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TRAFFIC · PARKING · ACOUSTICS

Residential Apartment Tower
5 Hercules Street Hamilton

Traffic Engineering Report

Pamada

Reference: 13BRT0625rep1

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1. Introduction

1.1. Background

TTM Consulting has been engaged by Pamada to prepare a traffic engineering assessment of a proposed residential apartment tower in Hamilton. It is understood that this will form part of a Development Application to be submitted to EDQ (Economic Development Queensland).

1.2. Scope

This report investigates the transport aspects associated with the proposed development. The scope of the transport aspects investigated includes:

- Parking supply required to cater for development demand
- Parking layout to provide efficient and safe internal manoeuvring
- Access configuration to provide efficient and safe manoeuvring between the site and the public road network
- Internal layout to provide efficient and safe internal manoeuvring for service vehicles
- Suitability of access and internal facilities to provide for pedestrian and cyclist operation
- Access to suitable level of public transport

To assess the proposed transport arrangements, the development plans have been assessed against the following guidelines and planning documents:

- ULDA (*EDQ*) Northshore Hamilton Urban Development Area, Development Scheme
- Australian Standard 2890.1, 2890.2 and 2890.6.
- BCC Transport, Access, Parking and Servicing Planning Scheme Policy

Excluded from this report is any detailed assessment of the impact of the proposed development on the external road network.

1.3. Site Location and Current Use

The site is located at 5 Hercules Street Hamilton, within the Northshore Hamilton Urban Development Area, as shown in Figure 1.1. The property description is Lot 1 on RP 231749. The site has road frontages to both Hercules Street and a Main Street to be constructed along the southern boundary of the site. It is currently occupied by a commercial building, and includes a single vehicular driveway crossover on Hercules Street.

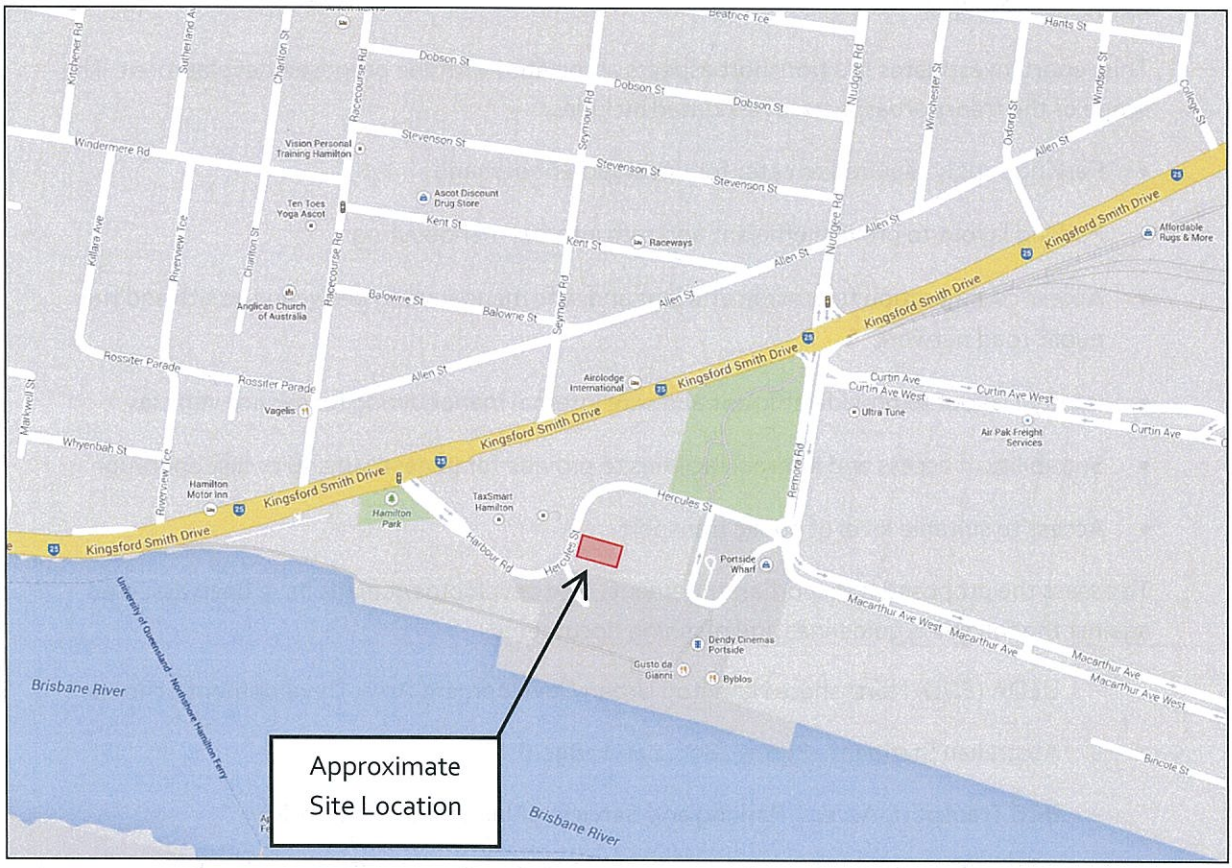


Figure 1.1: Site location

2. The Proposed Development

2.1. Development Profile

The proposed development comprises an 19 level tower (plus rooftop) with a small retail component occupying the ground level, 15 levels of residential apartments, 3 levels of podium parking plus two additional levels of basement parking.

The proposed land uses for this development are summarised in Table 2.1.

