

3 November 2016

Our ref: 13.0703

Raadas Property Group
Unit 1a /26 Mornington Road,
Mornington TAS 7018

Att: Richard Doedens

Dear Richard

36 Argyle Street hotel flood management RFI from HCC Oct 2016

The Hobart City Council has requested further information on the development application for the above, related to flood risks at the site and their management.

These flood risk issues have been largely addressed in my flood study for the site (draft of 19 June 2016), and that report should be forwarded to Hobart City Council to be read with this letter. This report modelled the 1% annual exceedance probability (AEP) storm with the year 2100 hydrology from Entura's study commissioned by Council (which used 20% increase in rainfall intensity due to climate change). Note my report doesn't contain a detailed flood management plan.

The site is exposed to flood risk from overland flow. The source of this flow is from

- Elizabeth Street catchment (north of Liverpool Street), flowing into Liverpool Street, through the Bank Arcade to the site; and
- Hobart Rivulet surcharging back into the sag in Kemp Street.

This existing flood risk impacts properties near the sag of Kemp Street. Overland flow in a 1% AEP storm from Kemp Street flows through the site to Argyle Street. Overland flow in such a major storm will continue to flow in a similar way with the development in place.

Since writing my report, the project has changed from having an arcade through the ground floor, to a driveway from Kemp Street to Argyle Street. This is a positive change for reducing flood risk as it provides a wider and so higher capacity hydraulic conveyance for any overland flow. There is also a redirection proposed for the pipe that drains the sag in Kemp Street, to change where it connects to the Hobart Rivulet. The redirection of this pipe to be under the driveway through to Argyle Street with a surge pit in Argyle Street before connecting to the Rivulet, will help reduce the flood risk in Kemp Street and for the building. This is because the Rivulet will surcharge in Argyle Street instead of Kemp Street, and Argyle Street drains into Collins Street and towards the River Derwent.

The final flood levels within the building and on surrounding properties will be a function of this pipe sizing and its hydraulic performance, in particular when the Hobart Rivulet is pressurised. This can be finalised in detailed design. What we know currently is

- With a 6.5 m wide driveway (narrowing to 3 m with footpaths near Argyle) and grading from 5.75 m AHD in Kemp St to 5.70 m AHD in Argyle Street, there is modelled to be lower peak flood levels in Kemp Street than with the existing site (6.19 m AHD, compared to 6.27 m AHD). With a DN600 pipe from Kemp Street draining directly to the Rivulet, the peak levels in the driveway would be still above the 5.91 m AHD proposed ground floor level (existing level is approximately 6.0 m AHD).
- With the same driveway as above through the building, if the DN600 was directed under the driveway into Argyle St then into the Rivulet, the Kemp Street levels were lower again (6.10 m AHD compared to 6.19 m AHD), but still just above the proposed building floor levels. If the DN600 was upgraded to a DN750 then the peak levels are almost below the floor levels (5.93 m AHD in site road). These calculations use a 1D hydraulic model through the driveway, and more detailed two dimensional calculations will be done during detailed design. Nominally flood protection is required for 300 mm above the 1% AEP flood level if the overland flow path is determined by Council's to be in a flood prone area.

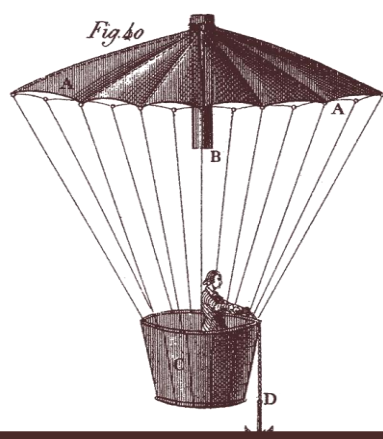
Suffice to say, the road through the site is superior from a flood conveyance point of view than a narrower and higher level arcade walkway. But by itself there could still be flooding of the building floor levels without redirecting and maybe upsizing the proposed DN600 into Argyle Street.

There is a benefit to having the driveway from Kemp Street to Argyle Street and redirected DN600 in varying amounts for the protection of existing flooded floor levels in Kemp Street, but even with the driveway and a DN750 pipe, the Kemp Street level was still 20 mm above an existing 6.04 m AHD floor level off Kemp Street. The 6.04 m AHD level was already flooded with the existing site. So if there needs to be a significant difference to the flood protection in Kemp Street, the redirected pipe under the driveway would be at least a dual DN600. The more conveyance capacity here the better, but obviously it's a matter of a cost-benefit.

Subject to the final pipe sizing there could still be a risk to the building being flooded. This will mean flood management is required for the building. A flood management plan to be developed in detailed design would have flood triggers, management procedures and infrastructure to make sure the occupants and property was adequately protected. Flood responses would include installing the flood gates/panels at entries, decided on when to leave the building and when to shelter in place.

Yours sincerely

Colin Terry PhD BE(Hons) MIEAust CPEng



Preliminary flood report

Managing risks for development and neighbours

36 Argyle Street, Hobart

for Raadas Investments

DRAFT 19 June 2016

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Gandy and Roberts Consulting Engineers
STRUCTURAL CIVIL HYDRAULICS

ph (03) 6223 8877
fx (03) 6223 7183
mail@gandyandroberts.com.au
159 Davey Street Hobart, Tasmania 7000
www.gandyandroberts.com.au

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1 Context

1.1 Engagement and scope of work

Gandy and Roberts Consulting Engineers have been engaged by Raadas Investments to undertake a preliminary flood study at part of the 36 Argyle Street hotel development. This development is located between Kemp Street and Argyle Street in a low lying part of Hobart. The site has the potential for overland flow from Kemp Street to flow through the site and also for inundation from an overflowing Hobart Rivulet to flood into the site during a major storm.

In terms of the project timeline, this investigation follows on from planning approvals for the subdivision of the land and for the building development, and has started prior to the detailed design of the building development. The purpose of this preliminary report is to

- Quantify, with limitations, the flood risks to the development and due to the development on neighbouring land—as a response to the planning conditions; and
- Provide conceptual input to the building design process for flood risk management strategies, in particular the impact of different sized opens for water to flow through the site.

Subject to the limitations and report outcomes, further work may be required to assess the impacts of the limitations and/or address solutions for any negative outcomes. The limitations are self-imposed by the project to provide a reasonable scope of work for a project on one allotment near the bottom of a complex stormwater system. These limitations will be a set of assumptions about the behaviour of the stormwater system external to the site and immediate surroundings.

1.2 The development and planning permits

The development is located on an empty ground level private car park between a high rise building on 34 Argyle Street and the Hobart City Council's Argyle Street Carpark at 38 Argyle Street (Figure 1). Part of this project is the adhesion of the land covered by the HCC's public toilets for the public carpark, and the subdivision of the high rise building on 34 Argyle Street. The final land will be called 36 Argyle Street after the subdivision occurs.

The draft layout of the multi-storey hotel ground floor is shown in Figure 2. Work during detailed design will develop this and incorporate the outcomes from this report. The building blocks the overland flow path, but has doors that lead into and out of the building. In particular there are doors into an arcade that provides a pedestrian thoroughfare directly from Kemp Street to Argyle Street.

There are two relevant planning permits for the development, one for the building and one for the subdivision. The key stormwater planning conditions are shown in Figure 3.

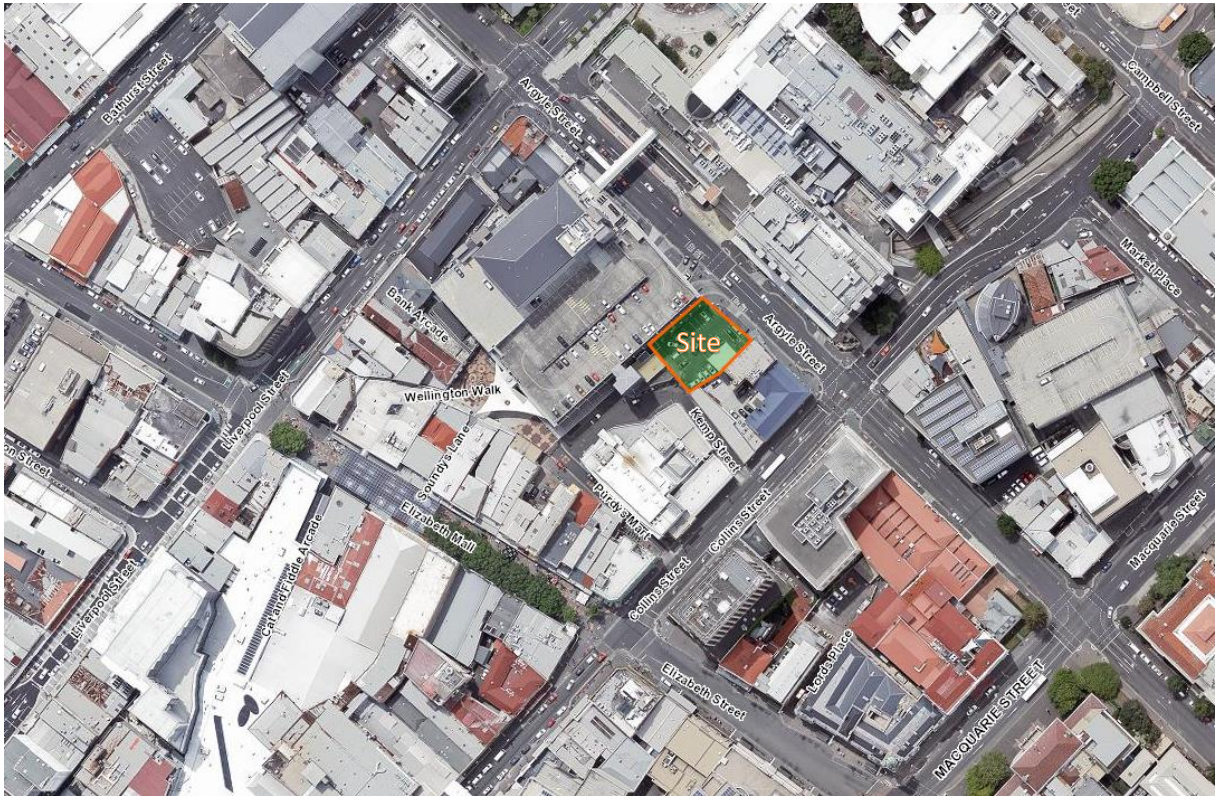


Figure 1. Site location in central Hobart

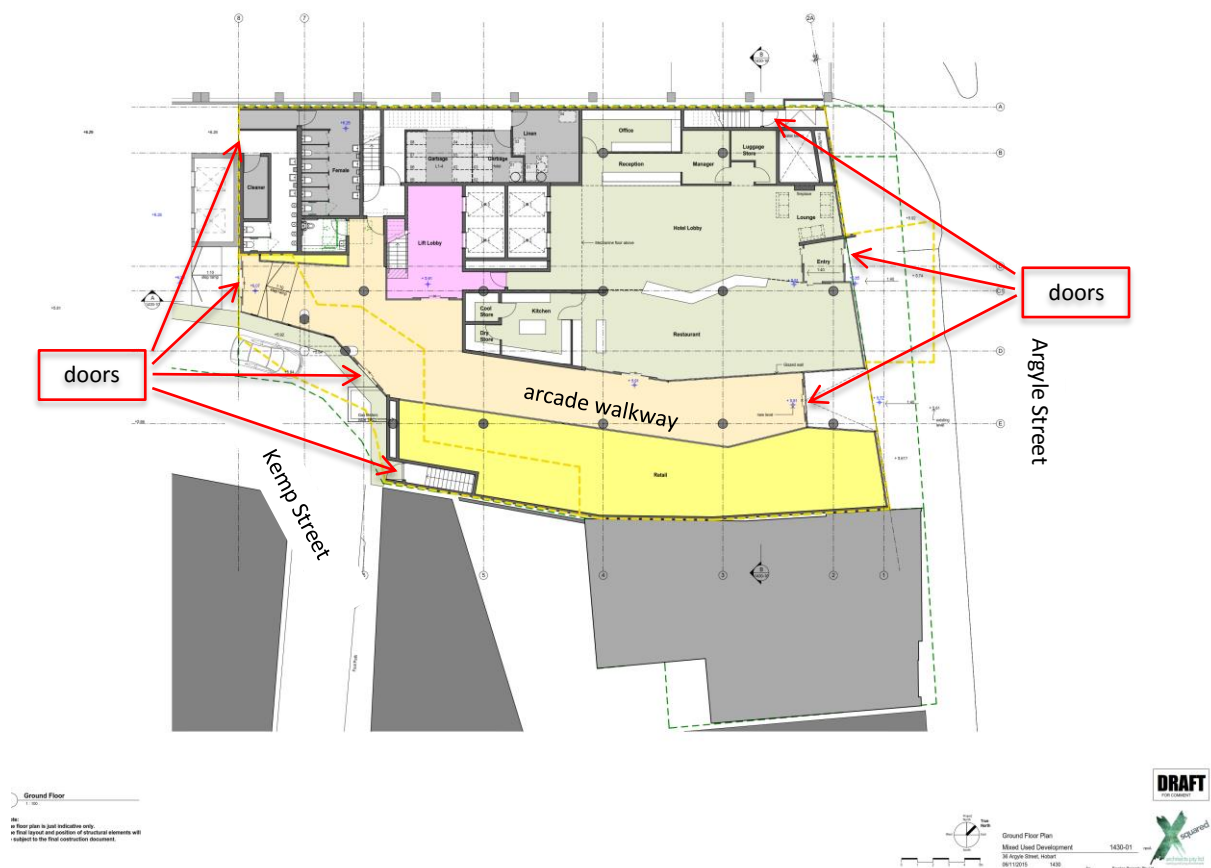


Figure 2. Draft ground floor site plan for development

ENGswS1 The existing stormwater main must be upgraded to provide the site with flood immunity at the owners cost prior to the sealing of the final plan.

A stormwater management plan must be submitted and approved prior to commencement of work.

The stormwater management plan must include:

- a. Site plan indicating the current catchment conditions and the path(s) of the existing overland flow
- b. Detailed design drawings of the proposed solution
- c. Supporting calculations to verify the design
- d. Certification of the design from an appropriately qualified and experienced Engineer
- e. The stormwater drainage system must be sized to accommodate the estimated 1 in 100 AEP (Annual Exceedence Probability) flow, including climate change, without increasing flood risk to either the development itself or other property. The assessment must take into consideration the flood levels of Hobart Rivulet and their impact on receiving drainage capacity.

All work required by this condition must be undertaken in accordance with the approved stormwater management plan.

Advice: Once the design drawings have been approved the Council will issue a condition endorsement (see general advice on how to obtain condition endorsement). Please note that once the condition endorsement has been issued you will need to contact Council's City Infrastructure Unit to obtain a Permit to Construct Public Infrastructure.

Reason for condition

To ensure the property has adequate flood immunity pursuant to Section 109h of the Local Government (Building and Miscellaneous Provisions) Act 1993

a) Subdivision (permit PLN-15-01412-01)

7. All stormwater from the proposed development (including hardstand runoff) must be discharged to the Council's infrastructure with sufficient receiving capacity. All costs associated with works required by this condition must be met by the owner. All works required by this condition must be installed prior to issue of a certificate of occupancy.

Prior to the issue of any approved plans, building consent (including demolition) and/or plumbing permit pursuant to the Building Act 2000 (if applicable), or the commencement of works on site (whichever occurs first), design drawings of the proposed stormwater drainage and connection to the Council's infrastructure, prepared by a suitably qualified person, must be submitted to and approved by the Council's Director Infrastructure Services and Director Development and Environmental Services. These must include appropriate long-section(s)/levels and grades to the point of discharge.

The stormwater design must take into account flooding of the rivulet and any associated capacity issues in the receiving infrastructure. Once approved the design drawings will form part of this permit and must be complied with.

Reason for condition

To ensure that stormwater from the site will be discharged to a suitable Council approved outlet.

11. Prior to the issue of any approved plans, building consent (including demolition or excavation) pursuant to the Building Act 2000 (if applicable), or the commencement of works on site (whichever occurs first), an assessment of the proposed stormwater drainage system of Kemp Street and the development, prepared by a qualified and experienced professional engineer, must be submitted to and approved by the Council's Director Infrastructure Services and Director Development and Environmental Services. This stormwater assessment must include a site plan indicating the current catchment conditions and the path(s) of the existing overland flow.

The stormwater drainage system must be sized to accommodate the estimated 1 in 100 AEP (Annual Exceedence Probability) flow, including climate change, without increasing flood risk to either the development itself or other property, and must be constructed as such at the owner's cost. The assessment must take into consideration the flood levels of Hobart Rivulet and their impact on receiving drainage capacity. Please refer to Advice Clause 9.

Reason for condition

To ensure the proposed stormwater drainage system has adequate capacity, and no increase in flood risk to third-party property occurs.

b) Building development (PLN-14-00952-01)

Figure 3. Key stormwater planning conditions

1.3 Flooding history

The history of flooding in the area around the site is useful in understanding the potential for future flooding and to appreciate potential impacts. Flooding has been recorded in local newspapers and analysed in engineering flood reports.

The low lying areas of Hobart, such as the Wapping area to the east of the site, was flooded in 1864. On 18 July 1864, *“flooding in the Wapping area of Hobart, with the overflowing of the Hobart Rivulet. Flooding also occurred at Longford”* [1]. Another flood and its damage was described in detail in newspapers [2] and [3]. There were fine days until the night of Monday 3 July 1872 when the weather turned. There was a south westerly *“gale”* that turned into a *“hurricane”* during the night. By daylight on Tuesday 4 July some flooding had starting, which increased and was widespread throughout Hobart and south east Tasmania up to Campbell Town. It was easing by the end of the day. It was described as having *“a much heavier rush of water”* than the 1864 floods. The following day there was a large landslide in Glenorchy and lots of restoration work all around town, such as removal of large amounts of mud and debris in Collins Street.

There were also large floods in 1929 and 1947 in Hobart, but in 1960 there was the largest flood in Hobart in since European settlement. From 20–23 April 1960 there was rain across the south-east of Tasmania focused in New Norfolk. The flows where knee deep down Liverpool Street and caused \$84 million dollars in damage (Figure 4) (in 2015 dollars¹). The Hydro Electric Commission [4] calculated this had approximately a 0.67% annual exceedance probability (AEP) (150 year annual report interval).

Since the 1960 flood there have been changes made to the stormwater system, further conversion of natural areas to hardstand, and the future climate has changed. Therefore historical flooding record may not be as good an indication of the future flood as it used to be. While the rarity of a particular storm may be different to before, the nature and damaged caused would be similar. Hence the historical record provides a vivid image of the issues surrounding flooding within the middle of Hobart (Figure 4). Surprisingly there was no loss of life in the 1960 flood, but there was huge social and commercial cost.

The 5–8 June 2016 flooding in Tasmania, with unfortunate loss of life, is a reminder of the risks from flooding. The easterly weather during this event, with moisture drawn from the north, often results in high rainfall over wide areas, which generates high flows in the larger river systems (Figure 5). If the heavy rainfall part of this system had over moved south over Hobart, the Hobart Rivulet would have been near or over capacity. In northern Tasmania at Sheffield there was 267 mm of rain in 46 hours, and their current climate 1% AEP is 200 mm in 48 hours, so the event was more extreme than a 1% AEP event. The most intense 6 hour duration portion within that total was 62 mm (6 hours being the critical duration for the Hobart Rivulet). Should that 62 mm have fallen in Hobart in 6 hours, this would have been nearly the 2% AEP event in the current climate, and the Rivulet would have broken its banks in places according to Entura’s report [5].

¹ <http://www.rba.gov.au/calculator/annualPreDecimal.html>

Canberra Times 25 April 1960: FLOOD IN HOBART [6]

HOBART, Sunday. — Thousands of people to-day walked the silt-covered, battered streets of Hobart appalled at the havoc caused by the flood on Friday night.

The damage in the centre of the city, alone is estimated at a million pounds at least. It may be a great deal more.

Hundreds of yards of footpath paving were ripped up by the force of the water.

Shop windows were smashed, basements containing hundreds of thousands of pounds worth of merchandise—including newly purchased T.V. sets—flooded above street level and feet thick deposits of silt left on street level floors.

To-day Hobart was like a city recovering from a siege.

Pumps rigged up on footpaths clattered and whined as they sent wide rivulets of water brought from basements and storerooms cascading down city streets.

Hundreds of lorries laden with sodden plaster sheets, ruined shop

goods and debris formed convoys in every city street.

From nearly every shop sodden goods—furnishings, electrical gear, drapery and groceries—are being passed out along "human chains" to waiting vehicles.

Behind shops in laneways and in other open areas earthmoving equipment is moving silt into foot high pumps where more vehicles are waiting.

Shopkeepers in Harrington Street, City, said to-day it was a miracle that loss of life did not result on Friday night when the Hobart Rivulet burst through a stone parapet and swept into city streets.

The torrent smashed a phone box to matchwood and roared at thirty knots down Liverpool Street.

It sent parked cars smashing into shops and marooned pedestrians who had to cling for their lives to shop verandah posts.

