

Traffic Engineering Assessment

**Proposed Mixed Use Development
at
40 Upper Heidelberg Road, Ivanhoe**

**Prepared For
SB + G 40 Upper Heidelberg Road (Ivanhoe) Pty Ltd**

**April, 2017
20992R#2**

Traffic Engineering Assessment

40 Upper Heidelberg Road, Ivanhoe: Proposed Mixed Use Development

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1 Introduction

Traffix Group has been engaged by SB + G 40 Upper Heidelberg Road (Ivanhoe) Pty Ltd to prepare a traffic engineering report for a proposed mixed use development at 40 Upper Heidelberg Road, Ivanhoe.

This report provides a detailed traffic engineering assessment of the parking and traffic issues associated with the proposed development.

2 Proposal

The proposal is for a multi-storey mixed use development on the site. The table below summarises the development and proposed car parking allocation.

Table 1: Development Summary

| Use | Size/No. | Car Parking Allocation | Resultant Car Parking Rate |
|---------------------|-------------------|------------------------|----------------------------------|
| Residential | | | |
| One-bedroom Apt. | 5 | 5 | 1 space / apartment |
| Two-bedroom Apt. | 96 | 156 | 1.63 spaces / apartment |
| Three-bedroom Apt. | 10 | 20 | 2 spaces / apartment |
| <i>Subtotal</i> | <i>111</i> | <i>181</i> | <i>1.63 spaces / apartment</i> |
| Visitor Car Parking | 111 (apts.) | 22 | 0.2 spaces / apartment |
| Commercial | | | |
| Office | 450m ² | 15 | 3.5 spaces per 100m ² |
| Café | 270m ² | 14 | 5.2 spaces per 100m ² |
| Total | - | 232 | - |

A total of 232 car spaces are provided a 5-level basement carpark, with spaces allocated as follows:

- 181 resident spaces,
- 22 visitor spaces, and
- 15 office spaces, including 1 DDA compliant space, and
- 14 café spaces, including 1 DDA compliant space.

The existing crossover located along the site's frontage to Upper Heidelberg Road will be widened to accommodate two-way simultaneous movement to the carpark.

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Post development, 13 on-street car spaces will be available along the site's frontage to Upper Heidelberg Road (net gain of 2 spaces) following removal of the redundant crossover.

A total of 150 bicycle spaces are shown on the development plans located within the basement levels.

Pedestrian access to the development is via Upper Heidelberg Road via a ground floor lobby entry.

A copy of the development plans prepared by John Demos Architects (dated April, 2017) is attached at Appendix A to this report.

3 Existing Conditions

3.1 Subject Site

The subject site is located on the east side of Upper Heidelberg Road, just north of Lower Heidelberg Road. A locality plan, aerial photograph and photograph of the subject site are presented in Figure 1, Figure 2 and Figure 3, respectively.

The development site is triangular in shape with a site area of approximately 2,445m² and has a frontage to Upper Heidelberg Road of 113.8m. The eastern boundary of the site is bound by the Hurstbridge Railway Line.

Steep grades exist on the site, with the land falling significantly from the site's Upper Heidelberg Road frontage towards the railway line.

The subject site is currently vacant and was previously occupied by a service station with vehicle access via two existing crossovers of widths of 7.9m and 9.25m.

There are a total of 11 car spaces located along the site's frontage to Upper Heidelberg Road and are subject to 'Clearway 7am-9am Mon-Fri, Tow Away' restrictions.

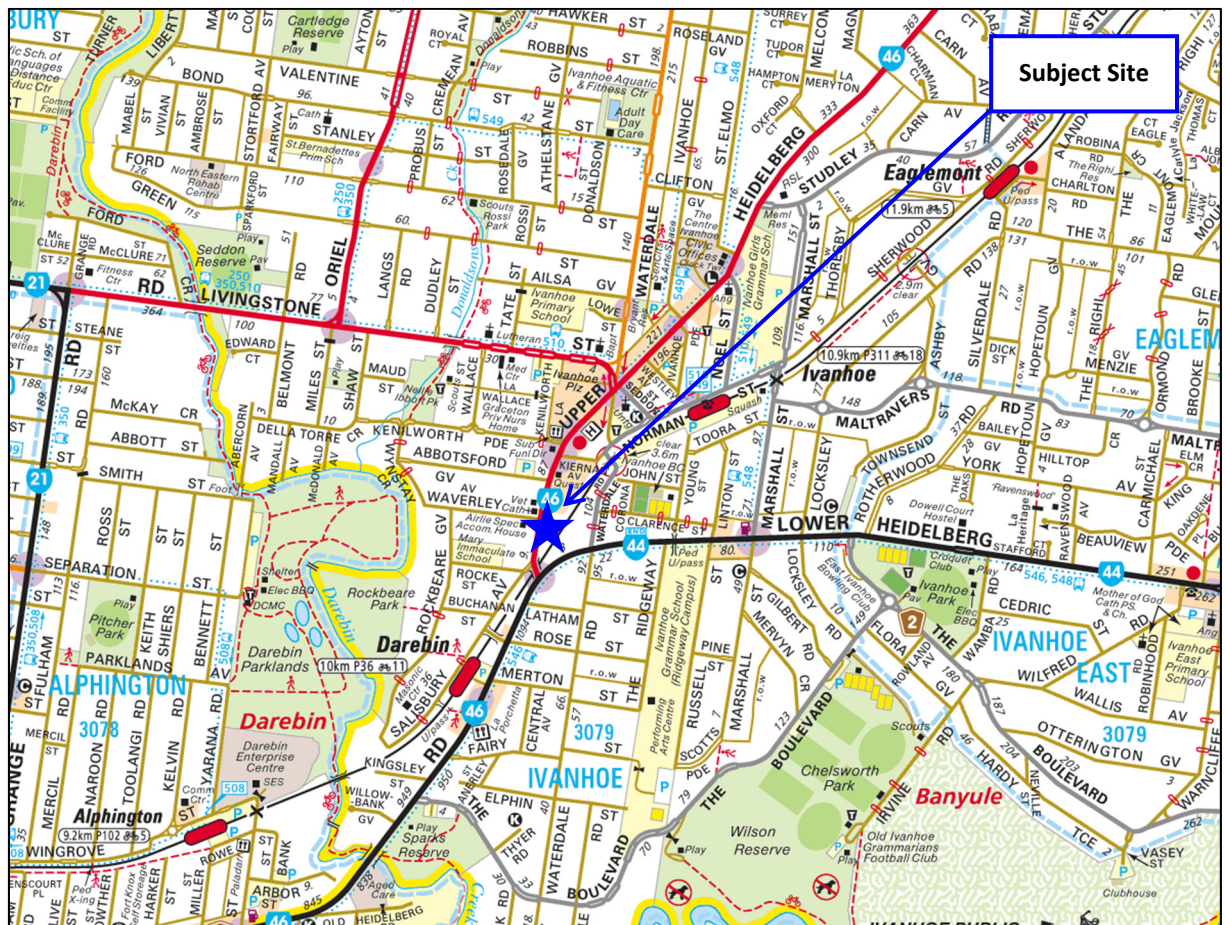
The site is located within a Commercial Zone – Schedule 1 (C1Z) under the Planning Scheme as presented at Figure 4. The site is located within the Ivanhoe Activity Centre and as such is surrounded by a variety of residential, commercial, entertainment, community and educational land uses.

To the north, the site is neighboured by an existing two-storey office building. Access to a rear carpark is provided via a single width vehicle crossover located along the north boundary of the subject site. Other land uses in the vicinity of the subject site include:

- office buildings, self-storage warehouse and shops along the eastern side of Upper Heidelberg Road,
- a vet, church, aged care facility, residential properties and shops on the western side of Upper Heidelberg Road, and
- predominantly residential dwellings in the nearby local streets.

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Source: Melway Publishing

Figure 1: Locality Plan



Source: www.nearmap.com

Figure 2: Aerial Photograph

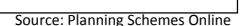


Figure 4: Land Use Zoning Map

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3.2 Road Network

Upper Heidelberg Road is a VicRoads declared Arterial Road and Road Zone Category 1, generally aligned in a north-south direction in between Lower Heidelberg Road in the south and Bell Street in the north. In the vicinity of the site, Upper Heidelberg Road has a carriageway width of approximately 13.2m providing kerbside parking on both sides of the road in parking bays and a single lane for through traffic in both directions.

Clearway Tow Away restrictions apply to the east side '7-9am Mon-Fri' along the length of Ivanhoe Shopping Centre.

Parking is a mixture of short-term (1P) and unrestricted parking, outside of clearway times.

The intersection of Lower Heidelberg Road and Upper Heidelberg Road is signalised with no right-turn movement into Upper Heidelberg Road from Lower Heidelberg Road at all times.

Photographs of Upper Heidelberg Road are presented in Figure 5 and Figure 6.



Figure 5: Upper Heidelberg Road – view north from site



Figure 6: Upper Heidelberg Road – view south from site

3.2.1 Existing Traffic Conditions

Traffix Group has undertaken a traffic volume count of two-way traffic along Upper Heidelberg Road adjacent to the site's proposed access point over a commuter peak period.