Table 2.1: Proposed Land Uses

Use	Area/Qty
Ground level retail floorspace	135m^2 gfa
1-bedroom apartment	x 65
2-bedroom apartment	x 71
3-bedroom apartment	x 15
Total apartments	x 151
Total floor area (all uses)	14580m^2 gfa
Carparking	155 car spaces (including 1 PWD space)
Vehicular Access	1 x 5.5m wide undivided driveway on Hercules St near the northern boundary and 1 x 6.4m wide undivided driveway on the Main Street, near the eastern boundary.
Servicing	On-site service bay for an SRV plus kerbside bay (on private road) for refuse collection and furniture trucks
Bicycle Parking	Dedicated space for approximately 80 bicycle parking spaces plus approximately 70 storage uses which could also be used for storage of individual bikes.

It should be noted that the 'anticipated' development for the site (from a Consideration in Principle (CiP) given by the ULDA in 2012) was 7,920m^2 gfa or 132 units. Compared to the number of units in this CiP, the proposed development has just 19 more units. Thus TTM consider the proposal to be essentially consistent with the CiP in terms of unit numbers and consequently traffic generation/impact.

3. Existing Transport Infrastructure

3.1. The Road Network

The hierarchy and characteristics of roads in the immediate vicinity of the site are shown below in Table 3.1

Table 3.1: Local Road Hierarchy

Road	Speed Limit	Form	Classification	Road Authority
Kingsford Smith Drive	60kph	4-lanes	Arterial	BCC
Hercules Street / Harbour Road	50kph	2-lanes including kerbside parking	Neighbourhood Access	BCC
Remora Road	50kph	2-lanes including kerbside parking	Neighbourhood Access	BCC
Macarthur Avenue	60kph	2-lanes including kerbside parking	Neighbourhood Access	BCC
Main Street (along the sites southern boundary)	20-30kph	2-lanes + kerbside parking	Local Access	private

The following intersection controls apply in the vicinity of the site:

- Kingsford Smith Drive / Hercules Street is a fully signalised t-intersection
- Kingsford Smith Drive / Remora Road / Nudgee Road is a fully signalised 4-way intersection
- Hercules Street / Remora Road/Macarthur Avenue is roundabout controlled.
- Hercules Street / Main Street is a priority controlled t-intersection

3.2. Road Planning

Brisbane City Council has a proposal for a significant upgrade of Kingsford Smith Drive between Theodore Street and Breakfast Creek Road, expanding the capacity from four to six lanes by constructing a retaining wall in the Brisbane River. As part of this project, a new road connection between Hercules Street / Harbour Road and Kingsford Smith Drive will be constructed, with the intersection of the two roads being a signalised t-intersection. The eastern end of this project, including the new road link and intersection, is shown in Figure 3.2.

Council has announced that an in-principle agreement has been reached with the Queensland Investment Corporation and Queensland Motorways Limited to take over operational responsibilities and tolling rights to the Legacy Way tunnel and the GoBetween Bridge in a 50-year lease. Funding from this agreement will be directed towards the Kingsford Smith Drive upgrade, subject to State and Federal Government approval of the agreement.

Figure 3.1: Eastern End of Kingsford Smith Drive Upgrade

3.3. Public Transport and Pedestrian Facilities

Doomben and Ascot train stations on the Doomben line are located approximately 1200m to the northeast and northwest of the site respectively.

Northshore and Bretts Wharf Citycat ferry terminals are located approximately 1600m to the east of the site, and 600m to the west of the site respectively.

The nearest on-street bus stops are located 380m away on Racecourse Road (north of Allen Street), and 600m away on Kingsford Smith Drive near the Bretts Wharf Citycat ferry terminal. Both stops are serviced by bus routes 300 & 305, connecting the site with both Toombul Centro and the Brisbane CBD. These routes provide a weekday service generally every 15-20 minutes, and weekend services generally every 30 minutes. Figure 3.2 shows these bus routes.