Washed out roads, damaged railways and stock losses will cost the State at least another million

pounds. Lachlan, about 20 miles west of Hobart in the flood-stricken Derwent Valley, was still isolated yesterday and at the Lachlan Hospital which is without water or power cooking is being done barbecue style.

At nearby New Norfolk people had to scramble from their beds on Friday night to escape the sudden floods. Some woke to find water lapping over their bedclothes and rescuers hammering on doors and windows.

Some shops at New Norfolk have been wrecked and one business house assesses its loss at about £13,000.

An Army duck tried to rescue some people in the New Norfolk area, but could make no headway against floodwaters flowing at 15 knots.

There are scenes of desolation throughout the State.

Stock losses have not been fully assessed and disrupted communication lines have delayed reports from many outlying areas.

Canberra Times 26 April 1960: MANY HOMES LOST IN FLOODS [7]

HOBART, Monday. — At least a dozen homes and about eight fruit pickers' huts were destroyed in the disastrous flood which struck the Derwent Valley at the weekend..

Twelve of the houses destroyed were occupied by farm workers on one property owned by Mr. W. Terry, at Bushy Park.

The Bushy Park area was one of the worst hit in the floods and it is

doubtful whether many of the houses damaged will be repairable.

Salvage, and relief operations continued unabated throughout the day in many parts of the Derwent Valley.

Meanwhile in Hobart, the business centre of which was flooded on Friday night, mud is still being cleared from some businesses.

All retail stores have said that they will be open for business tomorrow but that their basements will not be usable for at least a week and in some cases up to six weeks.

Damage in the floods in the south of the State and including the business centre of Hobart has been estimated at more than £3 million.

Figure 4. Canberra Times reporting of 1960 Hobart flood

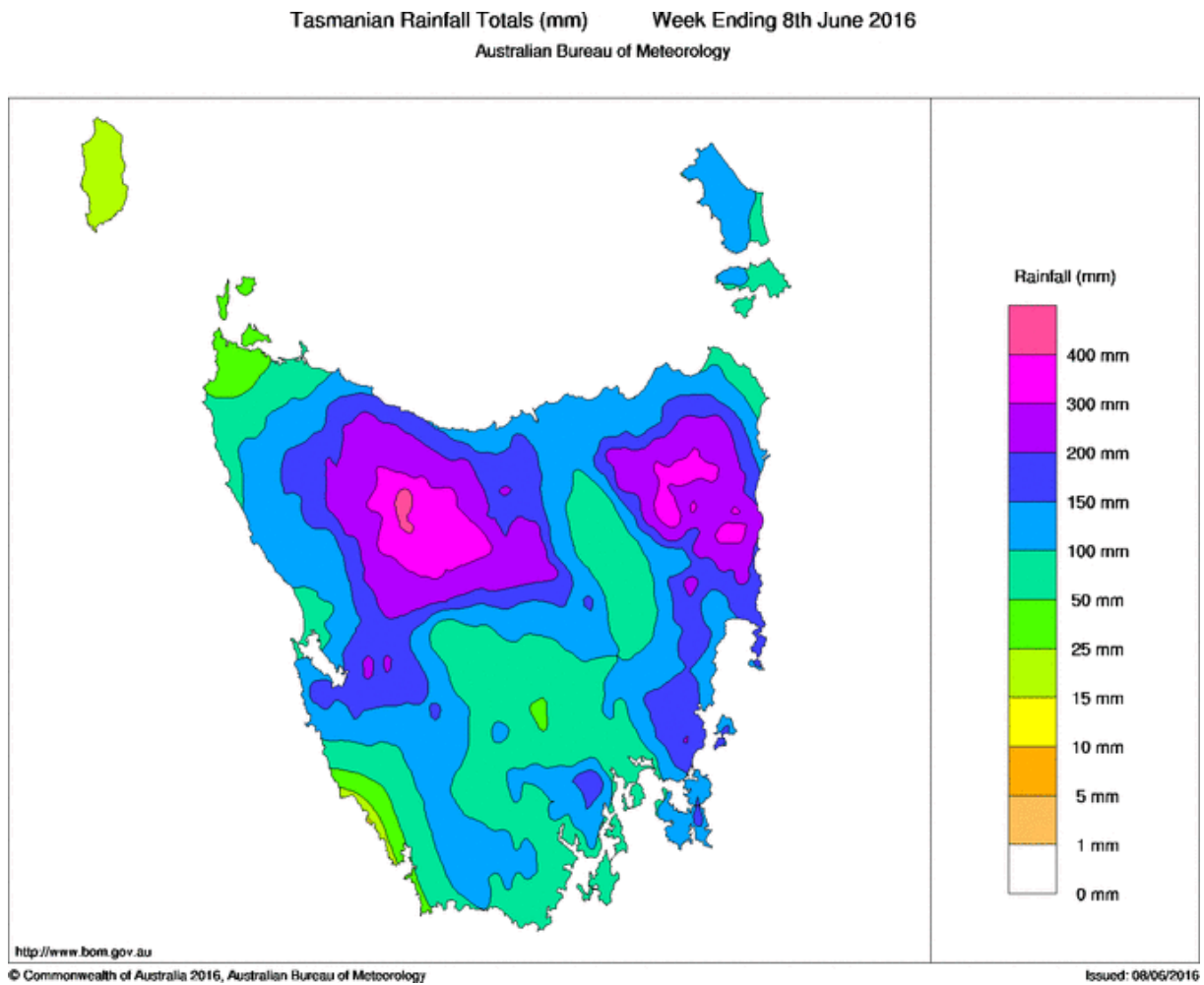


Figure 5. Week to 8 June 2016 Rainfall in Tasmania, most falling 5–7 June

1.4 Existing stormwater infrastructure

Hobart City Council is responsible for providing public stormwater services to the site and surrounding city area. There are a range of underground pipes and culverts in varying sizes and materials, with the Hobart Rivulet (the Rivulet) being the largest stormwater conveyance. The Rivulet is a mix of open natural channel, formed open channel and underground culvert. Typically the culvert is 6–8 m wide and 3–4 m high.

The capacity of Rivulet near the site has changed with better hydrological understanding and with the expectation of the climate changing. In the Hydro [8] report the 1% AEP event Rivulet flow at Collins Street was 59 m³/s, which was increased to 95 m³/s by Entura [5] by using updated data and more rigorous hydrological techniques. The 1% AEP for 2100 (which include current climate change impacts) has a peak flow of 117 m³/s. This study will use the 1% AEP for 2100 scenario as the design event.

The impact of different runoff scenarios on water depth in the Rivulet near the site, is shown in Figure 6. This shows the understanding of the 1% AEP event has changed dramatically. Previously it was expected the 1% AEP event could be easily contained within the Rivulet, but now the future 1% AEP event will fill the Rivulet and in some places it will overflow.

The piped infrastructure and flood area by Entura for the 2100 1% AEP event near the site is shown in Figure 7. In this area, the Hobart Rivulet is underground, and just becoming an open channel at the right hand edge of the figure. Next to each pipe is its nominal diameter in millimetres from HCC's GIS.

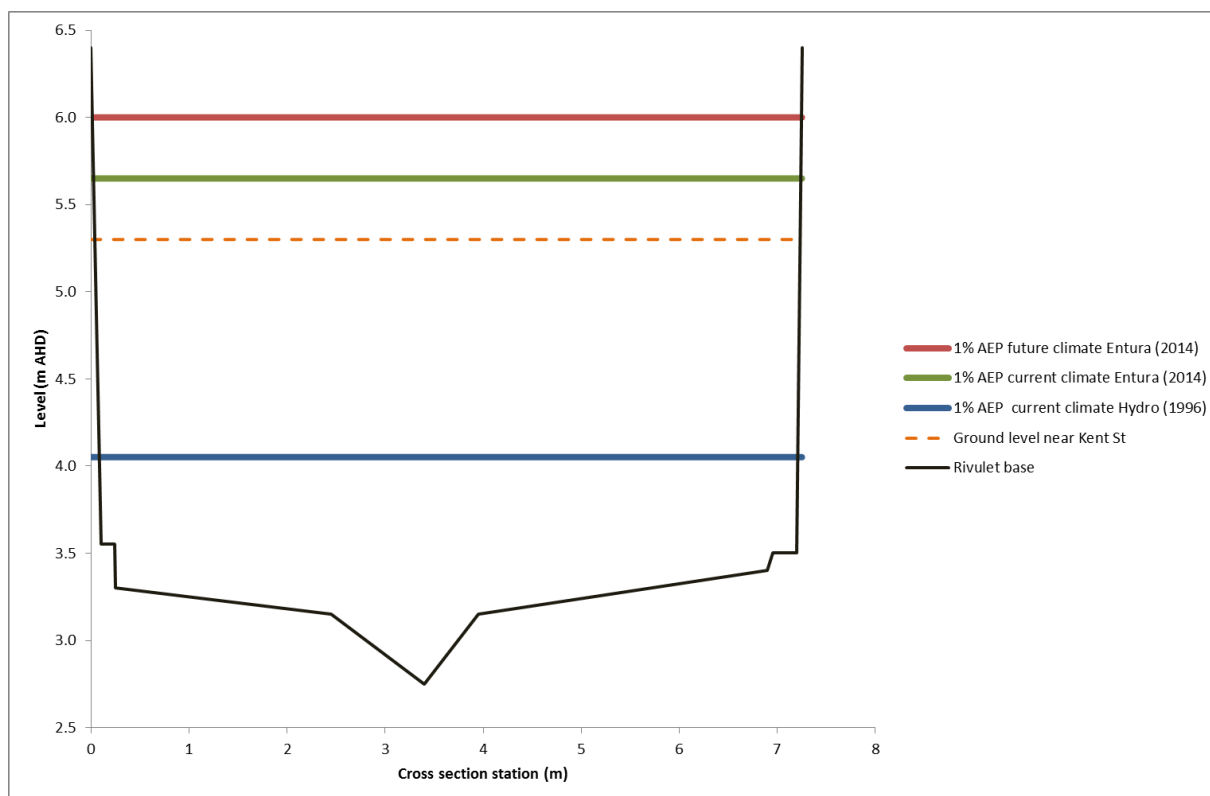


Figure 6. Hobart Rivulet cross section near 36 Argyle Street with flood levels

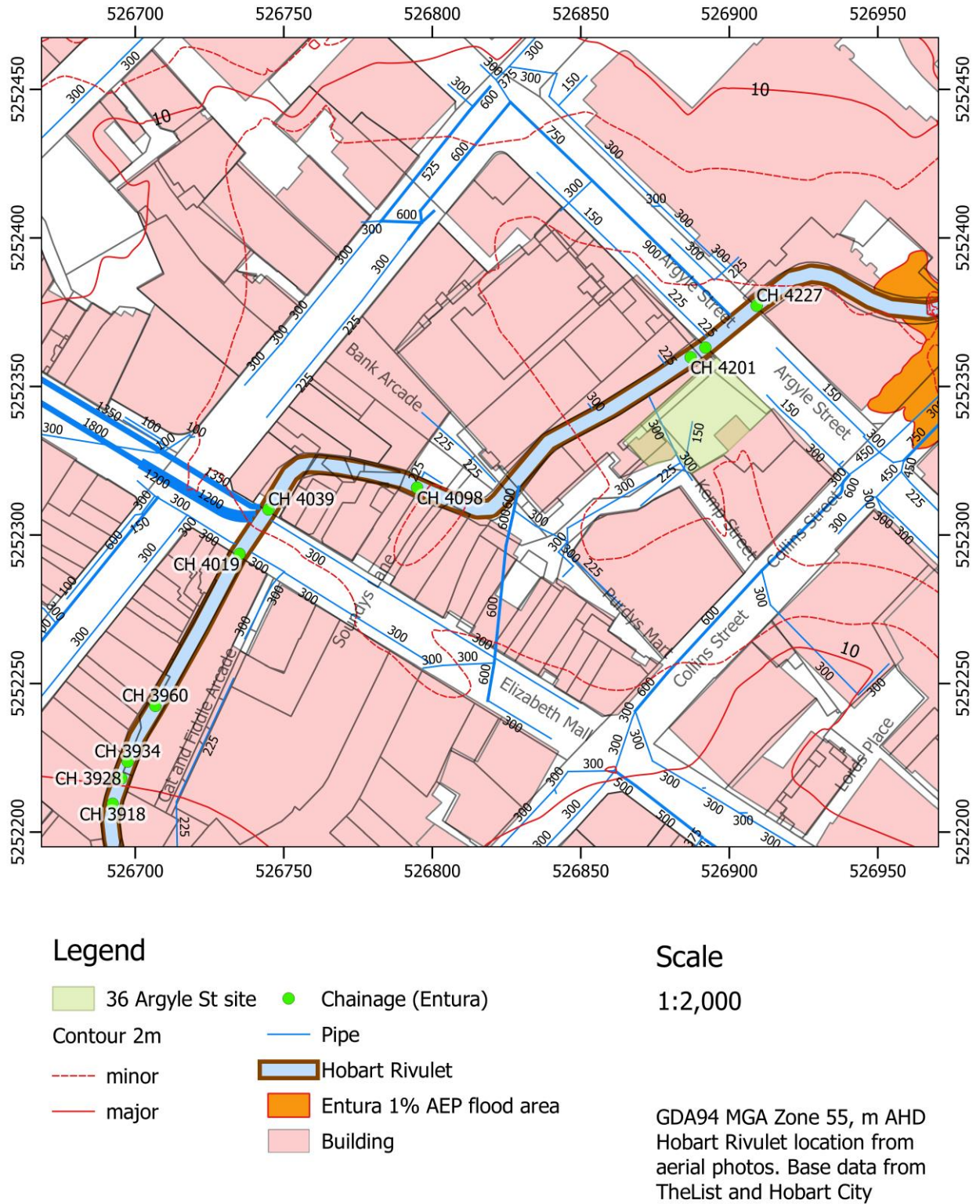


Figure 7. Existing stormwater infrastructure near site

1.5 Overland flow paths through site

The existing site is currently an asphalt carpark with a grated pit that drains into Council's stormwater system via a DN150 to Kemp Street and then into the Rivulet to the north via a DN225. In a major storm or if the sag pit in Kemp Street is blocked, there would be overland flow through the site from Kemp Street to Argyle Street (Figure 8). Note, in the distant past there have been buildings on the site, with walls blocking overland flow from Kemp Street (Figure 9). For this project the base-case will be what is existing now.

The next section of this report will characterise the flow to the site during a major storm.



Figure 8. Overland flow paths through site (site: green, arrows: flow direction, blue area: ponding)



Figure 9. Metropolitan Drainage Board Plan City of Hobart Detail Plan 3 (1905)

2 Stormwater modelling

2.1 Stormwater route

Stormwater that gets to the site overland is a risk to people and property. Overland flow is stormwater that can't be conveyed in the undergrounded piped system. The flow rate can be described by flow rate versus time graph called a hydrograph. For this preliminary report the more detailed calculations will be on land immediately surrounding the site, approximately from Argyle Street to Elizabeth Street and Liverpool Street to Collins Street, and less detail further afield.

The report Entura undertook for the Hobart City Council [5] gives a clear description of the Hobart Rivulet hydraulics during major storms. The Entura report has less information about the hydraulics of the pipes that drains to the Rivulet. The Entura report focuses on the flow rate of these tributaries and not whether it is all conveyed in pipes or overland. For this project the conveyance of stormwater into the Rivulet is of importance, in particular the conveyance of the stormwater that flows south down Elizabeth Street toward Liverpool Street. The overland flow path towards the site is shown in Figure 10, Figure 12, Figure 13 and described below (using the same numbers as the figure and giving some of the limitations for this stage of investigation as a preliminary flood report)

1. Overland flow and piped stormwater flows south down Elizabeth Street and splits east down Liverpool Street, and into the Elizabeth Street Mall. In Liverpool Street the ground levels at Elizabeth Street and Argyle Street are similar, and there is a local low point (sag) in between.
2. Stormwater pooling in sag in Liverpool Street between Elizabeth Street and Argyle Street that is in excess of the minor drainage system capacity, will flow into the Bank Arcade and other buildings openings. Some water could also drain into Pilgrims Lane or Argyle Street if the water ponded deeply enough.
 - a. It's unclear what capacity Pilgrims Lane has for holding water, as water flowing into the lane can flow under the Wellington Centre (south west side of 52–56 Liverpool Street). For this preliminary flood report it is assumed the lane has got the equivalent of 100 m² of storage area, which is approximately the area open to the sky. There would be less water getting to the development site if the area of Pilgrims Lane was larger, as the lane acts as a detention storage for water spilling from Liverpool Street.
 - b. While water could drain into other buildings off Liverpool Street including the Wellington Centre which would reduce flows to the site, for this report it is assumed this building will invest in flood protection to minimise this flow.
3. From the Elizabeth Street Mall there is the potential for overland flow through Wellington Arcade and Soundy's Lane. Overland flow can also enter the Mall from Collins Street, although the catchment area above there is much smaller than that draining from the Liverpool Street end, with corresponding lower flow rates.
4. Overland flow from the Bank Arcade, Wellington Arcade and Soundy's Lane all met in a Hobart City Council owned plaza that is south west of the Argyle Street carpark. This plaza with seating and play equipment will be called Kemp Street Plaza for convenience.
 - a. Water could drain through Wellington Centre from the plaza, which would mean less water draining to the site—but for this preliminary report it is assumed the Wellington Centre will protect itself against flooding.
 - b. The three arcades have roller shutters and if closed, these could block water going to the site—but for this report it is assumed these doors are open.
5. From the Kemp Street plaza, overland flow drains into Kemp Street, and here it is joined by local runoff from the surrounding roofs and Purdy's Mart and potentially some water from Collins Street and the Rivulet (welling back up from minor drainage system).

- a. The interaction between the Rivulet and overland flow has been approximately modelled for this preliminary report through an approximate match with the reported water levels in the Entura report. Further work could be done to improve this match and including the effects of some water that was assumed to be within the Rivulet is now overland flow which will could reduce the water levels in the Rivulet.
6. There is a sag in Kemp Street south west of the site at 36 Argyle Street, and from this sag once the water is deep enough there would be a flow though the site to Argyle Street. If the water becomes too deep in Kemp Street, it could also flow back into Collins Street.
7. From Argyle Street the overland flow drains to Collins Street and then north along Collins Street to Market Place and Campbell Streets, and finally the River Derwent.

2.2 Quantifying peak overland flow rates to site

During the 1% AEP 2100 event the Hobart Rivulet is relatively full near Elizabeth Street and the site according to Entura [5]. To quantify the overland flow rates to the site as a hydrograph, a hydraulic model using the XPSTORM v16.1 software is built with the follow inputs

1. The Rivulet was modelled from Harrington Street to its outlet in the River Derwent, but with less detail away from the site.
2. It was assumed that apart from the overland flow generated at Elizabeth Street, that there is no overland flow from further up the catchment that can't be conveyed by the Rivulet. Further work beyond this preliminary report that modelled more of the minor drainage system and local overland flows, would be required to quantify this assumption. Prior to this further work a land survey of the minor drainage system inverts and pipe diameters would be required (if HCC did not already have this information).
3. Boundary conditions at the edge of the model taken from information inferred from Entura's report during the 6 hour duration event. This preliminary report has not considering shorter duration events where the Rivulet won't be near capacity, but the minor drainage system may still be. Examples of information inferred from Entura's report are
 - a. There was no rainfall temporal pattern provided in Entura's report, so one was created from flow hydrographs and hydrological loss values. The XPSTORM model with this rainfall give similar peak values to those in the Entura hydrographs—so it is was assumed the rainfall pattern was close enough for this preliminary report.
 - b. The hydrograph for the flows south down Elizabeth Street towards the Rivulet where scaled by catchment area on the hydrograph provided, that also included catchment areas closer to the Rivulet (79% of the total hydrograph, Figure 14, Figure 15).
4. The existing pipe locations are from HCC's GIS and pipe depths are assumed from LIDAR surface levels using assumed pipe covers, which can have some impact on the hydraulics calculations for the flows in these pipe. Work beyond this preliminary report would need further land survey of these pipe inverts to improve the accuracy of these calculations.
5. Ground levels away from the block around the site are taken from LIDAR.
6. There were a few key land surveyor levels taken around the outside of the site's block and with Kemp Street, Kemp Street Plaza and arcades feeding to Plaza (Figure 11).

The Rivulet is relatively full during the 1% AEP storm, and pressurised in some places during the peak of the storm with higher velocities (around 5 m/s). This makes the water levels sensitive to the Rivulet's friction and fitting losses. The values for these parameters are selected to get a reasonable fit in the peak water surface provided in Entura's report (Figure 16). As previously mentioned, as this a preliminary report this fit is approximate, and Entura's report assumes no overland flow at Elizabeth Street. Further work could be done to refine these assumptions and provide a more robust answer. It is unclear whether this work would increase or decrease the flows to the site.