The count was undertaken between 8am-9am and 5pm-6pm on Thursday 24th November, 2016. These periods cover the typical peak times for commuter traffic on the surrounding road network and generally correspond with the expected peak hours for the residential and commercial uses proposed on the site.

The traffic survey undertaken by our office included gap acceptance surveys, which recorded vehicle headways (i.e. actual gaps in traffic) for northbound and southbound traffic along Upper Heidelberg Road. A detailed analysis of these surveys is provided in Section 4.5.3.

The results of the surveys are detailed in Figure 7.

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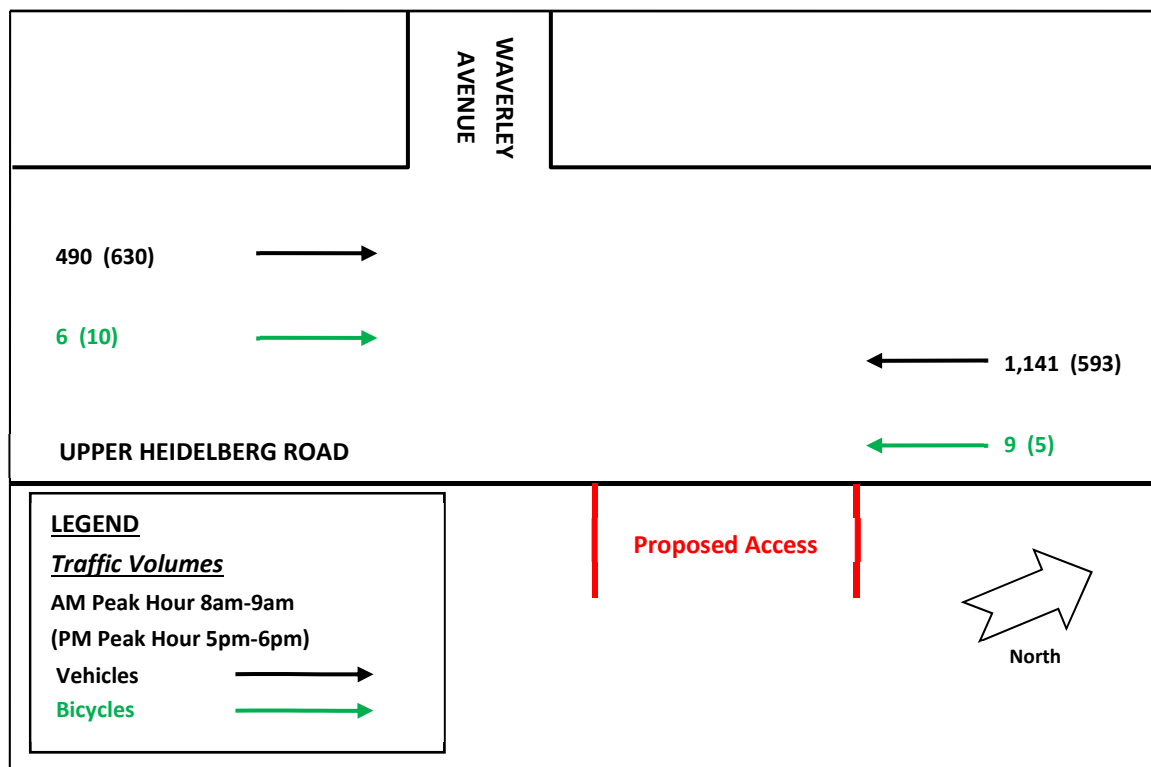


Figure 7: Existing Peak Hour Traffic Volumes (Maffra Street/Lexton Street)

The survey identified that Upper Heidelberg Road carries a total of 1,631 vehicles in the AM peak hour and 1,223 vehicles in the PM peak hour.

Assuming that 10% of traffic occurs during the commuter peak hour, Upper Heidelberg Road carries approximately 12,230-16,310 vehicle trips per day.

The traffic survey results indicate that traffic volume along Upper Heidelberg Road is consistent with its classification as an arterial road.

3.3 Car Parking Conditions

A series of spot parking occupancy surveys have been conducted by Traffix Group. These surveys were undertaken at various times to establish a parking profile for the area surrounding the site. The surveyed times included:

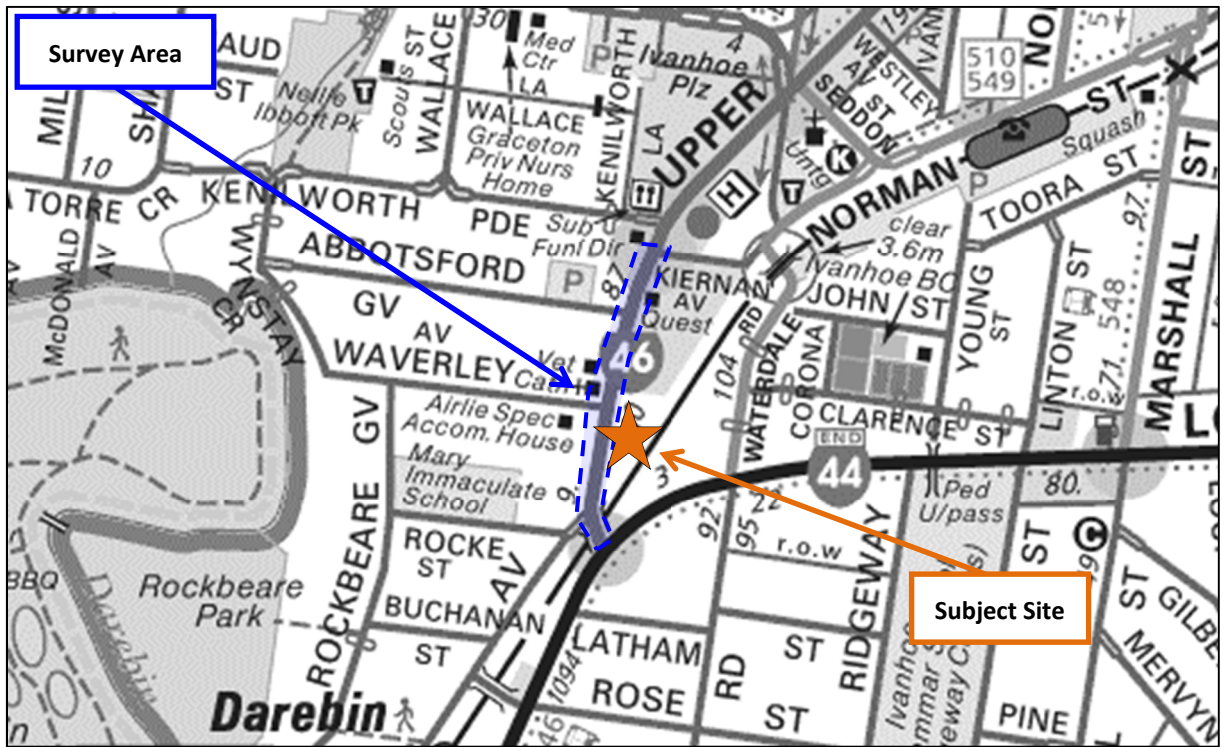
- 9am, 12noon, 1pm, 7pm and 8pm – Thursday 24th November, 2016, and
- 12noon, 1pm, 7pm and 8pm – Saturday 26th November, 2016.

The survey times include the expected peak times for nearby residents (i.e. evenings and weekends) and for commercial uses in the vicinity of the site (i.e. lunch time weekdays during business hours).

The area surveyed is shown in Figure 8 and the detailed results of the surveys are provided at Appendix B.

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Source: Melway Publishing

Figure 8: Parking Survey Area

A total of 40 publicly available on-street car parking spaces are located within the survey area.

On-street parking is generally a mixture of short-term (1P) and unrestricted parking restrictions.

Clearway Tow Away restrictions apply on the east side of Upper Heidelberg Road in between '7-9am Mon-Fri'.

A profile of on-street parking demand is provided at Figure 9.