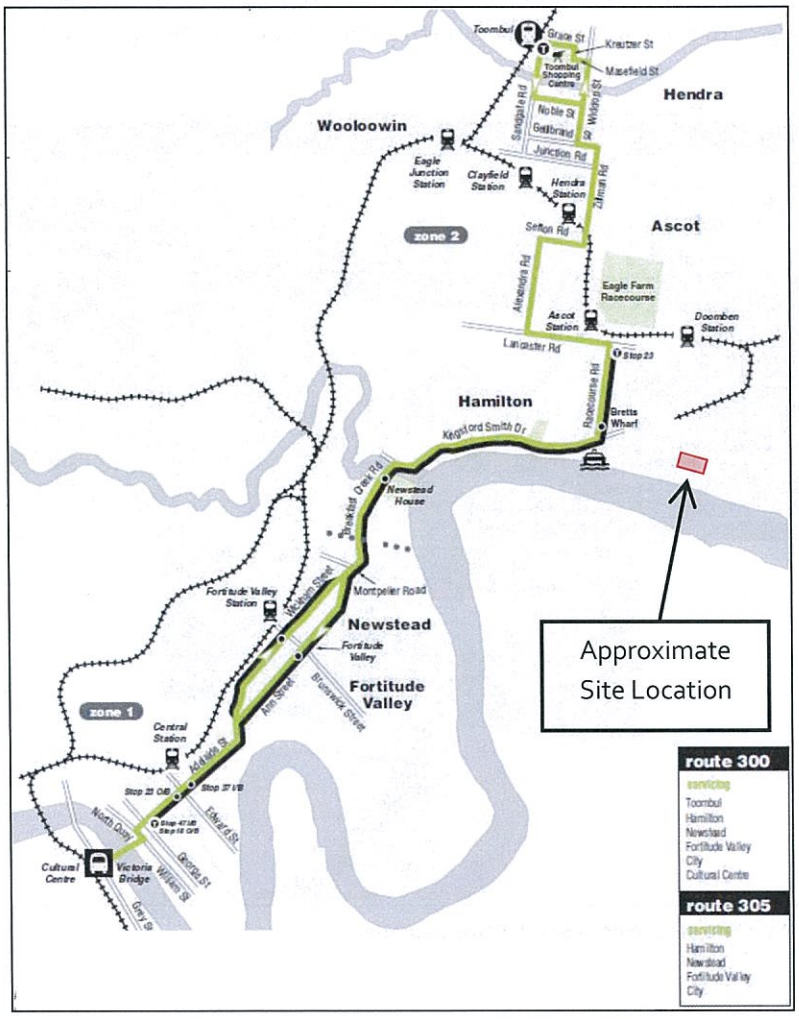


Figure 3.2: Local Bus Routes

Formal pedestrian footpaths are located on both sides of all roads in the immediate vicinity of the site, and signalised pedestrian crossings are incorporated into nearby intersections with Kingsford Smith Drive.

An off-road cycle path extends from the nearby cruise ship terminal westward toward Newstead, between Kingsford Smith Drive and the river's edge. Other on-street routes connect Kingsford Smith Drive to Doomben and Ascot train stations. Cycle routes in the vicinity of the site are shown in Figure 3.3.

Figure 3.3: Local Cycle Routes

4. Site Access Arrangements

4.1. Proposed Access Arrangements and Their Adequacy

The proposed development incorporates a 90 space low turnover podium carpark, for residents, and a 65 space low turnover ground/basement carpark, for residents, their legitimate visitors and the small retail component.

To access these parking facility, two vehicular access driveways are proposed, a 5.5m wide driveway on Hercules near the northern boundary and a 6.1m wide driveway on the Main Street near the eastern boundary.

Table 4.1 identifies the characteristics of the proposed access driveway compared to the requirements of Australian Standard AS2890.1. The last column identifies the compliance of each design aspect. Where compliance with the standard is not achieved, the alternative performance solution is further discussed below.

Table 4.1: Proposed Access Arrangements

Design Aspect	AS2890.1 Requirement	Proposed Provision	Compliance
Hercules Street Driveway (servicing 90 Type 1A spaces from a local road)			
Crossover design	3-5.5m undivided	5.5m undivided	AS2890 Complaint
Minimum separation from adjacent intersection	6m	≈20m	AS2890 Complaint
Desirable/minimum sight distance for 50kph road	69m/45m	Estimated as at least 45m	AS2890 Complaint
Queue storage capacity	3 vehicles = 18m (for up to 100 cars)	36m = 6 cars	AS2890 Complaint
Gradient of first 6m	1 in 20 (5%)	Essentially flat	AS2890 Complaint
Main Street Driveway (servicing 65 Type 1A spaces from a local road)			
Crossover design	3-5.5m undivided	5.5m undivided	AS2890 Complaint
Minimum separation from adjacent intersection	6m	≈37m	AS2890 Complaint
Desirable/minimum sight distance for 30kph road	41m/25m (estimated figures for lower speed)	Estimated as approximately 25m	AS2890 Complaint
Queue storage capacity	2 vehicles = 12m (for up to 67 cars)	6m = 1 car	**Alternative Solution**
Gradient of first 6m	1 in 20 (5%)	Essentially flat	AS2890 Complaint

4.2. Alternative Performance Solutions

The following aspect of the access design does not strictly satisfy the requirements of AS2890.1, and an alternative performance solution is proposed as discussed below.

Queue Storage Capacity: The 1 car queue length provided at the *Main Street* access driveway is deficient by 1 car length. This is not considered significant for the following reasons:

- the carpark primarily comprises low turnover residential spaces, which generate only very limited traffic
- parked vehicles within the additional 6m queue storage space required are likely to include an SRV service vehicle, a PWD car and a retail staff member all of the which are low turnover
- Main Street, being a private local access road, is unlikely to carry a significant traffic volume

Given the low vehicular activity within the site, and immediately outside it on *Main Street*, it is considered that the likelihood of vehicle queues extending onto Main Street is very low, and that if it did occur, the impact on the external road network would be insignificant in terms of safety and efficiency.

5. Car Parking Arrangements

5.1. Council Parking Supply Requirement

Based on the requirements of the EDQ Northshore Hamilton Development Scheme, car parking requirements are as detailed in Table 5.1

Table 5.1: EDQ Parking Supply Requirement

Use	Area/Qty	EDQ Rate	EDQ Requirement
Ground level retail floorspace	135m^2 gfa	1/100m^2 gfa (maximum)	2
Residential apartments - tenants & visitors	x151	1/unit (maximum)	151
TOTAL			153

5.2. Proposed Parking Supply

The proposed parking supply consists of a total of parking spaces, as detailed in Table 5.2.

Table 5.2: Proposed Parking Supply

Level	Res Tenant			Res Visitor	Res 'share' cars	Retail	Total
	Standard	Small	Stacker				
P3	32	0	7	0	0	0	39
P2	25	0	0	0	0	0	25
P1	26	0	0	0	0	0	26
Ground	2	0	0	2	2	1	7
Basement 1	30	5	6	0	0	0	41
Basement 2	12	5	0	0	0	0	17
Total	127	10	13	2	2	1	155

The proposed parking supply provides 1 parking space for most apartments (ie 137 out of 151), with an additional stacker space for most of the 3-bedroom apartments (ie 13 out of 15).

Two residential visitor spaces are also provided at ground level.

It is also proposed to introduce a car share scheme, whereby two parking spaces are allocated to communal cars which can be hired by residents as and when required, through a central booking system. The two spaces for this use are located at ground level.