Figure 10. Overland flow to site with key locations (arrow width indicates relative flow rate)

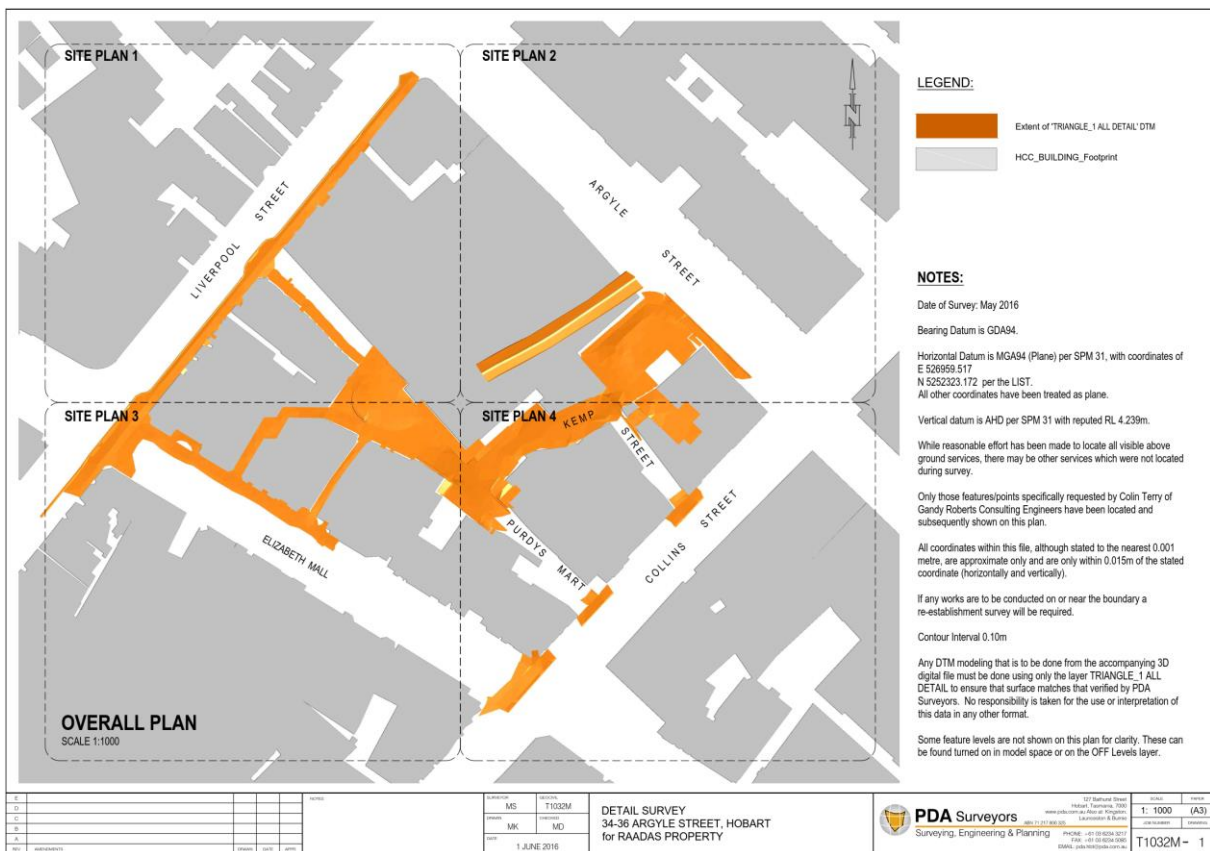


Figure 11. Extent of detailed ground level land survey (orange) by PDA Surveyors

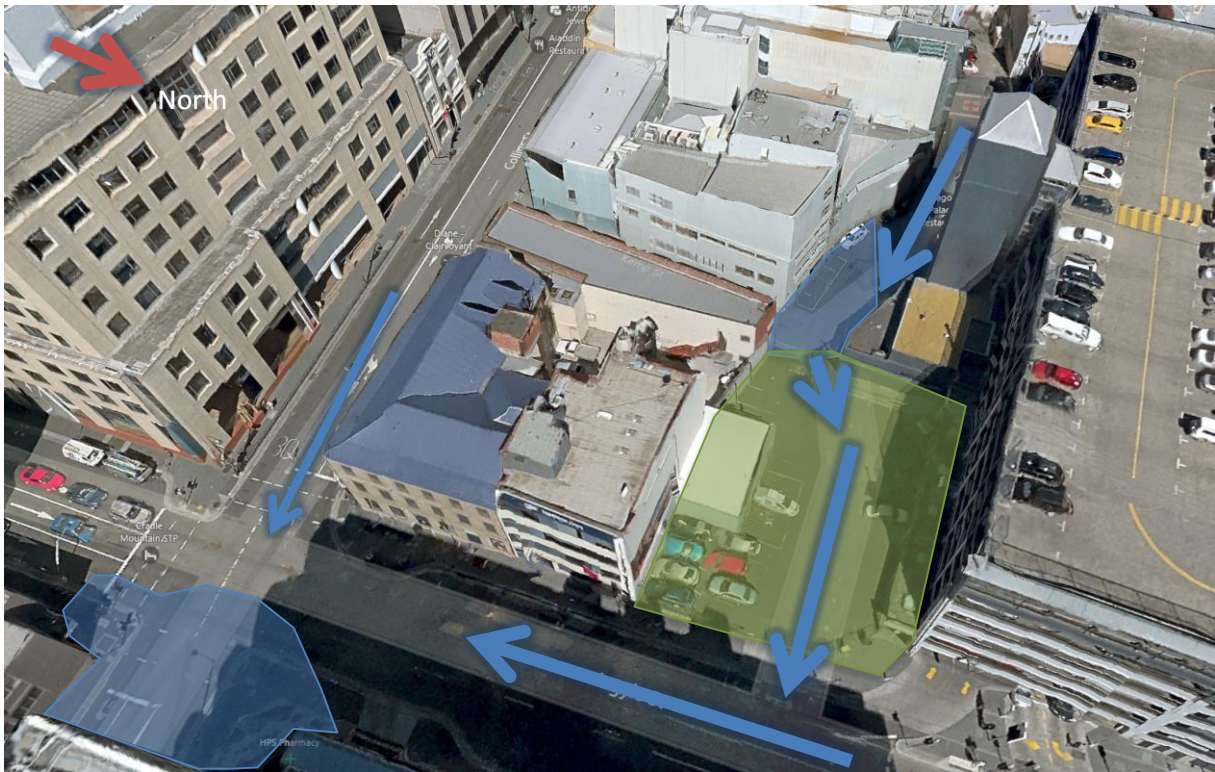


a) Looking east – wider angle (blue arrow: flow direction, blue area: ponding, green: site)



b) Looking east – detail (blue arrow: flow direction, blue area: ponding, green: site)

Figure 12. Aerial 3D view of site and overland flow paths - 1



a) Looking west (blue arrow: flow direction, blue area: ponding, green: site)



b) looking north (blue arrow: flow direction, blue area: ponding, green: site)

Figure 13. Aerial 3D view of site and overland flow paths - 2

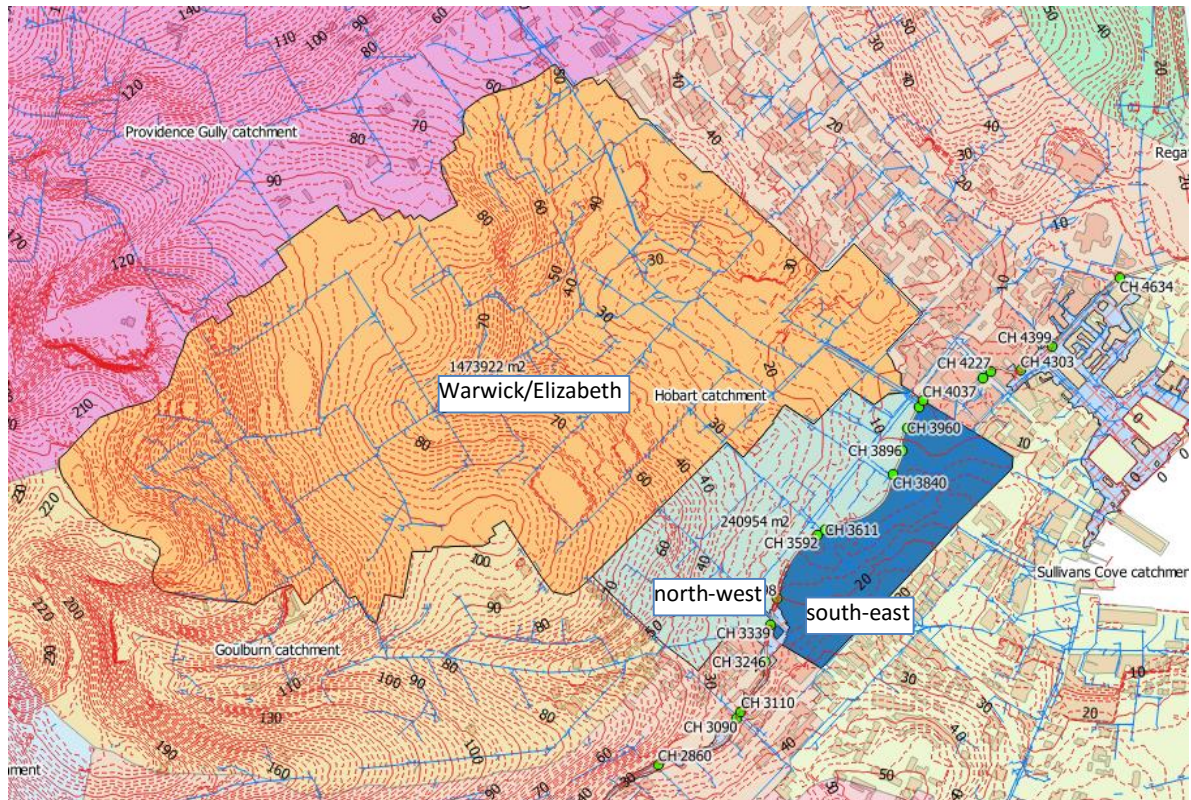


Figure 14. Elizabeth Street catchments draining to Hobart Rivulet (CH is Entura chainages)

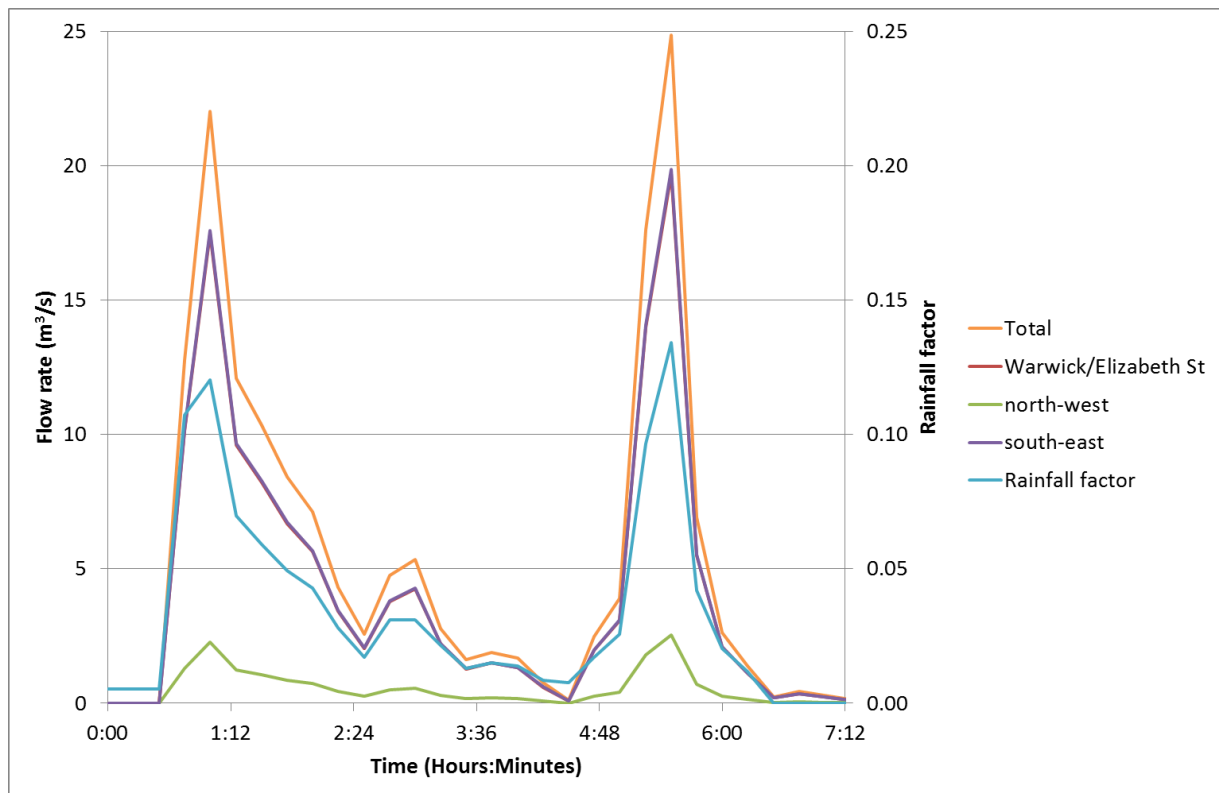


Figure 15. Total hydrograph at Elizabeth, and report's disaggregation for minor catchments and rainfall