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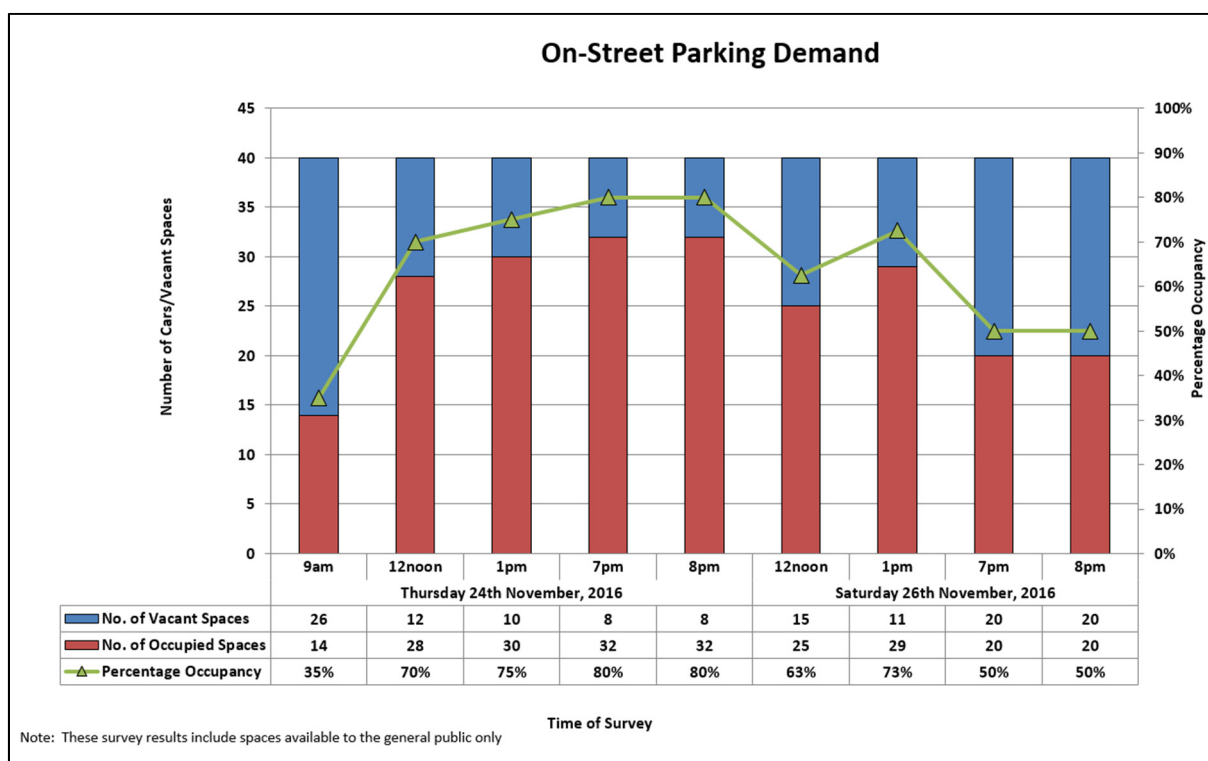


Figure 9: Profile of On-Street Parking Demand

The results of the surveys indicate that there is a moderate level of demand for on-street parking during business hours and on the weekend with occupancy recorded between 50-80% (8-20 vacant car spaces).

The minimum number of vacant spaces recorded was 8 at 7pm and 8pm on Thursday 24th November, 2016 (32 parked cars, 80% occupancy).

3.4 Public Transport

The site is served by a number of public transport services, including train and bus services located within walking distance of the site.

The public transport network surrounding the site is shown in Figure 10. The key facilities located within the nearby area are detailed in the following table.

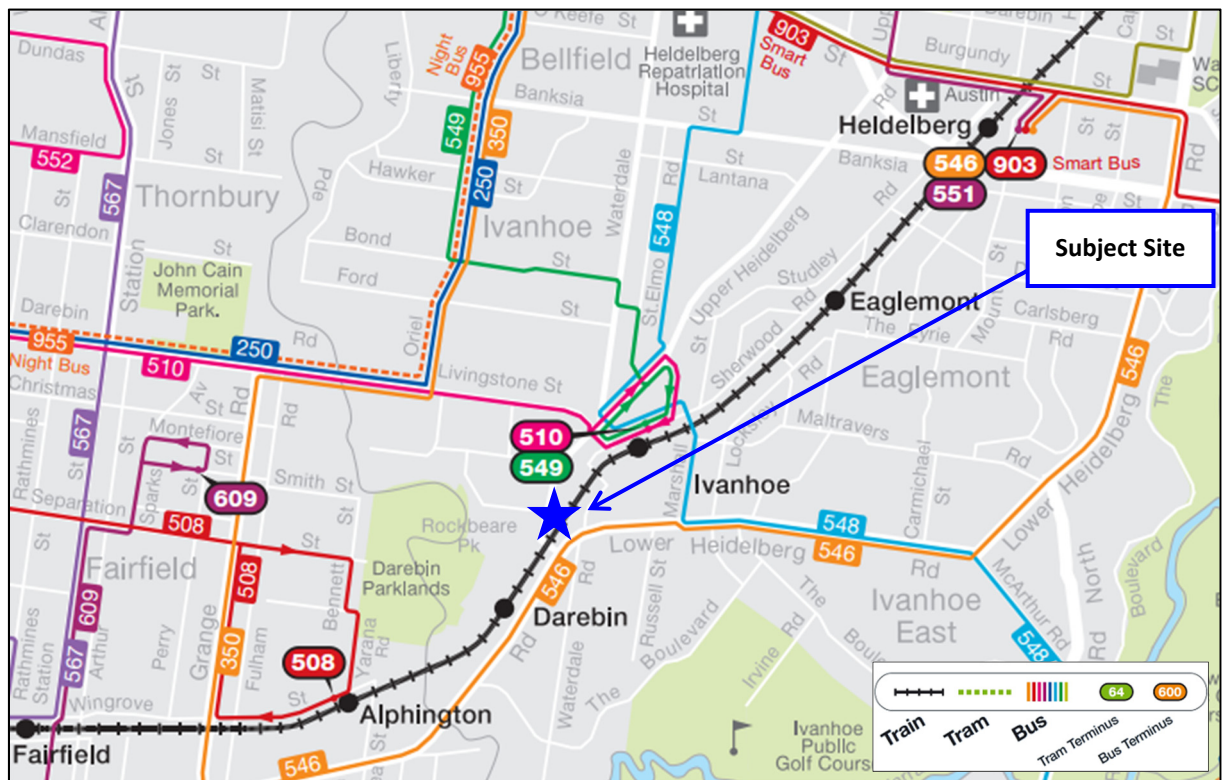
Table 2: Summary of Public Transport Services

| Service | Between | Via |
|--|-----------------------------------|----------------------------------|
| Lower Heidelberg Road – approximately 150m south-west of the site | | |
| Bus Route 546 | Heidelberg & Melbourne University | Clifton Hill & Carlton |
| Norman Street – approximately 500m north-east of the site | | |
| Bus Route 510 | Essendon & Ivanhoe | Brunswick, Northcote & Thornbury |
| Bus Route 548 | Kew & La Trobe University | Kew & La Trobe University |

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| Service | Between | Via |
|---|------------------------|---|
| Bus Route 549 | Ivanhoe & Northland SC | Oriel Road |
| Ivanhoe Railway Station – approximately 650m walking distance north-east of the site | | |
| Ivanhoe Station | CBD & Hurstbridge | Jolimont, Clifton Hill, Fairfield, etc. |



Source: ptv.vic.gov.au

Figure 10: Public Transport Map

4 Traffic Engineering Assessment

4.1 Statutory Car Parking Assessment

The proposed development falls under the following land-use categories under Clause 74 of the Planning Scheme:

- 'Dwelling',
- 'Office' and
- 'Café' (assessed as Food and Drink Premise).

The Planning Scheme sets out the parking requirements for new developments under Clause 52.06.

The purpose of Clause 52.06 is:

- *To ensure that car parking is provided in accordance with the State Planning Policy Framework and Local Planning Policy Framework.*
- *To ensure the provision of an appropriate number of car parking spaces having regard to the demand likely to be generated, the activities on the land and the nature of the locality.*
- *To support sustainable transport alternatives to the motor car.*
- *To promote the efficient use of car parking spaces through the consolidation of car parking facilities.*
- *To ensure that car parking does not adversely affect the amenity of the locality.*
- *To ensure that the design and location of car parking is of a high standard, creates a safe environment for users and enables easy and efficient use.*

The car parking requirements for the proposed use are set out under Clause 52.06 and the car parking table at Clause 52.06-5 of the Planning Scheme.

The assessment of the car parking requirements associated with the proposed development is set out in Table 3.

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Table 3: Statutory Car Parking Assessment – Clause 52.06

| Use | Size/No. | Statutory Parking Rate | Car Parking Requirement (Note 1) | Car Parking Provision | Shortfall(-)/ Surplus(+) |
|----------------------|-------------------|--|-------------------------------------|-----------------------|-----------------------------|
| Residential | | | | | |
| One-bedroom apt. | 5 | 1 car space per one and two-bedroom dwelling | 5 | 5 | 0 |
| Two-bedroom apt. | 96 | | 96 | 156 | + 60 |
| Three-bedroom apt. | 10 | 2 spaces per 3 bedroom dwelling | 20 | 20 | 0 |
| Residential visitors | 111 (apts.) | 1 car space per 5 dwellings, for developments of 5 or more dwellings | 22 | 22 | 0 |
| Subtotal | | | 143 | 203 | + 60 res |
| Commercial | | | | | |
| Office | 450m ² | 3.5 spaces per 100m ² of NFA | 15 | 15 | 0 |
| Café | 270m ² | 4 car spaces per 100m ² LFA | 10 | 14 | + 4 |
| Subtotal | | | 25 | 29 | + 4 |
| TOTAL | | | 168 | 232 | + 64 |

Note 1: Clause 52.06-5 specifies that where a car parking calculation results in a requirement that is not a whole number, the number of spaces should be rounded down to the nearest whole number.

The development has a statutory parking requirement under Clause 52.06-5 of 168 car spaces, including:

- 121 resident spaces,
- 22 visitor spaces,
- 15 office spaces, and
- 10 spaces associated with the café tenancy.

The provision and allocation of 232 car spaces results in a surplus of 64 car spaces.

Accordingly, a car parking reduction is not required under Clause 52.06-6.