The total residential parking supply of 154 spaces is therefore just two spaces in excess of the parking allowable under the EDQ development scheme, which is considered an insignificant departure from the scheme.

It should be noted that the stacker spaces are only provided for the small number of large apartments, and being stacker spaces they are more likely to be used by low usage cars eg the weekend sports-car, rather than 'everyday' cars.

As such, the provision of these additional residential parking spaces is not expected to have any significant effect on intersection performance, road capacity, or public transport usage.

One space is provided for a retail employee, which is consistent with the parking allowable under the EDQ development scheme.

TTM consider the proposed parking supply and allocation to be appropriate.

5.3. Car Park Layout

Table 5.3 identifies the characteristics of the proposed parking area with respect to the Australian Standards requirements. The last column identifies the compliance of each design aspect. Where compliance with Australian Standards is not achieved, the alternative performance solution is further discussed below.

Table 5.3: Australian Standards Carpark Requirements and Proposed Carpark Characteristics

Design Aspect	AS2890 Requirement	Proposed Provision	Compliance
Parking space length (min)			
► Standard car	5.4m	5.4m	AS Compliant
► Small car	5.4m	5.4m	AS Compliant
► PWD car	5.4m	5.4m	AS Compliant
Parking space width (min):			
► Residential tenant	2.4m	2.4m	AS Compliant
► Residential tenant (small)	2.3m	2.3m	AS Compliant
► Residential visitor	2.4m	2.6m	AS Compliant
► PWD	2.4m (+2.4m shared zone)	2.6m (+2.6m shared zone)	AS Compliant
► Retail	2.6m	2.6m	AS Compliant
Aisle Width (min):			
► Residential parking aisle	5.8m	5.8-6.2m	AS Compliant
► Retail parking aisle	6.2m	6.2m	AS Compliant
► Ramp	5.5m+0.3m kerbs	5.5m + 0.3m kerbs	AS Compliant
Parking envelope clearance:			
► Permissible column location near front of bay	between 0.75m and 1.75m of aisle	between 0.8m and 1.8m of aisle	**Alt Solution (BCC)**
► Min clearance to adjacent side wall	0.3m	0.3m	0.3m
Maximum Gradient:			
► PWD parking	1:40 (2.5%)	Flat	AS Compliant
► Parking aisle	1:16 (6.25%)	Generally flat, with small section of 1in20 in basement	AS Compliant
► Ramp	1:5 (20%)	1:6 (16.67%)	AS Compliant
Max. allowable change of grade (before transitions are required)	12.5% at summit & 15.0% at sag	Transitions ensure 8.3% maximum	AS Compliant
General / PWD height clearance	2.2m / 2.5m	Not less than 2.3m / 2.5m	AS Compliant
Terminated aisle treatment	1m past last bay	Adjacent aisle width of 8.2m	**Alt Solution (BCC)**

5.4. Alternative Performance Solutions

The following aspects of the carpark design do not strictly satisfy the requirements of AS2890.1, and alternative performance solutions are proposed as discussed below.

Column location: The column locations satisfy the alternative design standard of the Brisbane City Council TAPS Policy, which is not significantly different to AS2890.1

Terminated aisle treatment: The terminated aisle treatment on podium 3 provides an adjacent aisle width of 8.2m which is an alternative design solution identified in the Brisbane City Council TAPS Policy, and as such is considered an appropriate design.

6. Service Vehicle Arrangements

6.1. Practical Requirements

The residential component of the development requires a service bay for use by the following vehicles:

- a residential furniture truck (MRV or LRV),
- a residential refuse collection vehicle (RCV), and
- a trades van

The small retail component of the site has a practical requirement for say 1 x SRV bay.

6.2. Estimated Servicing Demand

Service vehicles are expected to visit the site as follows:

- Refuse collection (RCV) once per week
- Recycling collection (RCV) once per fortnight
- Residential furniture removal (LRV or MRV) up to three times per week
- Retail deliveries (Van or SRV) three times per week
- Tradesmen (Van) three times per week

This equates to an average of less than one large vehicle per day, and 1-2 small vehicles per weekday.

6.3. Proposed Service Vehicle Arrangements

The proposed service vehicle provisions include the following:

- one large kerbside service bay located on the Main Street adjacent to the site and measuring approximately 12.5m x 2.5m with unlimited vertical clearance, suitable for use by a residential furniture truck (LRV/MRV) and a refuse collection vehicle (RCV).
- one SRV service bay (7m x 3.5m x 3.5m vertical clearance) suitable for use by a trades or retail delivery vehicle;

The SRV service vehicle bay is accessed via the Main Street driveway. SRVs and vans enter and depart the site in a forward motion. Service vehicles using the large kerbside loading bay must approach the site from Hercules Street to the west, and depart the site to the east. Swept path manoeuvring diagrams of service vehicles, generated using *Autotrack* computer software is shown in Figure 6.1.

The bin room is located at ground level adjacent to the SRV service bay. It is proposed that bins be moved to the kerbside for collection when required. It is understood that refuse collection by a private contractor is proposed.