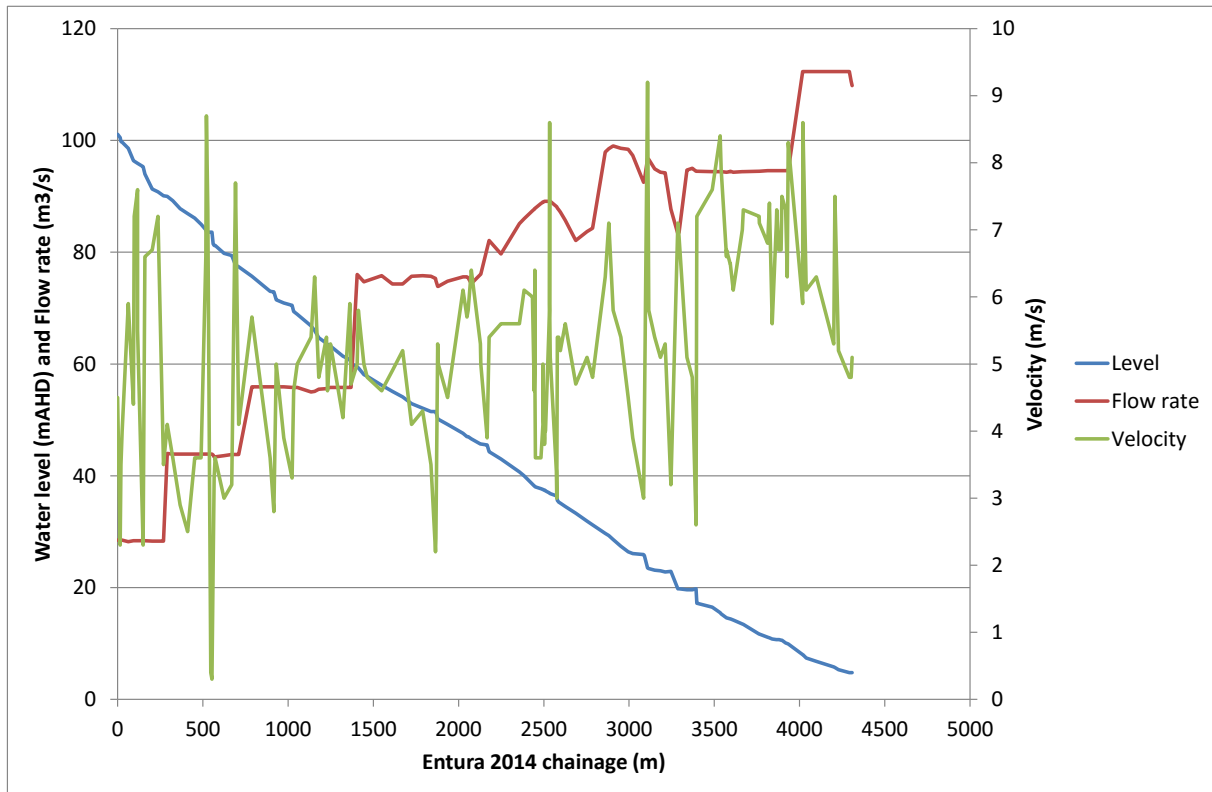


Figure 16 Hobart Rivulet flood levels from Entura report for 1% AEP at 2100

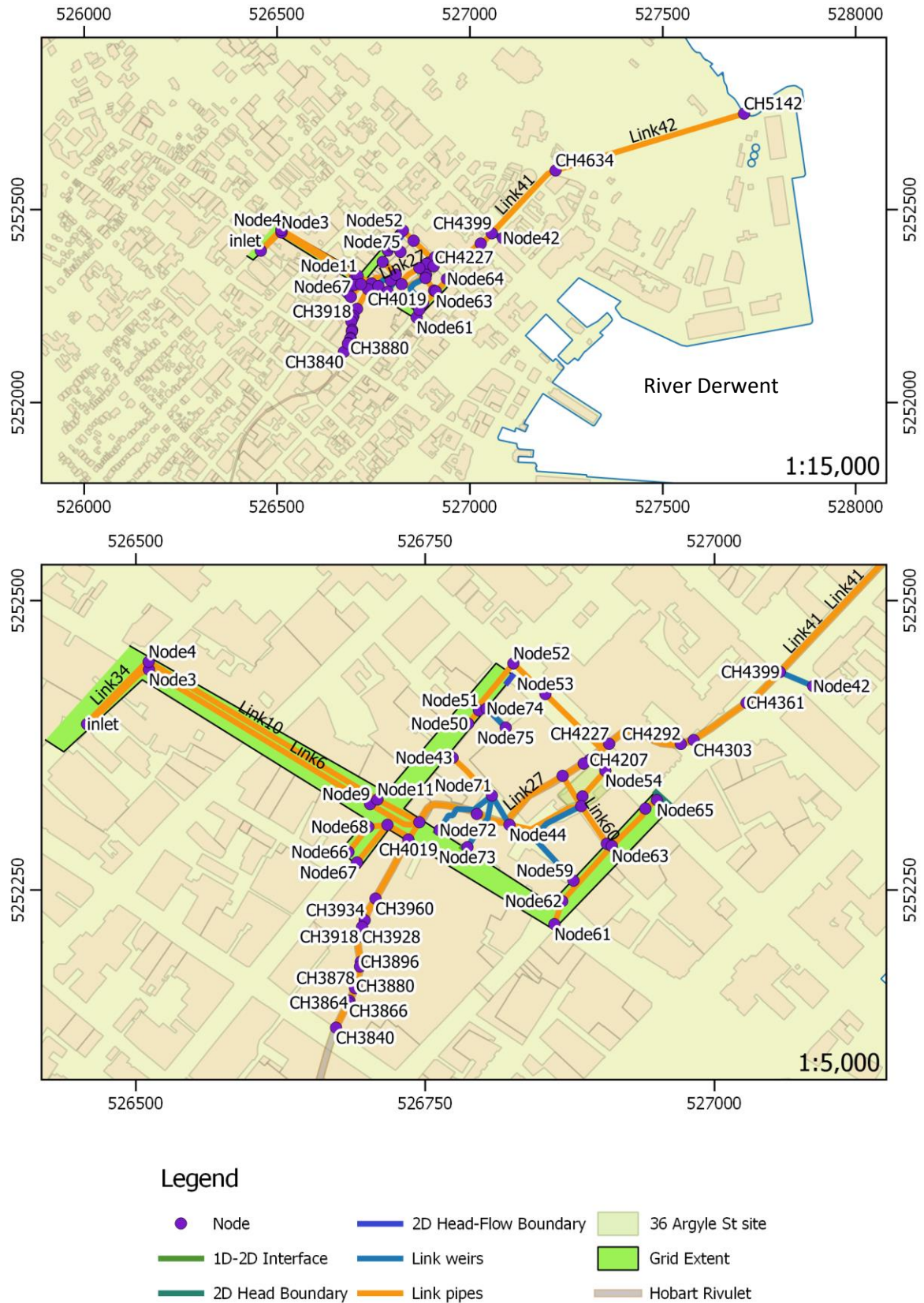


Figure 17. XPSTORM model setup – broad scale in Hobart

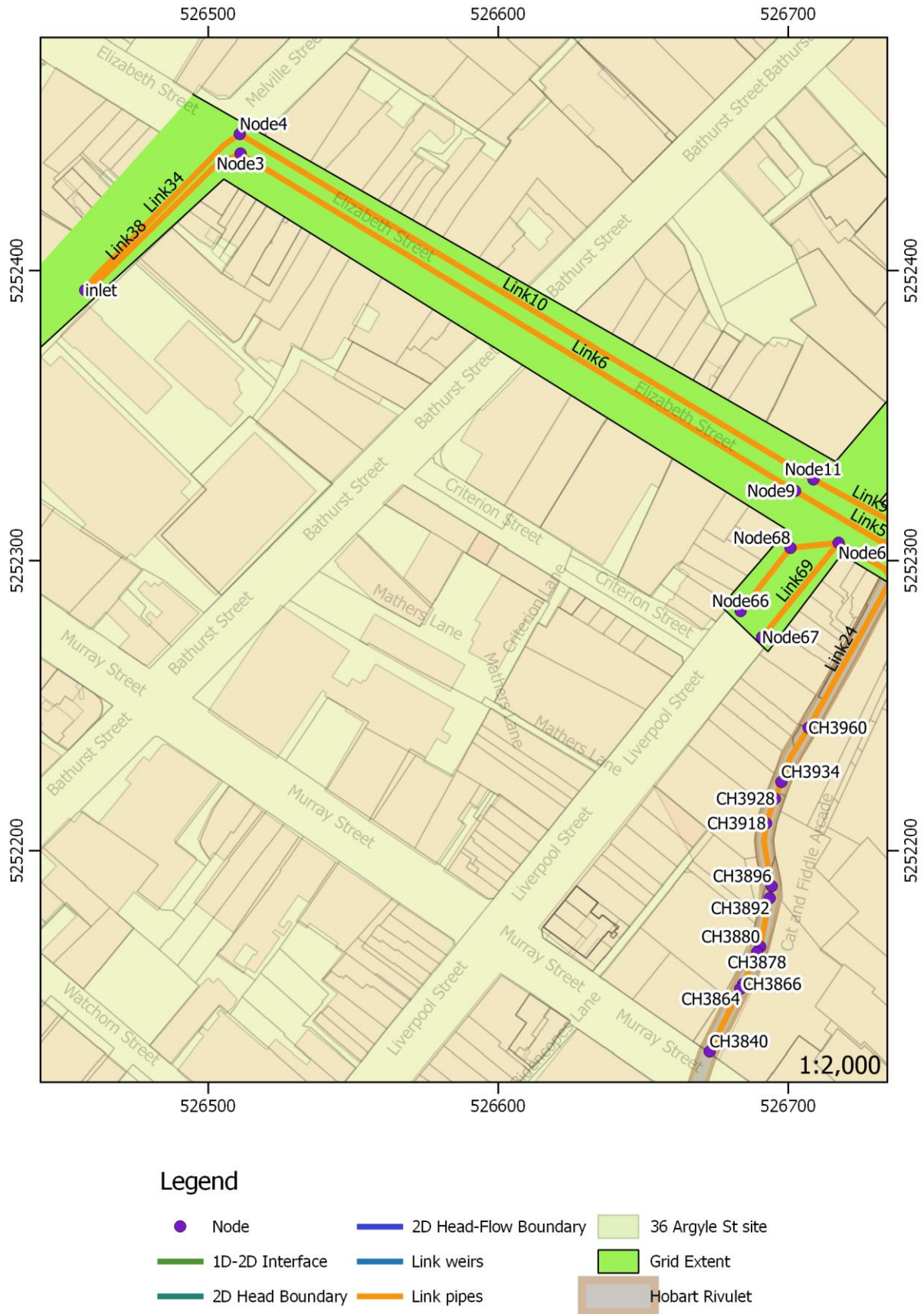


Figure 18. XPSTORM model setup – medium scale top left

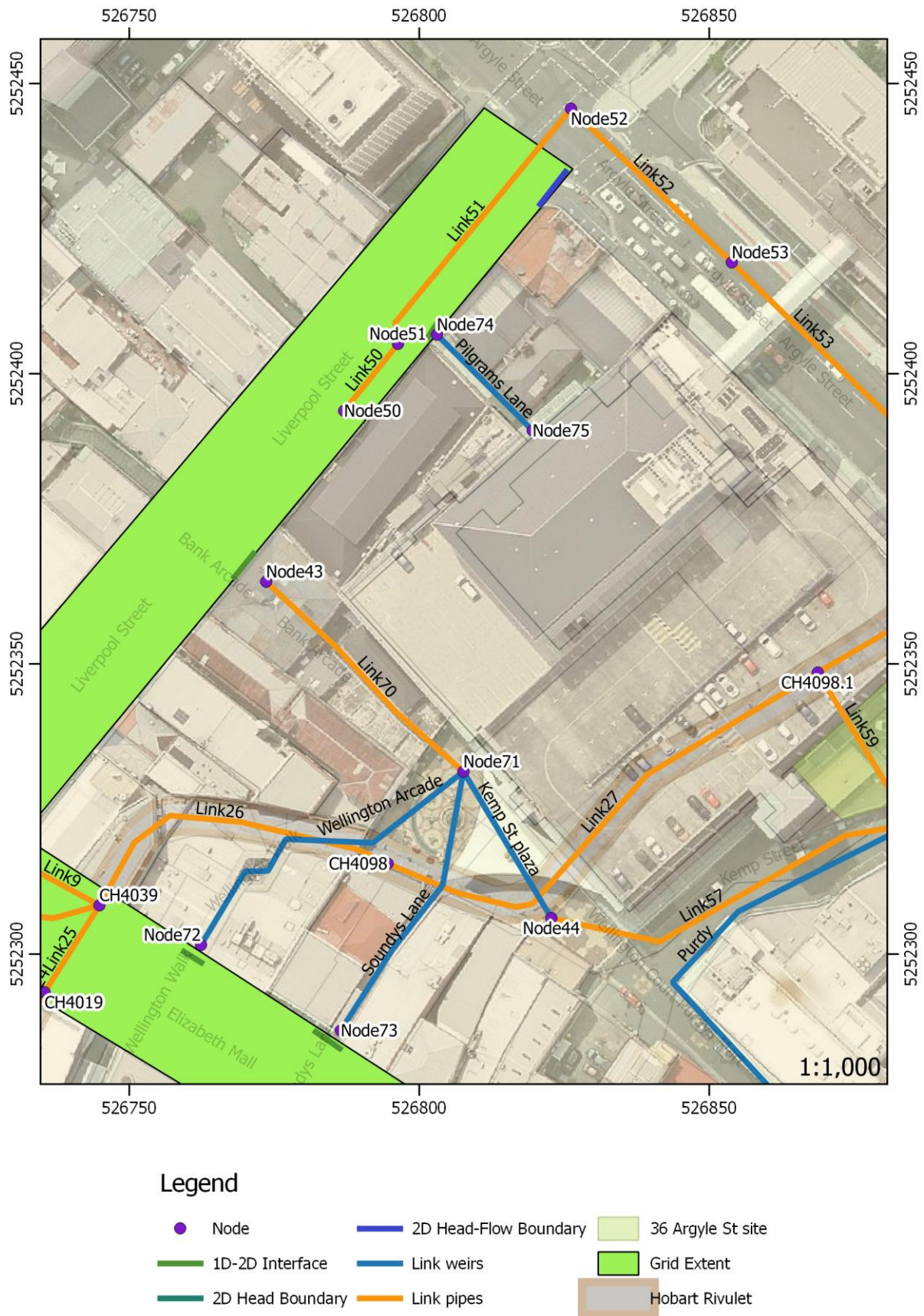


Figure 19. XPSTORM model setup – fine scale top right

Gandy and Roberts Consulting Engineers

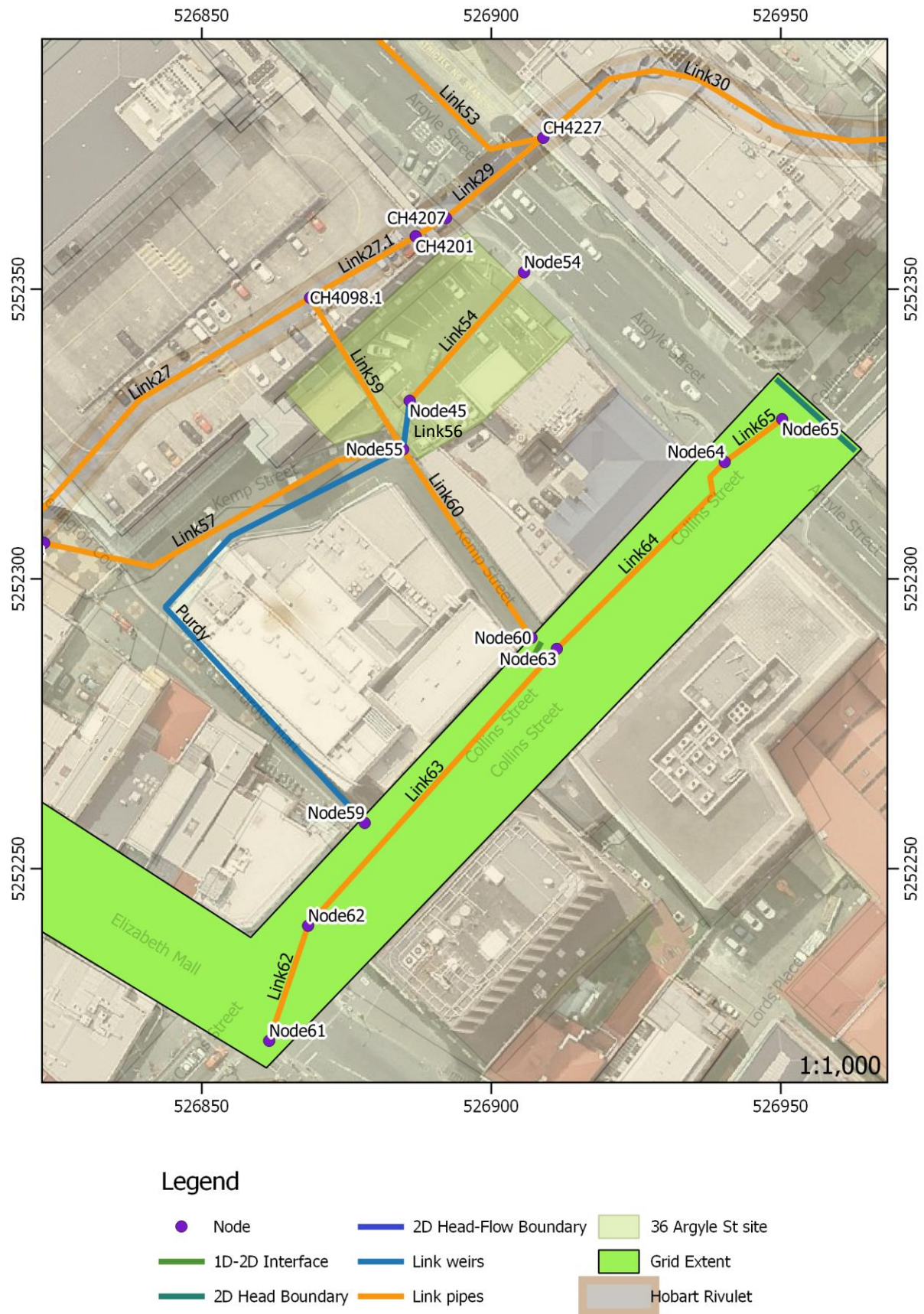


Figure 21. XPSTORM model setup – fine scale bottom right

The setup of the XPSTORM model used the following boundary conditions

- Inflow
 - Rivulet into 1D model node at Harrington Street, with hydrograph
 - Catchments to nodes for
 - Liverpool Street from Murray to Elizabeth and
 - south east Collins Street-Elizabeth Street intersection
 - Melville Street east of Elizabeth Street
 - Direct rainfall to grid
- Tailwater
 - Head-flow outlet corner Liverpool and Argyle Streets, discharging into Argyle Street
 - Head boundary corner Collins and Argyle Streets with 1% AEP flood level
 - Critical depth from site into Argyle Street
- 1D-2D connections
 - Mall to Wellington Arcade, linking into Kemp Street Plaza
 - Mall to Soundy's Lane, linking into Kemp Street Plaza
 - Liverpool Street to Bank Arcade, linking into Kemp Street Plaza
 - Liverpool Street to Pilgrams Lane closed storage

Model setup

- 1 m grid spacing for 2D
- 0.5 s time space, run for 6 hours of simulation time (runs took 25 minutes of real time)
- Diffusion equations for links (not full momentum)
- Flow into pits from 2D grid, $Q = 0.687 D^{0.5}$, which is an orifice equation $Q = CA(2gH)^{0.5}$, so with $C=0.6$, $A(2g)^{0.5}=1.145$, so $A=0.258 \text{ m}^2$ which is 500x500 mm pit, or 570 mm diameter opening like a manhole lid (which is 600 mm clear diameter).
- Node storage area = $A e^{B \times \text{surface depth}}$. The defaults are used, so for Kemp Street area is equal to $50000 \times e^{5 \times \text{depth}}$, which is a large storage. Testing a smaller storage with $A = 50 \text{ m}^2$ gave similar results, although more work in future investigations could refine this (Figure 22).
- Catchment, link and node parameters are given in Table 1, Table 2 and Table 3.

ID	catchment	width (m)	area (ha)	impervious (%)	slope (%)
Node3	1	300	39.801	90	0.03
Node4	1	600	106.332	90	0.11
Node51	1	120	1.476	100	3
Node52	1	150	1.057	100	6
Node55	1	120	2.012	100	3
Node61	1	60	1.596	100	2
Node63	1	80	0.824	100	2
Node65	1	40	0.403	100	2
Node66	1	180	2.166	100	3
Node67	1	20	0.217	100	1
	2	100	1.026	100	3
inlet	3	200	155.489	100	15

Table 1. XPSTORM model catchment parameters

Name	US node	DS node	Length (m)	Shape	Height	Manning n	Height	Diameter (m)	Entrance loss	Exit loss	US level	DS level	Slope (%)
Link26	CH4039	CH4098	58.75	User Defined	0	0.015	0.0001	0.05	0	0.25	3.900	3.400	0.9
Link6	Node3	Node9	223.76	Circular	0	0.015	0.0001	1.8	0.15	0.15	11.500	5.906	2.5
Link10	Node4	Node11	230.85	Circular	0	0.015	0.0001	1.35	0.15	0	11.500	5.729	2.5
Link5	Node9	CH4039	47.64	Circular	0	0.015	0.0001	1.2	0.15	0.15	5.906	4.699	2.5
Link5	Node9	CH4039	47.64	Circular	0	0.015	0.0001	1.2	0.15	0.15	5.906	4.699	2.5
Link9	Node11	CH4039	41.18	Circular	0	0.015	0.0001	1.35	0.15	0.15	5.729	4.699	2.5
Link29	CH4207	CH4227	21.79	User Defined	0	0.015	0.0001	0.05	0	0.2	2.400	2.200	0.9
Link30	CH4227	CH4292	68.67	User Defined	0	0.015	0.0001	0.05	0	0.2	2.200	1.800	0.6
Link32	CH4303	CH4361	55.96	Natural	0	0.015	0.0001	0.05	0	0.5	1.700	1.430	0.5
Link41	CH4399	CH4634	233.99	User Defined	0	0.015	0.0001	0.05	1.25	1.25	1.250	0.720	0.2
Link41	CH4399	CH4634	233.99	User Defined	0	0.015	0.0001	0.05	1.25	1.25	1.250	0.720	0.2
Link44	CH4399	Node42	overflow to Campbell Street										
Link25	CH4019	CH4039	17.87	User Defined	0	0.015	6	2.5	0	0.25	4.400	3.900	2.8
Link14	CH3840	CH3864	24.01	User Defined	0	0.015	0.0001	0.05	0	0.2	7.700	7.300	1.7
Link31	CH4292	CH4303	11.58	Natural	0	0.015	0.0001	0.05	0	0.5	1.800	1.700	0.9
Link28	CH4201	CH4207	6.09	User Defined	0	0.015	0.0001	0.05	0	1	2.450	2.400	0.8
Link27	CH4098	CH4098.1	90.29	User Defined	0	0.015	0.0001	0.05	0	0.2	3.400	2.630	0.9
Link24	CH3960	CH4019	58.4	User Defined	0	0.015	0.0001	0.05	0	0.25	5.400	4.400	1.7
Link23	CH3934	CH3960	20.86	User Defined	0	0.015	0.0001	0.05	0	0.25	5.900	5.400	2.4
Link22	CH3928	CH3934	6.17	User Defined	0	0.015	0.0001	0.05	0	0.25	6.000	5.900	1.6
Link21	CH3918	CH3928	9.02	User Defined	0	0.015	0.0001	0.05	0	0.25	6.000	6.000	0.0
Link20	CH3896	CH3918	21.95	User Defined	0	0.015	0.0001	0.05	0	0.25	6.150	6.000	0.7
Link19	CH3892	CH3896	4.16	User Defined	0	0.015	0.0001	0.05	0	0.25	6.300	6.150	3.6
Link18	CH3880	CH3892	17.09	User Defined	0	0.015	0.0001	0.05	0	0.25	6.800	6.300	2.9
Link17	CH3878	CH3880	2.16	User Defined	0	0.015	0.0001	0.05	0	0.25	6.800	6.800	0.0
Link16	CH3866	CH3878	11.93	User Defined	0	0.015	0.0001	0.05	0	0.14	7.300	6.800	4.2
Link15	CH3864	CH3866	2.01	User Defined	0	0.015	0.0001	0.05	0	0.2	7.300	7.300	0.0
Link34	inlet	Node4	75.93	Circular	0	0.015	0.0001	1.35	0.15	0.15	12.450	11.500	1.3
Link38	inlet	Node3	71.87	Circular	0	0.015	0.0001	1.35	0.15	0.15	12.450	11.500	1.3
Link32.1	CH4361	CH4399	39.34	Natural	0	0.015	0.0001	6	2	2	1.430	1.250	0.5
Link42	CH4634	CH5142	510.54	User Defined	0	0.015	0.0001	0.05	0	0	0.720	-0.700	0.3
Link70	Node43	Node71	10	Natural	0	0.014	0.0001	0	0	0	7.200	7.320	-1.2
Link57	Node44	Node55	66.21	Natural	0	0.014	5	5	0.15	0.15	7.700	5.200	3.8
Link54	Node45	Node54	29.71	Natural	0	0.014	3.6	2	0.15	0.15	5.700	5.700	0.0
Link50	Node50	Node51	14.8	Circular	0	0.014	0.0001	0.6	0.15	0.15	5.500	5.352	1.0
Link51	Node51	Node52	51.42	Circular	0	0.014	0.0001	0.6	0.15	0.15	5.352	4.838	1.0
Link52	Node52	Node53	38.36	Circular	0	0.014	0.0001	0.75	0.15	0.15	4.838	4.141	1.8
Link53	Node53	CH4227	73.68	Circular	0	0.014	0.0001	1.2	0.15	0.15	4.141	2.667	2.0
Link59	Node55	CH4098.1	30.7	Circular	0	0.009	0.0001	0.6	0.15	0.15	4.300	3.000	4.2
Link56	Node55	Node45	entry to building										
Link27.1	CH4098.1	CH4201	21.18	User Defined	0	0.015	0.0001	0.05	0	0.1	2.630	2.450	0.8
Link61	Node59	Node55	Purdy's Lane										
Link60	Node60	Node55	39.21	Natural	0	0.014	0.0001	0	0.15	0.15	6.600	5.200	3.6
Link62	Node61	Node62	20.96	Circular	0	0.014	0.0001	0.3	0.15	0.15	8.400	7.400	4.8
Link63	Node62	Node63	64.24	Circular	0	0.014	0.0001	0.6	0.15	0.15	7.400	5.000	3.7
Link64	Node63	Node64	44.55	Circular	0	0.014	0.0001	0.6	0.15	0.15	5.000	3.500	3.4
Link65	Node64	Node65	12.36	Circular	0	0.014	0.0001	0.45	0.15	0.15	3.500	3.000	4.0
Link66	Node66	Node68	27.73	Circular	0	0.014	0.0001	0.6	0.15	0.15	7.122	6.845	1.0
Link69	Node67	Node69	41.86	Circular	0	0.014	0.0001	0.3	0.15	0.15	8.000	7.581	1.0
Link67	Node68	Node69	16.65	Circular	0	0.014	0.0001	0.45	0.15	0.15	6.845	6.570	1.7
Link67	Node68	Node69	16.65	Circular	0	0.014	0.0001	0.45	0.15	0.15	6.845	6.570	1.7
Link68	Node69	CH4019	22.51	Circular	0	0.014	0.0001	0.6	0.15	0.15	6.984	6.534	2.0
Link73	Node71	Node44	Kemp St plaza										
Link71	Node72	Node71	Wellington Arcade										
Link72	Node73	Node71	Soundy's Lane										
Link74	Node74	Node75	Pilgrims Lane										