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4.2 Bicycle Parking Assessment

Clause 52.34 of the Planning Scheme specifies bicycle parking requirements for new developments and changes in use. The table below details the statutory bicycle parking requirement of the development.

Table 4: Statutory Bicycle Parking Assessment - Clause 52.34

| Proposed Use | Size/ No. | Bicycle Parking Rate | | No. of Bicycle Spaces Required |
|--------------|-------------------|--|---|--------------------------------------|
| | | Resident/Employee | Visitor/Customer | |
| Dwellings | 111 | 1 per 5 dwellings | 1 per 10 dwellings | 22 resident 11 visitor |
| Office | 450m ² | 1 to each 300m ² of LFA if the LFA exceeds 1,000m ² | 1 to each 1,000m ² of LFA if the LFA exceeds 1,000m ² | - |
| Café | 270m ² | 1 to each 300m ² of LFA | 1 to each 500m ² of LFA | 1 employee 1 customer |
| Total | | | | 35 |

The proposal has a statutory bicycle requirement of 35 bicycles. The development provides a total of 150 bicycle spaces. Accordingly, the development exceeds the minimum bicycle parking requirements of Clause 52.34.

Based on the above, we are satisfied with the provision of bicycle parking in this development.

4.3 Review of Car Parking Layout and Access Arrangements

A total of 232 car spaces are provided on-site as follows across 5 levels of basement carpark.

Traffix Group has provided design advice to the project architect to achieve a satisfactory carpark layout. The proposed parking layout has been assessed under the following guidelines:

- Clause 52.06-8 of the Planning Scheme (Design standards for car parking),
- AS2890.1-2004 – Part 1: Off-Street car parking, where relevant, and
- AS2890.6-2009 – Part 6: Off-street car parking for people with disabilities.

The key elements of the design include:

Clause 52.06-8 Design Standard 1 – Accessways

- access to the basement level carpark is provided via a 6.5m wide crossover and accessway to Upper Heidelberg Road at the site's northern boundary, in accordance with Clause 52.06-8 (Design Standard 1) which requires accessways to be at least 3m wide and AS2890.1-2004 for two-lane/two-way access.
- A minimum headroom clearance of 2.2m is provided along the ramp, which complies with Clause 52.06-8.

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- Vehicles will be able to enter and exit the site in a forwards direction in accordance with Clause 52.06-8.
- A security door will provide access to the basement level carpark and will be located at the bottom of the ramp, which ensures the carpark remains secure in accordance with Clause 52.06-8.
- A sight triangle is fully achieved on both sides of the accessway in accordance with Clause 52.06-8. No pedestrian sight triangle is technically required on the northern side of the accessway due to the two-lane width.
- Each of the curved ramps have an internal radius of 4.5m, in excess of the requirements of Clause 52.06-8 (Design Standard 1) and AS2890.1-2004.

Clause 52.06-8 Design Standard 2 – Car parking spaces

- Car space dimensions accord with Clause 52.06-8 (Design Standard 2) with dimensions provided at a minimum of 4.9m long x 2.8m wide with a 5.8m wide access aisle.
- Disabled parking spaces have been provided at 2.4m wide by 5.8m long with a 5.8m wide access aisle. This complies with AS2890.6-2009.
- Car spaces located adjacent to walls and columns accord with Diagram 1 of Clause 52.06-8.
- Access to and from all critical car spaces has been checked using a turning template based on the B85 design car presented in AS2890.1-2004 and we are satisfied that vehicles will be able to safely manoeuvre to and from each space.

Clause 52.06-8 Design Standard 3 – Gradients

- The grades provided within the site are fully in accordance with the requirements of Clause 52.05-8 (Design Standard 3) as follows:
 - A flat grade is provided for the first 5.0m into the site (maximum allowable grade of 1 in 10 in this location).
 - A maximum grade of 1:9 (11.11%) is provided through the mid-section of each of the ramps.

Overall, we are satisfied the proposed layout of car spaces is satisfactory and that the access arrangements for the site will provide for safe and efficient movements to and from the surrounding road network.

4.4 Loading and Waste Collection

Loading

Clause 52.07 of the Planning Scheme specifies that *‘No building or works may be constructed for the manufacture, servicing, storage or sale of goods or materials’* unless a loading bay is provided. Accordingly, a loading bay is required for the café tenancy, but not for the office and apartments. The table below sets of the loading bay requirements of Clause 52.07.

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Table 5: Loading Bay Requirements Clause 52.07

| Floor Area of Building | Minimum Loading Bay Dimensions | |
|---|--------------------------------|-----------|
| 2,600 sq m or less in single occupation | Area | 27.4 sq m |
| | Length | 7.6 m |
| | Width | 3.6 m |
| | Height Clearance | 4.0 m |
| For every additional 1,800 sq m or part | Additional 18 sq m | |

As the food and drink premises is 270m², a loading bay of the minimum dimensions is required.

Deliveries to the café tenancy would be undertaken by smaller trucks and vans that can readily use the on-street parking along Upper Heidelberg Road for loading purposes. We are satisfied that given the small size of the café tenancy that this is an acceptable outcome.

Based on the above, we are satisfied that a waiver of the loading bay requirement is acceptable.

Waste Collection

A common waste bin area is located on basement level 1.

Waste collection can be undertaken via private contractor along the site's frontage to Upper Heidelberg Road. Waste collection arrangements can be formalised via a Waste Management Plan as a condition of permit if required.

4.5 Traffic Impacts

4.5.1 Traffic Generation

Residential Component

The proposed development is conservatively expected to generate in the order of 4 vehicle trip ends per dwelling per day, which is consistent with other medium density developments within similar suburban areas. This equates to a daily traffic generation of 444 vehicle trip ends per day for the 111 dwellings proposed.

Typically, 10% of this traffic can be expected in the AM and PM commuter peak hours, which equates to 44 vehicle trip ends in each peak hour.¹ This traffic generation represents in the order of 1 vehicle movement every 1-2 minutes during each peak hour and can be readily accommodated by the surrounding road network.

Office and Café Component (staff only)

A total of 19 car spaces are assumed to be required for use by staff of the development, including 15 office spaces and 4 retail spaces.

¹ The RTA Guide to Traffic Generating Developments (Version 2.2, October, 2002) recommends a rate of 4 to 5 vehicle trip ends per dwelling per day, with a peak hour volume of 0.4 to 0.5 vehicle trip ends per dwelling for smaller units and flats with up to 2 bedrooms, and 5 to 6.5 vehicle trip ends per dwelling per day, with a peak hour volume of 0.5 to 0.65 vehicle trip ends per dwelling for larger units and townhouses with 3 or more bedrooms.

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Allowing for 60% of the car spaces to be turned over each peak hour, results in a peak hour traffic generation of 11 vehicle trip ends.

A total of 46 vehicle trip ends per day is expected to be generated, allowing for all car spaces to be entered and exited, as well as for 20% of car spaces to generate an additional work based trip.

Traffic associated with retail customers will be spread throughout the day and are not expected to be generated within the peak periods.

Summary

The development is expected to generate in the order of 486 daily vehicle movements with 55 occurring in each of the peak hours.

4.5.2 Distribution of Traffic

The following sets out the adopted traffic distribution for the proposed development. This distribution has adopted the following key assumptions:

- 60/40 split of vehicles arriving from/departing to the south and the north along Upper Heidelberg Road, based on current distribution of traffic along Upper Heidelberg Road.

Residential

- 80% of vehicles will exit the site and 20% will enter the site during the AM peak hour,
- 30% of vehicles will exit the site and 70% will enter the site during the PM peak hour,

Commercial (Office/Café)

- 100% of vehicles will enter the site during the AM peak hour, and
- 100% of vehicles will exit the site during the PM peak hour.

The following table details the predicted entering and exiting traffic volumes associated with 67 vehicle trip ends for each peak hour, based on the key assumptions listed above.

Table 6. Expected Development Peak Hour Traffic Volumes

| | ENTRY Movements | | EXIT Movements | |
|---------|--|--|--|---|
| | Left-in | Right-in | Left-out | Right-out |
| AM Peak | 11 veh movement (1 car per 5-6 minutes) | 7 veh movement (1 car per 8-9 minutes) | 22 veh movements (1 car per 3 minutes) | 15 veh movements (1 car per 4 minutes) |
| PM Peak | 19 veh movements (1 car per 3-4 minutes) | 13 veh movements (1 car per 4-5 minutes) | 14 veh movements (1 car per 4-5 minutes) | 9 veh movements (1 car per 6-7 minutes) |

Note: All times rounded down to be conservative.

