road, as shown in the recent aerial image below. Four on-street parking spaces are also located along the front of the existing building, on the eastern side of Kalang Road, are included in the parking allocated to the site as part of a 1972 land dedication.

The abovementioned ROW also provides vehicular access to the adjoining property (No.57 Kalang Road), for vehicles accessing the basement car parking area, with access provided via a right-of-carriageway (ROW) off Kalang Road.

Loading/servicing for the existing restaurant/commercial development is undertaken by a variety of light commercial vehicles such as "white vans", utilities and the like which can be accommodated in conventional parking spaces.

Proposed Development

The proposed development involves the demolition of the existing building on the site to facilitate the construction of a new mixed-use residential apartment building.

A total of 6 residential apartments are proposed in the new development as follows:

1 bedroom apartments:	2
2 bedroom apartments:	4
TOTAL APARTMENTS:	**6**

A commercial component is proposed on the ground floor level of the new building, with a floor area of 197m^2.

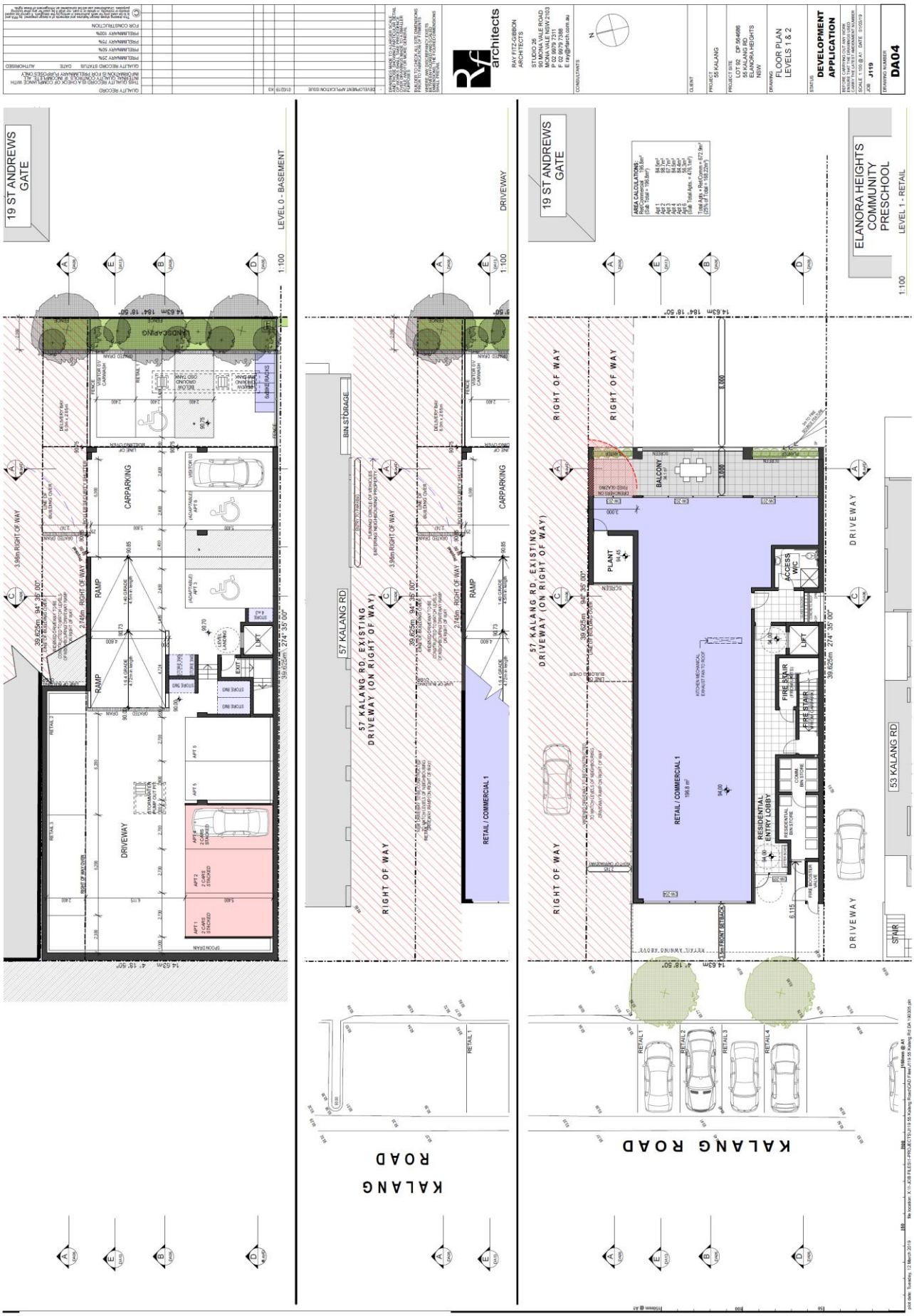
Off-street parking is proposed for a total of 19 cars, with all but four spaces provided in a new basement car parking area. The remaining parking spaces are to be provided on-street along the eastern side of Kalang Road, directly along the front of the proposed development, as per the *existing* arrangements.

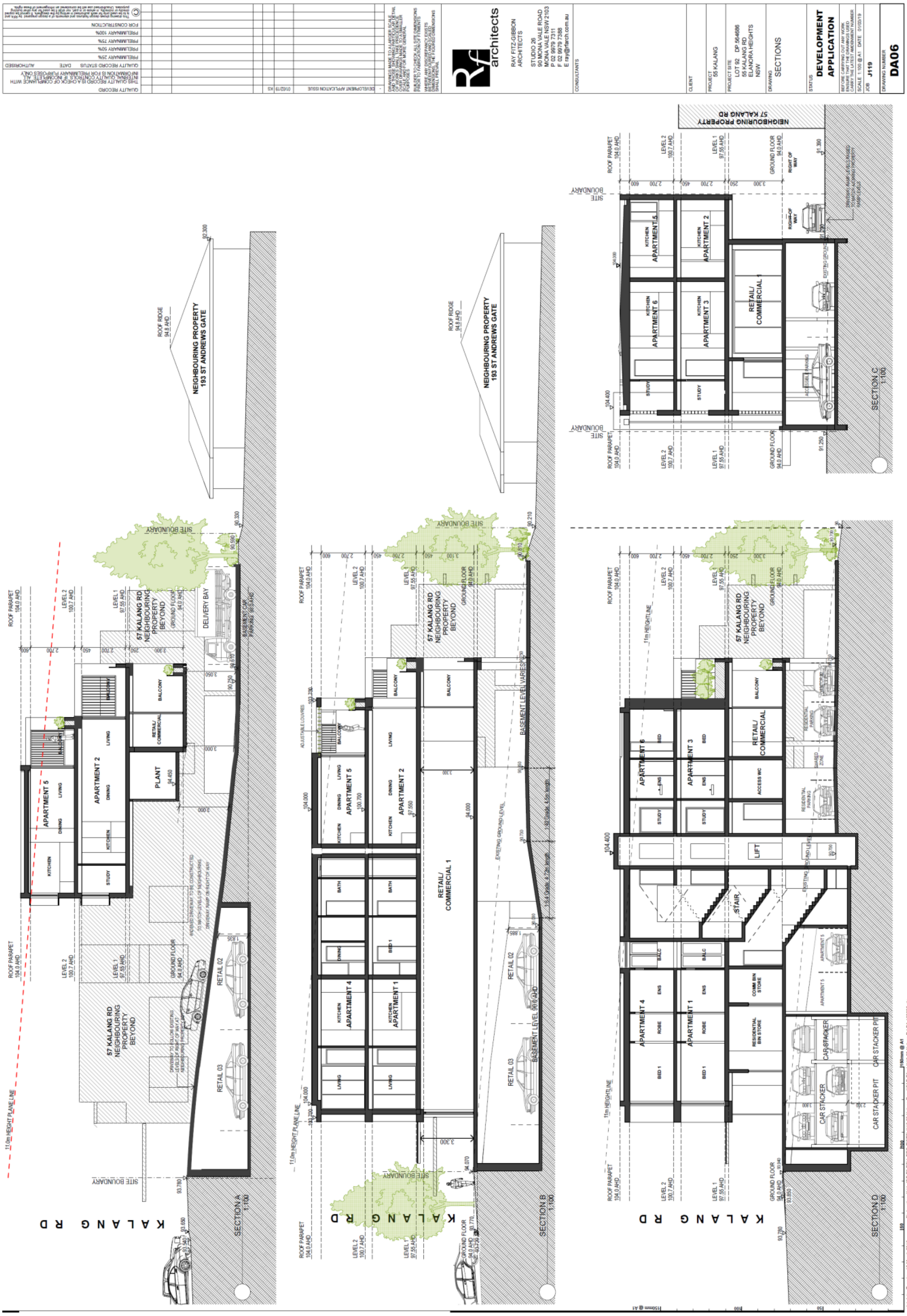
Vehicular access to the off-street car parking facilities is to be provided via the existing right-of-carriageway (ROW) which extends from the northern property boundary to Kalang Road.

In this regard, the on-street parking spaces are again to be allocated for the retail/commercial uses of the proposed development and businesses located within the local centre area, with the on-street parking restrictions to remain *unchanged*.

Loading/servicing for the proposed development is expected to be undertaken by a variety of light commercial vehicles such as "white vans", utilities and the like which can be accommodated in conventional parking spaces. A dedicated loading bay is to be located on the basement floor level, at the rear of the site. Vehicular access to the loading bay is also to be provided via the abovementioned ROW off Kalang Road.

Plans of the proposed development have been prepared by *Ray Fitz-Gibbon Architects* and are reproduced in the following pages.


19 ST ANDREWS GATE
LEVEL 0 - BASEMENT
1:100
DRIVEWAY
57 KALANG RD
57 KALANG RD. EXISTING DRIVEWAY (ON RIGHT OF WAY)
RIGHT OF WAY
CARPARKING
RAMP
BIN STORAGE
RETAIL / COMMERCIAL 1
KALANG ROAD
19 ST ANDREWS GATE
ELANORA HEIGHTS COMMUNITY PRESCHOOL
LEVEL 1 - RETAIL
1:100
53 KALANG RD
BALCONY
PLANT
ACCESS W/C
LIFT
FIRE STAIR
RESIDENTIAL ENTRY LOBBY
RETAIL 1
RETAIL 2
RETAIL 3
RETAIL 4
KALANG ROAD


SECTION A 1:100
SECTION B 1:100
SECTION C 1:100
SECTION D 1:100
KALANG RD
NEIGHBOURING PROPERTY 193 ST ANDREWS GATE
57 KALANG RD NEIGHBOURING PROPERTY BEYOND
RETAIL/ COMMERCIAL 1
APARTMENT 1
APARTMENT 2
APARTMENT 3
APARTMENT 4
APARTMENT 5
APARTMENT 6
RETAIL 02
RETAIL 03
DELIVERY BAY
PLANT
LIFT
STAIR
CAR STACKER
CAR STACKER PIT
SITE BOUNDARY
11m HEIGHTLINE
architects
RAY FITZ-GIBBON ARCHITECTS
STUDIO 26
90 MONA VALE ROAD
MONA VALE NSW 2103
55 KALANG
LOT 92 DP 564686
55 KALANG RD
ELANORA HEIGHTS
NSW
SECTIONS
DEVELOPMENT APPLICATION
J119
DA06

3. TRAFFIC ASSESSMENT

Road Hierarchy

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

Wakehurst Parkway is classified by the RMS as a *State Road* and provides the key north-south road link in the area, linking North Narrabeen to North Balgowlah. It typically carries one-two traffic lanes in each direction with turning lanes provided at key locations.

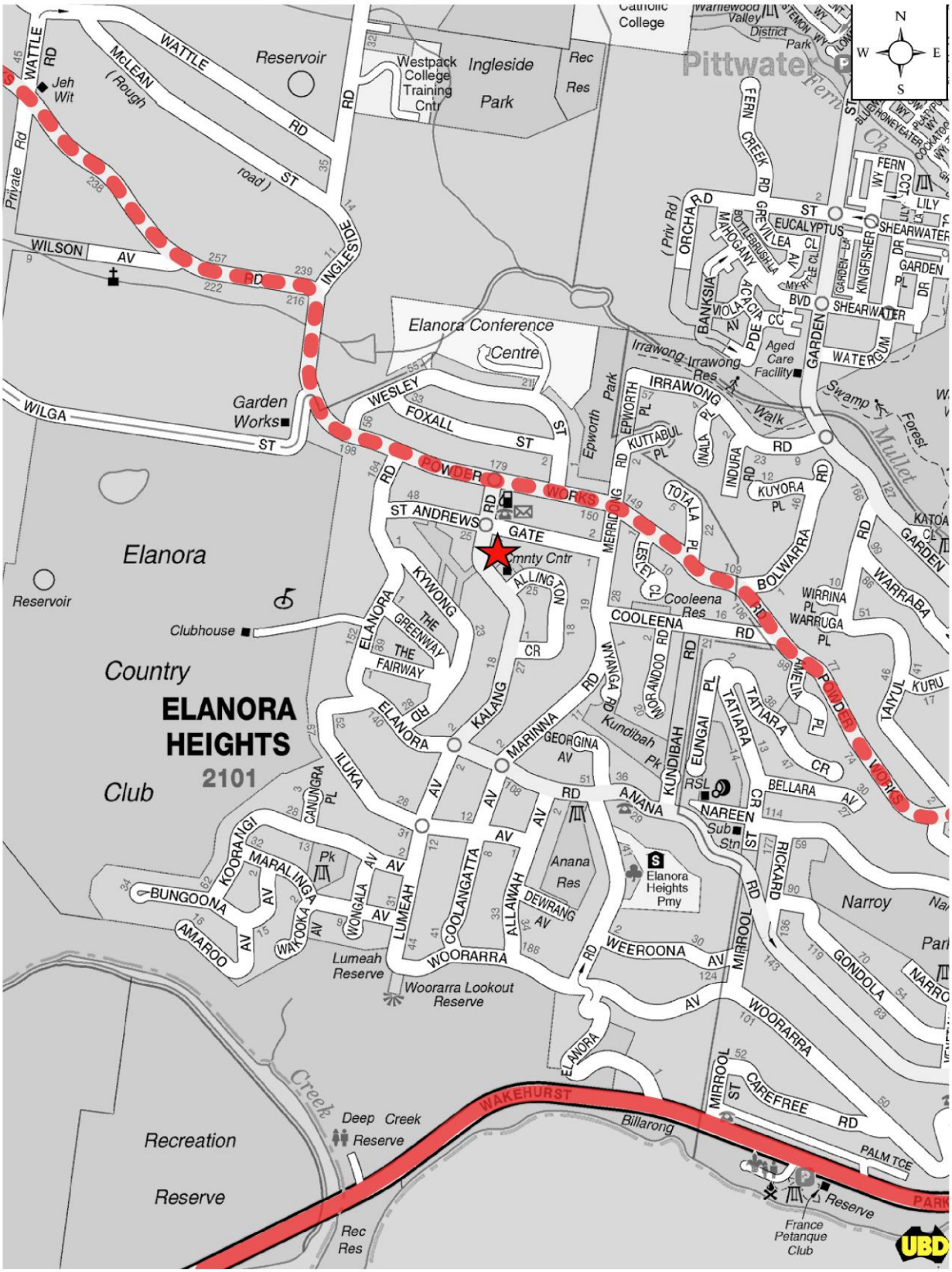
Powder Works Road is classified by the RMS as a *Regional Road* which provide a key east-west road link in the area, linking North Narrabeen and Ingleside. It typically carries one traffic lane in each direction in the vicinity of the site with turning lanes provided at key locations. Kerbside parking is generally permitted along both sides of the road, subject to sign-posted restrictions.

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

Existing Traffic Controls

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

- a 50 km/h SPEED LIMIT which applies to Powder Works Road, Kalang Road and all other local roads in the area
- ROUNDABOUTS in Kalang Road where it intersects with Powder Works Road and also St Andrews Gate
- RAISED PEDESTRIAN CROSSING located along Kalang Road, in between Powder Works Road and St Andrews Gate


Reservoir
Westpack College Training Cntr
Ingleside
Park
Rec Res
Pittwater
Catholic College
Warriewood Valley District Park
WATTLE RD
McLEAN (Rough road)
WILSON AV
INGLESIDE RD
Private Rd
Jeh Wit
Elanora Conference Centre
Garden Works
WILGA ST
WESLEY
FOXALL ST
Epworth Park
IRRAWONG RD
Irrawong-Irrawong Res
Aged Care Facility
Swamp Walk
Forest
Mullet
POWDER WORKS RD
ST ANDREWS GATE
Cmnty Cntr
Elanora Reservoir
Clubhouse
Country
ELANORA HEIGHTS
2101
Club
KYWONG
THE GREENWAY
THE FAIRWAY
ELANORA RD
KALANG
ILUKA AV
CANUNGRA PL
KOORAINGI
MARALINGA
BUNGOONA
AMAROO AV
WAKOOKA AV
WONGALA AV
LUMEAH AV
Lumeah Reserve
Woorarra Lookout Reserve
COOLANGATTA AV
ALLAWAH
DEWRANG AV
Anana Res
MARINNA RD
GEORGINA AV
ANANA RD
Elanora Heights Pmy
WOORARRA RD
WEEROONA AV
ELANORA
Creek
Deep Creek Reserve
Recreation Reserve
Rec Res
WAKEHURST
Billarong
MIRROOL ST
CAREFREE RD
PALM TCE
Reserve
France Petanque Club
Narroy
GONDOLA
RICKARD
NAREEN
BELLARA AV
TATIARA
EUNGAI PL
KUNDIBAH
RSL
Kundibah Pk
ORANDOO RD
WYANGA RD
ALLING TON CR
MERRIDONG
Cooleena Res
COOLEENA RD
BOLWARRA RD
WARRUGA PL
WIRRINA PL
WARRABA
KATOA CL
GARDEN
TAYUL
KURU
MELIA PL
KUYORA PL
INDURA RD
INALA PL
KUTTABUL PL
EPWORTH PL
TOTA PL
LESLEY CL
ORCHARD RD
FERN CREEK RD
EUCALYPTUS ST
SHEARWATER
GARDEN DR
KINGFISHER
BANKSIA
ACACIA AV
VIOLA CC
BVD
WATERGUM
GREVILLEA CL
MAHOGANY
BOTTLEBRUSH
LILY
FERN
N
S
W
E
Key:
State Road
Regional Road
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ROAD HIERARCHY
FIGURE 3


N
W
E
S
FOXALL ST
POWDER WORKS RD
POWDER WORKS RD
WESLEY ST
50
ST ANDREWS GATE
RD
ST ANDREWS GATE
KALANG
50
KALANG
CR
ALLINGTON
KYWONG RD
RD
Key:
Give Way Sign
Speed LImit
School Zone
Speed Hump
Roundabout
Pedestrian Crossing
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Traffic and Parking Consultants
EXISTING TRAFFIC CONTROLS
FIGURE 4

Existing Public Transport Services

The existing public transport services located in close proximity to the site are illustrated on Figures 5, including the bus services 182 and E83 which operates within easy walking distance of the site along Kalang Road and also Powder Works Road.

Notably, the *E83* express bus service operates between North Narrabeen and the City with services every 30 minutes (every 15-20 minutes during the peak periods).

The *E83* bus service can also be used to interchange with connecting train services at Wynyard Railway Station with stops located along employment centres including Warringah Mall, Neutral Bay Junction and the City.

The site is also located with the Elanora Heights Local Centre which includes a range of shops and services such as a local supermarket, butcher, bakery, gymnasium, pharmacy, post office and the like.