Table 2. XPSTORM model link parameters

Name	Max level	Ground	Crown	Invert	Easting	Northing	Ponding
inlet	17.272	15.450	15.450	12.450	526457.3	5252393.2	Link Spill Crest to 2D
CH4039	8.342	8.100	8.100	3.900	526744.9	5252308.4	Link Spill Crest to 2D
Node3	13.500	14.094	14.094	11.500	526511.1	5252440.3	Link Spill Crest to 2D
Node4	14.749	14.639	14.639	11.500	526510.8	5252447.1	Link Spill Crest to 2D
Node9	9.076	8.493	8.493	5.906	526702.3	5252324.1	Link Spill Crest to 2D
Node11	8.925	8.270	8.270	5.729	526708.6	5252328.0	Link Spill Crest to 2D
CH4207	5.711	9.000	6.510	2.400	526892.1	5252362.3	None
CH4227	5.552	6.400	6.000	2.200	526909.0	5252376.1	None
CH4303	4.600	4.600	4.590	1.700	526982.0	5252379.4	None
CH4399	4.037	3.900	3.900	1.250	527056.5	5252438.3	Allowed
CH4019	8.526	8.800	8.200	4.400	526735.4	5252293.4	Sealed
CH3840	10.952	12.100	11.900	7.700	526672.9	5252130.8	None
CH4292	5.339	6.000	5.600	1.800	526971.0	5252376.0	None
CH4201	7.134	9.000	6.560	2.450	526886.9	5252359.1	None
CH4098	7.834	9.000	7.510	3.400	526794.5	5252315.6	None
CH3960	8.607	15.000	9.200	5.400	526707.0	5252242.4	None
CH3934	8.965	15.000	9.700	5.900	526697.6	5252223.7	None
CH3928	9.399	15.000	9.800	6.000	526695.4	5252218.0	None
CH3918	9.766	15.000	9.800	6.000	526692.3	5252209.5	None
CH3896	10.012	15.000	9.950	6.150	526694.3	5252187.8	None
CH3892	10.218	15.000	10.500	6.300	526693.6	5252183.7	None
CH3880	10.298	15.000	11.000	6.800	526690.3	5252166.9	None
CH3878	10.569	15.000	11.000	6.800	526689.2	5252165.1	None
CH3866	10.528	15.000	11.500	7.300	526684.4	5252154.1	None
CH3864	10.802	15.000	11.500	7.300	526683.4	5252152.4	None
CH4361	4.524	4.600	4.530	1.430	527027.8	5252411.7	None
CH4634	2.953	5.500	5.120	0.720	527222.0	5252601.3	None
CH5142	1.500	4.000	3.700	-0.700	527710.8	5252748.7	None
Node42	2.000	3.000	2.000	2.000	527085.4	5252426.0	None
Node43	7.200	9.000	7.210	7.200	526773.6	5252364.2	Link Invert to 2D
Node44	7.969	9.000	9.000	7.600	526822.8	5252306.2	None
Node45	6.076	9.000	6.700	5.700	526885.9	5252330.7	None
Node50	8.039	7.000	7.000	5.500	526787.0	5252393.6	Link Spill Crest to 2D
Node51	8.021	7.160	7.160	5.352	526796.3	5252405.1	Link Spill Crest to 2D
Node52	6.344	8.860	5.588	4.838	526826.1	5252445.7	None
Node53	5.846	7.410	5.341	4.141	526853.9	5252419.2	None
Node54	5.969	9.000	6.700	5.700	526905.6	5252352.9	None
Node55	6.579	12.000	12.000	4.300	526884.8	5252322.4	Allowed
CH4098.1	7.311	9.000	6.740	2.630	526868.7	5252348.5	Sealed
Node59	8.140	9.000	9.000	8.140	526878.1	5252257.9	Allowed
Node60	6.732	12.000	12.000	6.600	526906.9	5252289.8	Link Invert to 2D
Node61	16.800	9.900	9.900	8.400	526861.6	5252220.3	Link Spill Crest to 2D
Node62	7.648	8.900	8.900	7.400	526868.3	5252240.2	Link Spill Crest to 2D
Node63	5.401	6.400	6.400	5.000	526911.3	5252287.9	Link Spill Crest to 2D
Node64	7.100	5.000	5.000	3.500	526940.3	5252320.2	Link Spill Crest to 2D
Node65	4.874	4.700	4.700	3.000	526950.2	5252327.6	Link Spill Crest to 2D
Node66	8.883	9.000	9.000	7.122	526683.5	5252282.6	Link Spill Crest to 2D
Node67	8.697	8.850	8.850	8.000	526691.0	5252273.6	Link Spill Crest to 2D
Node68	8.644	8.450	8.450	6.845	526700.7	5252304.4	Link Spill Crest to 2D
Node69	8.566	8.460	8.460	6.570	526717.3	5252306.2	Link Spill Crest to 2D
Node71	8.000	9.000	9.000	7.320	526807.6	5252331.4	Allowed
Node72	8.432	9.000	9.000	8.280	526762.4	5252301.6	Link Invert to 2D
Node73	8.404	9.000	9.000	8.210	526786.5	5252286.9	Link Invert to 2D
Node74	8.046	9.000	9.000	7.050	526803.0	5252406.7	Link Invert to 2D
Node75	8.046	9.000	4.500	4.500	526819.5	5252390.2	None

Table 3. XPSTORM model node parameters

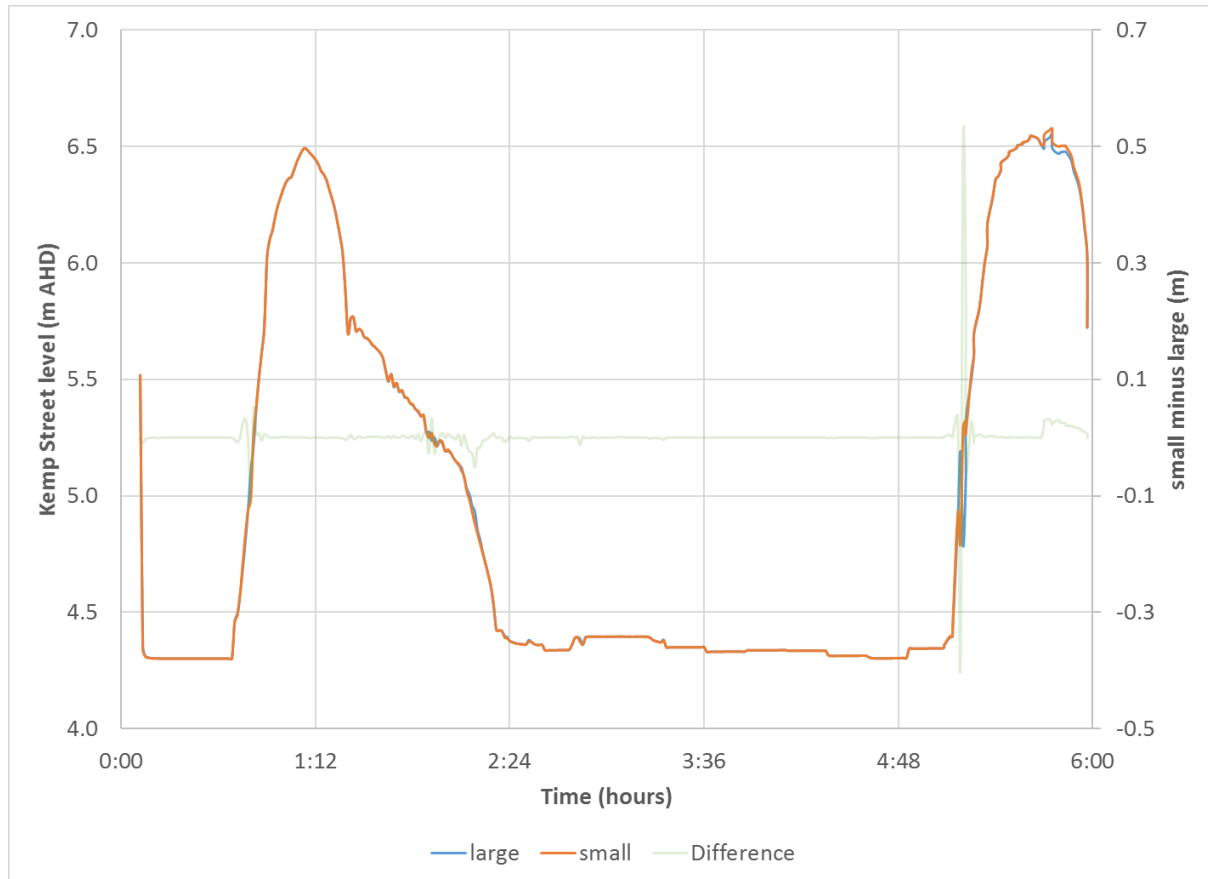


Figure 22. Impact of Kemp Street storage size on Kemp Street water level in 1% AEP storm

3 Results and discussion

3.1 Key levels near site

The XPSTORM model has been set up and run with a single plausible scenario for the existing system in this preliminary report during the critical 1% annual ascendance probability (AEP) event (with 2100 climate). The critical 1% AEP event is taken from the Entura report, and is the storm with a 1% chance of occurring in any year at the location of the Hobart Rivulet catchment, that has a duration of 6 hours. During this event there is flow to the site from the Kemp St Plaza and up from the Rivulet through the pipe draining the sag Kemp Street south west of the site. Further investigation beyond this report could consider other scenarios, such as a larger storage in Pilgrams Lane and allowing water to flow through the Wellington Centre which has an impact on flows to the site.

The hydrographs for the open channel flow from Kemp Street Plaza to the site, the pipe to the rivulet and the flow from Kemp Street into the site are shown in Figure 25. There are two peaks of the hydrograph, and the second peak being larger. The flows in the pipe between Kemp Street and the rivulet, have the flow coming from the Rivulet into Kemp Street during the both peaks, and then after the second peak Kemp Street drains into the Rivulet. In the model used for this report the pipe between the sag in Kemp Street and the rivulet was a DN600, which results in marginally lower Kemp Street levels than if the pipe was a DN300 (Figure 26, with an entry width of 2 m). Further investigation of the optimum pipe size and the practicalities of a reflux valve (to avoid flows from the Rivulet into Kemp Street) could be investigated in detailed design with further modelling and costing.

The main issue to be investigated is the flows from Kemp Street through the site. At this stage of the project the building opening has not be finalised, so the model is run with a range of scenarios to provide input to the design development stage. Kemp Street has a sag with a minimum level over a grated pit of 5.14 m AHD, and the existing site levels near Kemp Street where water can flow through are up to 5.83 m AHD near Kemp Street and 5.91–6.02 m AHD near Argyle Street (Figure 23, Figure 24). For the purpose of this preliminary report the level of the entry to the site was set as 6.00 m AHD for the existing and proposed development.

If the grated pit in the sag of Kemp Street blocks during a storm, water will pond to an approximate depth of 800 mm before flowing through the site. As the flow increases the depth increases. The ground levels rise relatively quickly away from the sag point, so the ponding depth is less away from the sag point. There is approximately 9 m width on the existing entry from Kemp Street into the site before it opens up into the existing car park. This ramp into the site and then an opening to a flat or lower ground acts like a broad crested weir.

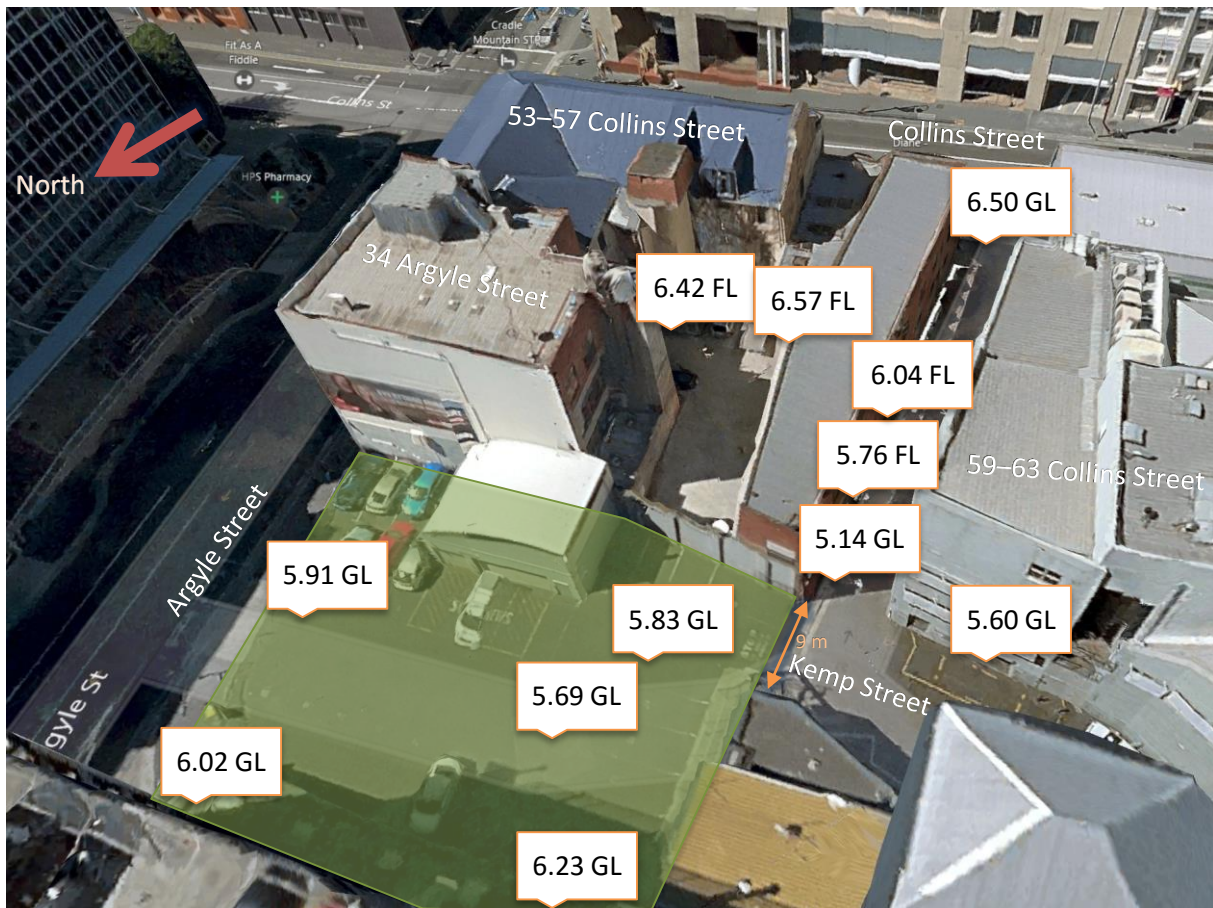


Figure 23. Aerial 3D: key levels around existing site in m AHD (site: green), GL = ground level, FL = floor level

The buildings off Kemp Street have back-of-house entries to Kemp Street

- To the south of the site at 59–63 Collins Street is Drysdale House run by the TAFE, owned by The Crown, used for teaching cooking. This has a basement that would be lower than Kemp Street, with the entry crest at 5.60 m AHD.
- To the south east is 53–57 Collins Street owned by Olympus Superannuation Fund (TAS) P/L, which is a multi-tenancy commercial site, with basements off Argyle Street, and court yard off Kemp Street (floor levels are 6.42 m AHD and 6.57 m AHD for main buildings from the court yard, and 5.76 m AHD and 6.04 m AHD from Kemp Street)
- To the west is the Argyle Street car park at 38 Argyle Street, which has a basement for storage, with entry at 6.28 m AHD at top of the ramp, that grades down to basement.

The level of the entry is proposed to be 6.00 m AHD, and the doorways will act like a broad crested weir. After this is an arcade walkway, which doesn't not restrict the flow into the site except where doorways are partly closed, even if the walkway is flat. So hydraulically the peak water levels in Kemp Street and flow rate into the site, are usually controlled by the width of the "weir" into the site. The XPSTORM model was run with range of weir widths with the results shown in Figure 27. For these runs the width of the arcade was 3.6 m and flat.

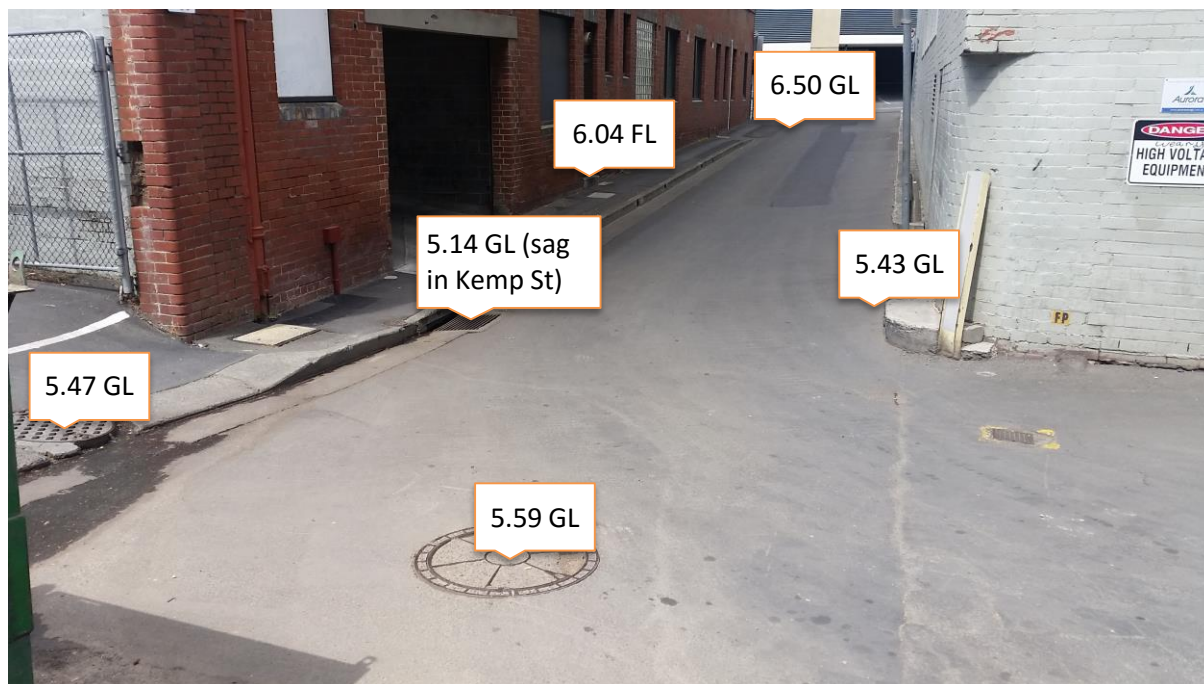


Figure 24. Kemp Street looking south to Collin Street (site to left)

3.2 Impacts on neighbouring properties

The aim of looking at the impact on neighbouring properties is to consider whether the proposed development will create an unacceptable increase in risk. The first task is developing criteria as to whether the impacts from the development are acceptable.

- There will be aspects of flood risk which are unacceptable with the current system, and these are not considered as criteria in this report, as these issues will be considered by Hobart City Council in their stormwater management plans.
- There could be areas where the impacts of the development cause the flood risk in an area to change from acceptable to unacceptable.
- Ideally the impacts of the development are positive, or if negative, are not significant.

The usual flood risk criterion is to have the floor level above the 1% AEP level, as this meets the National Construction Code's requirements for weatherproofing. As an extra level of safety for habitable floor levels, these should be a further height above the 1% AEP peak level. This extra height is called freeboard and is to allow for local hydraulic impacts and wind waves not typically considered in the flood modelling.

Under Section 159 of the *Tasmanian Building Act 2000* and Section 15 of the *Building Regulations 2014* for flood prone areas, the freeboard above watercourse floodplain is 300 mm. The freeboard requirement is for when buildings are next to flowing water. If there could be large debris flows, such as next to a major river, the freeboard could be 600 mm. For this project the freeboard 0 mm for non-habitable floors and 300 mm for habitable² rooms.

² Habitable room means a room used for normal domestic activities, and— (a) includes a bedroom, living room, lounge room, music room, television room, kitchen, dining room, sewing room, study, playroom, family room, home theatre and sunroom; but (b) excludes a bathroom, laundry, water closet, pantry, walk-in wardrobe, corridor, hallway, lobby, photographic darkroom, clothes-drying room, and other spaces of a specialised nature occupied neither frequently nor for extended periods.

In addition to keeping flood waters out from buildings to protect property, the flow depth and velocity can cause a risk to people and vehicles. The Australian Rainfall and Runoff guidelines [9] provide advice on the risks to people and vehicles for a combination of depth and velocity (Table 4 and Table 5).

3.2.1 Inundation from flood waters into properties

The opening width from Kemp Street into the site acts as a throttle on the overland flow. Considering the Kemp Street peak water levels from Figure 27, for widths larger than 3 m the change in water level with larger widths is small, compared with the larger change in level for widths less than 2 m. In the 1% AEP design event, the water level in Kemp Street gets to 6.27 m AHD with the existing site (weir is 9 m wide). This would inundate some of the floor levels off Kemp Street.

With the development, during the critical 1% AEP event, the floor level that gets inundated first due to the development is the 6.42 m AHD level within the courtyard at 53–57 Collins Street. This occurs in this preliminary study if the site opening is less than 3.5 m. This is not considering any allowance for freeboard, which is required for habitable floor levels near an overland flow path or water course. In this case no freeboard is required as the court yard

- would have still water flooding up from below in a backwater of the main flow and there are no local hydraulic water depth increases as the water is slow moving,
- is sheltered and so would not have any wind waves, and
- services 53–57 Collins Street which is office space at ground and basement levels, and so is not habitable.

Note this courtyard area is accessed from a roller door, and this could be defended with sand bags. For the purpose of this scenario this roller door is treated like the roller doors through the arcades from the Elizabeth Street Mall and Liverpool Street—and assumed to be left open during the storm.