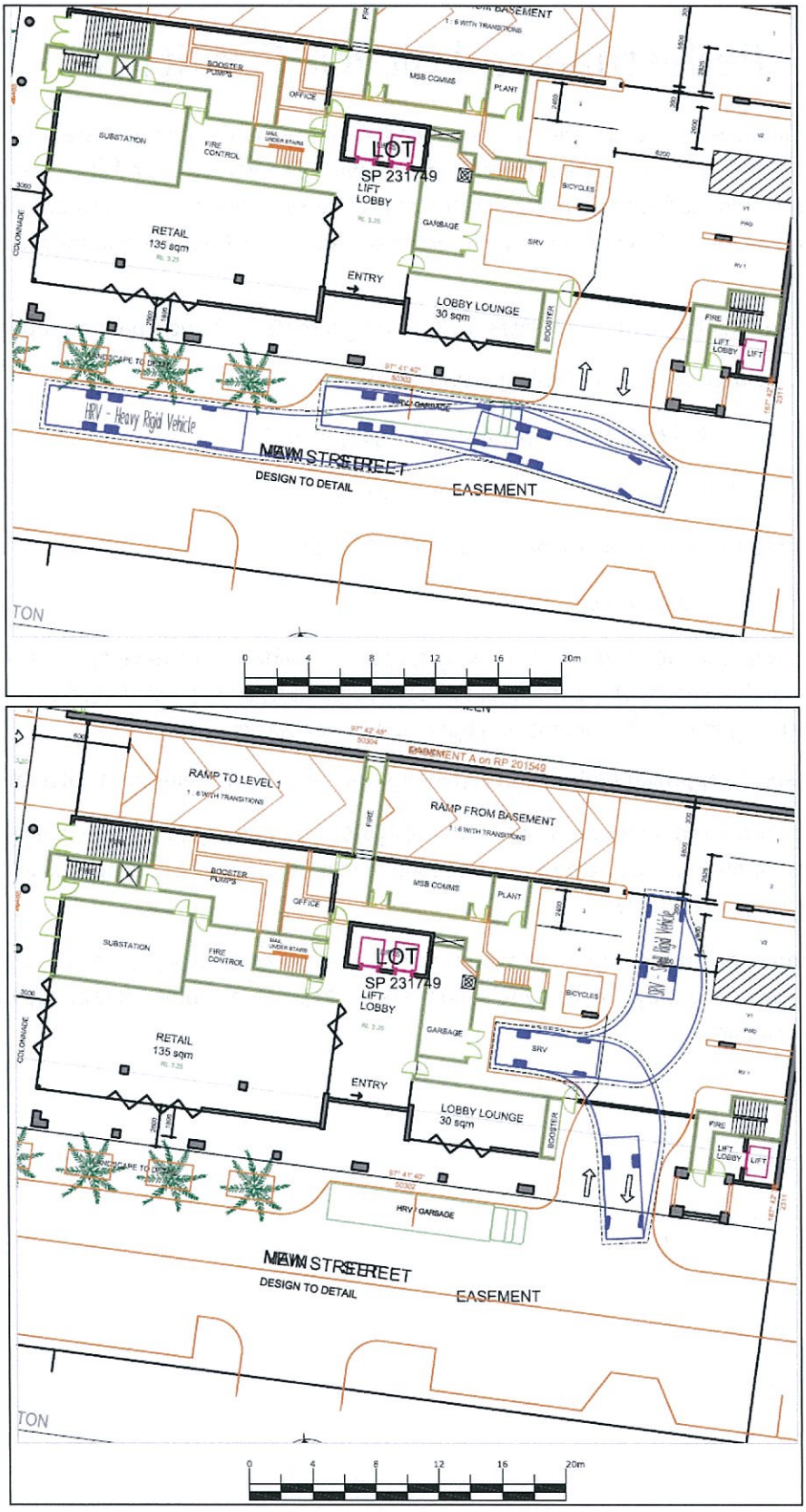


Figure 6.1: Service Vehicle Manoeuvring

7. Pedestrian and Bicycle Facilities

Pedestrian movement along the western boundary of the site (ie Hercules Street) is provided for within the road verge, where a concrete footpath will be constructed, and also within the contiguous colonnaded zone in front of the retail tenancy. Pedestrian movement along the southern boundary of the site (ie *Main Street*) is provided for within the colonnaded zone past the lift lobby.

The Development Scheme nominates the following targets for bicycle parking supply:

- 1 resident space per dwelling = 151 spaces
- 1 residential visitor space per 400sqm = 36 spaces
- 1 retail staff space per 200sqm NLA = 1 space
- 1 retail customer space per 1000sqm NLA = 1 space
- TOTAL = 189 spaces

Space for approximately 80 bicycle parking spaces is provided in the development, with approximately 5 spaces at ground floor for retail customers, and 75 distributed over podium and basement carparking for residents and their legitimate visitors.

This equates to approximately 1 bicycle parking space per 2 units, plus nominal retail parking.

Whilst the proposed provision is approximately 50% of the target, it is still considered a relatively generous supply in the context of what is required in other parts of Brisbane, and in TTMs opinion it is an appropriate supply.

Furthermore, a significant number of storage lockers (approximately 70) are provided within the parking levels for use by the residents, and these could provide additional capacity for bike parking if required.

8. Summary

8.1. Development Access

Two vehicular access driveways are proposed, a 5.5m wide driveway on Hercules near the northern boundary and a 6.1m wide driveway on the Main Street near the eastern boundary. The driveways generally satisfy all requirements of AS2890, with the exception of queue storage on the Main Street driveway, which is deficient by just one car, which is not considered significant given the location of this driveway.

8.2. Car Parking Arrangements

The proposed parking supply provides 1 parking space for most apartments (ie 137 out of 151), with an additional stacker space for most of the 3-bedroom apartments (ie 13 out of 15). Two residential visitor spaces are also provided at ground level. It is also proposed to introduce a car share scheme, whereby two parking spaces are allocated to communal cars which can be hired by residents as and when required, through a central booking system. The two spaces for this use are located at ground level. The total residential parking supply of 154 spaces is therefore just two spaces in excess of the parking allowable under the EDQ development scheme, which is considered an insignificant departure from the scheme. One space is provided for a retail employee, which is consistent with the parking allowable under the EDQ development scheme. TTM consider the proposed parking supply and allocation to be appropriate.