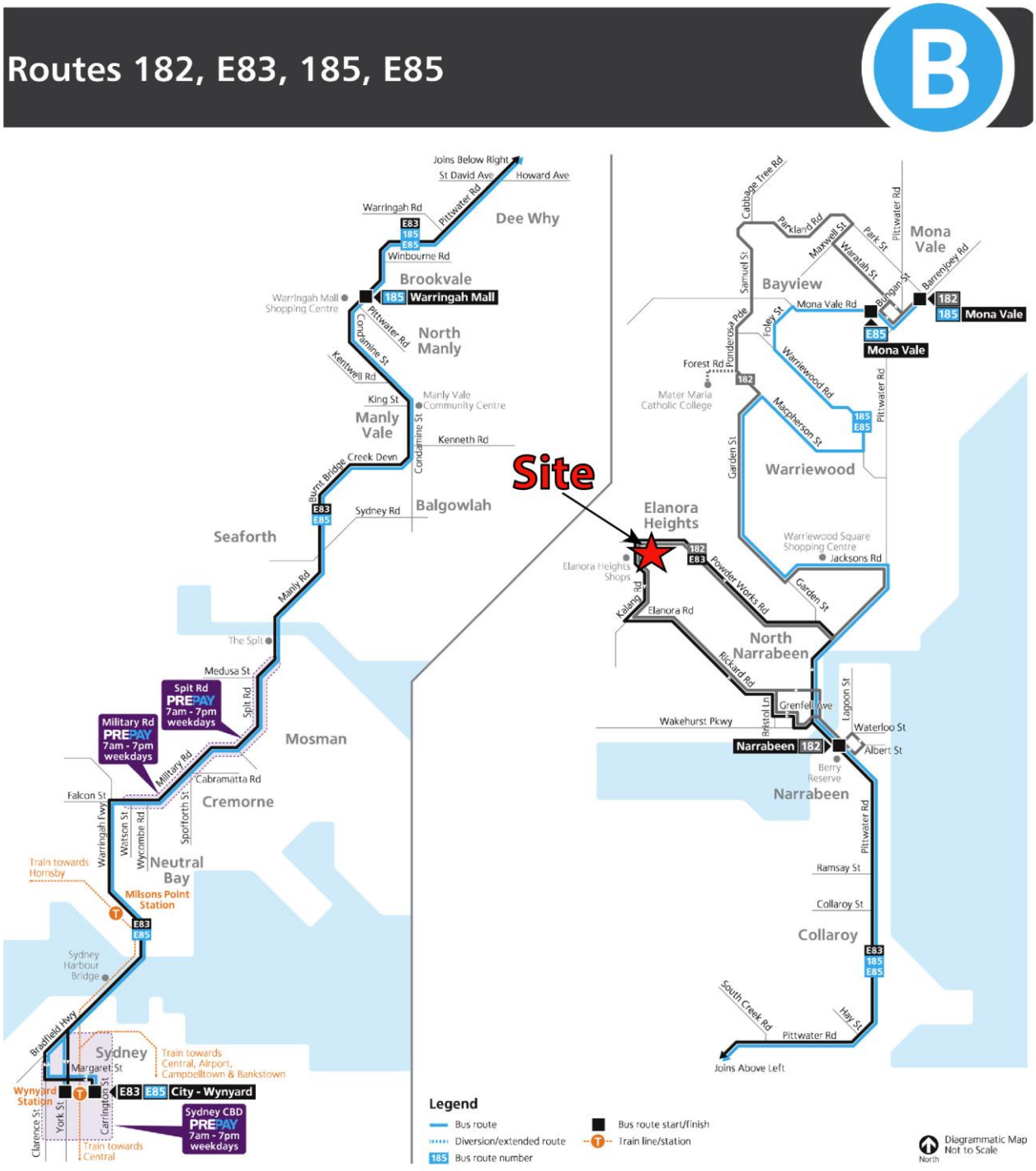
The site is therefore considered to be well served by public transport and essential services.

Projected Traffic Generation

The traffic implications of development proposals primarily concern the effects of the *additional* traffic flows generated as a result of a development and its impact on the operational performance of the adjacent road network.

An indication of the traffic generation potential of the proposed development is provided by reference to the Roads and Maritime Services publication *Guide to Traffic Generating Developments, Section 3 – Land Use Traffic Generation (October 2002).*

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



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EXISTING PUBLIC TRANSPORT SERVICES
FIGURE 5

Restaurant

5.0 evening peak hour vehicle trips per 100m^2 GFA

Commercial Premises

2.0 peak hour vehicle trips per 100m^2 GFA

Medium Density Residential

0.4-0.5 peak hour vehicle trips/dwelling (up to 2 bedrooms)

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

Definition

A *medium density residential flat building* refers to a building containing at least 2 but less than 20 dwellings. This includes villas, town houses, flats, semi-detached houses, terrace or row houses and other medium density developments. This does not include aged or disabled persons' housing.

Application of the above traffic generation rates to the various components of the development proposal yields a traffic generation potential of approximately 7 vehicle trips per hour during commuter peak periods, as set out below:

Projected Future Traffic Generation

Residential (6 apartments):	2.8 peak hour vehicle trips
Commercial (197m^2):	3.9 peak hour vehicle trips
TOTAL TRAFFIC GENERATION POTENTIAL:	**6.7 peak hour vehicle trips**

That projected future level of traffic generation potential should however, be offset or *discounted* by the volume of traffic which could reasonably be expected to be generated by the existing uses of the site, in order to determine the *nett increase* in traffic generation potential of the site expected to occur as a consequence of the development proposal.

Application of the above traffic generation rates to the existing restaurant and commercial offices on the site yields a traffic generation potential of approximately 2 vph during the AM peak period and a traffic generation of approximately 8 vph during the PM peak period, as set out below:

Existing Traffic Generation Potential

	AM	PM
Commercial Offices (115m^2):	2.3 vph	2.3 vph
Restaurant (115m^2):	0.0 vph	5.8 vph
TOTAL TRAFFIC GENERATION POTENTIAL:	**2.3 vph**	**8.1 vph**

Accordingly, it is likely that the proposed development will result in a *nett increase* in the traffic generation potential of approximately 4 vph during the AM peak period and a *nett decrease* in the traffic generation potential of approximately 1 vph during the PM peak period, as set out below:

Projected Nett Change in Peak Hour Traffic Generation Potential of the site as a consequence of the development proposal

	AM	PM
Projected Future Traffic Generation Potential:	6.7 vph	6.7 vph
Less Existing Traffic Generation Potential:	2.3 vph	8.1 vph
NETT CHANGE IN TRAFFIC GENERATION POTENTIAL:	**4.4 vph**	**-1.4 vph**

In any event, that projected nett change in the traffic generation potential of the site as a consequence of the development proposal is minimal, and will clearly not have any unacceptable traffic implications in terms of road network capacity.

4. PARKING IMPLICATIONS

Existing Kerbside Parking Restrictions

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

- 2 HOUR PARKING restrictions along the eastern side of Kalang Road, including along the entire site frontage

- a LOADING ZONE located along the northern side of St Andrews Gate, directly outside the *Elanora Heights IGA*

- NO PARKING restrictions along the southern side St Andrews Gate in the vicinity of the Kalang Road / St Andrews Gate roundabout

- NO STOPPING restrictions along the eastern side of Kalang Road, along the corner bend of the road

- BUS ZONES located at regular intervals along both sides of Kalang Road

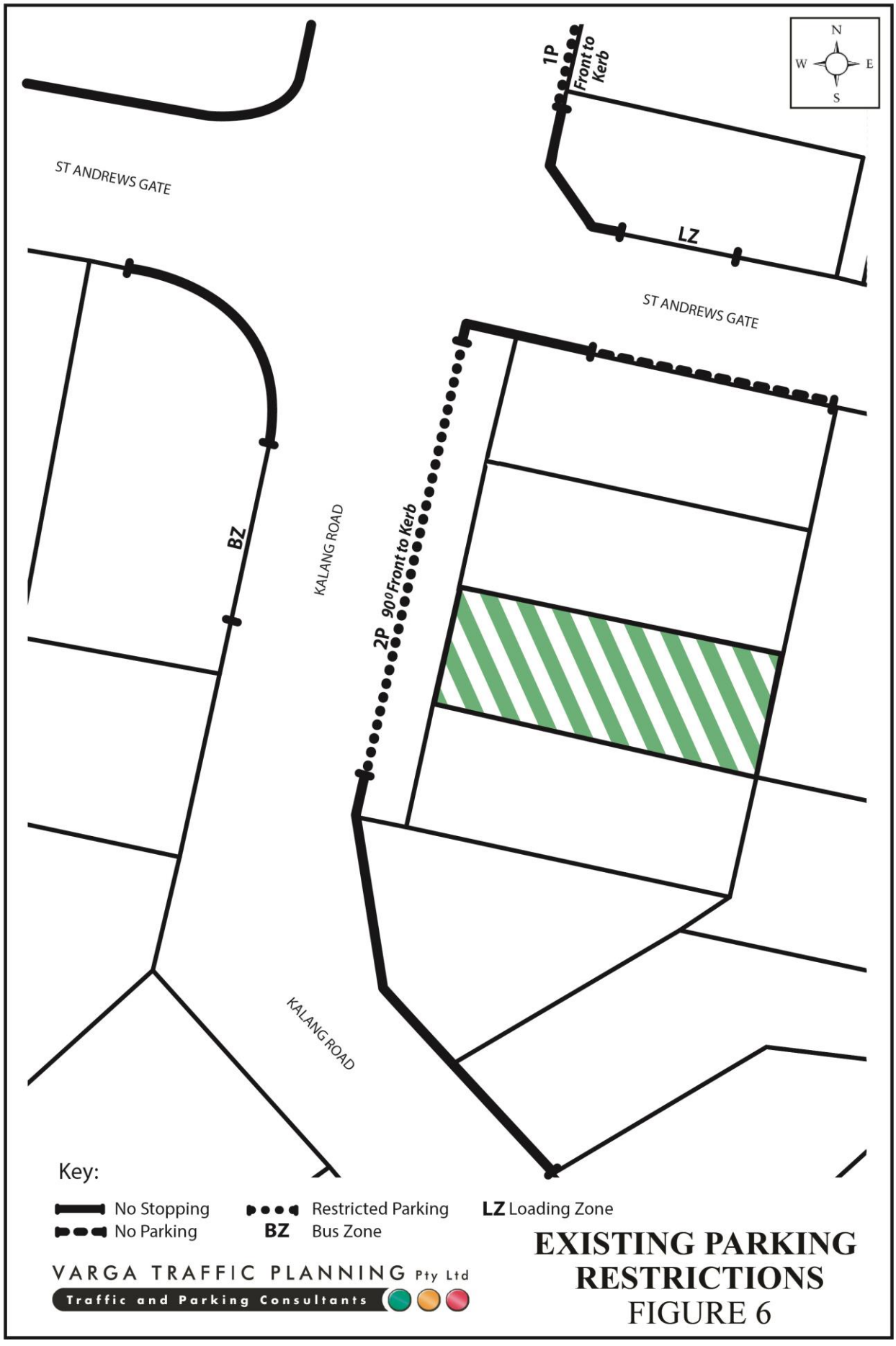
- generally UNRESTRICTED parking elsewhere outside of the local centre area, including along both sides of Kalang Road (south of the site) and St Andrews Gate.

Off-Street Parking Provisions

The off-street parking requirements applicable to the development proposal are specified in Council's *Pittwater 21 Development Control Plan 2011, Section B6 – Access and Parking* document in the following terms:

Multi-Unit Housing/Residential Flat Buildings/Shop Top Housing

1 bedroom dwellings:	1 space per dwelling
2 bedroom dwellings:	2 spaces per dwelling
Visitors:	1 space per 3 dwellings


N
W
E
S
1P
Front to Kerb
ST ANDREWS GATE
LZ
ST ANDREWS GATE
BZ
KALANG ROAD
2P 90° Front to Kerb
KALANG ROAD
Key:
No Stopping
No Parking
Restricted Parking
BZ Bus Zone
LZ Loading Zone
VARGA TRAFFIC PLANNING Pty Ltd
Traffic and Parking Consultants
EXISTING PARKING RESTRICTIONS
FIGURE 6

Retail Premises
1 space per 30m^2 GLFA

Application of the above parking requirements to the various components of the development proposal yields an off-street parking requirement of 19 parking spaces as set out below:

Residential (6 Apartments):	10 spaces
Visitors:	2 spaces
Retail Premises (197m^2):	7 spaces
TOTAL:	**19 spaces**

The proposed development makes provision for a total of 19 car parking spaces, comprising 10 residential parking spaces (including 2 disabled spaces), 2 visitor parking spaces and 7 commercial spaces (including a disabled space), thereby satisfying Council's *DCP* requirements for the various components of the development proposal.

It is noted that 4 of the 7 commercial parking spaces are located in front of the building in the angle parking bay in Kalang Road. These spaces were allocated to the subject site as part of a 1972 land dedication.

The residential car parking spaces include the use of a *pit-style* car stacker which allows each car to be parked/retrieved independently without the need to move the other car. Specifications of the proposed car stacker are provided at Appendix A.

The geometric design layout of the proposed car parking facilities has been designed to comply with the relevant requirements specified in the Standards Australia publication *Parking Facilities Part 1 - Off-Street Car Parking AS2890.1* in respect of parking bay dimensions, overhead clearances, visibility splays and aisle widths.

A series of *swept turning path* diagrams of a B85 design vehicle entering/exiting all parking spaces have been prepared which are reproduced in the following pages, demonstrating that all vehicles will be able to enter and exit the site whilst travelling in a forward direction and maintaining sufficient clearances at all times.

Off-Street Bicycle Parking Provisions

The off-street bicycle parking requirements applicable to the development proposal are specified in Council's *Pittwater 21 Development Control Plan 2011, Section B6 – Access and Parking* document in the following terms:

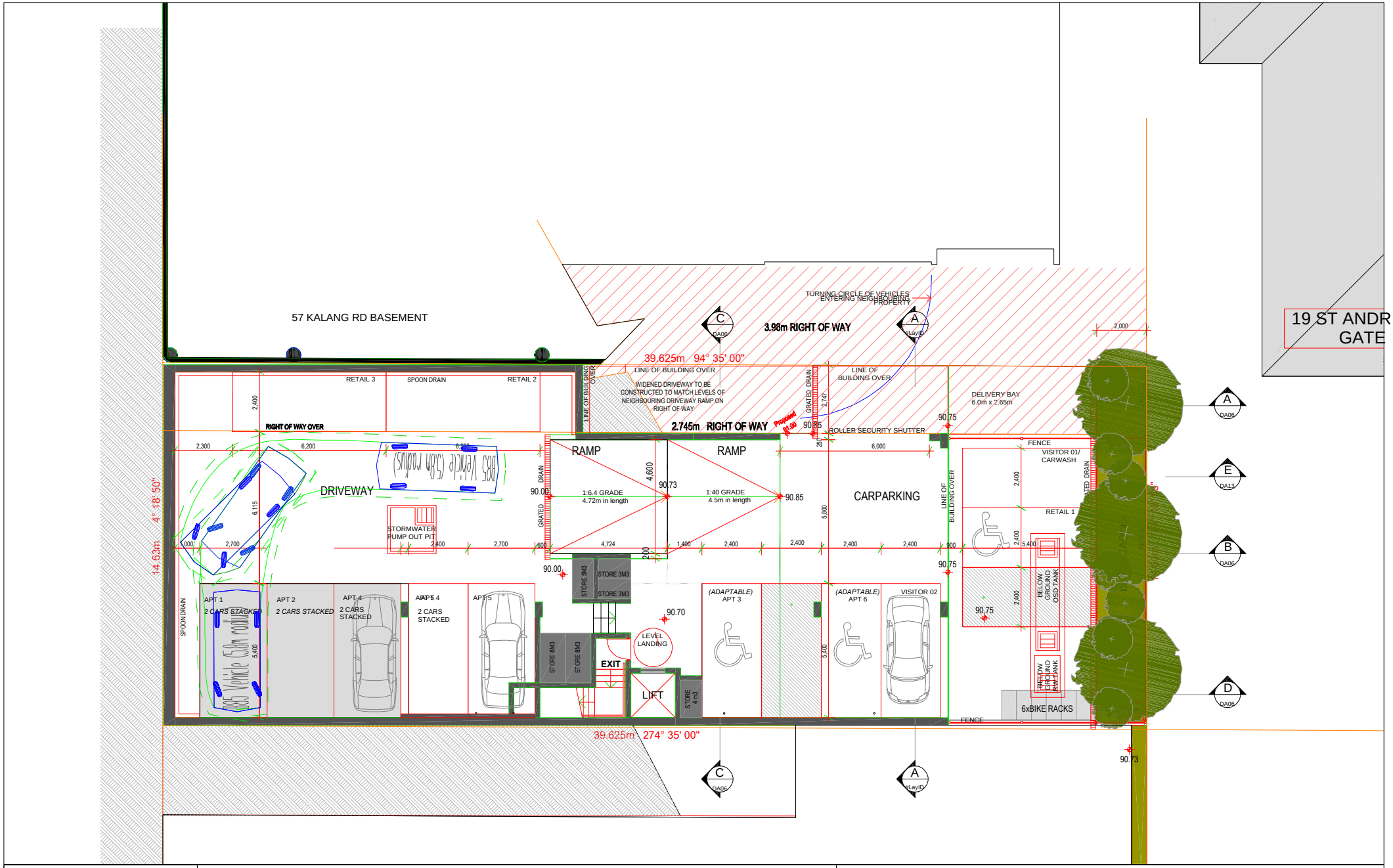
> **Residential Development**
> 1 space per 3 dwellings
>
> **Business / Industrial Developments**
> 1 space per 1,000m² GFA *or* a minimum of 4 bicycle racks (whichever is greater)

Application of the above bicycle parking requirements to the various components outlined in the development proposal yields an off-street bicycle parking requirement of 6 spaces as set out below:

Residential (6 apartments):	2.0 spaces
Business (197m²):	4.0 spaces
TOTAL:	**6.0 spaces**

The proposed development makes provision for a total of 8 off-street bicycle parking spaces, within the secure basement parking area, thereby satisfying Council's bicycle parking requirements.