3.2.2 Safety for people

With a narrower opening into the site, than the existing width, the peak water level in Kemp Street gets higher during a major storm with the development than without the development. From a safety point of view, it is unsafe for adults in still water if it's more than 1.2 m deep, and more than 0.5 m deep for children (Table 4). The product of depth multiplied by velocity is also used in the flood risk criteria.

When water is moving the depth limit reduces, until after 3 m/s it's unsafe at any depth. Small cars can start to float after a depth of 0.3 m (Table 5). During a major storm with the existing system the water would be deeper than the safe depth for children in Kemp Street. So in terms of looking at the impacts of the development, the adult depth is used (1.2 m).

To get to 1.2 m above the sag in Kemp Street (5.14 m AHD), the water would need to get to 6.34 m AHD, which occurs when the site entry width is restricted less than 5 m. But this is for someone standing on top of the grated pit in the roadway. Not far from this pit the water would be shallower, and a more practical minimum ground level is 5.40 m AHD which is the near the entry to the site. At this ground level the 1.2 m depth would occur when the site width was restricted to 1.5 m. Given the previous section's discussion on not increasing the risk to neighbour requires the opening to be wider than 3.5 m, this requirement for at least 1.5 m is less restrictive. It is the impact on neighbour's criteria that is the governing criteria.

After the water pools in Kemp Street, it accelerates into the site and travels faster and with less depth through the site. Typical depth multiplied by velocity values are $0.5 \text{ m}^2/\text{s}$ in a 3.6 m wide

arcade set at 5.7 m AHD. This is a significant hazard for children and a low hazard for adults. While the facility is not a dedicated area for children, it is expected children will occupy the arcade from time to time. Therefore prior to the flood levels and flows becoming an unacceptable risk, people should be evacuated from the building to higher ground.

If a storm is likely to inundate the site, people should be evacuated in a timely manner. During a storm it's unclear what the flood peak will be, although improved forecasting and modelling could improve this. The Hobart City Council have a flood warning system which a site building management system may be able to link into. Another approach within the control of the project is a physical depth measurement device in the rivulet near the site. The trigger for depth gauge would be set to a suitable level, such as half the rivulet depth, a level that would provide enough time to evacuate the building assuming the flood waters were increasing. Further work during detailed design would be required to provide a robust decision making framework based on the hydrology of the rising limb of the event that will flood the site.

DV (m ² s ⁻¹)	Children (H.M = 25 to 50)	Adults (H.M > 50)
0	Safe	Safe
0–0.4	Low Hazard if depth < 0.5 m and velocity < 3 m/s otherwise Extreme Hazard	Low Hazard if depth < 1.2 m and velocity < 3 m/s otherwise Extreme Hazard
0.4–0.6	Significant Hazard; Dangerous to most if depth < 0.5 m and velocity < 3 m/s otherwise Extreme Hazard	
0.6–0.8	Extreme Hazard; Dangerous to all	Moderate Hazard; Dangerous to some if depth < 1.2 m and velocity < 3 m/s otherwise Extreme Hazard
0.8–1.2		Significant Hazard; Dangerous to most if depth < 1.2 m and velocity < 3 m/s otherwise Extreme Hazard
> 1.2		Extreme Hazard; Dangerous to all

Table 4. Hazard to people from flood waters

	Small passenger	Large passenger	Large 4WD
Length (m)	< 4.3	> 4.3	> 4.5
Kerb Weight (kg)	< 1250	> 1250	> 2000
Ground clearance (m)	< 0.12	> 0.12	> 0.22
Limiting still water depth ¹ (m)	0.3	0.4	0.5
Limiting high velocity flow depth ² (m)	0.1	0.15	0.2
Limiting velocity ³ (m/s)	3	3	3
Equation of stability	DV = 0.3	DV = 0.45	DV = 0.6

Table 5. Hazard to vehicles from flood waters

¹at velocity = 0 m/s, ²at velocity = 3 m/s, ³at low depth

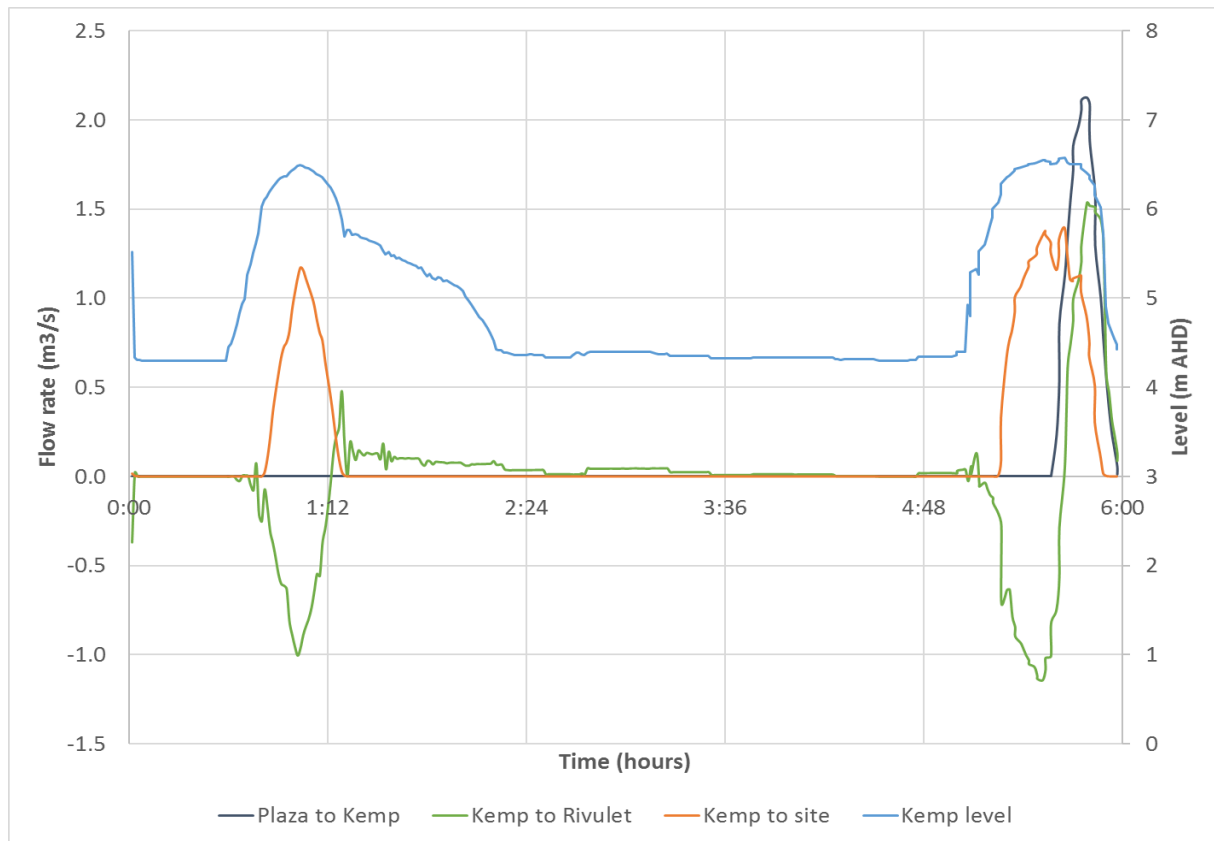


Figure 25. Flows in and out of Kemp Street sag point, with Kemp Street levels during 1% AEP storm

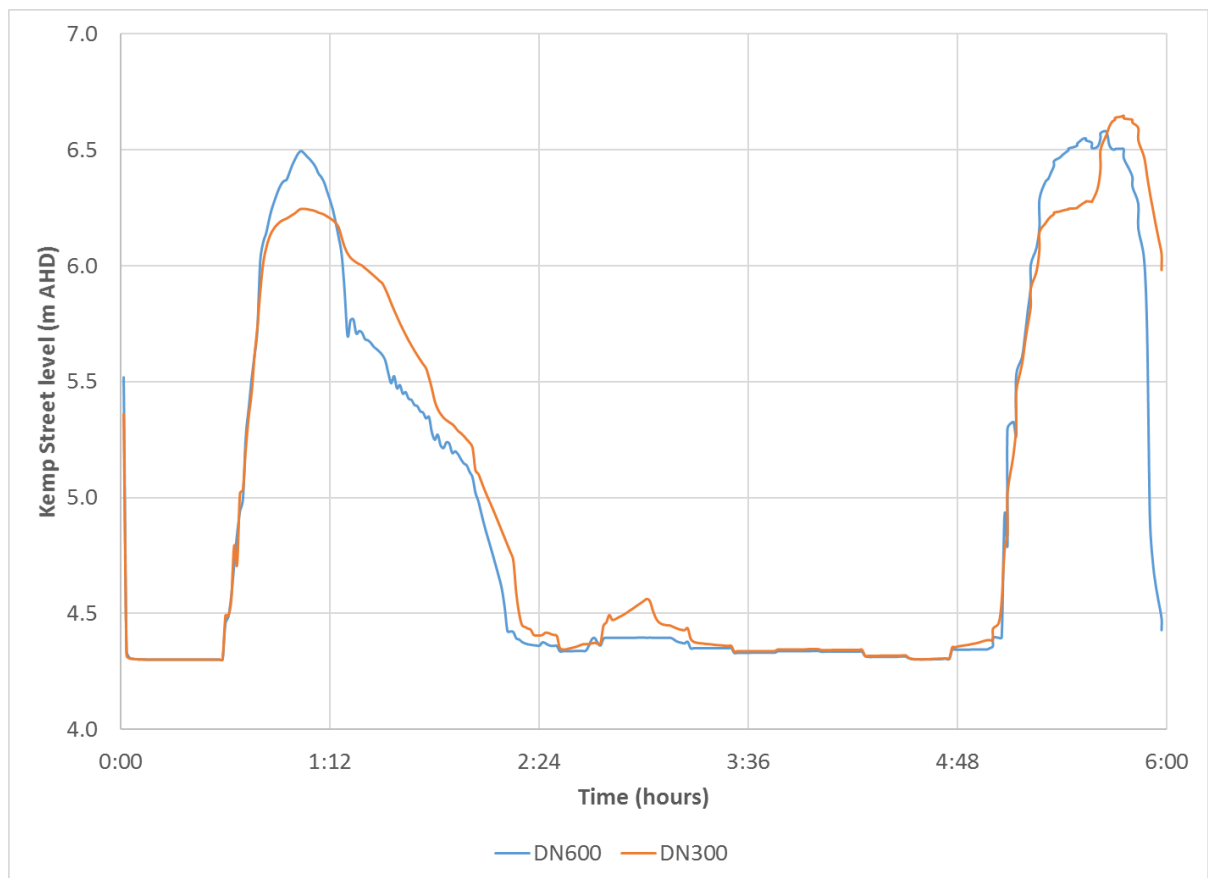


Figure 26. Impact of size of pipe between Kemp Street and Rivulet on Kemp Street level during 1% AEP event

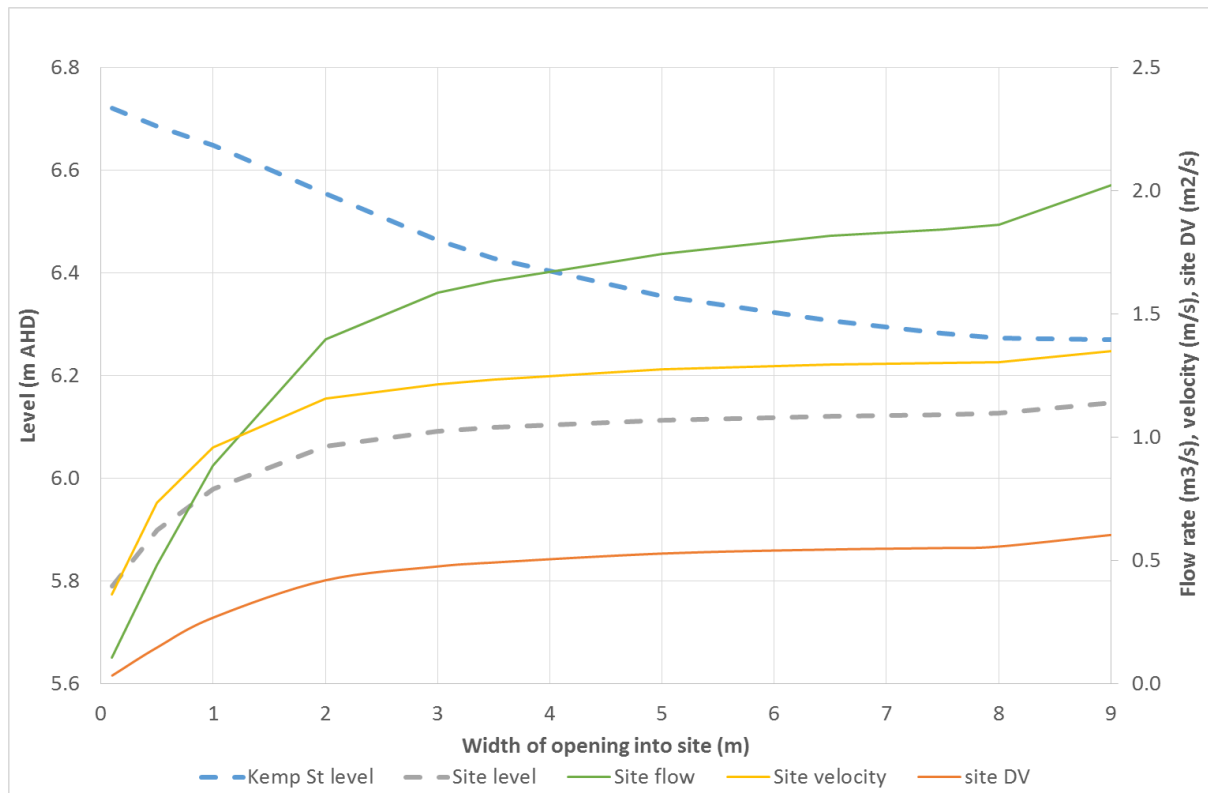


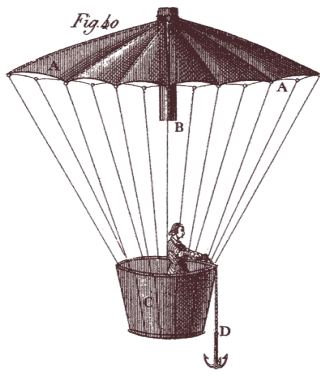
Figure 27. Kemp Street and site levels and velocity for different entry opening widths

4 Conclusions

1. This preliminary flood report has created a hydraulic model of the city block upstream of the development site, and provided a plausible scenario for flood behaviour during the critical 1% AEP storm event. This work used the results from the Entura [5] modelling of Hobart Rivulet and investigated in more detail how the flood water gets to the rivulet near the site.
2. The modelled results have been used to understand how overland flow from Elizabeth Street north of Liverpool Street, can't all be conveyed in the underground piped system. This is due mainly to Hobart Rivulet being full during the peak of the 1% AEP storm near where is crossed Elizabeth Street. The overland flow makes it way from ponding in Liverpool Street, through the Bank Arcade and into Kemp Street. There is also water flowing back up the piped system from the Rivulet into Kemp Street. From Kemp Street the overland flow is conveyed through the site at 36 Argyle Street, to Argyle Street and finally to the River Derwent.
3. Without the development, the restriction to the site from Argyle Street is a 9 m opening. This throttles the flow such it ponds to 6.27 m AHD in Kemp Street. At this level there are some floor levels off Kemp Street that would be inundated, and water would pool in Kemp Street to form an unacceptable flood for children and vehicles. For this existing scenario, the peak flow through the site is 2.0 m³/s.
4. The developed will impede, to some degree, water flowing through the site from Argyle Street during a major storm. In minor storms the piped system will convey the water in Kemp Street directly to the Rivulet. The restriction on overland flow due to the development will increase the depth of the peak water levels in Kemp Street. Above the levels already inundated in the 1% AEP storm prior to the development, the floor level off the court yard at 53–57 Collins Street will get inundated if the opening into the site is less than 3.5 m in width. To ensure the project does not have an unacceptable increase in flood risk on neighbouring properties, the site should be designed such that during the design storm flood waters do not inundate areas that weren't previously inundated where practical. With a width of 3.5 m the peak flow through the site is 1.6 m³/s, with a peak level in Kemp Street of 6.42 m AHD.
5. It is therefore recommended that the site be designed with doors that automatically open during a major flood and that the door and arcade walkway be at least 3.5 m wide and no higher than 6.0 m AHD. Further more detailed flood investigation may be done to test some of the assumptions in this preliminary report and so alter this requirement.
6. During the 1% AEP flood, the overland flow through the site would pose significant risk to children, although would be a low risk for adults. It is therefore recommended that people are evacuated from the ground floor during a flood to higher floors or alternative safe locations. This evacuation could be triggered when the depth of water in the Rivulet near the site is at a suitable level to give enough advanced warning of the flood risk, and communicated with the building's fire evacuation system.

6 References

- [1] Australian Government, "Tasmanian Flood History," 2016. [Online]. Available: http://www.bom.gov.au/tas/flood/flood_history/flood_history.shtml. [Accessed 13 January 2016].
- [2] The Mercury, "The Weather and The Floods," 5 July 1872. [Online]. Available: <http://trove.nla.gov.au/ndp/del/article/8920584>. [Accessed 13 January 2016].
- [3] The Mercury, "The Floods - Further Particulars," 6 July 1872. [Online]. Available: <http://trove.nla.gov.au/ndp/del/article/8920982>. [Accessed 13 January 2016].
- [4] Hydro-Electric Commission, "New Norfolk Flood Plain Study," Hydro-Electric Commission, 1992. [Online]. Available: <https://stors.tas.gov.au/au-7-0054-00608>.
- [5] Entura, "Hobart Rivulet Flood Study 2014," Hydro-Electric Corporation trading as Entura, 89 Cambridge Park Drive, Cambridge, Tasmania, 2014.
- [6] The Canberra Times, "£1m. Damage By Flood In Hobart," The Canberra Times, 25 April 1960. [Online]. Available: <http://trove.nla.gov.au/newspaper/article/103077881>. [Accessed 24 May 2016].
- [7] The Canberra Times, "Many Homes Lost In Floods," The Canberra Times, 26 April 1960. [Online]. Available: <http://trove.nla.gov.au/newspaper/article/103077931/11492463>. [Accessed 24 May 2016].
- [8] Hydro Electric Corporation, "Hobart Rivulet Flood Study," 1996.
- [9] Engineers Australia, "Australian Rainfall and Runoff," Engineers Australia, December 2015. [Online]. Available: <http://www.arr.org.au/>. [Accessed 19 June 2016].



13 October 2016

Neil Noye
Director City Planning
HOBART CITY COUNCIL
GPO BOX 503
HOBART 7001

Dear Neil

36 Argyle Street

Planning Application for Alterations to Approved Development

Further to our meeting Monday 10 October regarding the above, please see attached a set of amended plans, Traffic Impact Assessment and updated Planning Report in response to matters discussed.

In particular please note:

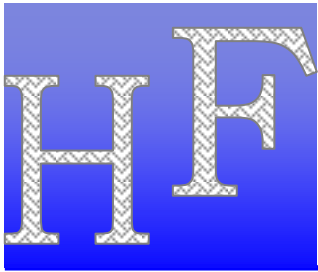
- the proposed vehicle access and egress is to include a public ROW and footway;
- a service easement is to be included within the boundaries of the proposed driveway;
- the footpath link between Argyle and Kemp Streets will have a minimum width of 1.4m (DA201);
- modifications to the existing footway ramp and canopy to 34 Argyle Street on the Argyle Street frontage are now shown on the plan DA201;
- enclosed bike storage is included along the southern side of the driveway and parking area (DA201);
- removal of door swing over footpaths (DA201);
- realignment of the proposed Kemp Street boundary to a 50mm offset from the building alignment (to allow for accepted builder's tolerances);
- the first floor office level retains the proposed cantilever to Argyle Street (DA202);
- end of trip facilities are included on the 5th Floor (DA206); and
- a maintenance access link to the Argyle Street carpark is to be provided on the 5th Floor (DA206)

I would be pleased to discuss as necessary.

Yours sincerely



Frazer Read
Principal
All Urban Planning Pty Ltd



Howarth Fisher and Associates

ACN 119 043 051

Structural, Civil and Traffic Engineering

Structural and Civil Engineering

Project Design and Management
Forensic Engineering and Structural Inspections
Research and Development Facilitators

Traffic Engineering

Traffic Management Studies and Traffic Impact Assessment
Expert Witness Representation
Road Safety Audits

36 Argyle Street Mixed Use Development Traffic Impact Assessment Report



Prepared for

Raadas Property Pty Ltd

Date

November 2016

Prepared by

Joanne Fisher




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Name		Signature	Date
Authorised by:	Joanne Fisher		1 st November 2016



1. Introduction

1.1 Client Details

This document has been prepared for the following:

Client Name: Richard Doedens

Address: Raadas Property Pty Ltd

1a/26 Mornington Road

Mornington, Tasmania 7018

Client Contact: Richard Doedens and Daniel Burger

1.2 Project Details

The report is undertaken for the site at 36 Argyle Street, Hobart. This report is an update to the previous report (dated November 2104, which has been appended at Appendix C) and assesses the alterations to the approved development application, but as yet unconstructed, development site. The impact on the parking and traffic requirements of this application compared to the approved, but not yet constructed, development (PLN-14-00952-01) generated by the use changes and additional hotel rooms, results in a reduction in the total calculated trip generation to the site. In addition, the introduction of the driveway is an improvement to the previously approved scheme.