The carpark design is generally consistent with the requirements of AS2890, and where minor departures from the standard occur, the proposal satisfies the alternative design standard of the Brisbane City Council TAPS policy, which is considered an acceptable alternative.

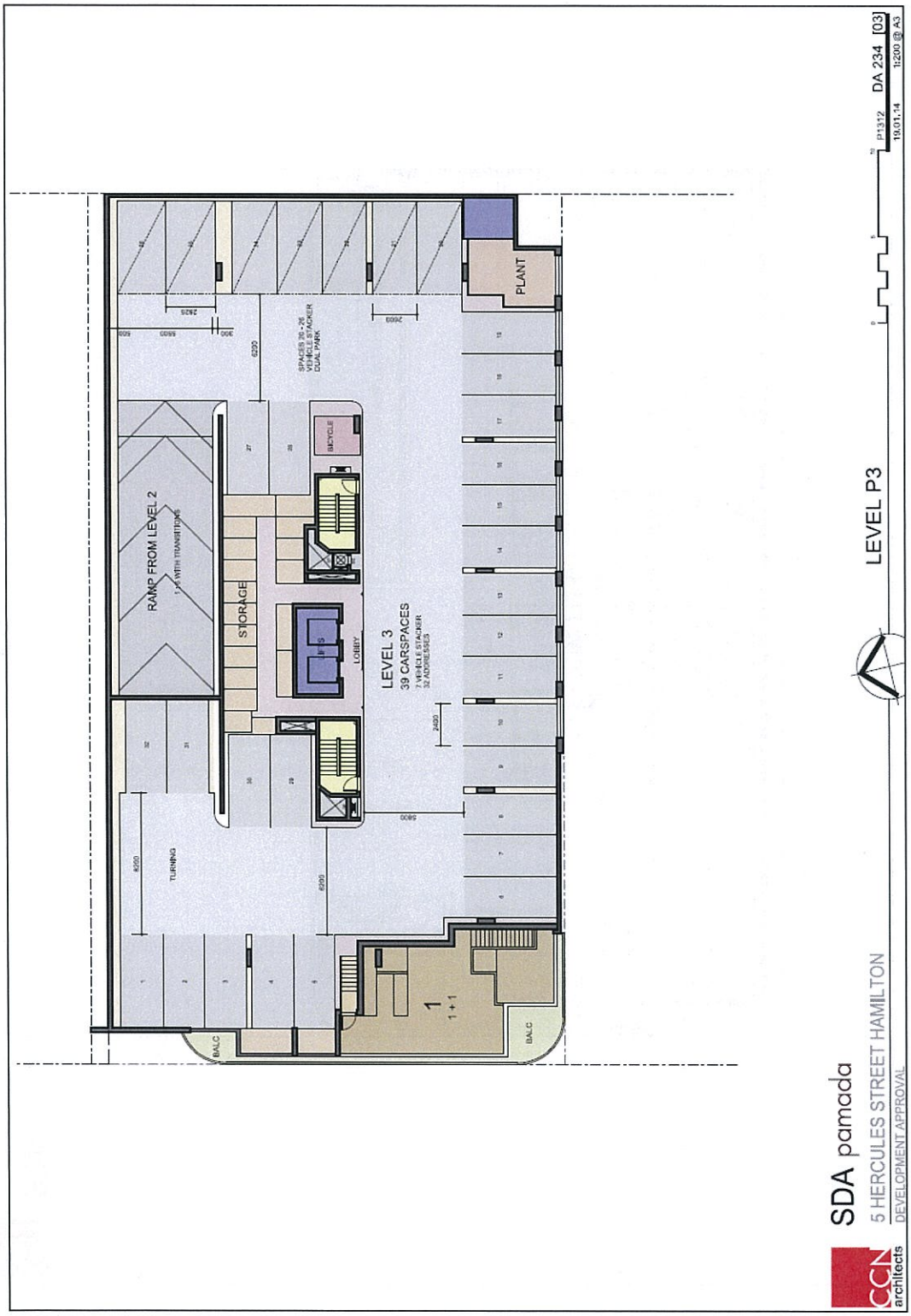
8.3. Service Vehicle Arrangements

The proposed service vehicle provisions include one large kerbside service bay located on the Main Street adjacent to the site (suitable for use by a residential furniture truck and a refuse collection vehicle) and one on-site SRV service bay suitable for use by a trades or retail delivery vehicle. SRVs and vans enter and depart the site in a forward motion, whilst large service vehicles using the kerbside loading baywill approach the site from Hercules Street to the west, and depart the site to the east. The bin room is located at ground level adjacent to the SRV service bay. It is proposed that bins be moved to the kerbside for collection when required. It is understood that refuse collection by a private contractor is proposed.