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



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Sydney, Australia

PROJECT
MIXED USE DEVELOPMENT

N

DRAWING TITLE
B85 VEHICLE TURNING PATHS - APT 1
Entering Space

ADDRESS
55 Kalang Road, Elanora Heights

PROJECT NO.
18507

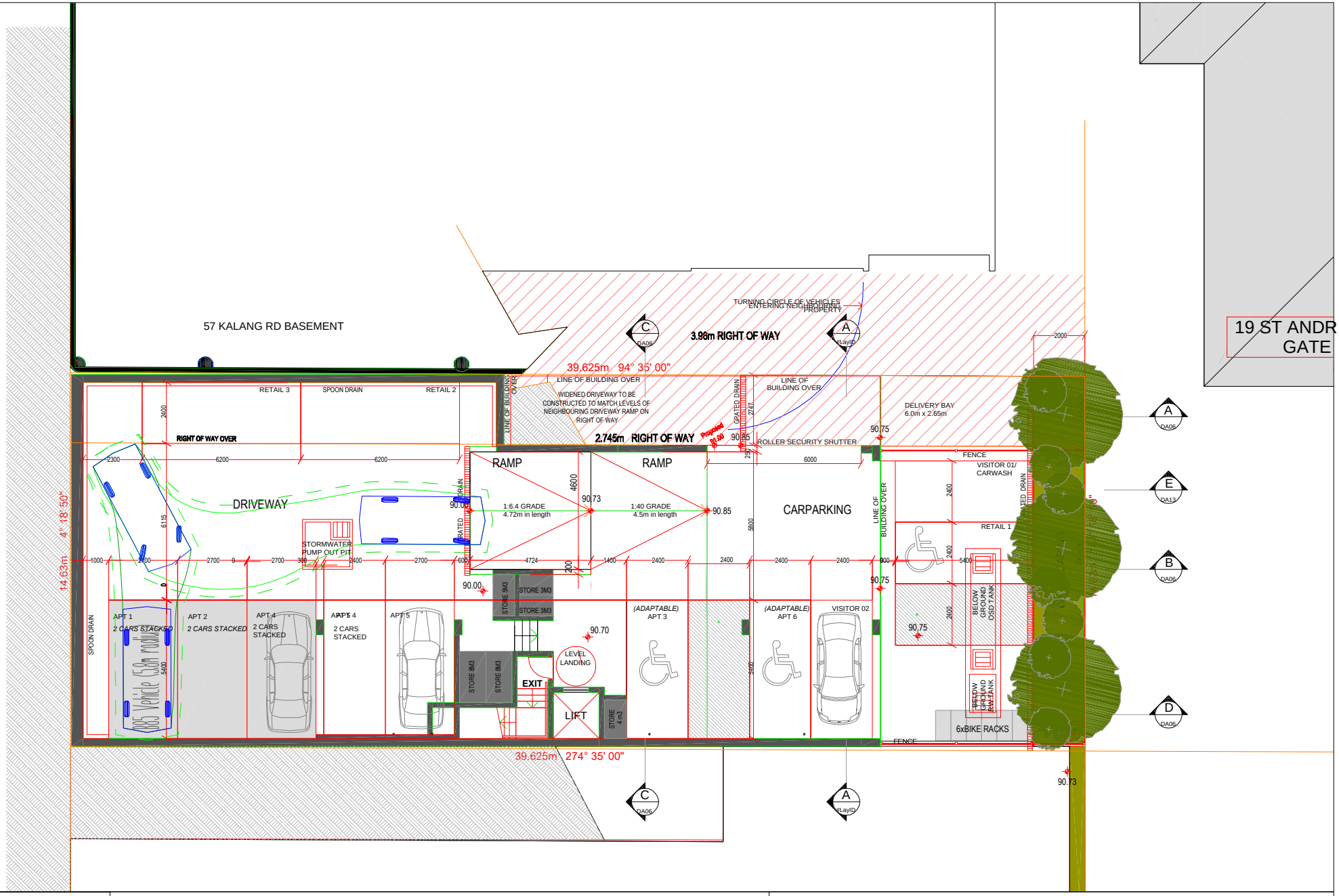
REVIEWED
ROBERT VARGA

1:200 @ A4

DATE DRAWN
2019-3-6

PREPARED
DONALD LEE

VARGA TRAFFIC PLANNING Pty Ltd
Transport, Traffic and Parking Consultants



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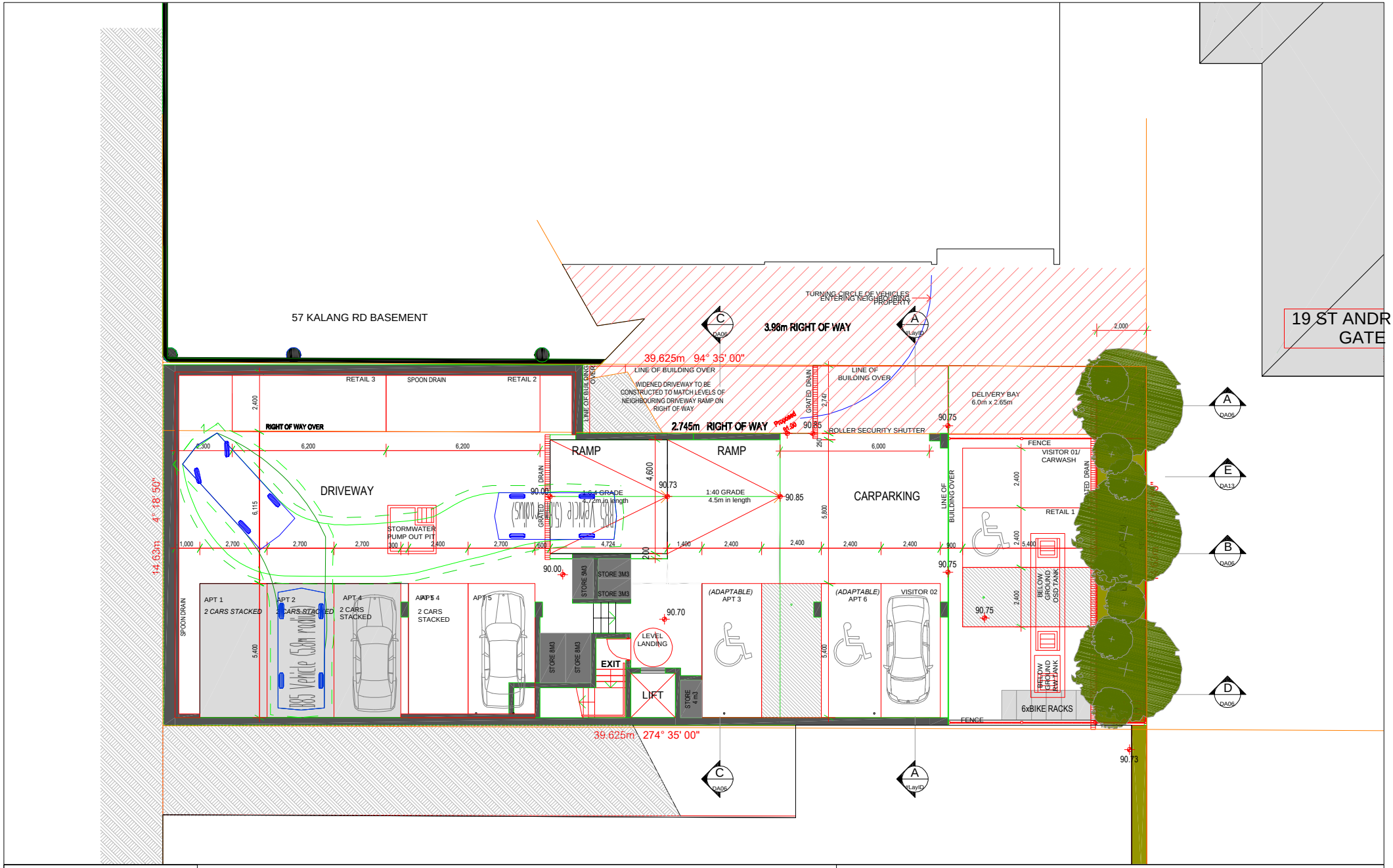

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Sydney, Australia

PROJECT
MIXED USE DEVELOPMENT

N

DRAWING TITLE
B85 VEHICLE TURNING PATHS - APT 2
Entering Space

ADDRESS
55 Kalang Road, Elanora Heights

1:200 @ A4

PROJECT NO.
18507

DATE DRAWN
2019-3-6

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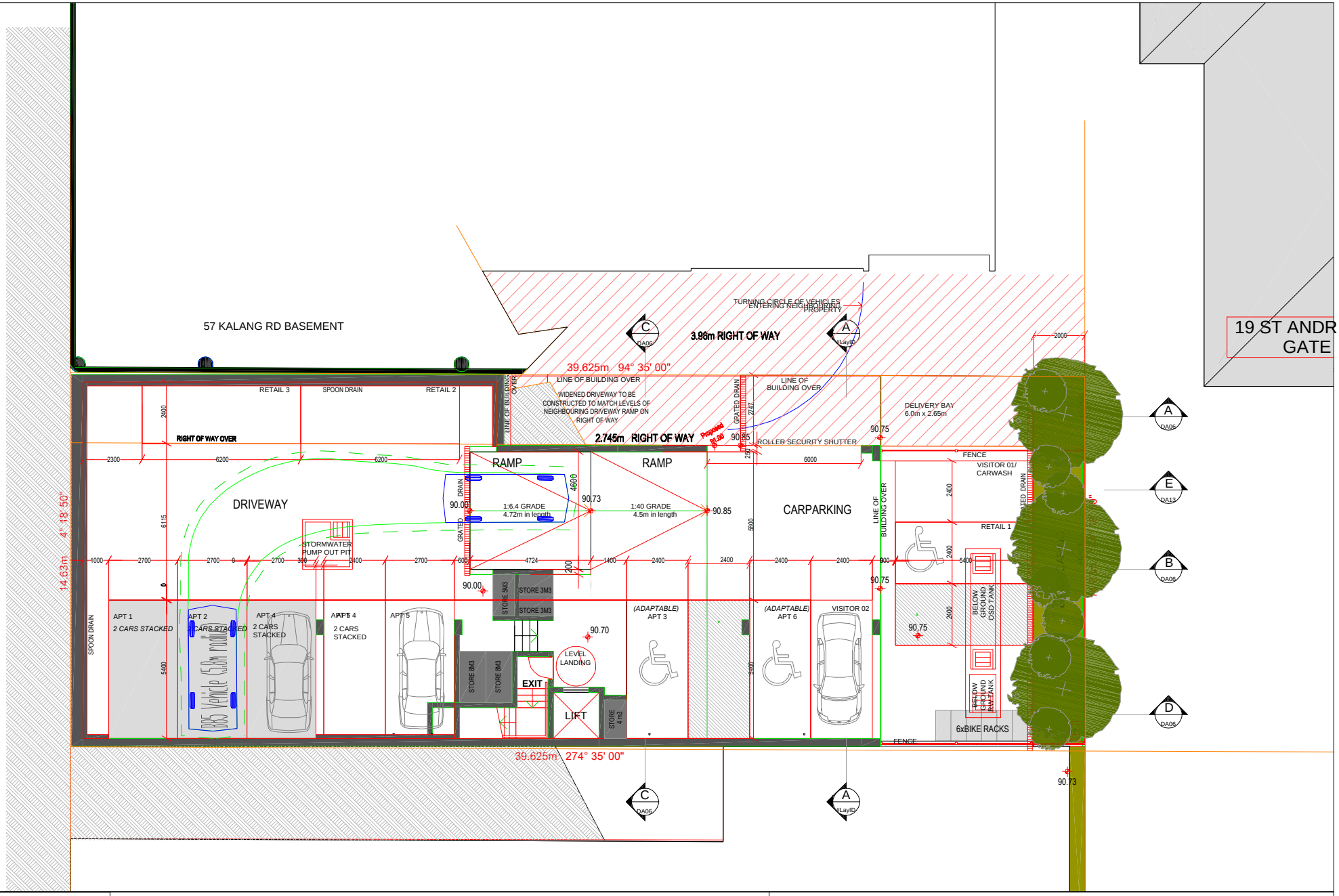

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Exiting Space

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1:200 @ A4

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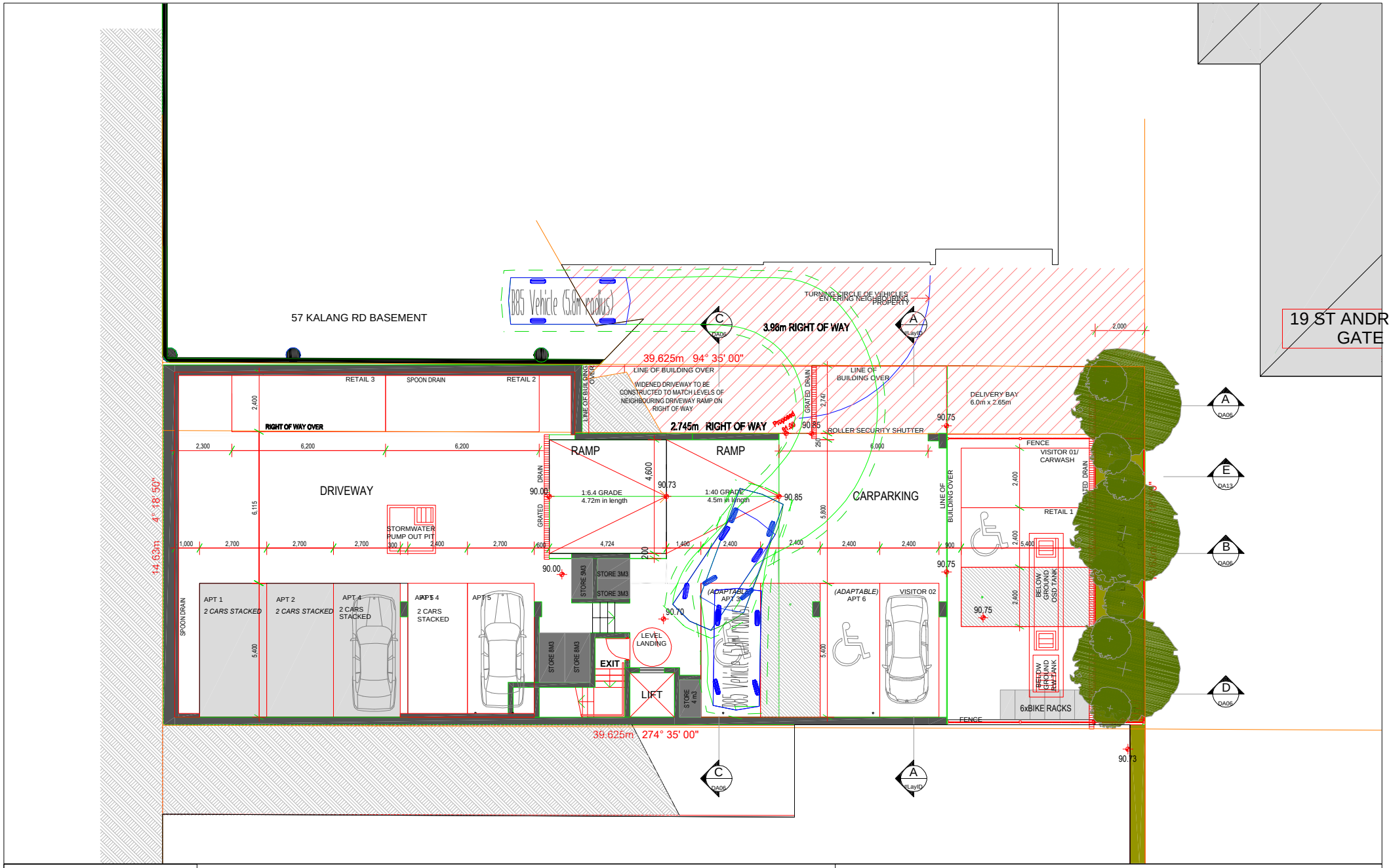

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Sydney, Australia

PROJECT
MIXED USE DEVELOPMENT

N

DRAWING TITLE
B85 VEHICLE TURNING PATHS - APT 3 (OPT.2)
Entering Space

ADDRESS
55 Kalang Road, Elanora Heights

1:200 @ A4

PROJECT NO.
18507

DATE DRAWN
2019-3-6

REVIEWED
ROBERT VARGA

PREPARED
DONALD LEE

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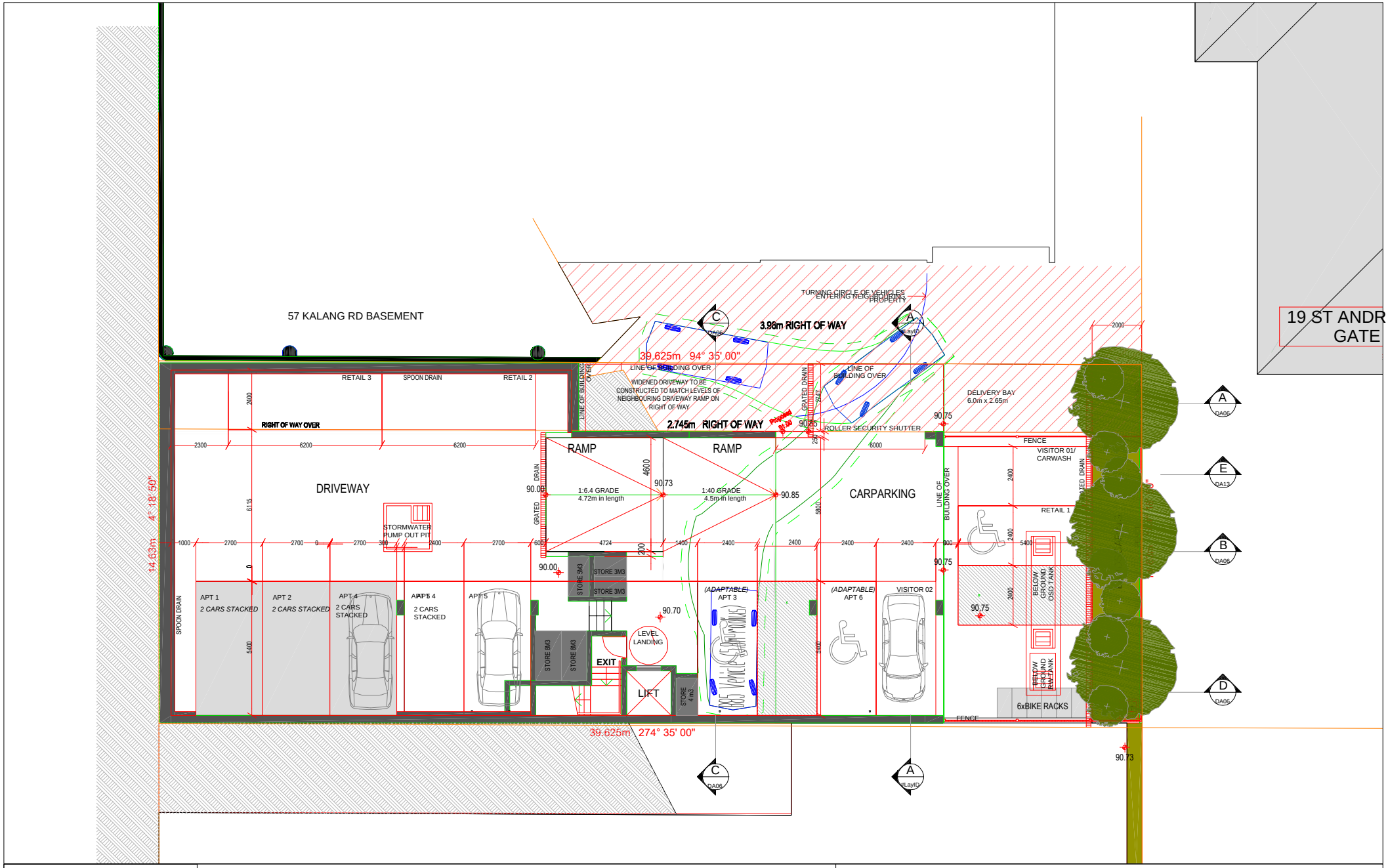

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Exiting Space

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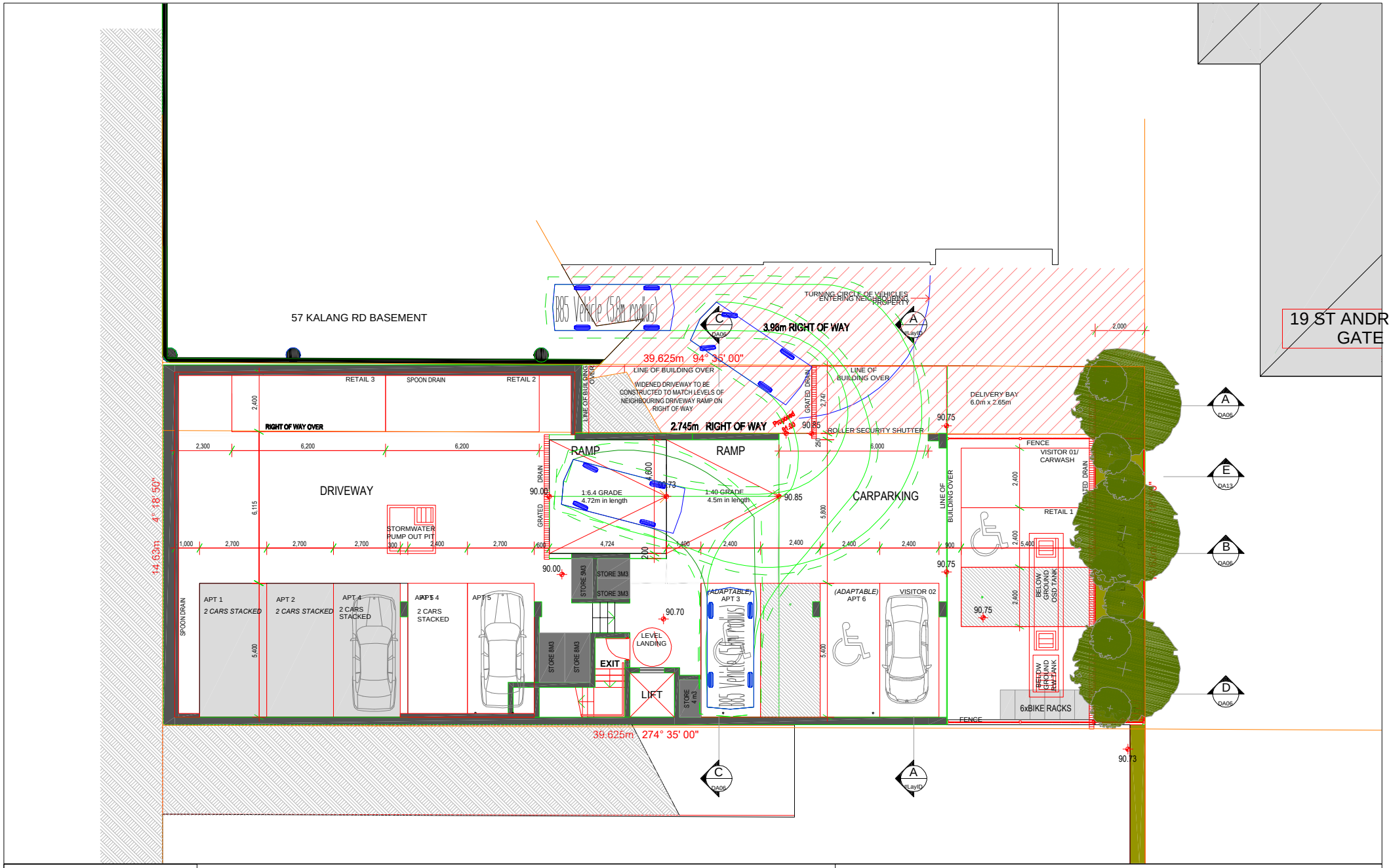