A copy of the proposed development plans can be found at **Appendix A**.

The main change associated with the new development is a reconfiguration of the ground floor to accommodate a new driveway linking Argyle Street to Kemp Street, which will provide public access to Kemp Street from Argyle Street, as well as provide drop off and pick up parking and a servicing option for light vans associated with the new development. This change will significantly improve vehicle circulation, servicing and provide high turnover, short term parking to facilitate pick up and drop offs. The proposed access and egress would accommodate a change in direction in Kemp Street should Council decide to reverse the direction of Kemp Street and Purdy's Mart at a later stage.

In addition to the modifications to the vehicular traffic arrangement, the main proposed changes to the approved development, include but are not limited to, the removal of:

- retail space,
- HCC amenities,
- retail arcade,
- first floor café/ bar,
- parenting room and,
- childcare centre.

The new development application provides for the inclusion of:

- a ground floor restaurant and bar;
- additional office space;
- amended form of the front and rear canopies;
- hotel conference facilities and
- minor changes to the numbers of hotel rooms and hotel suites.
- a driveway between Argyle and Kemp Street.

2. Scope of Consultancy

The scope of consultancy involves the following:

- To obtain background information and plans.
- To liaise with architects.
- To undertake site visit.
- To measure sight distances to comply with the conditions in the *City of Hobart Planning Scheme*.
- To assess parking requirement and compliance with *AS2890.1: Off street parking 2004*.
- To assess impact on surrounding intersections.
- Assess access provision in accordance with *AS2890.1: Off street parking 2004*.
- Assess sustainable transport provision.
- Run Autotrack.
- Document findings in a Traffic Impact Assessment report.

3. Location of the Development

Figure 1 shows the location of the proposed development in the context of the surrounding street network.

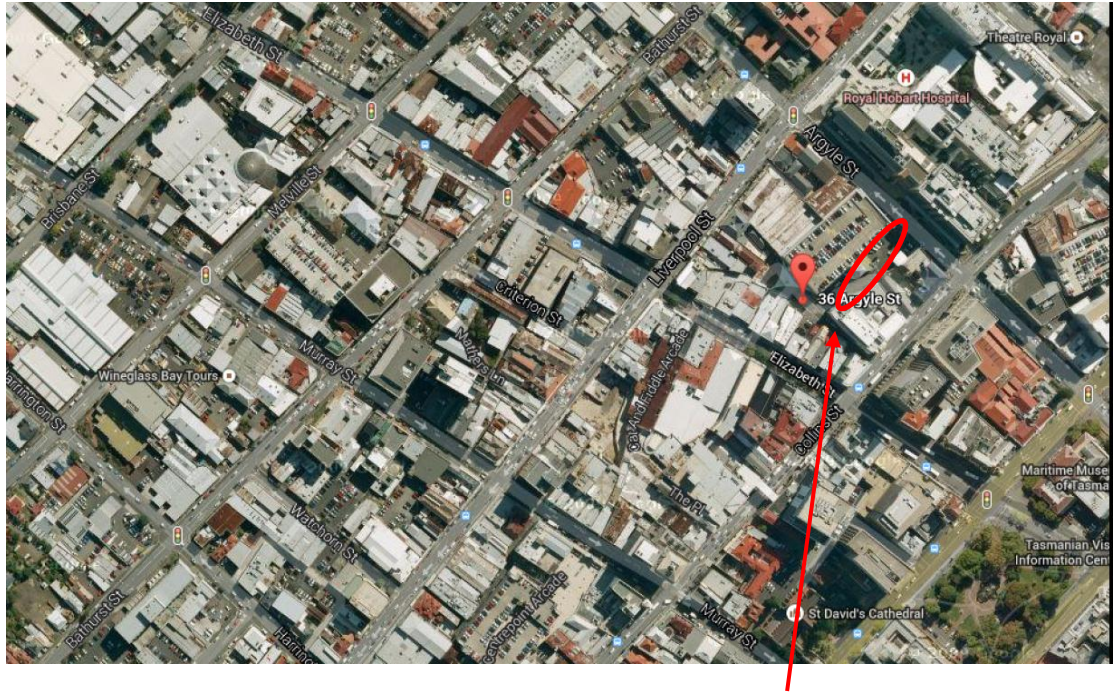


Figure 1: Location (source: GoogleMaps)

4. Existing Situation

4.1 Site Details

The site is located at 36 Argyle Street, Hobart. The site will have frontage onto both Kemp Street and Argyle Street.

Argyle Street acts as a major collector road within the city, providing a main northbound route out of the City of Hobart.

Kemp Street is a local access street, performing an access and service function to existing land uses, particularly in the morning, as well as providing all day loading facilities and short term parking. There are no formally defined footpaths and the road has a shared pedestrian and vehicle facility, with low vehicular operating speeds.

4.2 Road Width

The existing access to the site is via Argyle Street which is 15 metres wide (including 3 through lanes and 2 parking lanes). There are some sections of Kemp Street where parking and loading bays are provided on both sides in addition to the travelling lane (~13 metre wide cross section) and other narrower sections where the road travelling lane width is minimum 3 metre wide, there are some sections with an additional 2.5 metre parking bays (5.5metre cross section).

Both Argyle and Kemp Street operate in a one way direction.

4.3 Traffic Volumes

Hobart City Council has advised of the following traffic volumes.

- Argyle Street / Collins Street Intersection–

AADT Annual Average Daily Traffic - 19,199 vehicles per day

PM Peak Hourly Flows – 1,573 vehicles per hour¹

- Kemp Street - AADT Annual Average Daily Traffic - ~ Estimated 160 per day

Peak Hourly Flows – 16 vehicles per hour²

The SCATS data for Argyle Street and Liverpool Street shows that there are 20, 894 vehicles per day (AADT) travelling through this intersection. There are

¹ Based on SCATS data supplied by the Department of State Growth 2014 .

² Based on traffic data collected on Monday 11th August 2014 by Howarth Fisher and Associates.

~1,814 vehicles an hour travelling through this intersection during the evening peak hour.³

4.4 Posted Speed Limits

Argyle Street and Kemp Street are subject to the urban default speed limit of 50km/hr. However, given the width and functional constraints of Kemp Street, this street operates at a maximum speed of approximately 20km/hr.

4.5 Accident History

In line with standard traffic engineering practice the accident history for the past five years has been obtained from the Department of Infrastructure, Energy and Resources, (DIER). The results of the findings are outlined below:

There have been a total of twelve accidents in the vicinity of 36 Argyle Street. Of these twelve accidents, there have been three rear end accidents, three accidents involving vehicles in the same lane, three left rear end accidents and one accident involved a vehicle driving left into an object or parked vehicle. Two of the accidents involved vehicles parking, one involved of a vehicle pulling out of an access and another involved a vehicle pulling out of a space and failing to give way.

There has been one accident on Kemp Street in the past five years, the accident is described as *a parked car run away* and involved two vehicles.

4.6 Proposed Development

The proposed development comprises the following land uses:

- 142 bedroomed hotel, incorporating a recreation area, pool, Conference facilities (200m²), workshop and services.
- Office space (1936m²).
- Hotel reception / lobby.
- Ground floor restaurant and bar.

³ This is based on data collected in September 2014

5. Assessment of Trip Generation

5.1 Existing Trip Rates

The existing land uses at the site comprise the following:

A 28 space at grade car park with accesses onto Argyle Street and Kemp Street as shown in the photograph below:



Photograph 1: Showing the off street car park which currently occupies the site.

5.2 Proposed Trip Generation

The *New South Wales, Road Traffic Authority, Guide to Traffic Generating Developments 2002* is a nationally recognised reference document for determining trip generation rates. For purposes of comparison the approved development assessed on October 2014, generated 830 daily trips and 100 trips during the peak hour. The trip generation rate associated with the previously approved development for the site is, therefore, comparable to the newly proposed development.

Table 3: Additional Trip Generation for Proposed Development

Land Use	Trip Generation Rates	Total
<i>142 Room Hotel⁴</i>	Assumed motel ⁵	426 trips per day
	Daily vehicle trips = 3 per unit	
	Evening peak hour trips = 0.4 per unit	57 trips during the evening peak
<i>Hotel office, lobby, services and workshop</i>	All ancillary use - no additional trips	0
<i>Recreation Gym 50m² Pool 150m²</i>	For hotel patrons only	0
	All ancillary use - no additional trips	
<i>Conference Facilities 200m²</i>	Open to the public	20 daily trips
	Based on office and commercial trip rates	
	Daily vehicle trips = 10 per 100m ²	4 during the evening peak hr ⁶
	2 per 100m ²	
<i>Ground Floor Restaurant and Bar 100m²</i>	Evening peak hour vehicle trips = 5 per 100m ² gross floor area	60 daily trips
	Daily vehicle trips = 60 per 100m ² gross floor area	5 during the peak hour
<i>Offices 3555m²</i>	Daily Vehicle Counts	356 per day
	10 per 100m ²	
	Evening peak hour 2 per 100m ² gross floor area	71 during the evening peak
<i>1 Suite</i>	Assumed motel room	3 per day

⁴ This includes seven one bedroomed suites.

⁵ Definition of Motel in the NSW, RTA, Guide to Traffic Generating Developments, 2002, is more similar to the proposed hotel, the hotel definition is more similar to a pub.

⁶ The generation rates are based on sites with a mean peak hour mode split for cars of 0.62 and a mean peak hour occupancy of 1.19 . i.e. 52% car drivers.

	Daily vehicle trips = 3 per unit	0.4
	Evening peak hour trips = 0.4 per unit	during evening peak hr
	minus 56 trips ⁷ associated with commuter car park	865 – 56 = 809
<i>TOTAL</i>	129 trips during the evening peak hour	138 - 28=
	minus 28 trips associated with current use	110 trips per day
	<i>20% Reduction for linked and multipurpose trips</i>	647 trips per day
		88 trips during evening peak hour

5.3 Reduction for Linked and Multi-Purpose Trips

The incidence of linked and multi-purpose trips can reduce overall trip generation rates. A linked trip is a side track trip. A multi-purpose trip is where more than one shop or facility is visited. For example a person staying at the hotel and using the offices or attending a conference (and or using the bar and restaurant). Further reductions in trip rates can be attributed to the likely high proportion of public transport trips. The trip rates used in the table are based on individual land use trip generation in isolation from other land uses.

Consideration needs to be given to the prevalence of common usage of the various land uses. Notably, the offices, bar / restaurant and conference facilities may be used by hotel guests. Therefore, the trip generation may have been double counted. This report has calculated a 20% discount associated with linked or multi-purpose trips.

Some people may be dropped off at the parking bays along the new driveway. There will be general through traffic use of the driveway. However, this drop-off and pick up zone is designed for high turnover, short term parking requiring the driver park for a maximum of 10 minutes to drop off bags and check in before parking in a long term facility. It is anticipated that this facility will also be used by taxis and / or people who arrange for lifts to and from work or from the airport. It is assumed the office occupants would arrive on foot unless they have an allocated leased car space in the adjacent Council car park.

⁷ 28 x 2 = 56 daily trips (in and out of the commuter car park)

5.4 Hotel

The hotel development will generate an estimated 57 trips during the evening peak hour. The trip rates are based on worst case scenario of 100% occupancy, typically occupancy will be lower. Typically 85% occupancy rates (49 trips) may be more appropriate, however worst case scenario of trips based on 100% occupancy rates have been considered.

5.5 Offices

As outlined in the NSW, RTA, Guide to Traffic Generating Developments, 2002:

Offices

The car parking requirements for office and commercial developments vary with the parking policies of local government areas. It is the responsibility of local government to determine parking policy in commercial centres. Distinction needs to be drawn between whether the parking demand is to be met on site (unrestrained situation) or whether car parking supply is to be used as a policy tool to restrict commuter movement by private vehicles into a commercial centre (restrained situation). On this basis the following car parking provision is recommended.

The development's location in the centre of the City (Central Business Zone) means that the development does not have any car parking requirement.

5.6 Impact of the Development on Surrounding Intersections

The worst case scenario will occur during the evening peak period when an assumed 88 trips will be generated by the proposed development. Given that there is limited parking associated with this site it is not assumed that all trip destinations will be to the site itself and there will be disbursement of trips onto the network to other parking locations.

5.7 Hotel Traffic

Of these trips ~ 57 evening peak hour trips will be associated with the hotel and some of them will use the new driveway, with associated right of way, and then egress to Collins Street via Kemp Street. The parking bays within the new driveway will be for the exclusive use of the development traffic. Traffic volume counts undertaken by Howarth Fisher show that there were 16 vehicles per hour using Kemp Street during the evening peak hour. If half of the visitors to the hotel utilise the drop off / pick up facility the total flows on Kemp Street will increase to 45 vehicles per hour. Kemp Street can clearly cater for this increase.

It is assumed that these 45 movements will also utilise the Kemp Street and Collin Street intersection (or the Kemp Street / Purdy's Mart intersection depending on the Council's decision on the preferable direction of the flow and the Collins Street/ Argyle Street intersection). Given that the SCATS data provided by DIER shows that 1573 vehicles use this Collins Street / Argyle Street intersection during the evening peak and 19,199 vehicles use this intersection daily. The 45 vehicles coming from the drop off and pick up zone will represent an increase of approximately 2.2%.

It is assumed that the remaining vehicle flows that do not use the drop off and pick up zone associated with the hotel will go straight to the Market Place and Bathurst Street car parks. These car parks provide ~ 1400 spaces, which are available 24hr/ 7 days a week. The extra ~29 hotel based trips will be absorbed into the existing peak hour flows and in to the network and will again reflect a negligible increase in traffic flows and impact on intersections.

5.8 Office

Hobart City Council does not actively encourage commuter parking within the city centre. It is not assumed that all office workers will park in the Argyle Street car park, given the cost implications of the long term parking. However, there will be a proportion of consulting room / office workers who use the lease spaces. If 40 spaces are used for this purpose it can be assumed that the majority of the workers will leave during the evening peak hour. If 75% leave during the evening peak (a reduction has been made for people who work part time,) this will reflect an additional 30 trips through the intersection of Collins Street and Liverpool Street. This reflects a ~1.7% increase in traffic at this intersection during the evening peak hour. Currently there are approximately 20,894 vehicles travelling through this intersection during the day of which there are 1,814 during the evening peak hour.

The location of the mixed use development in the middle of a city, provides an opportunity to integrate best practice, land use and transport planning, by locating development in areas which reduce the need to travel, especially by car. The development's location actively manages the pattern of urban growth to make the fullest use of public transport and focus major generators in city centres near to public transport interchanges.

6. Assessment of Parking

6.1 Existing Situation

There are currently 28 parking spaces⁸ associated with the existing site.



Photograph 1: Showing existing off street parking provision at the site

6.2 Parking Requirements

The site is located within the Central Business Zone. There is no parking requirement associated with the zone as outlined in the City of Hobart Planning Scheme. Despite this for comparison purposes the parking requirement, for the previously approved development (based on the lower parking requirements contained in the City of Hobart Planning Scheme) was for 178 spaces. Notably, only 2 spaces per 3 bedrooms was required under the previous City of Hobart Planning Scheme as opposed to one space required per bedroom and one space per 80m² of office space was required compared to 1 space per 30m² under the new Hobart Interim Planning Scheme, 2015.

⁸ It has been assumed that there would be 28 trips from the site in the evening peak hour and these have been deducted from the trips at Table 3 of this report (ref: trip generation –page 8).

Table 4: Parking requirements for the proposed development based on the Typical Requirements of the Hobart Interim Planning Scheme 2015

Land Use	Parking Rates	Total Requirement
<i>142 bedroom Hotel⁹</i>	<i>1 space per each bedroom</i>	142 spaces
<i>Office 3555m²</i>	<i>1 space for each 30m² floor area</i>	118.5 (119)spaces
<i>Conference Facility 200m²</i>	<i>1 space per 30m²</i>	6.7 (7) spaces
<i>1 new suite</i>	<i>1 per unit</i>	1 space
<i>Services and workshop</i>	All ancillary	Nil
<i>Recreation</i>	All ancillary	Nil

⁹ This includes seven one bedroomed suites.

<i>Restaurant and bar 100m²</i>	15 for each 100m ² of floor area	15
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TOTAL	284 spaces
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There is a requirement for 284 spaces associated with the proposed development based on the typical requirements of the Hobart Interim Planning Scheme, 2015. 40 spaces are to be leased from the Council and dedicated to the development leaving a shortfall of 244 spaces. There are many off street car parks in the vicinity of the site, including the Argyle Street Council car park (950 spaces), the Market Place car park (~800 spaces) which is open 24hours / 7 day per week and the newly opened Bathurst Street / Argyle Street (~650 spaces) car park which is also open 24hours / 7 days per week.

However, given the location of the proposed development within the Central Business Zone there is no requirement for parking to be provided.

6.3 Proposed Parking Provision

The proposed layout of the drop off and pick up zone can be found in Appendix A. Furthermore, it is proposed to lease 40 spaces from the City of Hobart's Argyle Street car park. These spaces will be available for staff in the office and for hotel staff. The proponent has had discussions with officers at Council, regarding the lease of 40 car spaces within the Argyle Street car park. Notwithstanding that, it is expected that a lease will be formalised on the basis of these discussions, any such car parking or agreement is not required by the planning scheme and is beyond Council's consideration of this Development Application.

It will also ensure that the drop off and pick up zone located on the new link driveway between Argyle Street and Kemp Street will be used for high turnover drop off and pick up parking and servicing associated with the hotel. Given the location of the site, in the middle of the city, it is expected that the actual trip generation to the hotel will be lower due to higher public transport use (taxi and *airporter* bus). Turnover should be expedited by hotel staff assisting at the drop off and pick facility. Staff will also assist guests with baggage, advise of the location of the reception and where to find long term parking. Many guests who arrive at the hotel without excessive baggage, and who are familiar with the hotel's location, are likely to park off site and walk to the hotel development.

The drop off and pick up facility will be predominantly used:

- for those with bags;
- for those with a passenger(s) who can check in separately from the driver;
- for those with a mobility issue;
- for servicing purposes and ;
- for those who arrive via taxi or airporter bus.

It is expected that the hotel (through staff, publications and internet) will advise those guests who wish to use the drop off and pick up facility of its location. Other guests who do not wish to use the drop off and pick up facility will be directed and advised of the nearest 24hr / 7 day car park sites at Market Place and Bathurst / Argyle Street during the booking process.

6.4 Dimensions and Manoeuvring

The existing Argyle Street car park spaces have been designed in accordance with the *Australian Standard 2890.1: Off street parking 2004*. These bays will be directly associated with the hotel and office land use and therefore the minimum requirement for user class 2 hotel car parking is 2.5metre wide x 5.4metre long bays with 5.8metre wide aisles. All the bays in the existing car park exceed this requirement.

Disabled bays also exist within the car park and are located in the vicinity of the lifts. The parallel bays along the new driveway will also comply with the Australian Standards for on street parking.

The end bays along the driveway will be utilised by light vehicles and small vans and are dimensioned at 2.3metres wide by 5.4metre long. Any mid bays which have been provided will be 6.3metres long x 2.3metres wide. The aisle width is 3 metre wide and have been designed in accordance with the requirements of AS2890.1:2004.

6.5 Impact of the Development on On-Street Parking

Consideration needs to be given to the prevalence of common usage reducing the total demand and / or the parking demand associated with the various land uses. Notably, the offices and conference facility are likely to be used by hotel guests and therefore the parking requirement associated with these uses has been double or triple counted.

The hotel's location, in the middle of the city, will make it an ideal location for a City break, which will typically involve people arriving at the hotel on an

Airporter bus or by taxi and then walking or using public transport during their City stay. The location of the hotel, near the hospital, also makes the site ideally situated for people who need to visit the hospital. There are a number of off street car parks located near the site, which make the location less dependent on on-street parking. The off-street car parks near this hotel site will make it affordable and accessible for people to use for overnight parking. Many national and international city based hotels require guests to utilise off site paid parking. The Market Place car park is located in close proximity to the hotel and opens 24 hours a day seven days per week.

6.6 Bicycle Parking

There is a requirement under the Hobart Interim Planning Scheme 2015 for the following bicycle parking facilities, based on the various land uses:

Table 5: Bicycle Parking Requirement based on the Hobart Interim Planning Scheme 2015.

Land Use	Employee Class 1 or 2	Visitor / customer Class 3
Office 3555m²	1 for each 250m ² floor area after the first 250m ² floor area 14 spaces	1 for each 1000m ² of floor area 4 spaces
Hotel 143 rooms (based on 142 rooms and 1 additional suite¹⁰)	1 for each 40 accommodation rooms 4 spaces	1 for each 30 accommodation rooms 5 spaces
Restaurant/Bar 100m²	1 for each 100m ² of floor area available to the public. 1 space	1 for each 200m ² floor area after the first 200m ² 0 spaces
Conference facility¹¹	1 for each 250m ² after	1 for each 1000m ² of

¹⁰ Assumed suite has 1 bedroom for this purpose.