8.4. Pedestrian and Bicycle Facilities

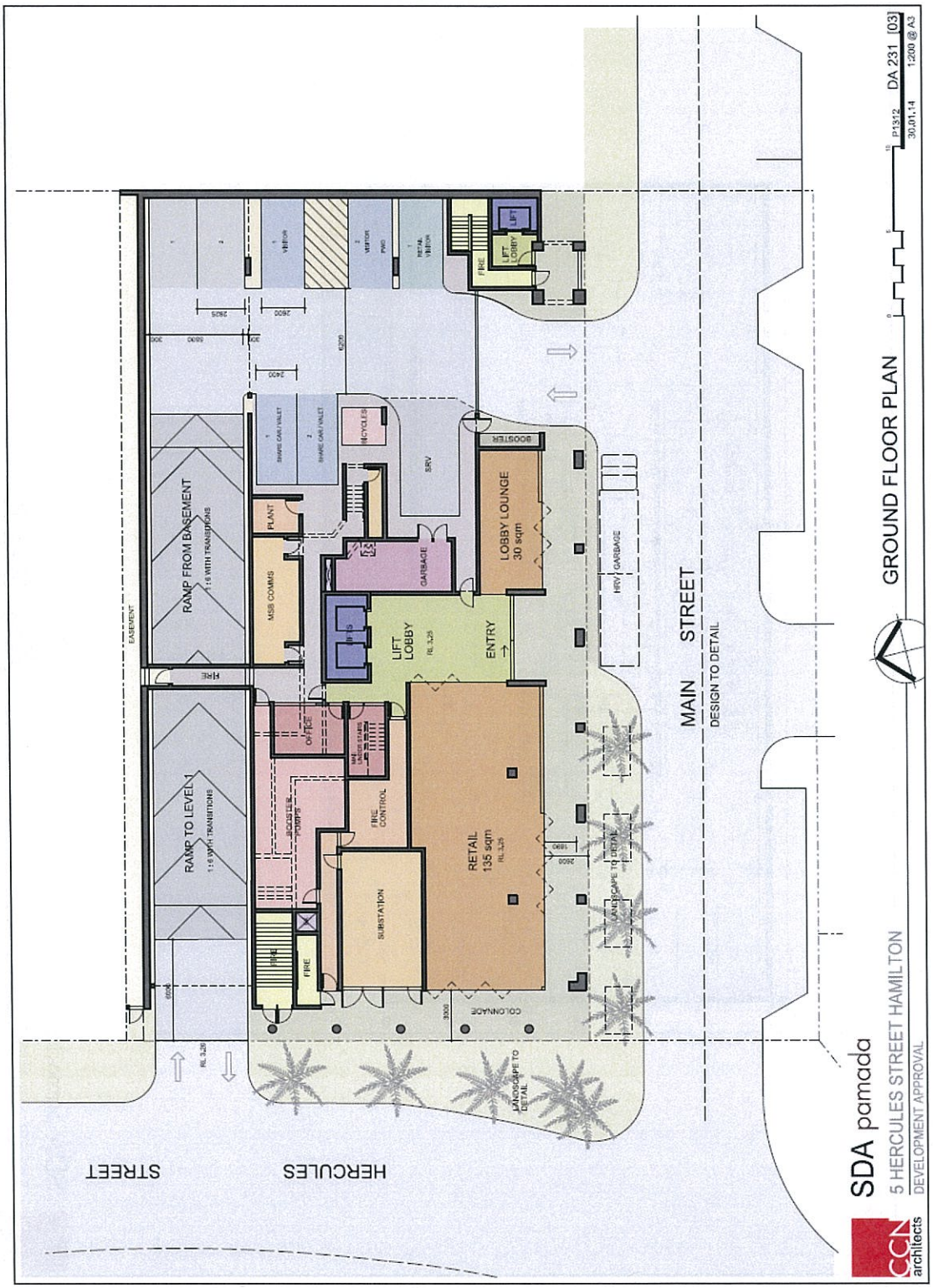
Pedestrian movement is facilitated along the southern and western boundaries of the site. Space for approximately 80 bicycle parking spaces is provided in the development, with approximately 5 spaces at ground floor for retail customers, and 75 distributed over podium and basement carparking for residents and their legitimate visitors. This equates to approximately 1 bicycle parking space per 2 units, plus nominal retail parking. Whilst short of the EDQ target provisiuon, it is still considered a relatively generous supply in the context of what is required in other parts of Brisbane, and in TTMs opinion and in TTMs opinion it is an appropriate supply.

Appendix A Development Plans


RAMP FROM LEVEL 2
1:14 WITH TRANSITIONS
STORAGE
BICYCLE
LIFTS
LOBBY
LEVEL 3
39 CARSPACES
7 VEHICLE STACKER
32 ADDRESSES
SPACES 35-39
VEHICLE STACKER
DUAL PARK
PLANT
TURNING
BALC
1
1+1
LEVEL P3
SDA pamada
5 HERCULES STREET HAMILTON
DEVELOPMENT APPROVAL
CCN architects
P1312
DA 234 [03]
19.01.14
1:200 @ A3


LEVEL P2
LEVEL 2
25 CARSPACES
RAMP FROM LEVEL 1
RAMP TO LEVEL 3
STORAGE
LIFT
LOBBY
BICYCLE
LIFT LOBBY
BALC
STORAGE
4
1 BED
3
1 + 1
1
1 + 1
SDA pamada
5 HERCULES STREET HAMILTON
DEVELOPMENT APPROVAL
CCN architects
P1312
DA 233 [03]
19.01.14
1:200 @ A3


LEVEL P1
LEVEL 1
26 CARSPACES
RAMP FROM GROUND FLOOR
RAMP TO LEVEL 2
STORAGE
BICYCLE
LIFT
LOBBY
LIFT LOBBY
BALC
2
1 BED
3
1+1
BICYCLE WORKSHOP
COLONNADE
SDA pamada
5 HERCULES STREET HAMILTON
DEVELOPMENT APPROVAL
CCN architects
P1312
19.01.14
DA 232 [03]
1:200 @ A3