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PROJECT
MIXED USE DEVELOPMENT

N

DRAWING TITLE
B85 VEHICLE TURNING PATHS - APT 3
Entering / Exiting Space

ADDRESS
55 Kalang Road, Elanora Heights

1:200 @ A4

PROJECT NO.
18507

DATE DRAWN
2019-3-6

REVIEWED
ROBERT VARGA

PREPARED
DONALD LEE

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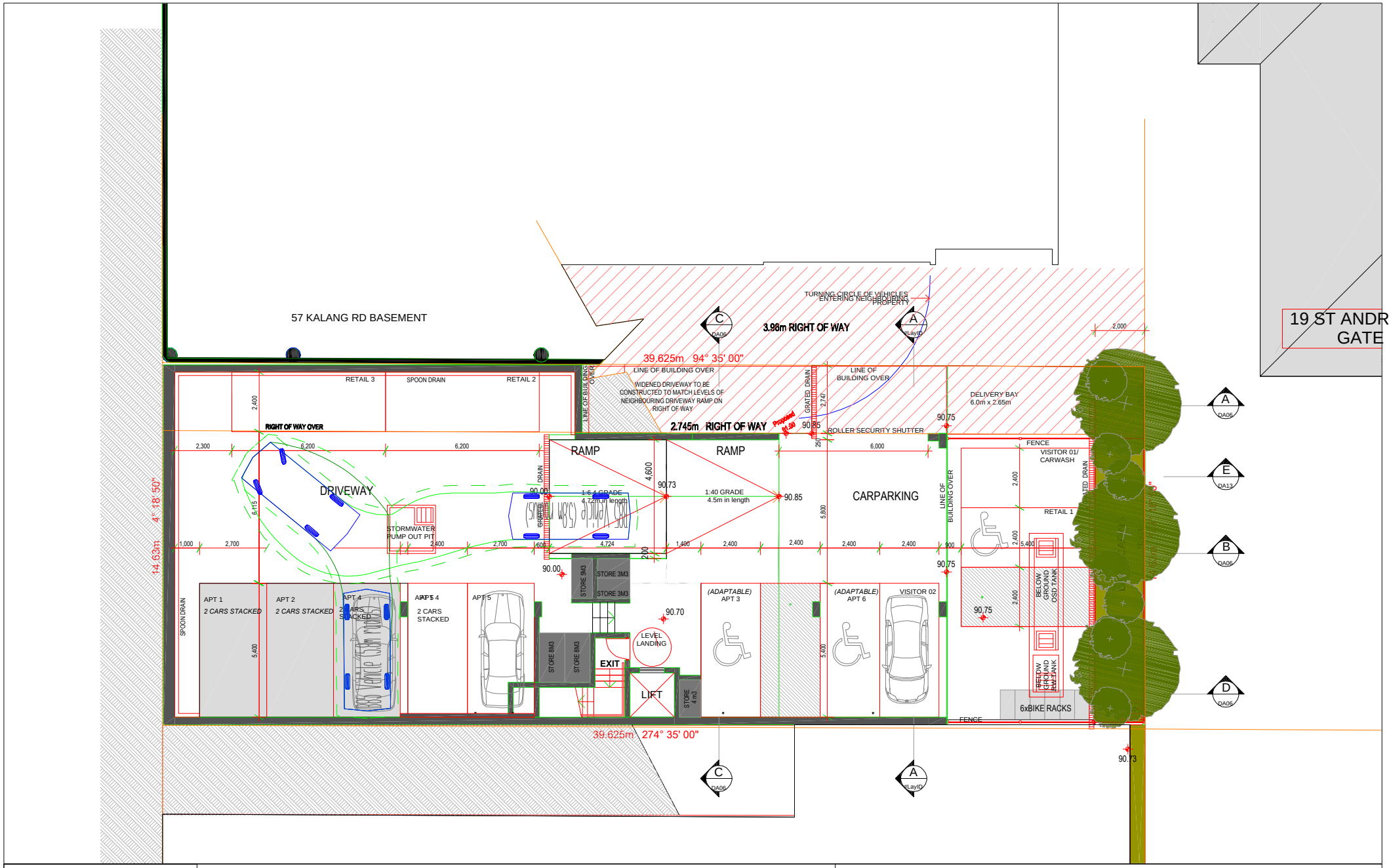

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DRAWING TITLE
B85 VEHICLE TURNING PATHS - APT 4
Entering Space

ADDRESS
55 Kalang Road, Elanora Heights

1:200 @ A4

PROJECT NO.
18507

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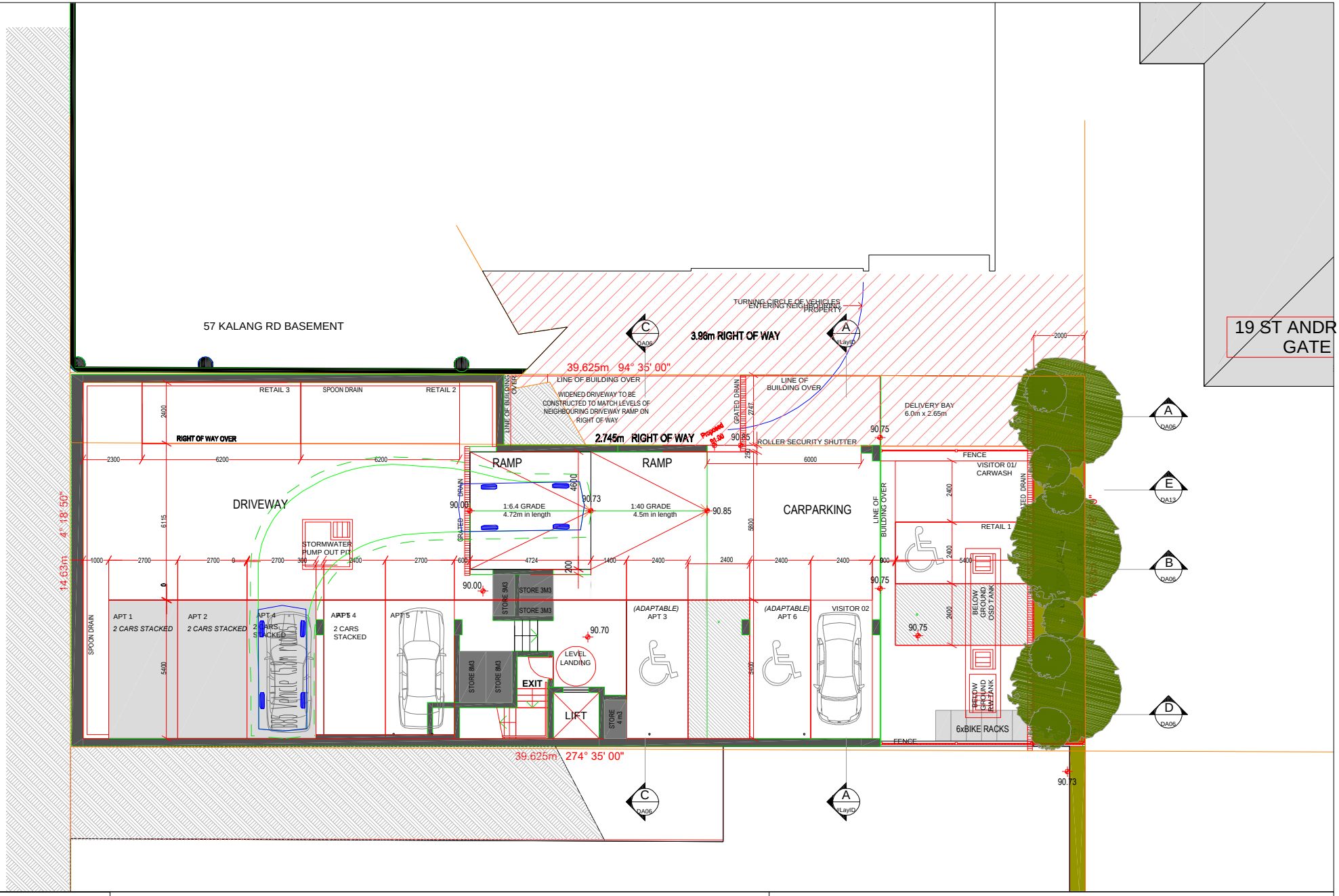

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DRAWING TITLE
B85 VEHICLE TURNING PATHS - APT 4
Exiting Space

ADDRESS
55 Kalang Road, Elanora Heights

1:200 @ A4

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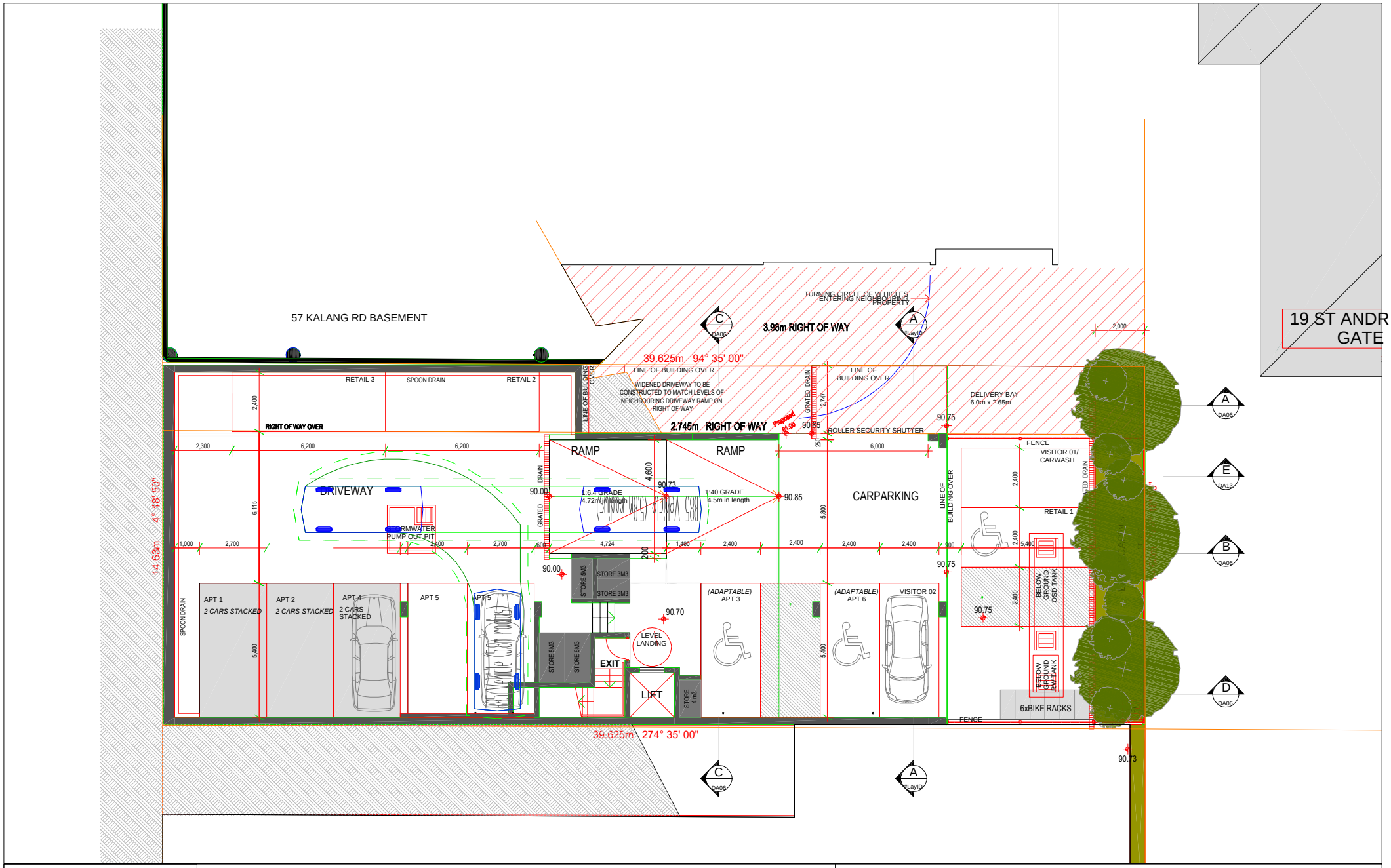

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DRAWING TITLE
B85 VEHICLE TURNING PATHS - APT 5 (SPACE 2)
Entering Space

ADDRESS
55 Kalang Road, Elanora Heights

1:200 @ A4

PROJECT NO.
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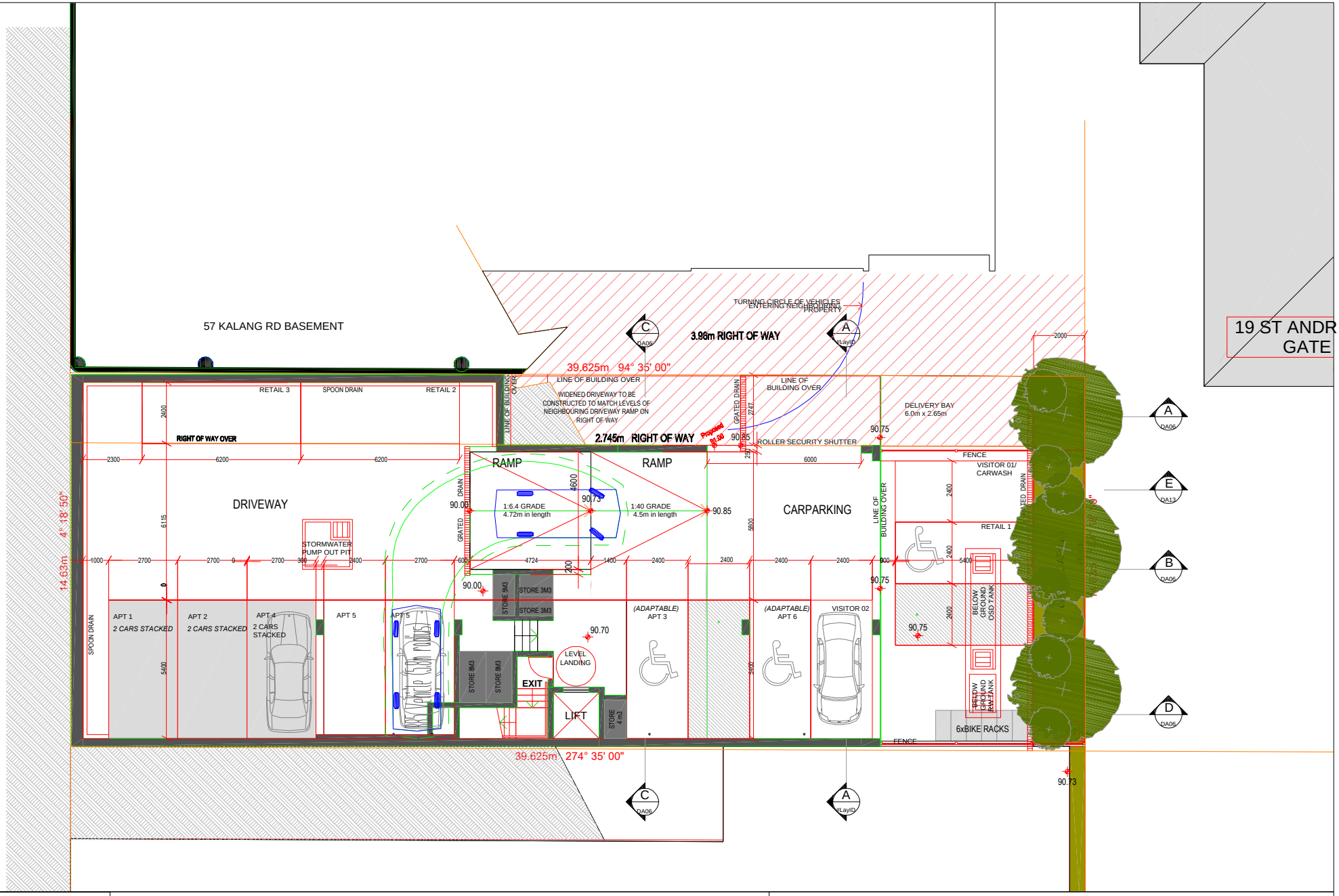

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DRAWING TITLE
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Exiting Space

ADDRESS
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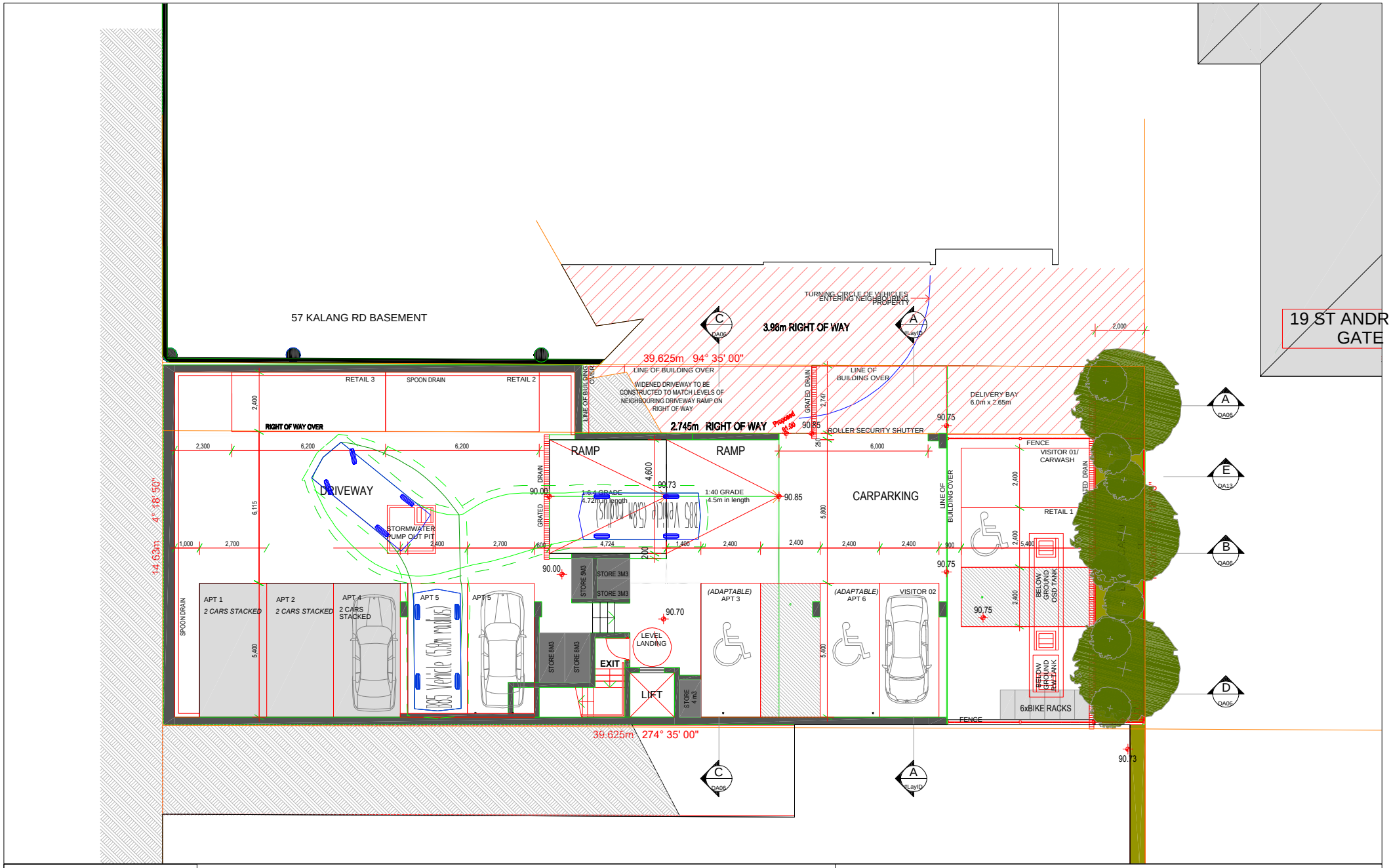