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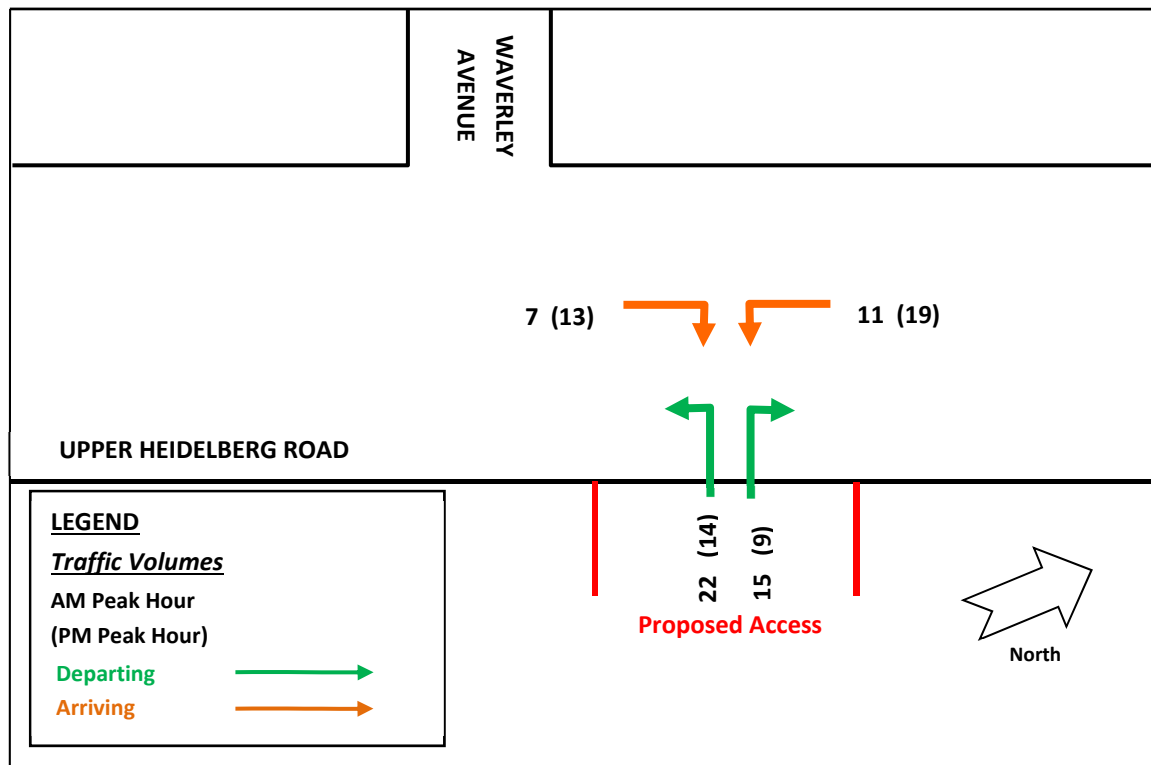


Figure 11: Predicted Development Peak Hour Traffic Volumes Generated by the Development

Upper Heidelberg Road was observed to carry 1,223-1,631 vehicle movements in the peak hour periods, adjacent to the site access.

The development traffic (55 movements in the peak hours) represents an increase in the order of less than 4% of the existing traffic on Upper Heidelberg Road, noting that the traffic will be split between the north and south. This increase in traffic will not be significant in the context of the existing volumes using Upper Heidelberg Road.

The nearby signals at Upper Heidelberg Road/Kiernan Avenue intersection and Upper Heidelberg Road/Lower Heidelberg Road intersection provide 'gaps' in traffic as traffic streams tend to arrive in 'platoons'.

The ramp has been designed to facilitate simultaneous entry and exit movements and accordingly, no potential conflict will occur along the ramp.

We are satisfied that the access to Upper Heidelberg Road has been appropriately designed and the increase in traffic will not have an unreasonable impact on the operation or safety of Upper Heidelberg Road or the surrounding road network.

4.5.3 Gap Acceptance Analysis

To evaluate the impact of the additional traffic generated by the development on Upper Heidelberg Road, Traffix Group has analysed the collected headway (gap) data to determine the capacity of Upper Heidelberg Road at the site access to accommodate the traffic generated by the site. This analysis uses the actual 'gaps' or 'headways' recorded in the traffic surveys, rather than theoretical gaps produced from recorded traffic volumes based on certain flow assumptions.

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In this case, the distribution of traffic flow along Upper Heidelberg Road past the site is affected by the nearby signalised intersection of Upper Heidelberg Road/Kiernan Avenue. As a result, traffic on Upper Heidelberg Road tends to arrive in platoons or groups, with larger gaps in traffic occurring between these groups.

The following gap acceptance parameters have been adopted in this assessment in accordance with the Austroads, Guide to Road Design: Part 4A: Unsignalised and Signalised Intersections (2015):

- Right-turn entry into site: critical gap = 5 seconds, follow-up headway = 3 seconds,
- Left-turn exit from site: critical gap = 5 seconds, follow-up headway = 3 seconds, and
- Right-turn exit from site: critical gap = 8 seconds, follow-up headway = 5 seconds.

The results of the assessment are set out in Table 7.

Table 7: Upper Heidelberg Road/Proposed Site Access: Gap Acceptance Analysis

| Movement | AM Peak | | | PM Peak | | |
|---|------------|-----------------|--------------------|------------|-----------------|--------------------|
| | Total Cap. | Proposed Volume | Remaining Capacity | Total Cap. | Proposed Volume | Remaining Capacity |
| Left-turn exit from site | 410 | 22 | 388 | >500 | 14 | >500 |
| Right-turn exit from site | 97 | 15 | 82 | 40 | 9 | 31 |
| Right-turn into site from Upper Heidelberg Rd | 410 | 7 | 403 | >500 | 13 | >500 |

It is noted that the assessment excluded those periods when vehicles in the northbound and southbound lanes are queued across the proposed site access due to the traffic signals at the Upper Heidelberg Road/Kiernan Avenue and Upper Heidelberg Road/Lower Heidelberg Road intersections. In practice, when queuing extends past the access point, motorists would prop to allow the left turn and right turn movements out of the site as a 'courtesy gap' (i.e. increasing the total capacity above that indicated).

The above analysis demonstrates that whilst a low capacity for right turn movements exiting the site exists under current conditions there will continue to be some spare capacity following the addition of the development traffic. We note that the above analysis does not include any courtesy gaps as discussed above.

Overall, we are satisfied that the level of traffic generated by the proposed development will be low, generally residential in nature and will not have a significant impact on the operation or safety of Upper Heidelberg Road.

5 Conclusions

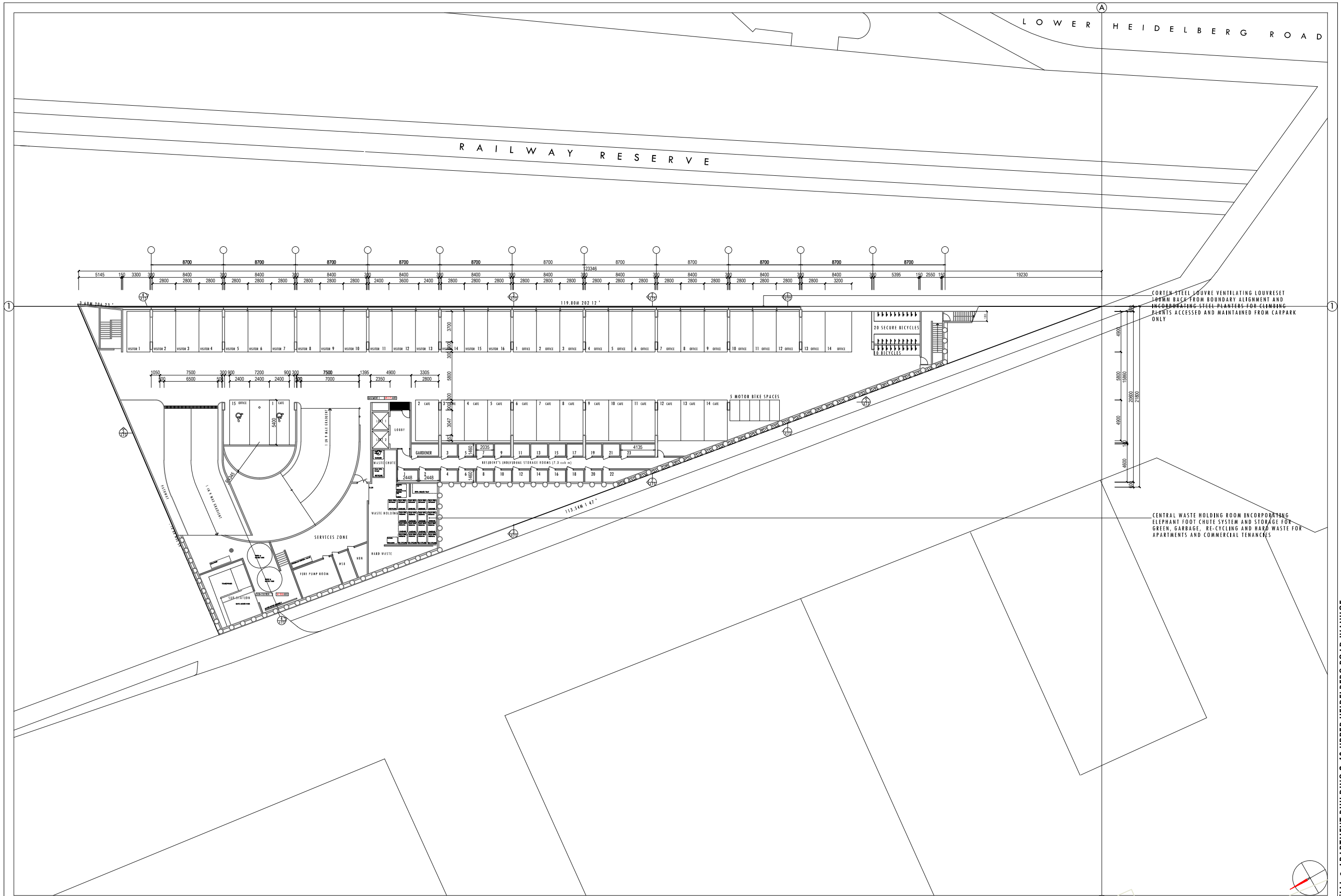
Having undertaken a detailed traffic engineering assessment of the proposed mixed use development at 40 Upper Heidelberg Road, Ivanhoe, we are of the opinion that:

- a) the proposed development has a statutory car parking requirement of 168 car spaces under Clause 52.06-5 including 121 resident spaces, 22 visitor spaces, 15 office spaces and 10 food and drink premises spaces,
- b) the provision of 232 car spaces results in a surplus of 64 car spaces. Accordingly, the development complies with Clause 52.06-5 of the Planning Scheme and a car parking reduction is not sought by this application,
- c) bicycle parking exceeds the requirements set out at Clause 52.34 of the Planning Scheme,
- d) the proposed parking layout and vehicle access arrangements accord with the requirements of the Planning Scheme, AS2890.1:2004 (where relevant) and current practice,
- e) a waiver of the loading bay requirements for the café tenancy is acceptable given its small size and availability of suitable on-street parking,
- f) waste collection will be via a private contractor and can be suitably managed by a Waste Management Plan if required by Council,
- g) the level of traffic generated as a result of this proposal will be minor, generally residential in nature, spread throughout the day and will not have an unreasonable impact on the operation of Upper Heidelberg Road or the surrounding road network,
- h) there are no traffic engineering reasons why a planning permit for the proposed mixed use development at 40 Upper Heidelberg Road, Ivanhoe should be refused, subject to appropriate conditions.

Traffic Engineering Assessment

40 Upper Heidelberg Road, Ivanhoe: Proposed Mixed Use Development

Appendix A: Development Plans



CORTEN STEEL LOUVRE VENTILATING LOUVRESET
100MM BACK FROM BOUNDARY ALIGNMENT AND
INCORPORATING STEEL PLANTERS FOR CLIMBING
PLANTS ACCESSED AND MAINTAINED FROM CARPARK
ONLY

CENTRAL WASTE HOLDING ROOM INCORPORATING
ELEPHANT FOOT CHUTE SYSTEM AND STORAGE FOR
GREEN, GARBAGE, RE-CYCLING AND HARD WASTE FOR
APARTMENTS AND COMMERCIAL TENANCIES

| | | | | | |
|---------------|--|-----------------------|--|------------------------|--|
| NO DATE ISSUE | | DESIGN DEVELOPMENT TP | | JOHN DEMOS ARCHITECTS | |
| | | | | SUITE 1 66 ALBERT ROAD | |
| | | | | SOUTH MELBOURNE 3205 | |
| | | | | VICTORIA AUSTRALIA | |
| | | | | +61 3 9654 1000 | |
| | | | | john@johndemos.com | |

BASEMENT LEVEL 1
UTILITIES & PLANTROOM

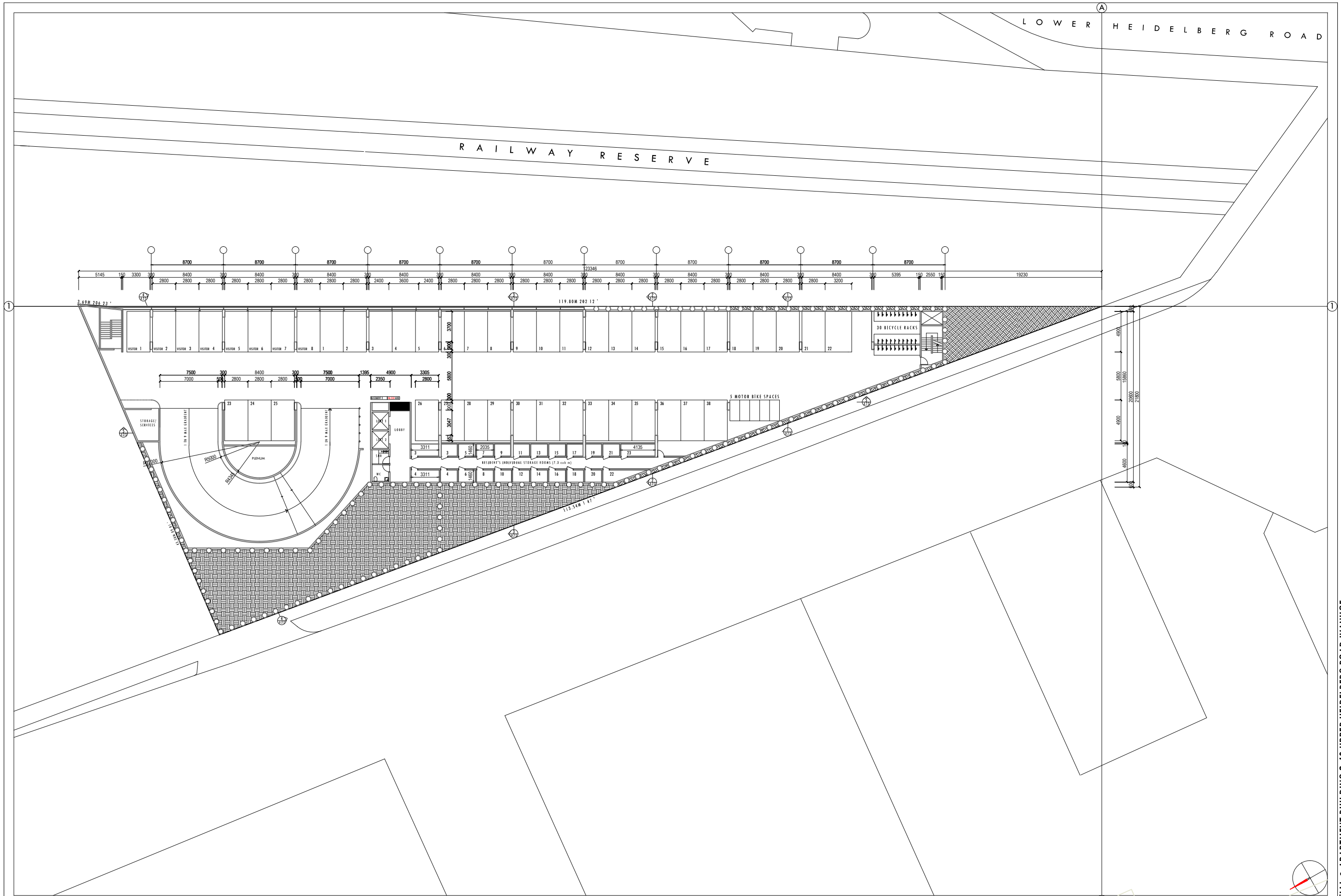
TP. A07
REV B
APRIL 2017

SCALE: 1:200 @ A1

JOB NO 2039

CORRIGAL

COMMERCIAL & APARTMENT BUILDING 2-40 UPPER HEIDELBERG ROAD IVANHOE



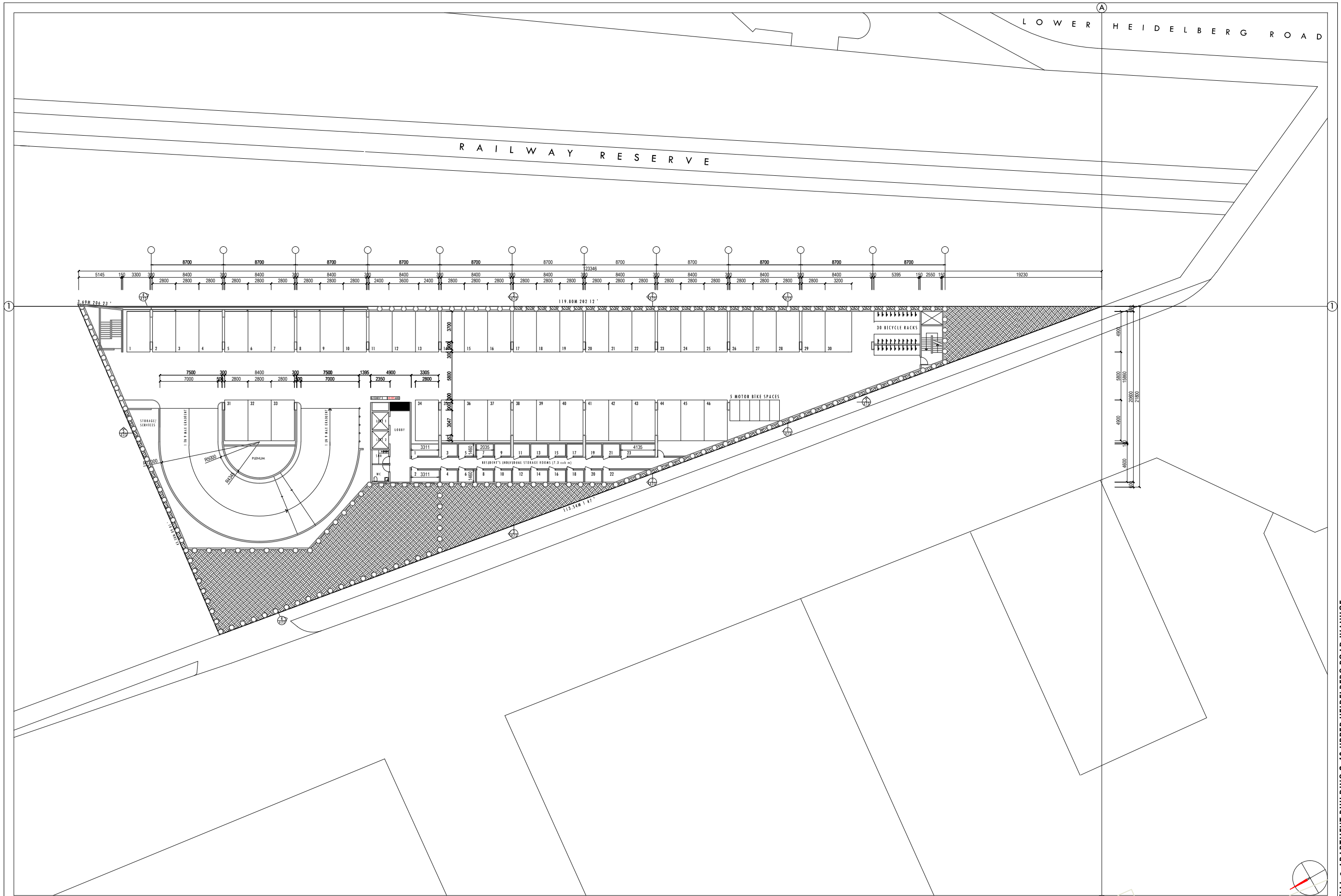
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| 3 | | |