GROUND FLOOR PLAN
DA 231 [03]
P1312
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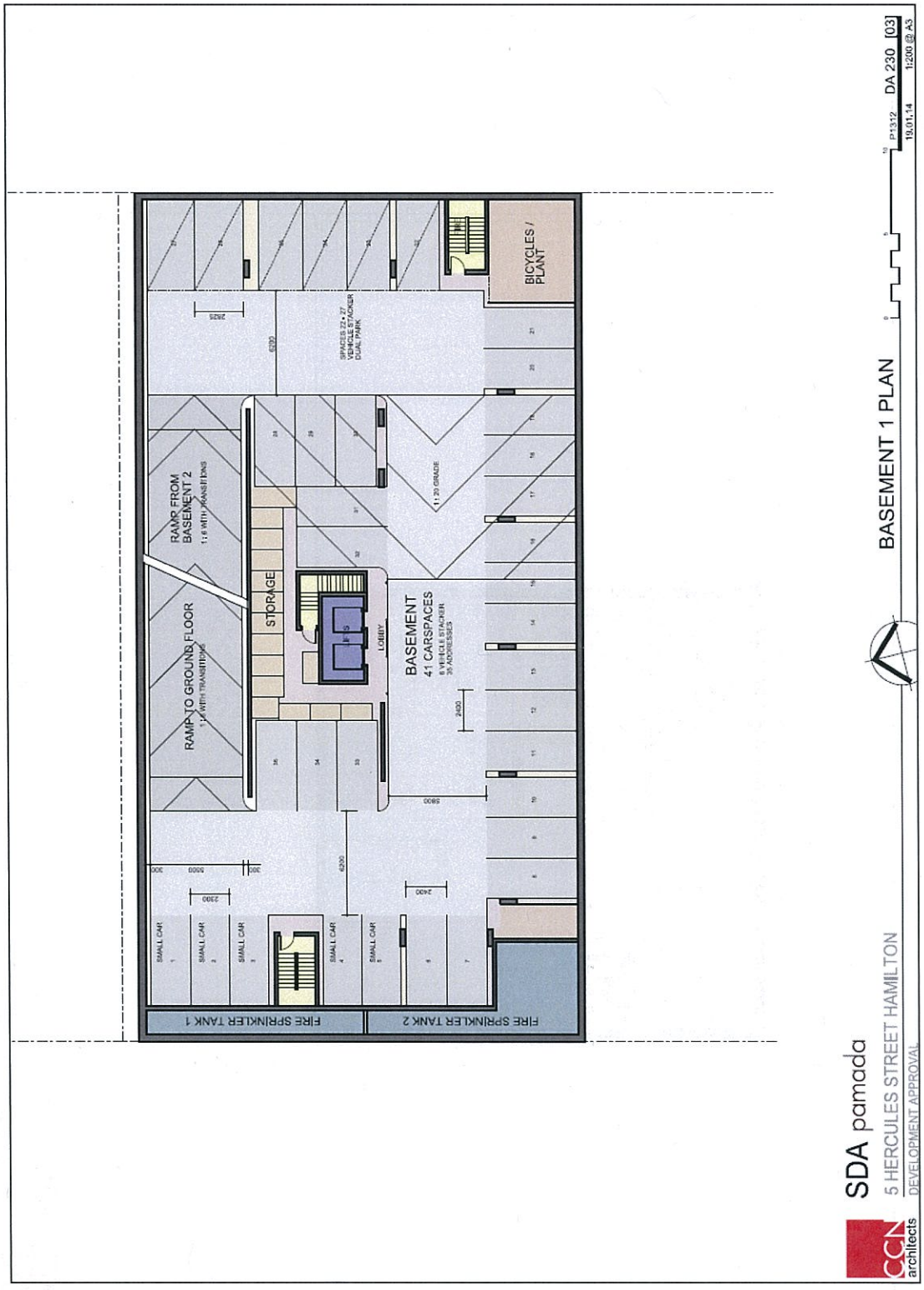
SDA pamada
5 HERCULES STREET HAMILTON
DEVELOPMENT APPROVAL
CCN architects
MAIN STREET
DESIGN TO DETAIL
HERCULES STREET
RAMP FROM BASEMENT
1:16 WITH TRANSITIONS
RAMP TO LEVEL 1
1:16 WITH TRANSITIONS
LOBBY LOUNGE
30 sqm
RETAIL
135 sqm
RL 3.25
LIFT LOBBY
ENTRY
SUBSTATION
FIRE CONTROL
BOOSTER POMPS
OFFICE
PLANT
MSB COMMS
GARBAGE
HRV GARBAGE
BOOSTER
LIFT
LIFT LOBBY
FIRE
SRV
BICYCLES
COLONNADE
LANDSCAPE TO DETAIL
EASEMENT


BICYCLES / PLANT
SPACES 22 + 27 VEHICLE STACKER DUAL PARK
RAMP FROM BASEMENT 2
1:6 WITH TRANSITIONS
STORAGE
LIFTS
LOBBY
BASEMENT
41 CARSPACES
8 VEHICLE STACKER
33 ACCESS
RAMP TO GROUND FLOOR
1:6 WITH TRANSITIONS
1:20 GRADE
SMALL CAR
FIRE SPRINKLER TANK 1
FIRE SPRINKLER TANK 2
BASEMENT 1 PLAN
SDA pamada
5 HERCULES STREET HAMILTON
DEVELOPMENT APPROVAL
CCN architects
P1312
DA 230 [03]
19.01.14
1:200 @ A3


FIRE STORAGE TANKS UNDER RAMP
RAMP TO BASEMENT 1
1:6 WITH TRANSITIONS
STORAGE
LIFTS
LOBBY
BICYCLES / PLANT
BASEMENT
17 CARSPACES
SPRINKLER PUMP ROOM
SMALL CAR
5800
2400
6200
BASEMENT 2 PLAN
P1312
DA 229 [03]
19.01.14
1:200 @ A3
SDA pamada
5 HERCULES STREET HAMILTON
DEVELOPMENT APPROVAL
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