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Entering Space

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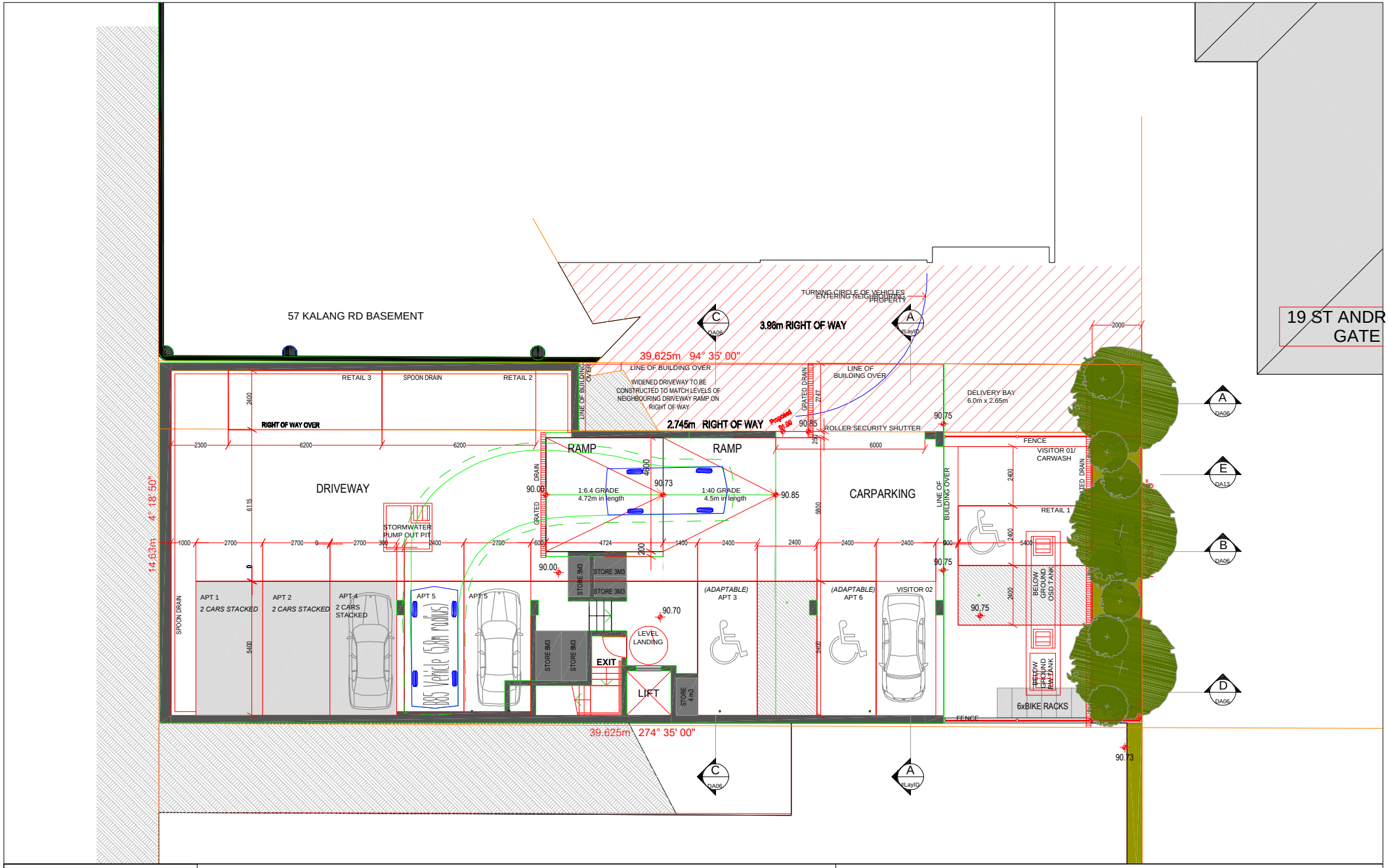

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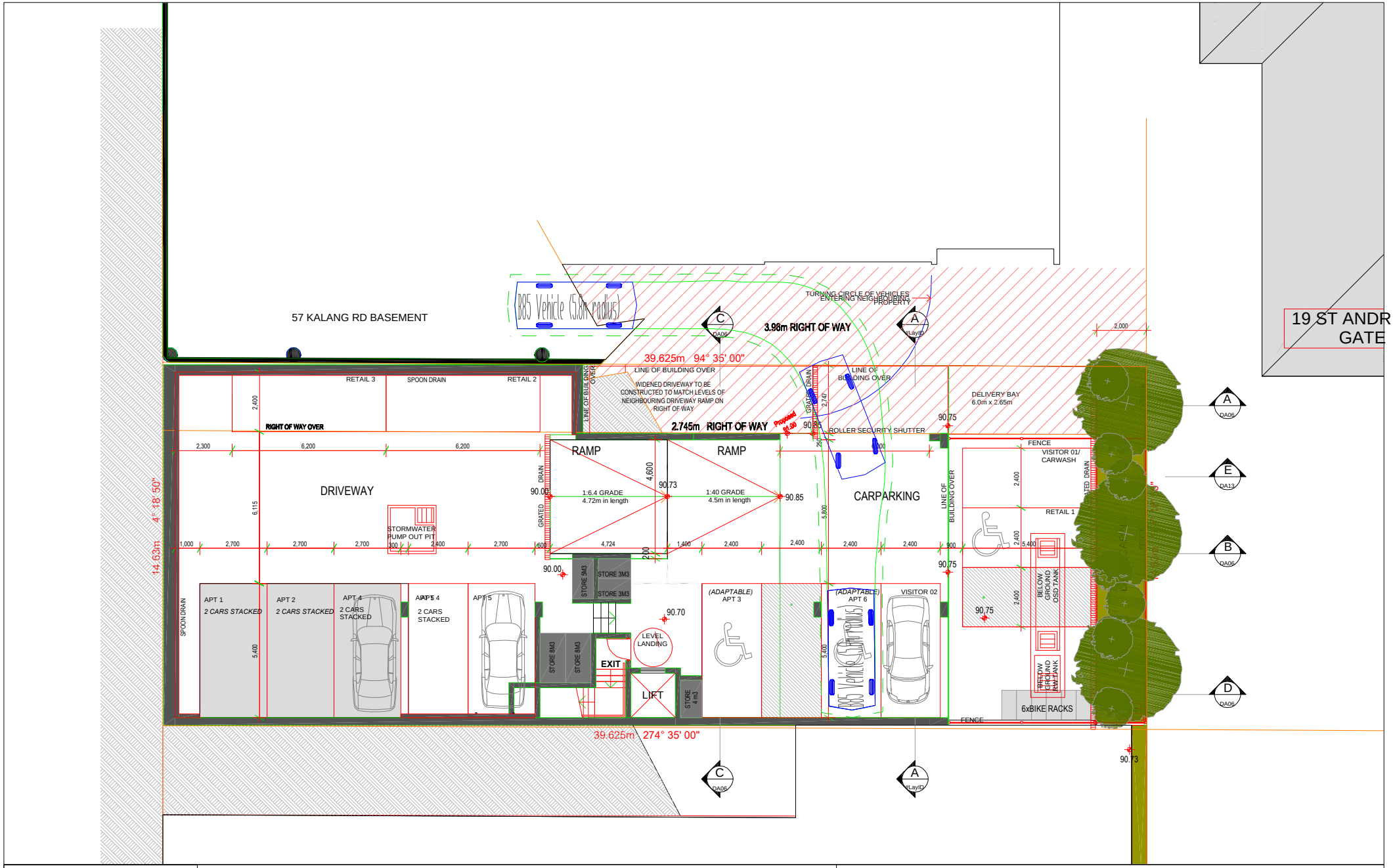

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B85 VEHICLE TURNING PATHS - APT 6
Entering Space

ADDRESS
55 Kalang Road, Elanora Heights

1:200 @ A4

PROJECT NO.
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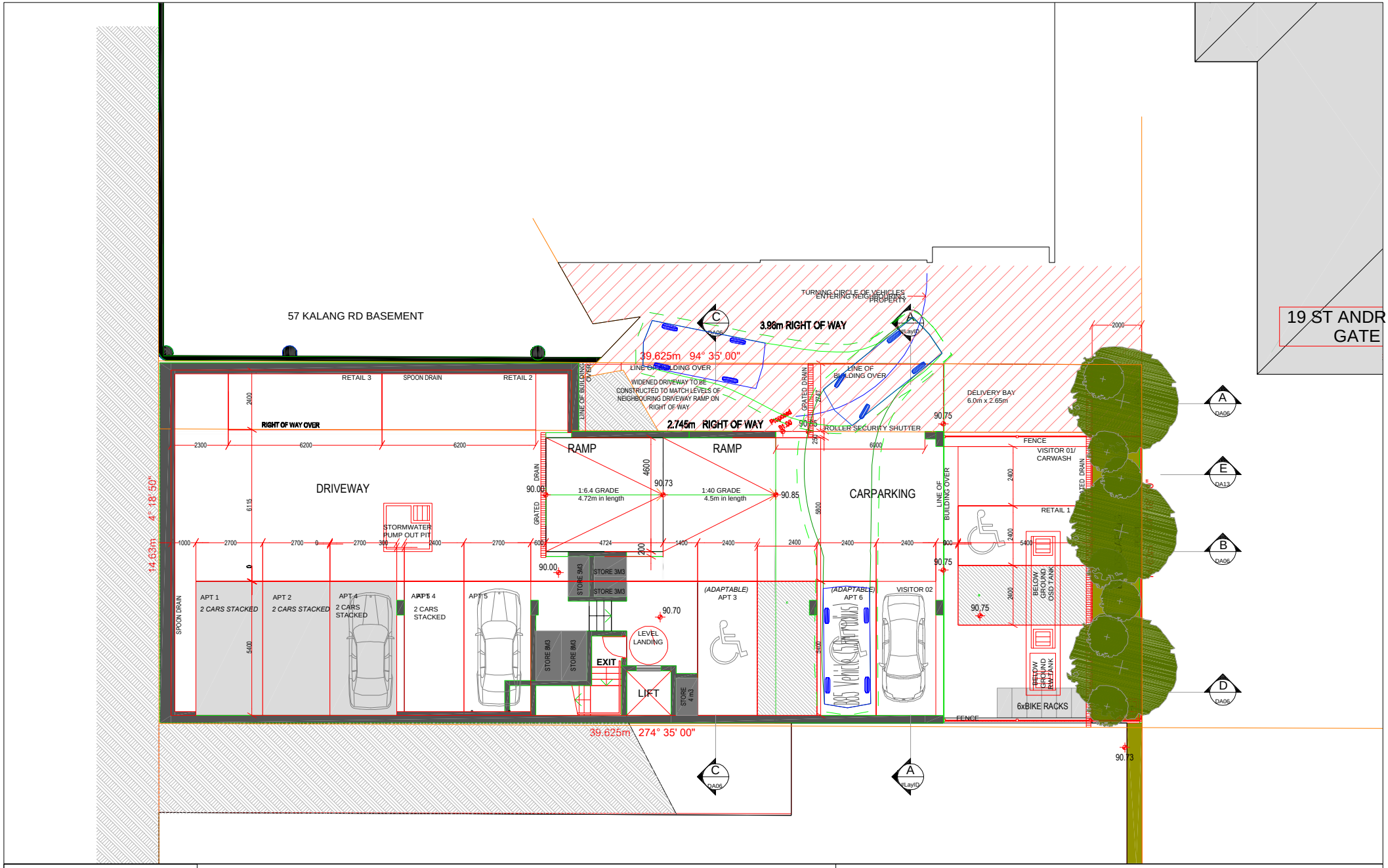

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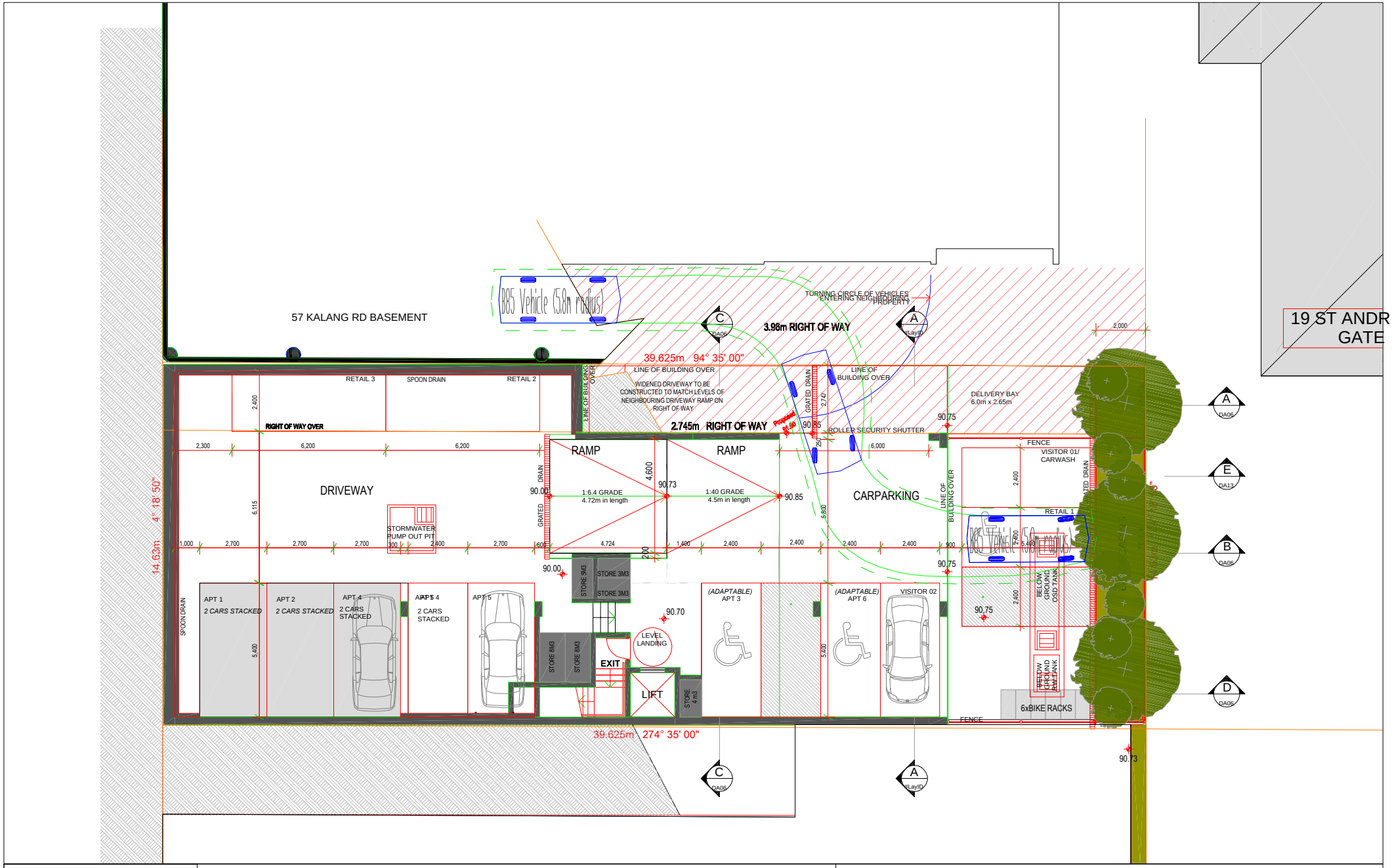

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B85 VEHICLE TURNING PATHS - RETAIL 1
Entering Space

ADDRESS
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1:200 @ A4

PROJECT NO.
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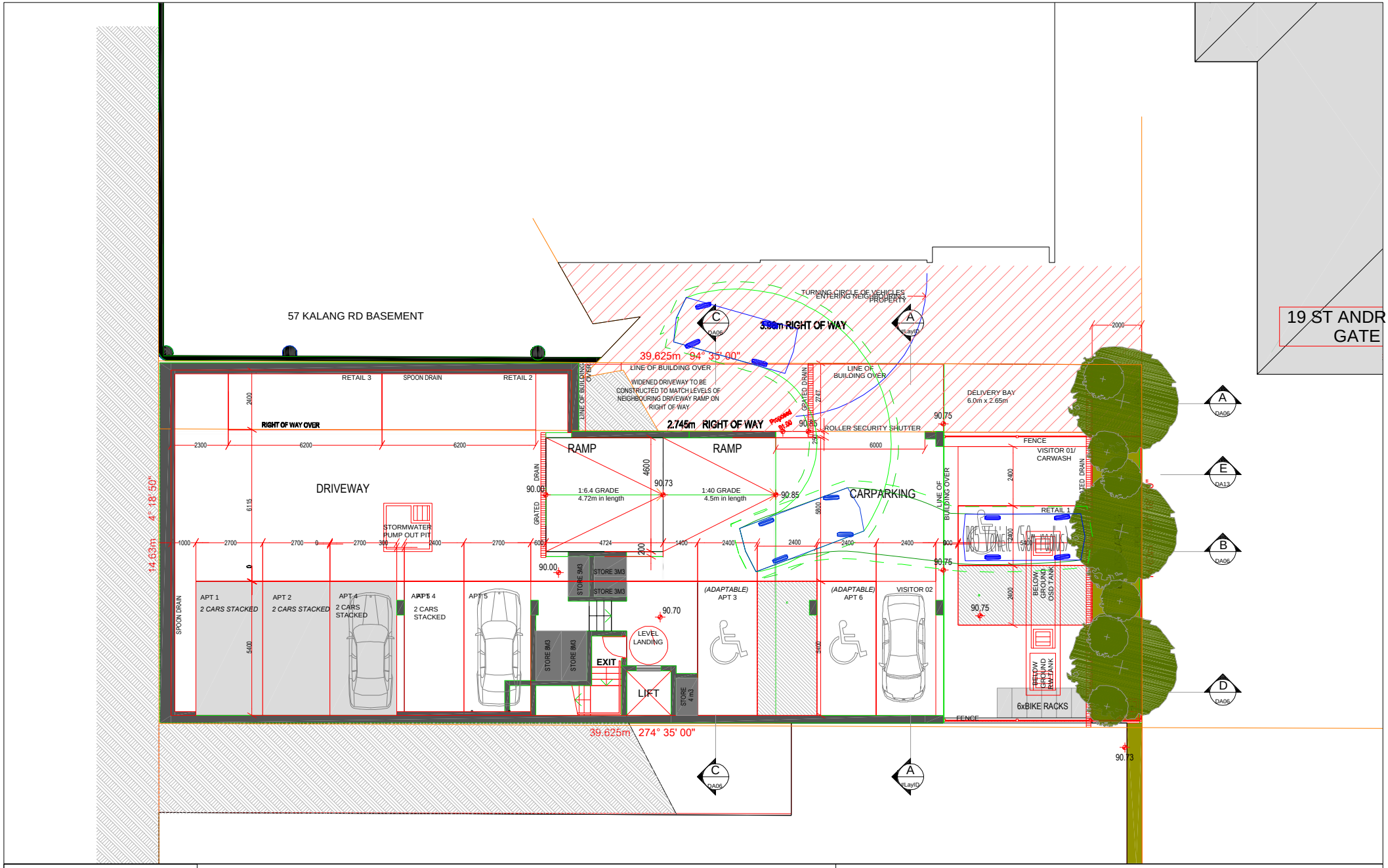