BASEMENT LEVEL 2

| | | |
|-----------------------|---------|------------|
| DESIGN DEVELOPMENT TP | TP. A06 | OF 14 |
| JOB NO 2039 | REV B | APRIL 2017 |

JOHN DEMOS ARCHITECTS
SUITE 1 & 2 ALBERT ROAD
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VICTORIA AUSTRALIA
+61 3 9654 1000
john@johndemos.com

COMMERCIAL & APARTMENT BUILDING 2-40 UPPER HEIDELBERG ROAD IVANHOE



| NO | DATE | ISSUE |
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| 1 | | |
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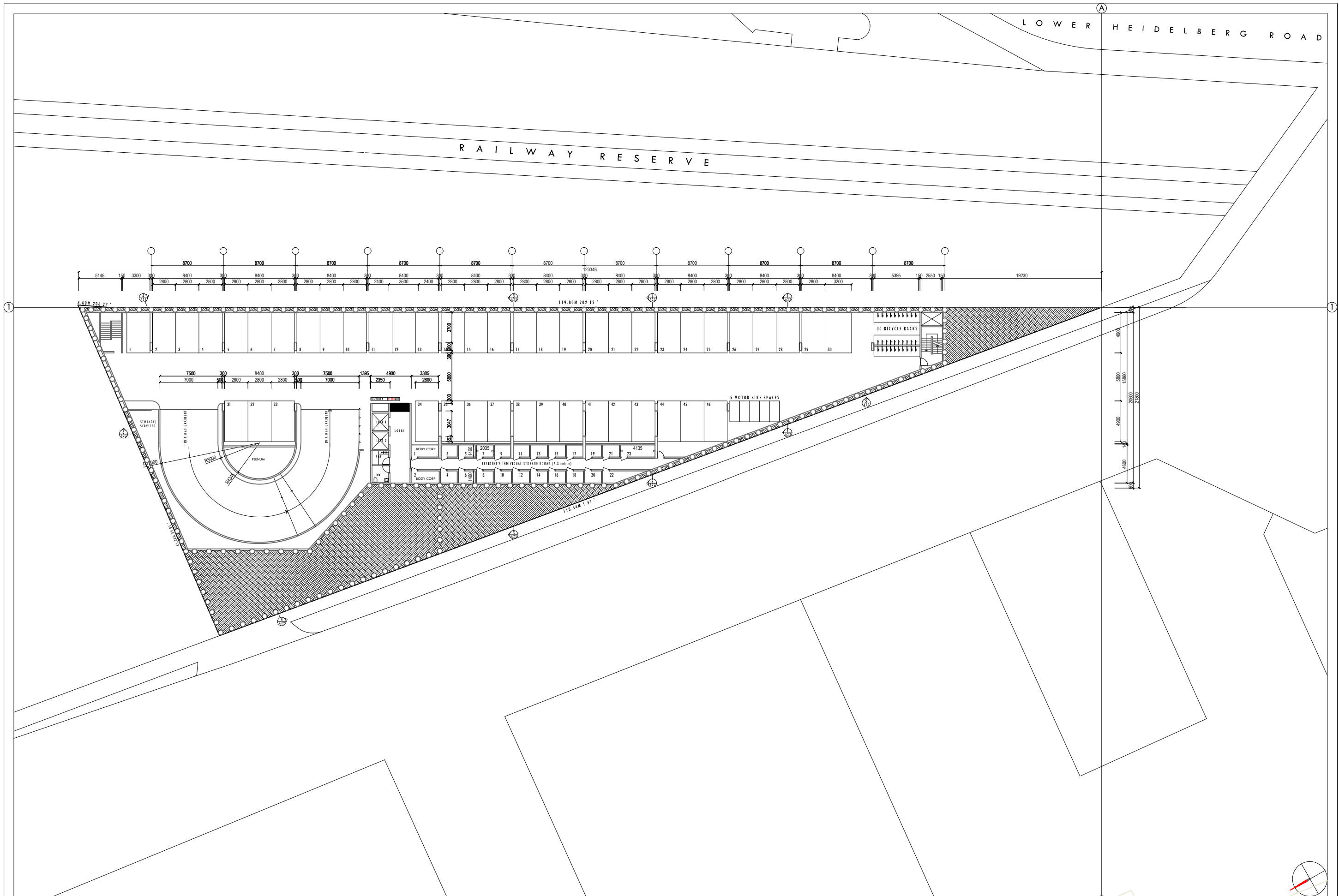
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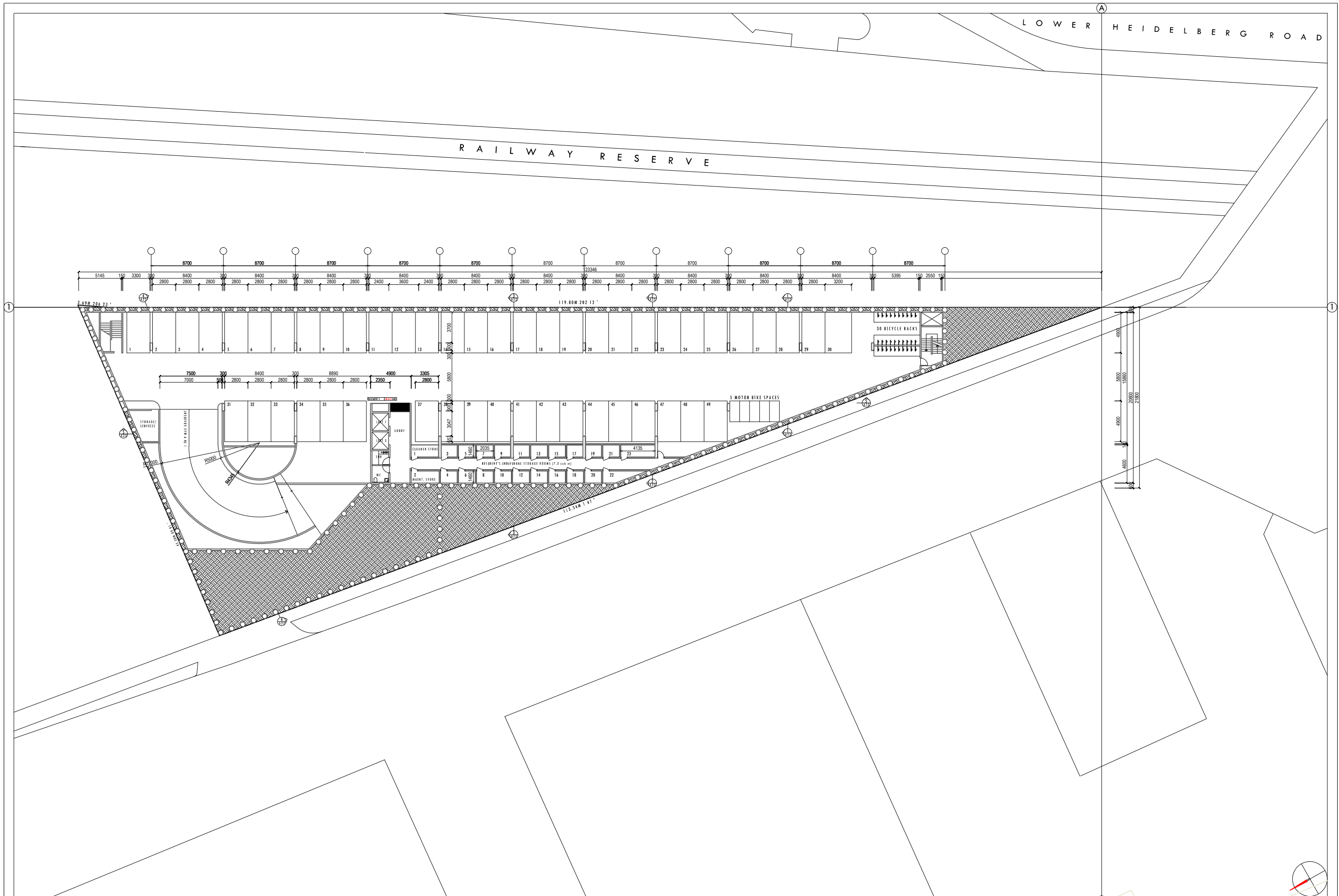
| DESIGN DEVELOPMENT | TP |
|--------------------|----|
| TP. A05 | DF |
| REV B | |