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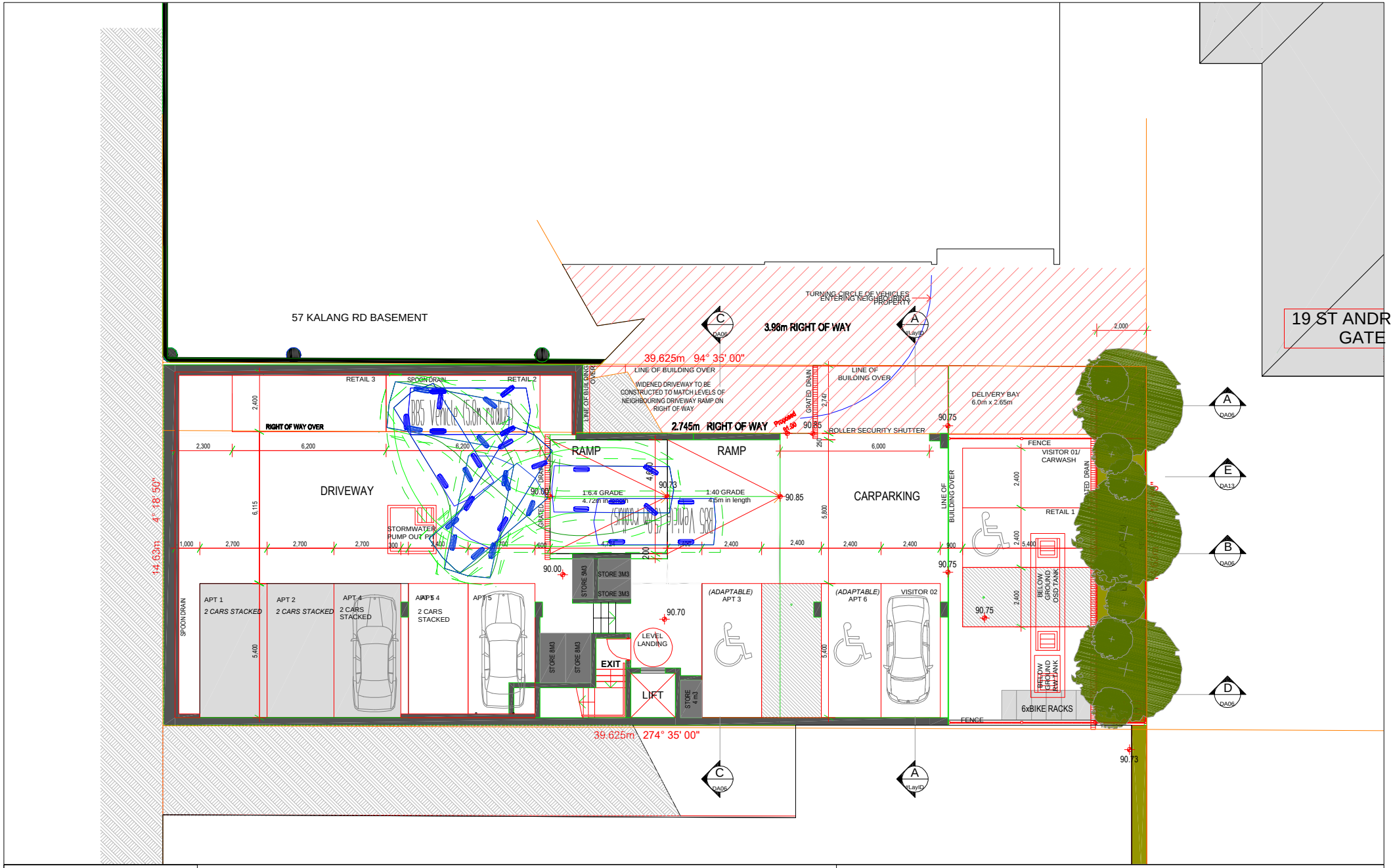

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B85 VEHICLE TURNING PATHS - RETAIL 2
Entering Space

ADDRESS
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1:200 @ A4

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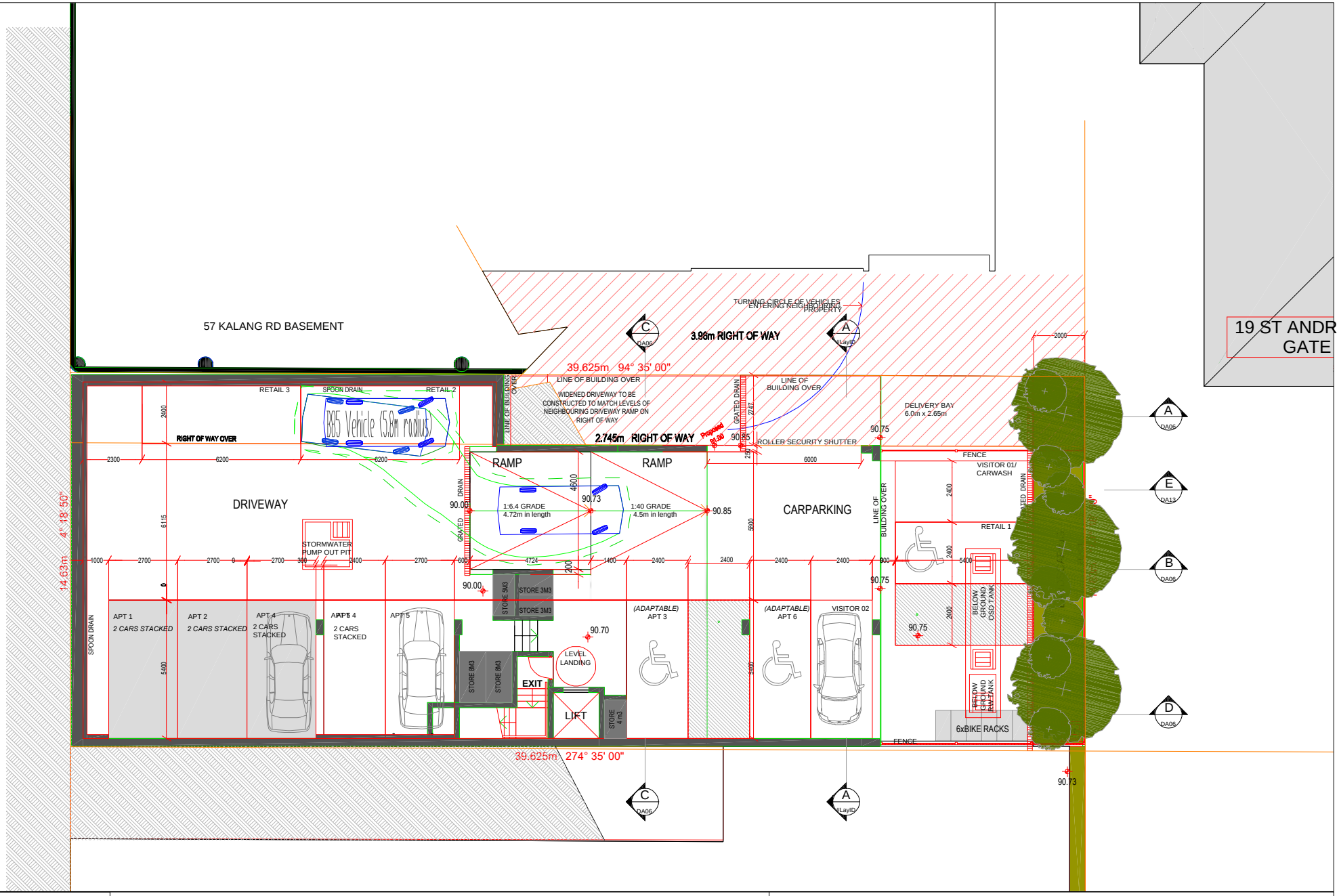

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DRAWING TITLE
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Exiting Space

ADDRESS
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1:200 @ A4

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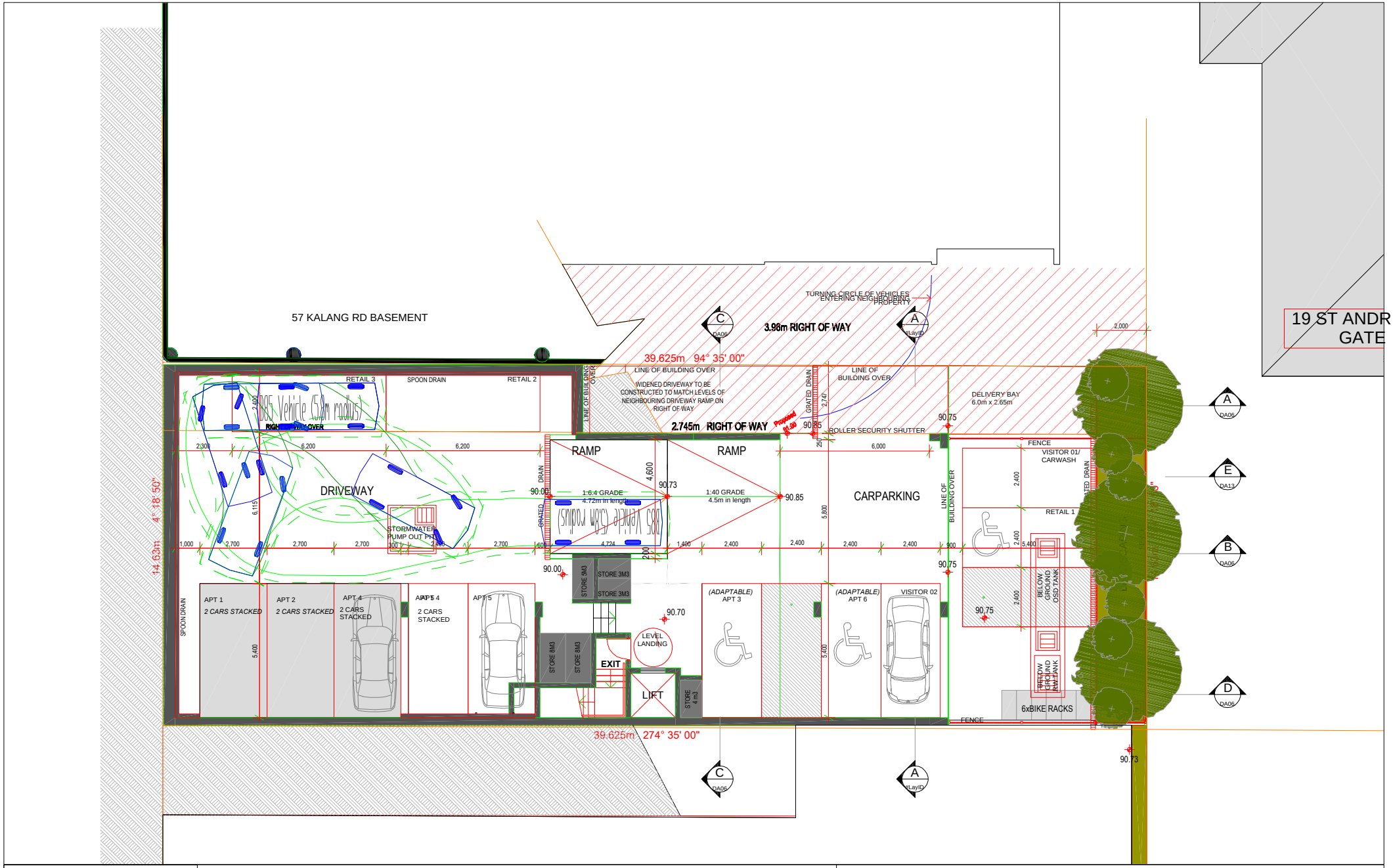

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PROJECT
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DRAWING TITLE
B85 VEHICLE TURNING PATHS - RETAIL 3
Entering Space

ADDRESS
55 Kalang Road, Elanora Heights

1:200 @ A4

PROJECT NO.
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DATE DRAWN
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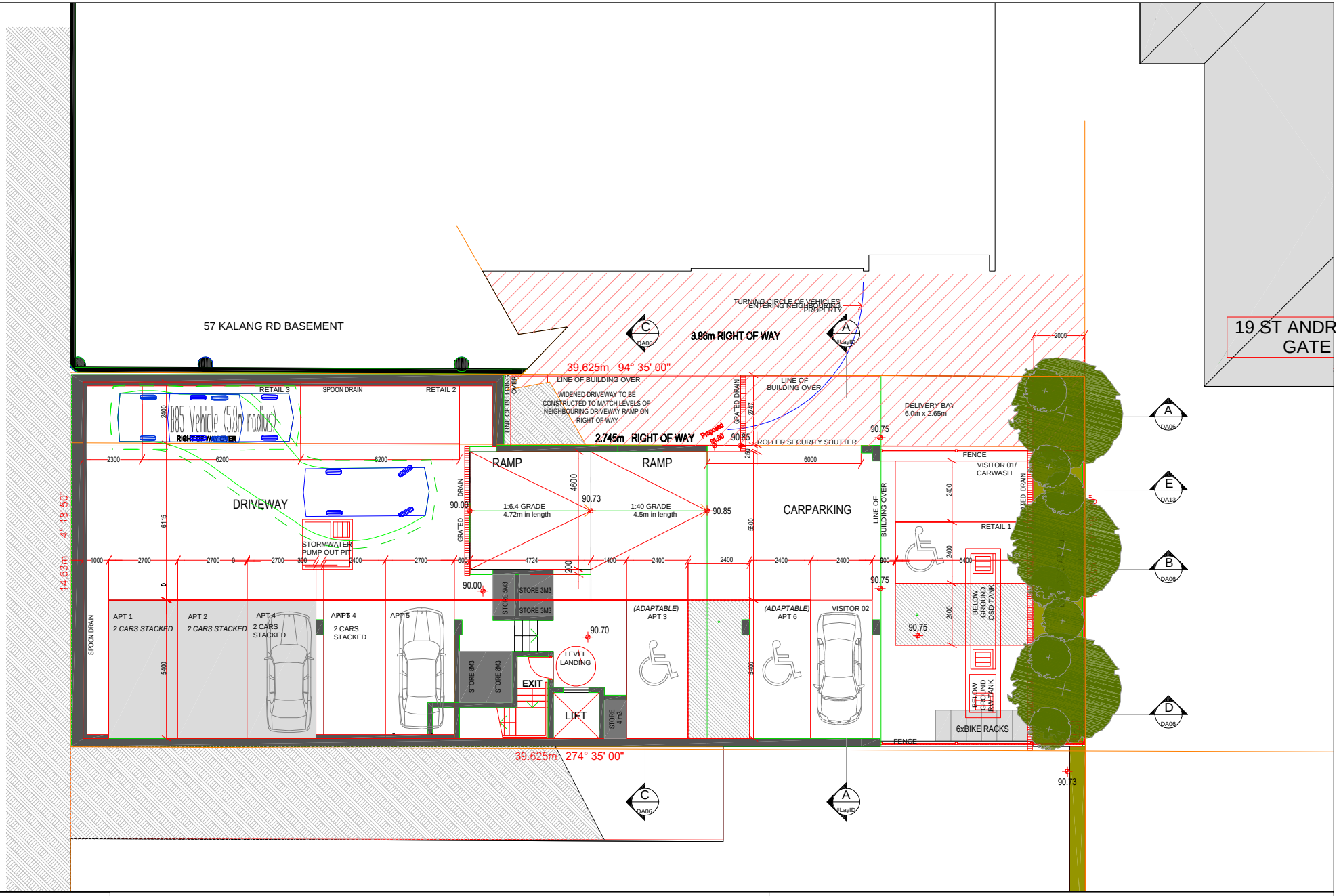

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Exiting Space

ADDRESS
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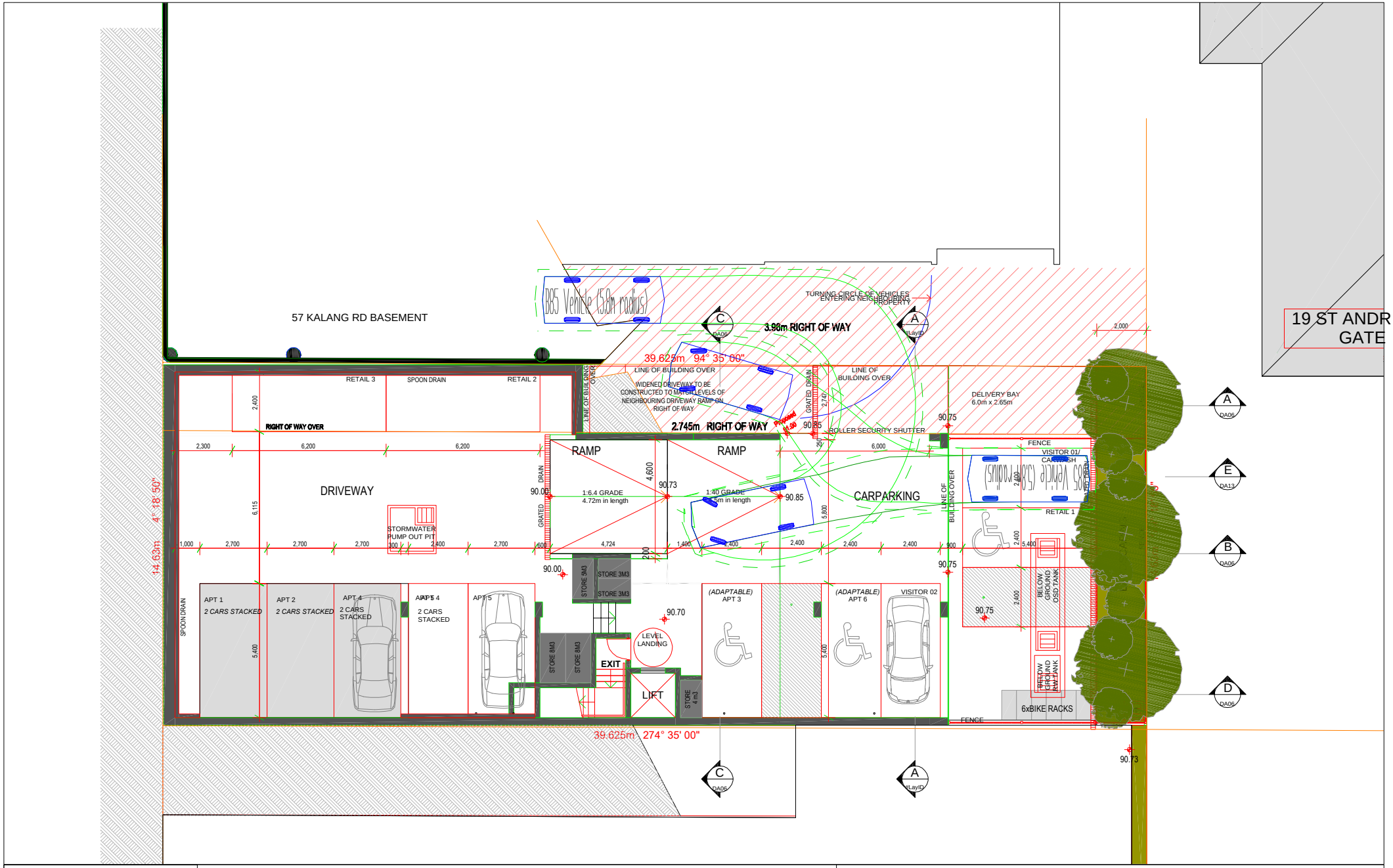

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DRAWING TITLE
B85 VEHICLE TURNING PATHS - VISITOR 1
Entering / Exiting Space

1:200 @ A4

ADDRESS
55 Kalang Road, Elanora Heights

PROJECT NO.
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DATE DRAWN
2019-3-6

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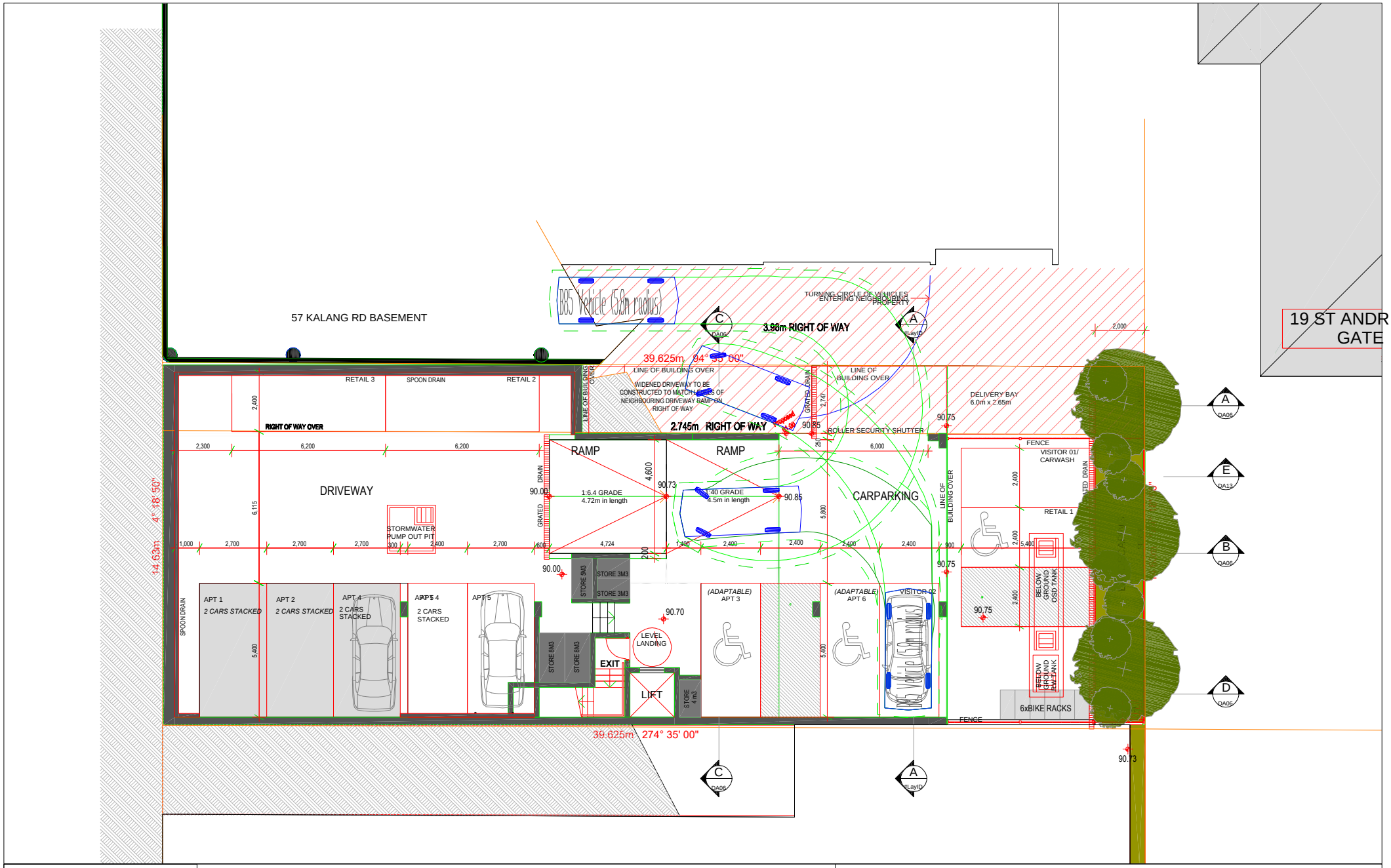

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DRAWING TITLE
B85 VEHICLE TURNING PATHS - VISITOR 2
Entering / Exiting Space

ADDRESS
55 Kalang Road, Elanora Heights

1:200 @ A4

PROJECT NO.
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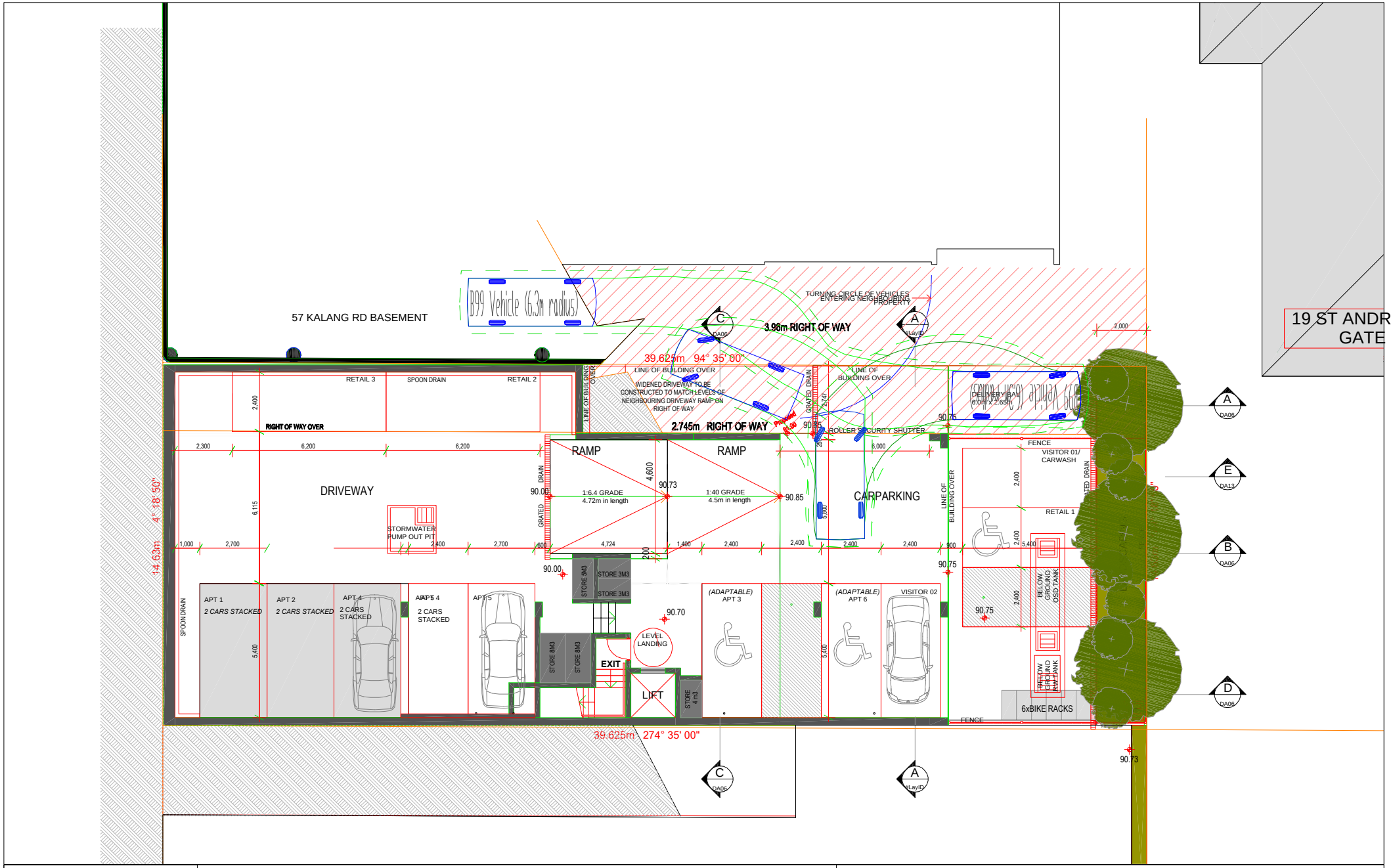

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PROJECT
MIXED USE DEVELOPMENT

N

DRAWING TITLE
B99 VEHICLE TURNING PATH - LOADING
Entering / Exiting Loading Bay Area

ADDRESS
55 Kalang Road, Elanora Heights

PROJECT NO.
18507

REVIEWED
ROBERT VARGA

1:200 @ A4

DATE DRAWN
2019-3-6

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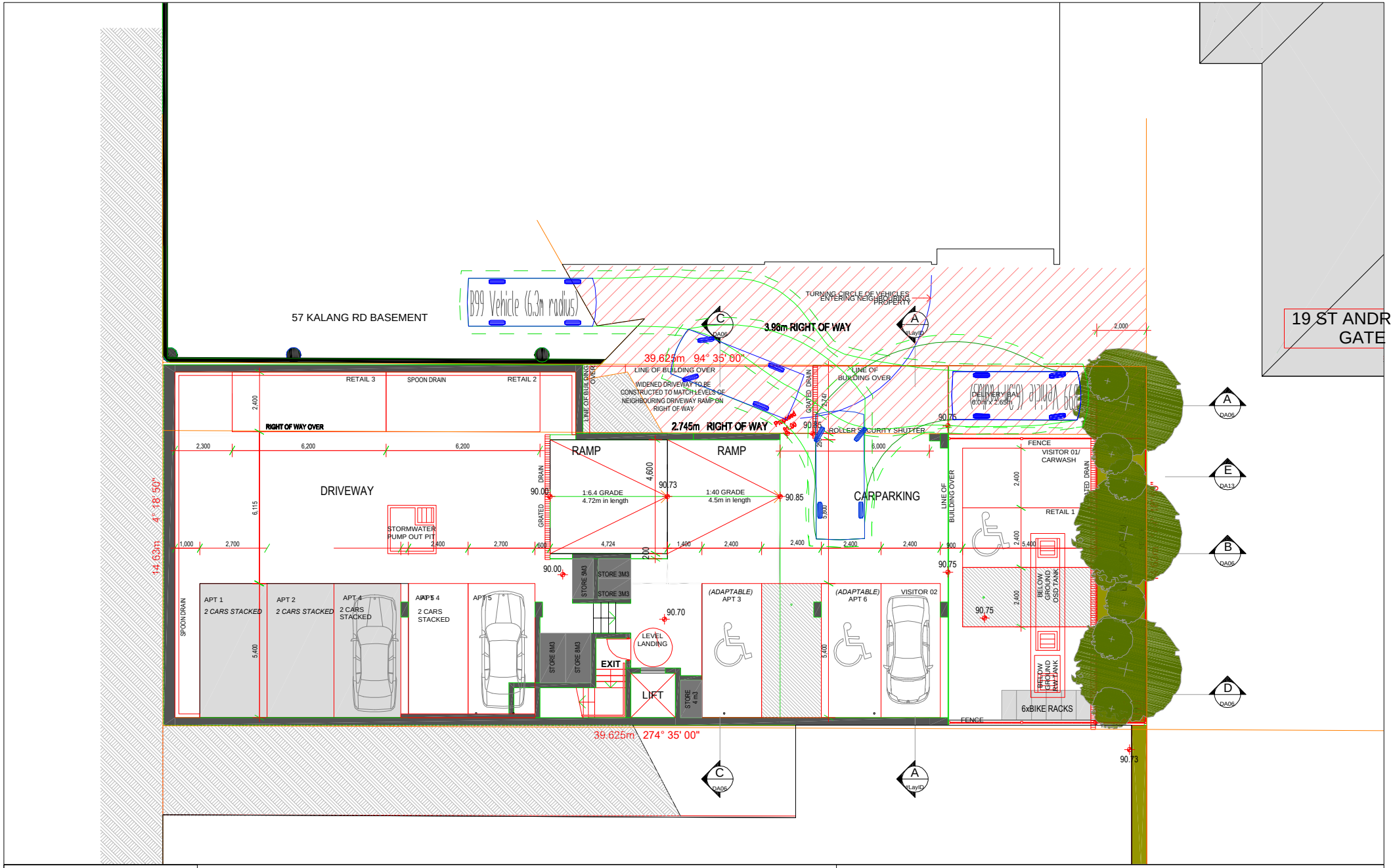

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PROJECT
MIXED USE DEVELOPMENT

N

DRAWING TITLE
B99 VEHICLE TURNING PATH - LOADING
Entering / Exiting Loading Bay Area

ADDRESS
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PROJECT NO.
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1:200 @ A4

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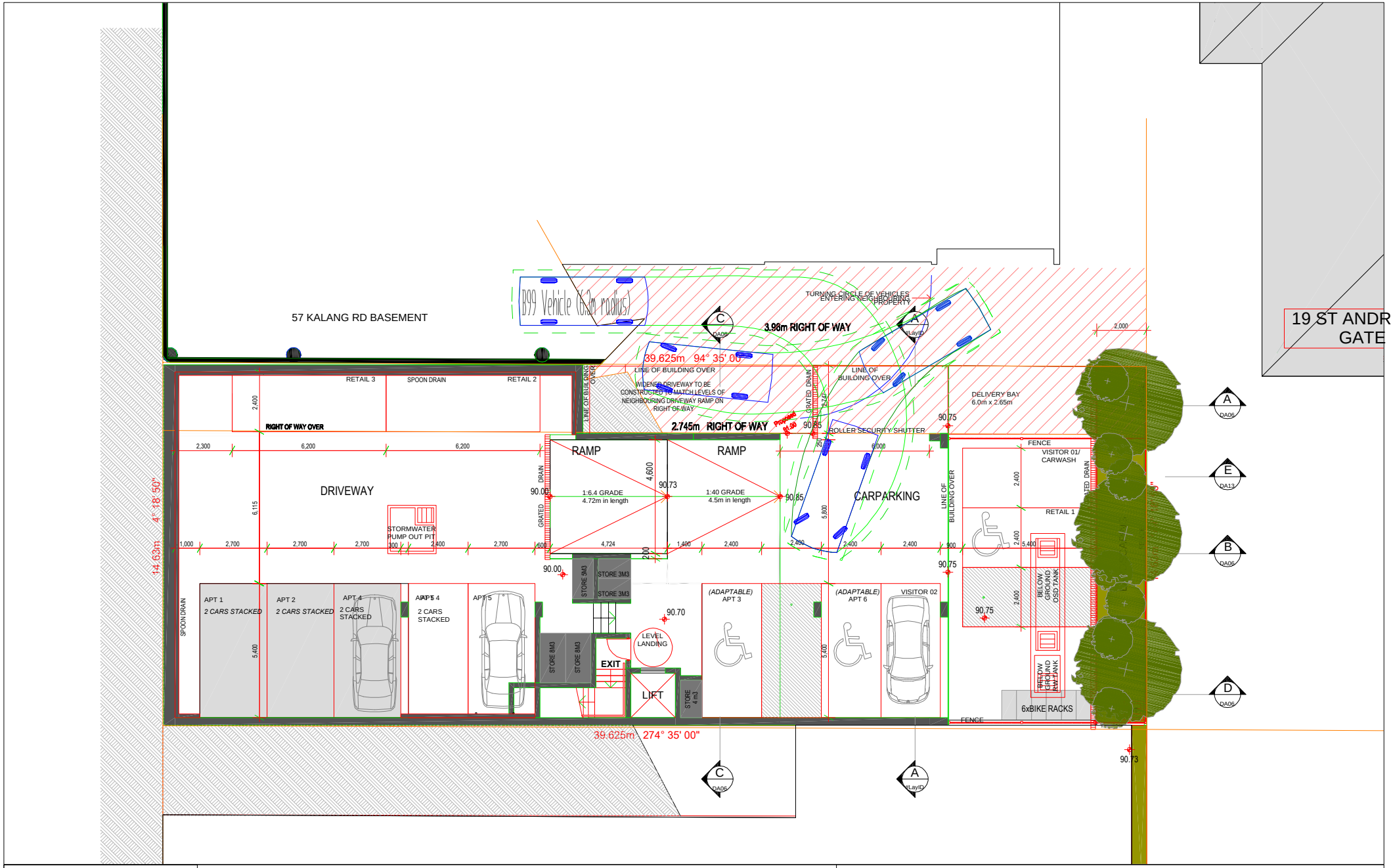

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PROJECT
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DRAWING TITLE
B99 VEHICLE TURNING PATH
Visitor U-Turning Out of Site

ADDRESS
55 Kalang Road, Elanora Heights

1:200 @ A4

PROJECT NO.
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APPENDIX A

CAR STACKING SYSTEMS SPECIFICATIONS

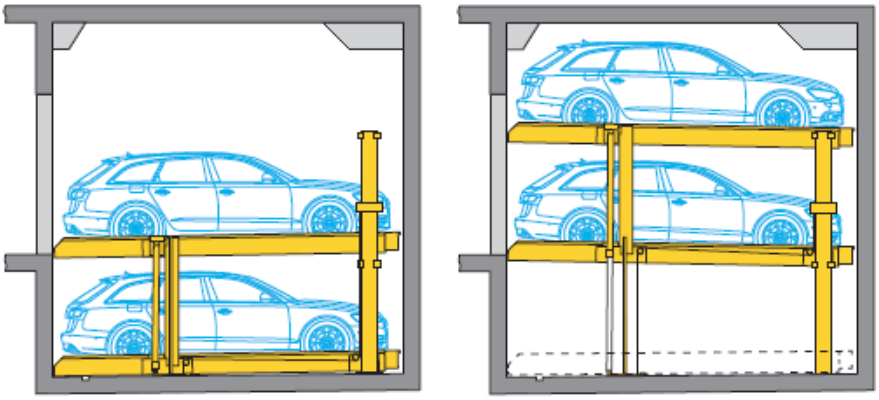
Data Sheet
WÖHR PARKLIFT 450

- **Single units: 2 cars**
  Double units: 4 cars

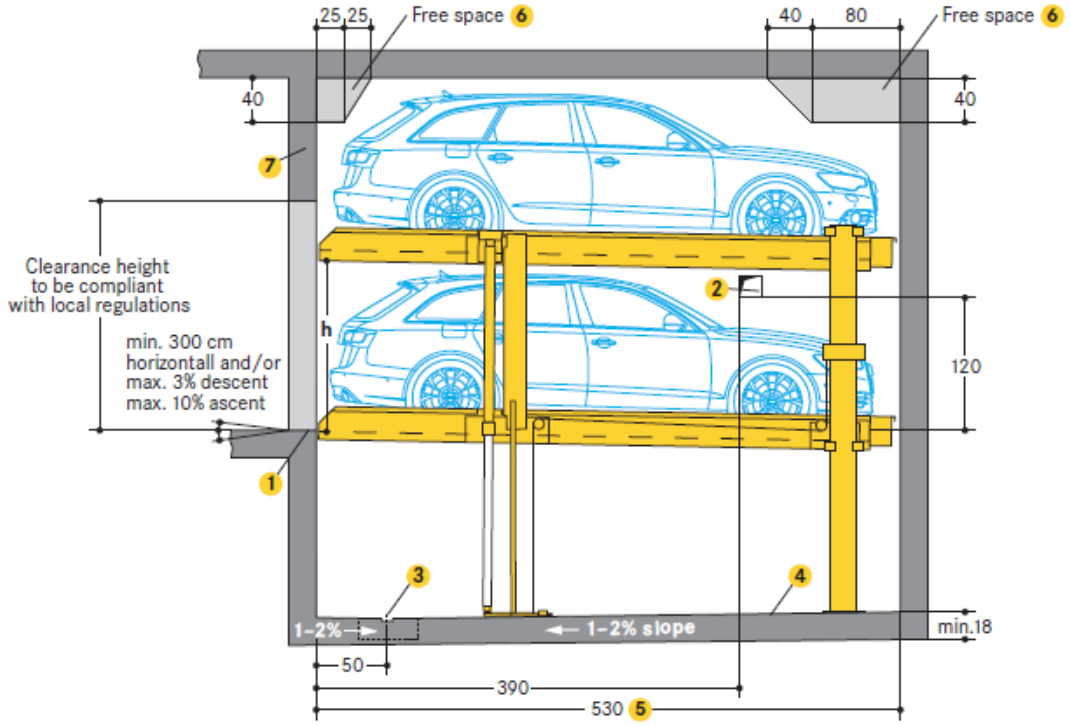
- **Platform load options:**
  - max. 2000 kg, load per wheel 500 kg
  - max. 2600 kg, load per wheel 650 kg

- **Platform slopes for drive-on:**
  - upper level: 1° – 2% ascent
  - lower level: 1° – 2% descent

  Platform slopes help drainage



Length dimensions underground car park (height dimensions see page 2)