SCALE: 1:200 @ A1
JOB NO 2039
APRIL 2017

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COMMERCIAL & APARTMENT BUILDING 2-40 UPPER HEIDELBERG ROAD IVANHOE





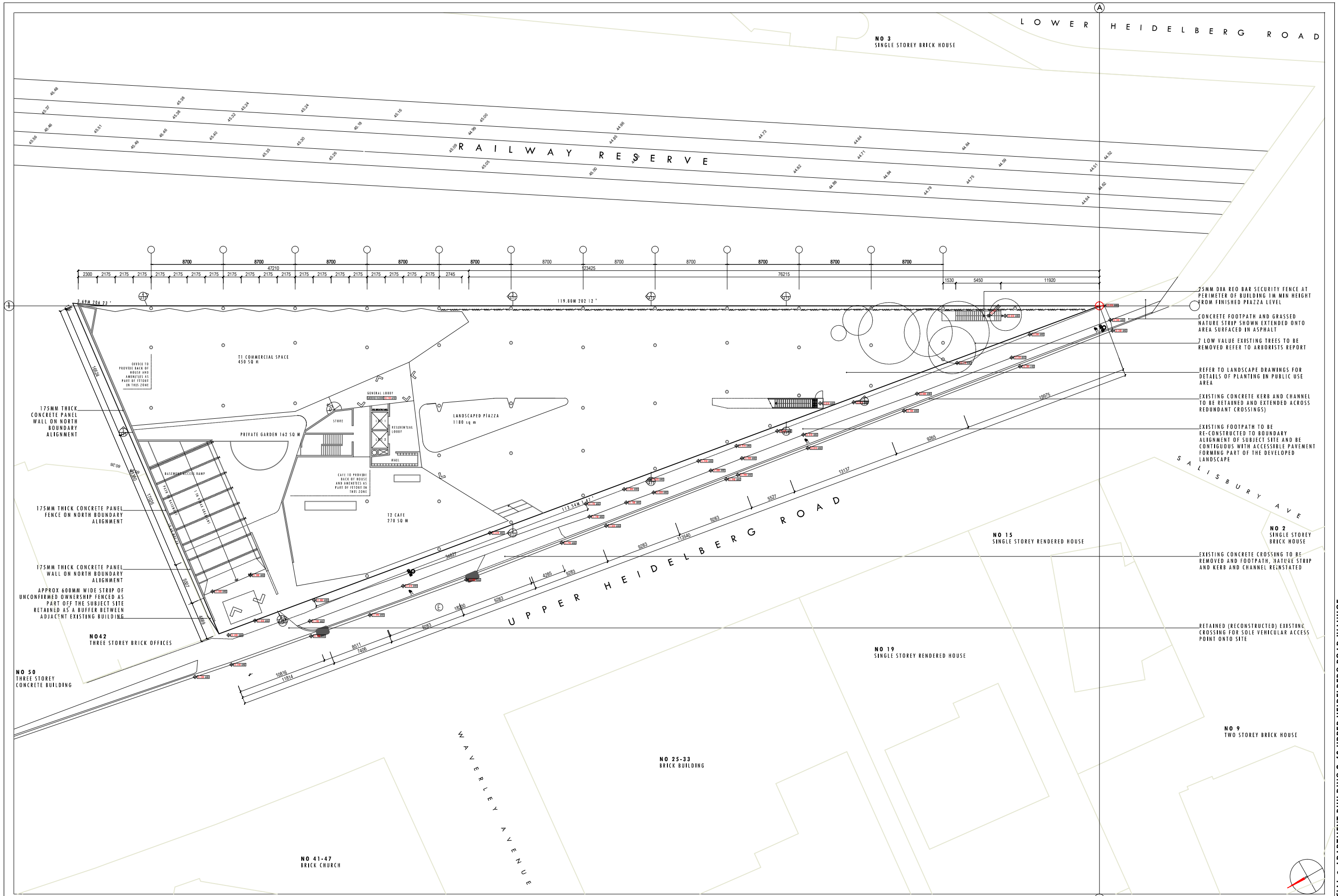
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BASEMENT LEVEL 5

| | |
|-----------------------|---------|
| DESIGN DEVELOPMENT TP | TP. A03 |
| OF 14 | REV 8 |
| APRIL 2017 | |

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| NO | DATE | ISSUE |
|----|------|-------|
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| | | |
| | | |

GROUND
FLOOR PLAN

| DESIGN DEVELOPMENT TP | TP. A08 |
|-----------------------|---------|
| | |
| | |
| | |

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COMMERCIAL & APARTMENT BUILDING 2-40 UPPER HEIDELBERG ROAD IVANHOE

Traffic Engineering Assessment

40 Upper Heidelberg Road, Ivanhoe: Proposed Mixed Use Development

Appendix B: Parking Survey Results

Supervised By: Fiona Banh
Surveyed By: Jignisha Patel

Survey Dates & Times: See below

| Location | Restriction | Capacity Min - Max | Thursday 24th November, 2016 | | | | | Saturday 26th November, 2016 | | | |
|---|---|-----------------------|------------------------------|--------|-----|-----|-----|------------------------------|-----|-----|-----|
| | | | 9am | 12noon | 1pm | 7pm | 8pm | 12noon | 1pm | 7pm | 8pm |
| ON-STREET CARPARKING | | | | | | | | | | | |
| UPPER HEIDELBERG ROAD | | | | | | | | | | | |
| East Side | | | | | | | | | | | |
| Lower Heidelberg Road to opposite North Boundary #15 | No Stopping | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Opposite North Boundary #15 to NB #40 (subject site) | Clearway 7am-9am Mon-Fri, Tow Away | 11 | 3 | 7 | 8 | 9 | 11 | 7 | 4 | 1 | 1 |
| NB #40 to SB #72-84 | Clearway 7am-9am Mon-Fri, Tow Away | 7 | 5 | 5 | 7 | 7 | 7 | 5 | 7 | 7 | 6 |
| SB #72-84 to 10m South of Kiernan Avenue | Clearway 7am-9am Mon-Fri, Tow Away 1P 9am-5:30pm Mon-Fri, 9am-12noon Sat | 6 | 3 | 5 | 6 | 6 | 6 | 5 | 6 | 4 | 5 |
| 10m South of Kiernan Avenue to Kiernan Avenue | No Stopping | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| West Side | | | | | | | | | | | |
| Kiernan Avenue to 30m South of Kiernan Avenue | No Stopping | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 30m South of Kiernan Avenue to 10m North of Abbotsford Grove | 1P 9am-5:30pm Mon-Fri, 9am-12:30pm Sat | 3 | 1 | 3 | 2 | 3 | 3 | 2 | 3 | 2 | 3 |
| 10m North of Abbotsford Grove to Abbotsford Grove | No Stopping | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Abbotsford Grove to 10m South of Abbotsford Grove | No Stopping | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10m South of Abbotsford Grove to 10m North of Waverley Avenue | 1P 9am-5:30pm Mon-Fri, 9am-12:30pm Sat | 6 | 1 | 6 | 5 | 6 | 3 | 3 | 6 | 6 | 4 |
| 10m North of Waverley Avenue to Waverley Avenue | No Stopping | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Waverley Avenue to 10m South of Waverley Avenue | No Stopping | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10m South of Waverley Avenue to 10m North of Salisbury Avenue | 1P 9am-5:30pm Mon-Fri, 9am-12:30pm Sat | 7 | 1 | 2 | 2 | 1 | 2 | 3 | 3 | 0 | 1 |
| 10m North of Salisbury Avenue to Lower Heidelberg Road | No Stopping | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| UPPER HEIDELBERG ROAD | Capacity | 40 - 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| | Total Number of Cars Parked | | 14 | 28 | 30 | 32 | 32 | 25 | 29 | 20 | 20 |
| | Total Number of Vacant Spaces | | 26 | 12 | 10 | 8 | 8 | 15 | 11 | 20 | 20 |
| | Percentage Occupancy | | 35% | 70% | 75% | 80% | 80% | 63% | 73% | 50% | 50% |
| Note: Public parking includes spaces that are available to the general public and excludes 'No Stopping' areas during the relevant enforcement periods | | | | | | | | | | | |
| <div>LEGEND:</div> <div>Public Parking<div></div></div> <div>Not available to the general public<div></div></div> <div>No Stopping/ Other No Parking<div></div></div> | | | | | | | | | | | |