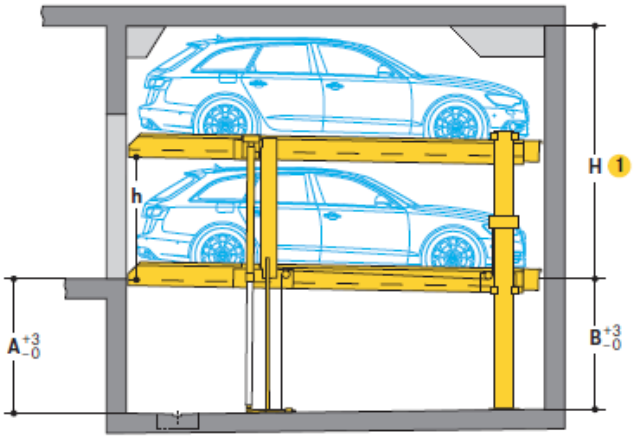
1. Yellow-black safety marking:
   - compliant to ISO 3864, 10 cm wide, along the pit edges (see page 4 »Static calculations and construction works requirements«)
2. In case of intermediate walls:
   - 15 x 15 cm opening for electric and hydraulic system cables and piping
   - after installation, do not close the opening
3. Recommended drainage channels:
   - 10 x 2 cm, with a 50 x 50 x 20 cm drainage pit
   - in case of installation of a sump pump, it is necessary to comply with the drainage pit dimensions specified by the pump manufacturer
4. Channels or undercuts/concrete haunches:
   - not allowed along the pit floor-to-wall joints
   - should channels or undercuts be necessary, the system width needs to be reduced or the pit needs to be wider
5. 500 cm vehicle length – 530 cm pit length
   - for longer vehicles:
     vehicle length + 30 cm safety distance – pit length
     (pit length max. 550 cm)
6. Free spaces for any connections performed by the customer:
   - please ask WÖHR for the dimension sheets
7. Lintel

Dimensions

- all dimensions specified are the minimum, finished dimensions
- tolerances must be taken into consideration
- all dimensions are given in cm

WÖHR Autoparksysteme GmbH | Ölgrabenstr. 14 | 71292 Friolzheim | Germany
+49 [0] 7044 46-0 | +49 [0] 7044 46-149 | info@woehr.de | www.woehr.de

Height dimensions Standard type

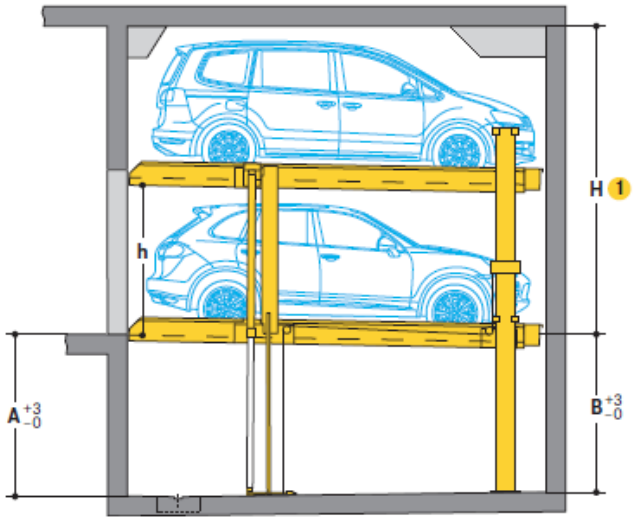


Type	Height (H) 1	Pit depth A	Pit depth B	Vehicle height 2 UL	Vehicle height 2 LL	Platform distance (h)
450-170	320	170	165	L+S: 150	L+S: 150	155
450-175	325	175	170	L+S: 150	L+S: 155	160
	330	175	170	L+S: 155	L+S: 155	160
450-180	330	180	175	L+S: 150	L+S: 160	165
	340	180	175	L+S: 160	L+S: 160	165
450-185	335	185	180	L+S 150	L+S: 165	170
	350	185	180	L+S: 165	L+S: 165	170
450-190	340	190	185	L+S: 150	L+S: 170	175
	360	190	185	L+S: 170	L+S: 170	175
450-195	345	195	190	L+S: 150	L+S 175	180
	370	195	190	L+S: 175	L+S 175	180
450-200	350	200	195	L+S: 150	L+S: 180	185
	380	200	195	L+S: 180	L+S: 180	185

1 With an increase in headroom available, correspondingly taller cars will be able to park on the upper platform.

2 UL= upper level / LL = lower level
L = Limousine / S = Station wagon

Height dimensions Premium type

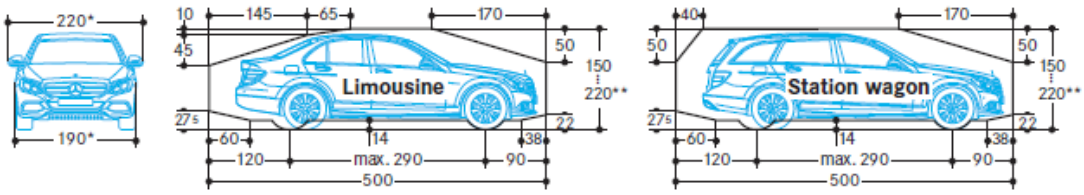


Type	Height (H) 1	Pit depth A	Pit depth B	Vehicle height 2 UL	Vehicle height 2 LL	Platform distance (h)
450-205	355	205	200	L+S: 150	L+S: 185	190
	390	205	200	L+S: 185	L+S: 185	190
450-210	360	210	205	L+S: 150	L+S: 190	195
	400	210	205	L+S: 190	L+S: 190	195
450-215	365	215	210	L+S: 150	L+S: 195	200
	410	215	210	L+S: 195	L+S: 195	200
450-220	370	220	215	L+S: 150	L+S: 200	205
	420	220	215	L+S: 200	L+S: 200	205
450-225	375	225	220	L+S: 150	L+S: 205	210
	430	225	220	L+S: 205	L+S: 205	210
450-230	380	230	225	L+S: 150	L+S: 210	215
	440	230	225	L+S: 210	L+S: 210	215
450-235	385	235	230	L+S: 150	L+S: 215	220
	450	235	230	L+S: 215	L+S: 215	220
450-240	390	240	235	L+S: 150	L+S: 220	225
	460	240	235	L+S: 220	L+S: 220	225

1 With an increase in headroom available, correspondingly taller cars will be able to park on the upper platform.

2 UL= upper level / LL = lower level
L = Limousine / S = Station wagon

Clearance profile (for standard vehicles)



* for a 250 cm platform width

** The overall vehicle height including roof luggage rails and antenna mounts must not exceed the max. vehicle height dimensions specified

Width dimensions

Platform widths:

250 cm (single units), 500 cm (double units):
- for 190 cm vehicle width (without outside mirror)

260–270 cm (single units), 520–540 cm (double units):
- for vehicles wider than 190 cm (without outside mirror)
- for units with imtermediate walls
- for units at the end of the driving aisle

For comfortable parking, entry and exit conditions platform widths upon 250 cm are recommended. Reduced platform width means reduced parking comfort depending on the vehicle width, vehicle type, individual driving style, access situation of the garage.

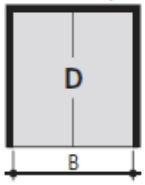
Width dimensions (underground car park)

Intermediate walls

Single unit (2 cars)

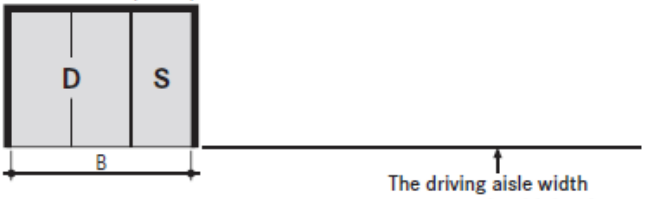
Space requirements B	clear platform width
260	230
270	240
280	**250**
290	**260**
300	**270**

Double unit (4 cars)



Space requirements B	clear platform width
490	460
510	480
530	**500**
550	**520**
570	**540**

Combined unit (6 cars)

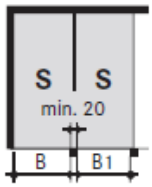


Space requirements B	clear platform width
750	460+230
780	480+240
810	**500+250**
840	**520+260**
870	**540+270**

It is possible to combine different widths

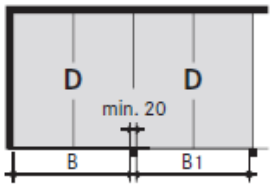
Columns external to the pit

Single unit (2 cars)



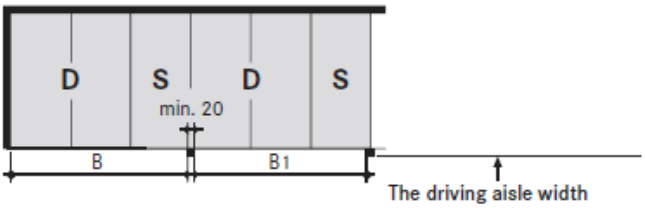
Space requirements wall-column B	column-column B1	clear platform width
250	240	230
260	250	240
270	**260**	**250**
280	**270**	**260**
290	**280**	**270**

Double unit (4 cars)



Space requirements wall-column B	column-column B1	clear platform width
480	470	460
500	490	480
520	**510**	**500**
540	**530**	**520**
560	**550**	**540**

Combined unit (6 cars)

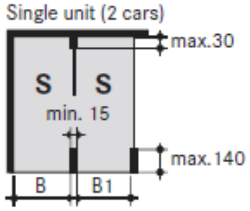


Space requirements wall-column B	column-column B1	clear platform width
740	730	460+230
770	760	480+240
800	**790**	**500+250**
830	**820**	**520+260**
860	**850**	**540+270**

It is possible to combine different widths

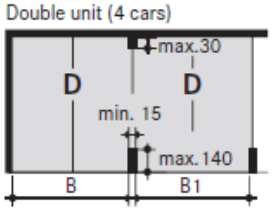
Columns in the pit

Single unit (2 cars)



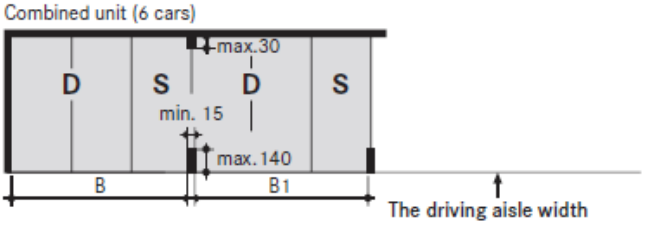
Space requirements wall-column B	column-column B1	clear platform width
255	245	230
265	255	240
275	**265**	**250**
285	**275**	**260**
295	**285**	**270**

Double unit (4 cars)



Space requirements wall-column B	column-column B1	clear platform width
485	475	460
505	495	480
525	**515**	**500**
545	**535**	**520**
565	**555**	**540**

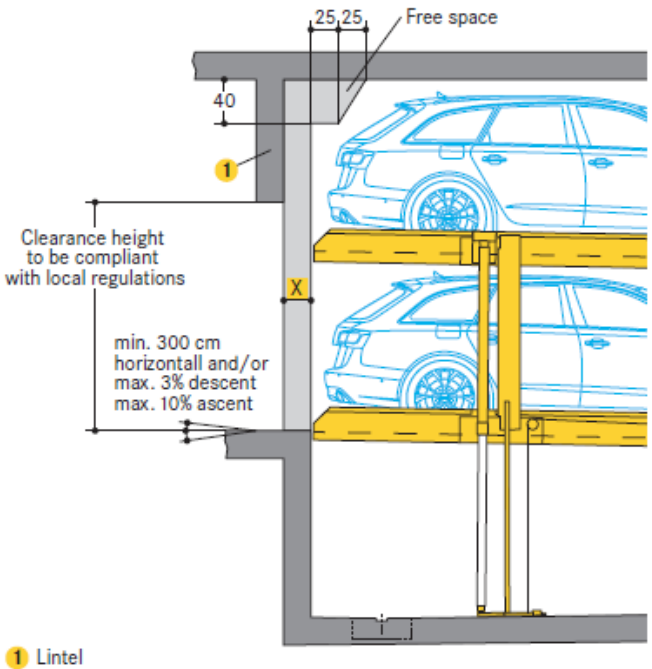
Combined unit (6 cars)



Space requirements wall-column B	column-column B1	clear platform width
745	735	460+230
775	765	480+240
805	**795**	**500+250**
835	**825**	**520+260**
865	**855**	**540+270**

It is possible to combine different widths

Garages with doors

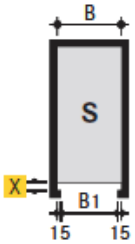


1 Lintel

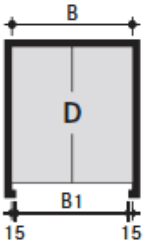
X – 10/ 15 cm for roller shutters

Dimension X to be defined by customer with the door supplier.

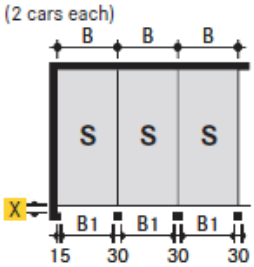
Single unit (2 cars)



Double unit (4 cars)

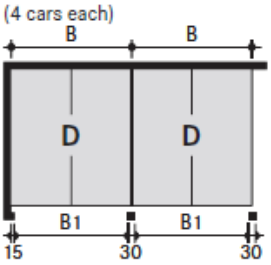


Garage rows with single doors (2 cars each)



Space requirements B	B1*	clear platform width
260	230	230
270	240	240
280	**250**	**250**
290	**260**	**260**
300	**270**	**270**

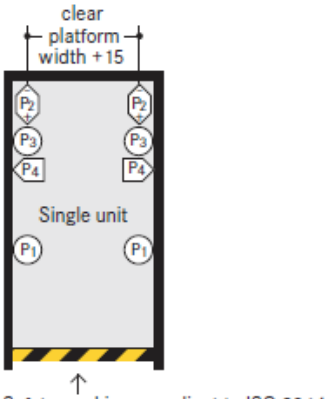
Garage rows with double doors (4 cars each)

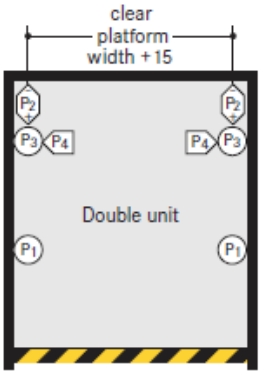


Space requirements B	B1*	clear platform width
490	460	460
510	480	480
530	**500**	**500**
550	**520**	**520**
570	**540**	**540**

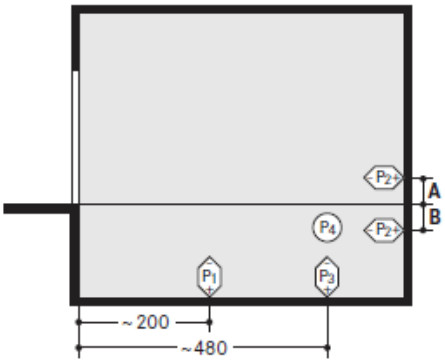
* B1 – drive-in passage width

Static calculations and construction works requirement





Safety marking compliant to ISO 3864



P1	+ 45 kN* – 15 kN
P2	+ 4 kN – 4 kN
P3	+ 17 kN
P4	+ 3 kN

P1	+ 80 kN* – 30 kN
P2	+ 4 kN – 4 kN
P3	+ 30 kN
P4	+ 3 kN

*specified load bearing data includes the vehicle weight

Standard type	A	B
Parklift 450-170	–	0
Parklift 450-175	–	5
Parklift 450-180	–	10
Parklift 450-185	–	15
Parklift 450-190	–	20
Parklift 450-195	–	25
Parklift 450-200	–	30

Premium type	A	B
Parklift 450-205	20	–
Parklift 450-210	15	–
Parklift 450-215	10	–
Parklift 450-220	5	–
Parklift 450-225	–	0
Parklift 450-230	–	5
Parklift 450-235	–	10
Parklift 450-240	–	15

Fixing of the system frames to the floor slab:
- using base plates (approx. 140 cm²)
- using adhesive anchor bolts
- hole depth to 12–14 cm
- concrete thickness of at least 18 cm

Concrete quality grade:
- compliant to the static requirements of the construction
- min. C20/25 grade (for dowel fastening)

Walls:
- front drive-in wall and rear wall in concrete
- perfectly flat wall surfaces
- without protruding sections such as border edgings, pipes and tubes, etc.

Frame bearing points:
- the specified lengths are expressed as mean value
- for the exact data, specific TÜV-tested data sheets are available

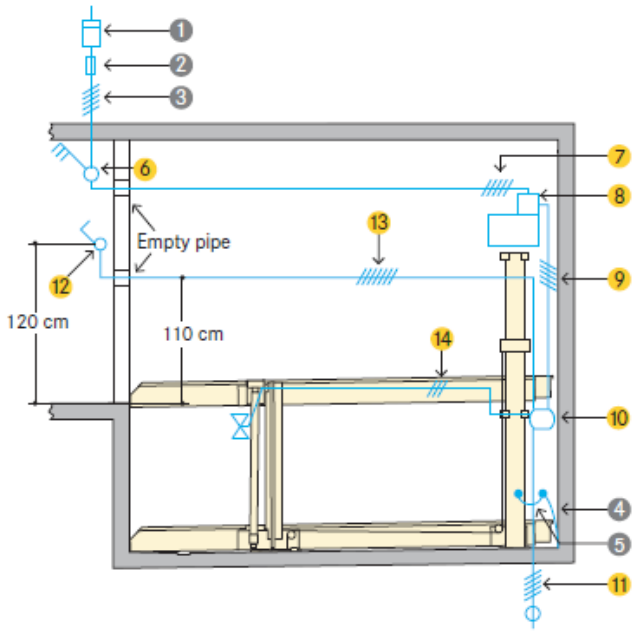
Extra space for hydraulic power packs

Dimensions in cm	1–5 Parklifts	6–10 Parklifts
Length:	100	150
Height:	140	140
Depth:	35	35

Hydraulic power pack placement options:
- located either on the top platform so that it moves with unit or on the wall
- where this is not possible, it is necessary to arrange for an extra space above drive-in level (i.e. for a wall recess or a niche)

Electrical specifications

Installation diagram



Cabling preparation to be performed by the customer:

- up to the main switch to be in place prior to starting the installation operations
- connection to the main switch during installation
- system functional check testing can be performed by WÖHR together with the electrician provided by the customer
- if requested at a later date, functional check testing can be performed by WÖHR at extra-cost

Grounding and potential equalisation:

- to be performed by the customer compliant to DIN EN 60204
- connections required every 10 metres

To be performed by the customer

Item	Quantity	Description	Position	Recurrence
1	1 piece	power meter	in the feed cable	
2	1 piece	fuse protection or automatic circuit breaker compliant to DIN VDE 0100 part 430: – 3 x 16 A slow blow for 3,0 kW power pack – 3 x 25 A slow blow for 5,5 kW power pack	in the feed cable	1 x per power pack
3	based on site conditions	compliant to local power supply regulations 3 phases + N + PE* 230/400 V, 50 Hz	feed cables to main switch	1 x per power pack
4	every 10 m	grounding and potential equalisation lead-out connection	along pit floor edges/ rear wall	
5	1 piece	grounding and potential equalisation compliant to DIN EN 60204	from lead-out connection to system	1 x per system

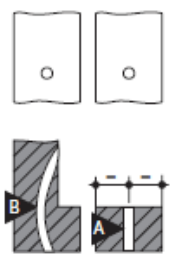
* to DIN VDE 0100 sections 410 and 430 (no permanent load) 3 phases + N+ PE (three phase current)
Note: for garages with doors the door manufacturer must be consulted before the electrical feed cabling is laid.

Scope of delivery by WÖHR (unless otherwise specified)

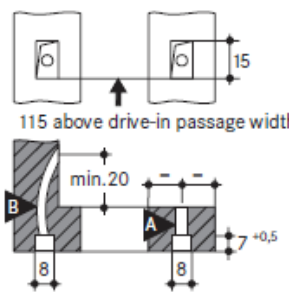
Item	Description
6	Lockable main switch
7	5 x 2,5² PVC control cable leading from the main switch to the power pack
8	Hydraulic power pack with three-phase motor, 3.0 or 5.5 kW. Ready-wired switching cabinet with motor safety contactor
9	5 x 1,5² PVC control cable
10	Branch connector
11	5 x 1,5² PVC control cable lead-out to the system alongside
12	UP/down operating unit with EMERGENCY STOP. Possibly located on the left, but always out of the platform's range of movement. Cable feed-in strictly from below leading upwards (2 keys for each parking space).
13	7 x 1,5² PVC control cable
14	3 x 1,5² control cable for the cylinder valve lead

Operating panel recesses and empty piping requirements

Flush mounted



Recess mounted



A M20 plastic or steel-armoured piping

B M20 flexible, plastic-insulated piping