200m²	first 250m ² floor area 0 requirement	floor area if the floor area exceeds 1000m ² 0 requirement
TOTAL	19 spaces	9 spaces

The proponent of the development is providing a bicycle storage facility to accommodate eight bicycles along the footpath sited between the new driveway and 34 Argyle Street.

Bicycle parking is currently available in the vicinity of the site, notably within the Argyle Street car park and it has been advised by Council that it is underutilised. It is proposed that the shortfall in bicycle parking racks be accommodated within this existing Council owned facility. The close proximity of the bike parking facility to the site will facilitate and encourage access to the site by bicycle.

¹¹ Assumed business and professional service facility, except as otherwise specified

7. Assessment of Access

7.1 Existing Situation Access Width

Vehicular access into the site will be via the Argyle Street car park, which provides access to the 40 leased car parking spaces. The Council car park is an existing structure and has been designed to comply with the requirements of the Australian Standards.

Access to the drop off and pick up zone is via a new link road which will be constructed between Argyle Street and Kemp Street. The design of the driveway meets the requirements of the Australian Standard, with parallel bays 2.3metre wide and a one way 3metre wide through lane. This facilitates use by 6.4metres long small vans as well the lesser manoeuvring space required for a B99 design vehicle.



Photograph 2: The access to the drop off and pick up zone is via Kemp Street.

7.2 Planning Scheme Access Widths Requirement

As the Argyle Street car park is an existing facility it has been designed to comply with the full requirements of the Australian Standards.

7.3 Access Provision

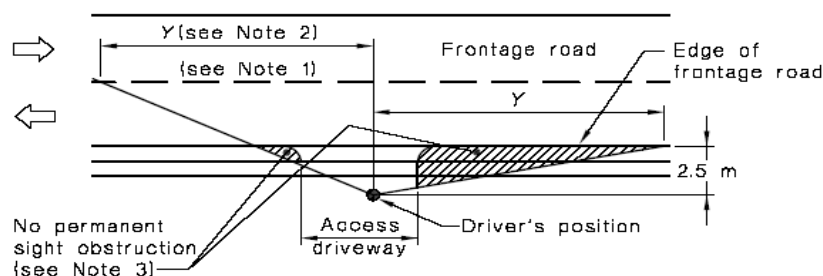
The location of the access and egress points can be found on the plan at **Appendix A**. The access at the Argyle Street car park has been designed to cater for the full capacity of the car park and will be compliant with the access requirement as outlined in the Australian Standard.

The new driveway servicing the pick-up and drop off facility for the hotel will comprise an on street short term parking facility only. The link road has been designed to current Australian Standard requirements.

A dedicated pedestrian facility along both sides of the driveway has been provided to ensure pedestrian amenity is maintained.

8. Assessment of Sight Distance

In accordance with Australian Standard 'AS2890.1: 2004 Off-street parking,' the sight distances from the egress point has been determined both for vehicles and pedestrians. The requirement of sight distance according to standards and the existing situation has been assessed as follows:



Frontage road speed (Note 4) km/h	Distance (Y) along frontage road m		
	Access driveways other than domestic (Note 5)		Domestic property access (Note 6)
	Desirable 5 s gap	Minimum SSD	
40	55	35	30
50	69	45	40
60	83	65	55
70	97	85	70
80	111	105	95
90	125	130	Use values from 2 nd and 3 rd columns
100	139	160	
110	153	190	

FIGURE 3.2 SIGHT DISTANCE REQUIREMENTS AT ACCESS DRIVEWAYS

The sight distance from the new Kemp Street link road access was measured to be 59 metres which exceeds the minimum SSD. However, given the width and functional constraints of Kemp Street, this street operates at a maximum speed of approximately 20km/hr. A 59 metre sight distance provision is therefore deemed adequate for the speed environment.

The photograph below shows the sight distance available from the driveway egress:



Photograph 3: Showing the sight distance available from the driveway egress.

The sight distance onto Collins Street was measured as follows:



Photograph 4: Shows sight distance to the south exceeds 100 metres and is in excess of 69 metres required in the AS2890.1 from the Kemp Street egress onto Collins Street

9. Servicing Requirements

Small service vehicles (i.e. 6.4 metre long vans) will be serviced via the new driveway located between Argyle Street and Kemp Street. Some bays will be used specifically for servicing. A height clearance of 4.5metres has been provided to facilitate servicing requirements in line with the requirements of AS2890.2.

There is currently a dedicated loading zone, with two bays, in Kemp Street adjacent to the proposed development site. This loading zone is operational between 8am – 6pm Monday to Friday. Consideration may be given by Council to extend the hours of its operation to include early mornings and later in the evenings (6am- 8pm) to ensure adequate servicing facilities are available for the hotel and other development land uses.



Photograph 5 showing the location of the existing loading zone on Kemp Street.

There are three metered parking bays on Argyle Street which are restricted to use before 10.30am and after 2pm Monday to Friday. Consideration could be given to utilising this area as a loading zone before 8am and after 6pm to facilitate early morning and late night servicing to the various land uses in the proposed development site.

Typical servicing will be via an 8.8-metre medium rigid truck or a smaller 6.4 metre rigid truck.

The Argyle Street car park can also provide a servicing function for light vans, (these vehicles would need to be lower than the vehicle height clearances of less than 2 metres). A dedicated loading zone could be provided through the

allocation of a car parking space for this purpose. Ideally this would be located near the development site access into the Argyle Street car park which is located on the 5th floor, (the conversion of a space for loading purposes would be subject to Council approval).

There are two 15 minute parking areas on the one way ingress to the main loading zone on Kemp Street. One or both of these bays could be used for an additional loading facility if demand warrants further servicing facilities.

The southern corner of the Drysdale building will be protected via the provision of a new bollard.

Service and maintenance access will also be provided via the 5th floor of the Argyle Street car park.

9.1 Options for Service Vehicles

Hobart City Council is currently considering two options for directing traffic through Kemp Street. One option involves maintaining traffic in its current direction, (i.e. in via Purdy's Mart and out via Kemp Street) the other involves reversing the traffic flow so all vehicle access travel one way in via Kemp Street and egress out onto Collins Street via Purdy's Mart.

For the purpose of this development application consideration has been solely given to Purdy's Mart and Kemps Street operating in its current directional flow. The Autotrack paths for the 8.8 metres vehicle entering via Argyle Street and egressing via Purdy's Mart are also demonstrated. As is typical within the confines of a constrained site this movement requires the turn to be undertaken from the second lane as opposed to the kerbside lane.

9.2 Autotrack Paths

The truck Autotrack paths are found at Appendix B of this report and show a medium rigid truck operating in the current directional flow (in via Purdy's Mart) and out via Kemp Street onto Collins Street.

The autotrack paths also show a light van travelling along the link road and turning left out of the driveway into Kemp Street.

Two truck autotrack paths are shown at Appendix B of this report.

- 13J270(P4) – 8.945 Refuse Vehicle (Tandem Axle)

This vehicle can utilise the Kemp Street service loading bay. The autotrack paths show clearances between the vehicle bays and kerb edge in excess of 300mm (specifically 447mm and 302mm) on Kemp Street. This vehicle has a better turning radius than the Australian Standard 8.8metre design vehicle. It should be noted that the HCC refuse vehicle is approximately 6.8metres in

length and has adequate clearances to the kerb. The autotrack paths showing this level of detail are contained in Appendix B of the original report.

- 13J270(P5) – 8.8metre medium rigid truck

In reality most vehicles perform better than the 8.8metre Australian Standard design vehicle. The 8.8metres vehicle will perform better now that more of Kemp Street is available for manoeuvring as a result of the new driveway being provided for pick up and drop off. Clearance of 221mm and 309mm can be achieved (79mm short of Council's 300mm requirement on the southern side of Kemp Street). This side of Kemp Street has a kerb only and no footpath.

An autotrack path of an 8.8metre service medium rigid truck operating in the opposite direction (egressing via Purdy's Mart) are shown at Appendix B.

Given the constraints of the site the Council will have to invoke some discretion on their 300mm clearance requirement. The service vehicles currently operate in the Purdys Mart and Kemp Street area, typically outside of the peak periods, when pedestrian and vehicle flows are lower.

10. Sustainable Transport Requirements

10.1 Buses

The proposed site is well served with public transport services and is located in proximity to a number of different bus routes, notably all the services operating to the northern and eastern suburbs. The development will also be located in close proximity to the main Hobart Bus Station on Elizabeth Street. The bus services provide a convenient, accessible and sustainable transport link to the site.

The location of the proposed development, in close proximity to the CBD and the Hobart Bus Interchange, reduces the car-based dependence to access this site. Efforts to promote both general bus use and the Airporter bus to the site will be supported. The development is in a location where there is a good choice of transport modes other than the car. This will lead to an increased proportion of non-car based movements to the development site.

The Hobart Hopper bus service provides a free Saturday bus service from the street frontage in Argyle Street to various locations in the City, including Elizabeth Street bus interchange and Salamanca, providing a useful and sustainable link to other bus, coach services. This will hopefully reduce the necessity for car based trips for many hotel guests.

10.2 Bicycles

Bicycle parking is provided at the site to facilitate and encourage access to the site by bicycle. Hobart City Council is providing and expanding a network of bicycle facilities within the vicinity of the site.

Bicycle access may be particularly attractive for short distance trips. The site is located in close proximity to local residential catchments, which could be potential generators of bicycle movements to the site for staff. By promoting and facilitating cycling to the site, we are encouraging a shift away from private cars to less environmentally damaging modes.

10.3 Pedestrians

There are 2.4-metre wide footpaths along the Argyle Street road frontage to the development site. Furthermore, there are many traffic signal controlled pedestrian crossing facilities along the length of Argyle Street in addition to a pedestrian crossing facility which is located in close proximity to the site. These will provide a useful link between the hospital and the proposed hotel.

The site is conveniently located near to the Central Business District (CBD) of Hobart as well as Salamanca and Brooke Street Pier (which acts as an

interchange for tourist based trips via bus, bicycle and ferry). Hobart City Council has a good network of footpaths within the CBD, which provide a safe, controlled pedestrian environment. Again, this will typically lead to an increased proportion of non-car based movements to the development site.

A pedestrian visibility splay has been provided from the Kemp Street access onto Collins Street in line with the requirements of AS2890.1: Off street Parking 2004. The Kemp Street shared pedestrian and vehicular environment provides a safe low speed, low vehicle flow area for people walking to the hotel and mixed use development.

There will be a pedestrian connection between the driveway and the hotel facility. Easily accessible stairs and lifts, will facilitate circulation between the arcade floors.

10.4 Hotel

Hotel guests will arrive and depart from the hotel by:

Taxi, mini-bus (Airporter shuttle bus) or be dropped off at the Kemp Street hotel entrance, and then proceed on foot to the hotel reception for check-in. Check-in would most often occur in the afternoon or evening, but could be at any time to a lesser extent.

Guests with cars will either park them at a convenient location elsewhere (for example there is a privately owned car park at Market Place which provides access 24hours a day / 7 days a week in close proximity to the hotel.) There are also other pay and display car parks which are conveniently located within walking distance to the site. From these car parks people would proceed to the hotel site on foot. Others may be directed to available leased car spaces in the adjacent Council car park. The guests would then take the lift to the ground floor reception for check-in, and then use the lifts to take them to their room on the hotel floors.

Check-out would most often occur in the mornings over an extended period from early to mid-morning. It should be noted that these hotel based movements are counter-cyclical to the business hours of movements to the office areas, providing temporal distribution of pedestrian and vehicular demand to the site.

10.5 Offices / Consulting rooms

It is assumed that people in the offices / consulting rooms have leased or private parking either within the Argyle Street car park or elsewhere.



Other people who work in the offices will travel to work, as other typical city workers do, by foot, public transport or by bicycle, walking into the site via Kemp Street or Argyle Street.

11. Conclusion and Recommendations

This report is an update to the previous report (dated November 2104)which has been appended at Appendix D) and assesses the alterations to the approved development application, but as yet unconstructed, development site.

From a traffic perspective the new design provides significant improvements to traffic and pedestrian safety and improves amenity and safety for all road users. The introduction of the driveway is an improvement to the previously approved scheme.

- **Trip Generation**

The impact on the parking and traffic requirements of this application compared to the approved, but not yet constructed, development (PLN-14-00952-01) generated by the use changes and additional hotel rooms, results in a reduction in the total calculated trip generation to the site.

The proposed development has been assessed in relation to trip generation during the evening peak hour. The evening peak hour depicts worst case scenario conditions for a hotel and office use and therefore the proposed development is typically likely to generate approximately 78 trips per hour. The extra trips will be absorbed into the existing peak hour flows and into the network and will reflect a negligible increase in traffic flows and impact on intersections.

The location of the mixed use development in the middle of a city, provides an opportunity to integrate land use and transport planning by locating development in areas which reduce the need to travel, especially by car. The development's location actively manages the pattern of urban growth to make the fullest use of public transport

- **Parking**

The site is located within the Central Commercial Zone. There is no parking requirement associated with the zone as determined by the City of Hobart Planning Scheme.

- **Sight Distance**

The sight distance from the Kemp Street access exceeds 100metres to the north and therefore exceeds the requirement of the Australian Standard of 69 metres. Typically vehicle speeds on Kemp Street are in the order of 20km/hr, the sight distance achievable exceeds the minimum sight distance requirement for an access on to a 50km/hr road.

- **Servicing Requirements**

Servicing will be via the pre-existing loading zone located on Kemp Street and via a service facility for small vans within the new driveway between Argyle Street and Kemp Street. Consideration could also be given to converting the 15 minute parking bay (opposite the existing loading zone) on Kemp Street for servicing purposes.

Autotrack has been used to model the swept path of a vehicle through the driveway and through Kemp Street. Typical servicing will be via an medium rigid truck or a smaller 6.4 metre small service vehicle.

The traffic flows in Kemp Street have been counted during the evening peak period 4.45pm- 5.45pm and totalled 16 vehicles per hour. The road can clearly accommodate the increased traffic flows associated with the proposed drop off and pick up facility at the front entrance to the hotel and the service vehicle facility which will be provided on Kemp Street.

- **Sustainable Transport Requirements**

- **Buses**

The location of the proposed development in close proximity to the CBD and the Hobart Bus Interchange reduces the car-based dependence to access this site. Efforts to promote bus access to the site will be supported. The development is in a location where there is a good choice of transport modes other than the car. This will lead to an increased proportion of non-car based movements to the development site.

- **Bicycles**

Bicycle parking is currently available in the vicinity of the site and it has been advised by Council that it is underutilised. The close proximity of the bike parking facility to the site will facilitate and encourage access to the site by bicycle. Hobart City Council is providing and expanding a network of bicycle facilities within the vicinity of the site.

The proponent of the development is providing a bicycle storage facility to accommodate eight bicycles along the footpath located between the new driveway and 34 Argyle Street.

- **Pedestrians**

There are 2.4-metre wide footpaths along the Argyle Street road frontage to the development site. Furthermore, there are many traffic signal controlled pedestrian crossing facilities along the length of Argyle Street in addition to a pedestrian crossing facility which is located in close proximity to the site and would these will provide a useful link between



the hospital and the hotel. There is a 1.7metre wide footpath along Kemp Street providing a link from Collins Street to the proposed hotel and mixed use development. The footpath facility alongside the driveway will further improve pedestrian amenity.

Appendix A

DEVELOPMENT PLANS



Architectual Drawings for Planning Amendment

DA000	A	Coverpage
DA201	A	Ground Floor Plan
DA201_1	A	Mezzanine
DA202	A	1st Floor - Office
DA203	A	2nd Floor - Office
DA204	A	3rd Floor - Office
DA205	A	4th Floor - Office
DA206	A	5th Floor - Conference, Recreation & Staff Facilities
DA207	A	6th Floor - Hotel 1
DA208	A	7th, 10th & 11th (Hotel Levels 2, 5 & 6)
DA209	A	8th & 13th Floors (Hotel Levels 3 & 8)
DA210	A	9th & 12th Floors (Hotel Levels 4 & 7)
DA211	A	14th Floor Apartments (Hotel Level 9)
DA212	A	Roof Plan
DA301	A	Elevation 01
DA302	A	Elevation 02
DA303	A	Elevation 03
DA304	A	Elevation 04
DA305	A	Elevation 05
DA306	A	Elevation 06
DA401	A	Section A
DA402	A	Section B

Mixed Used Development

36 Argyle Street, Hobart

Raadas Property Pty Ltd

11/10/2016

Planning
Amendment

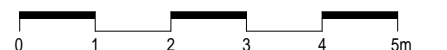


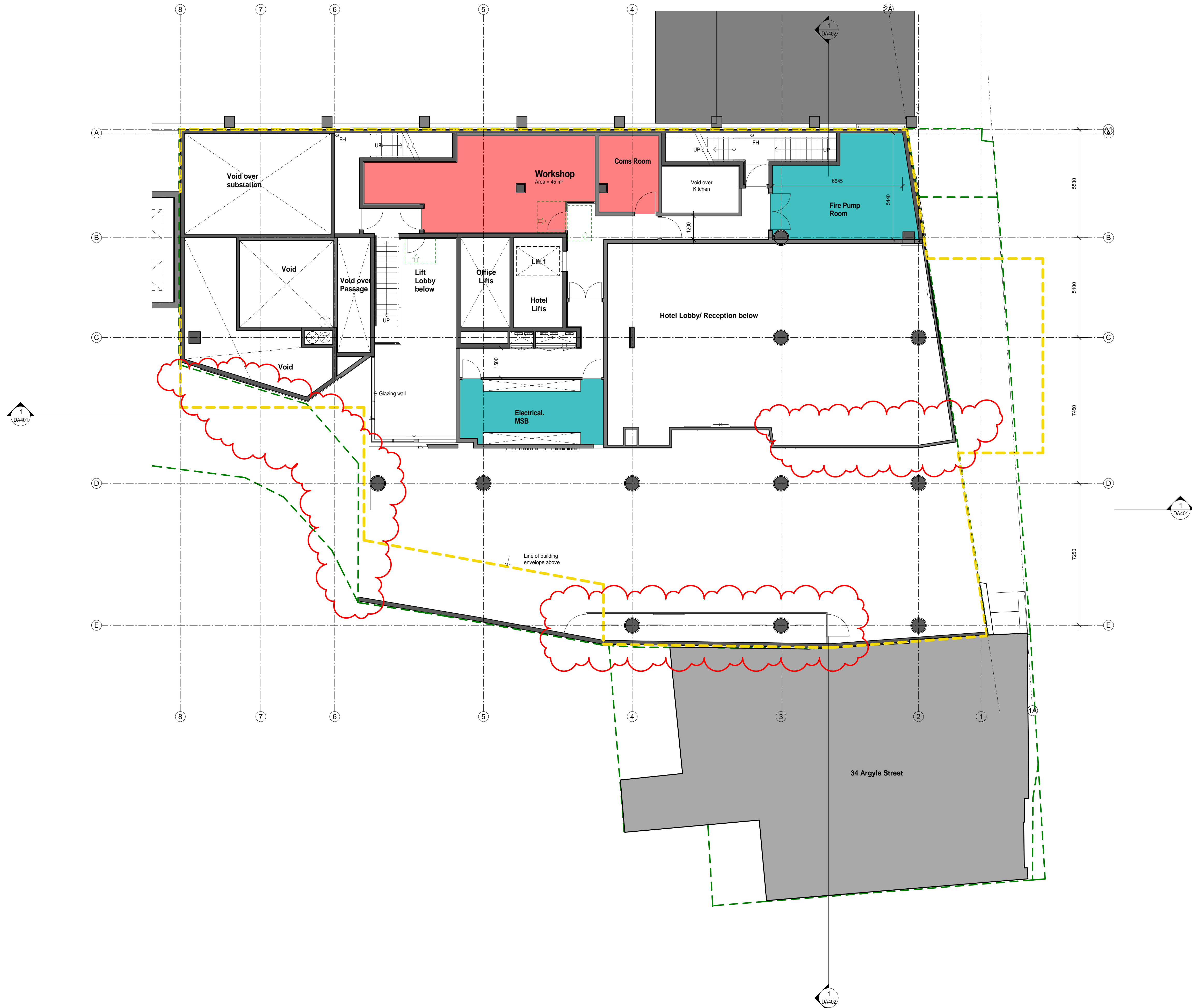
2016/10/11 DA Amendment no.1



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1 Mezzanine Floor

1:100

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PLANNING APPLICATION

REVISIONS

A 20/10/11 DA Amendment no.1

DRAWING

Mezzanine

PROJECT TITLE

Mixed Used Development

PRINCIPAL

Raadas Property Pty Ltd

PROJECT ADDRESS

36 Argyle Street, Hobart

JOB NUMBER

1430

DATE

11/10/2016

SCALE @ A1

1:100

DRAWN

CC

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DA201_1 A



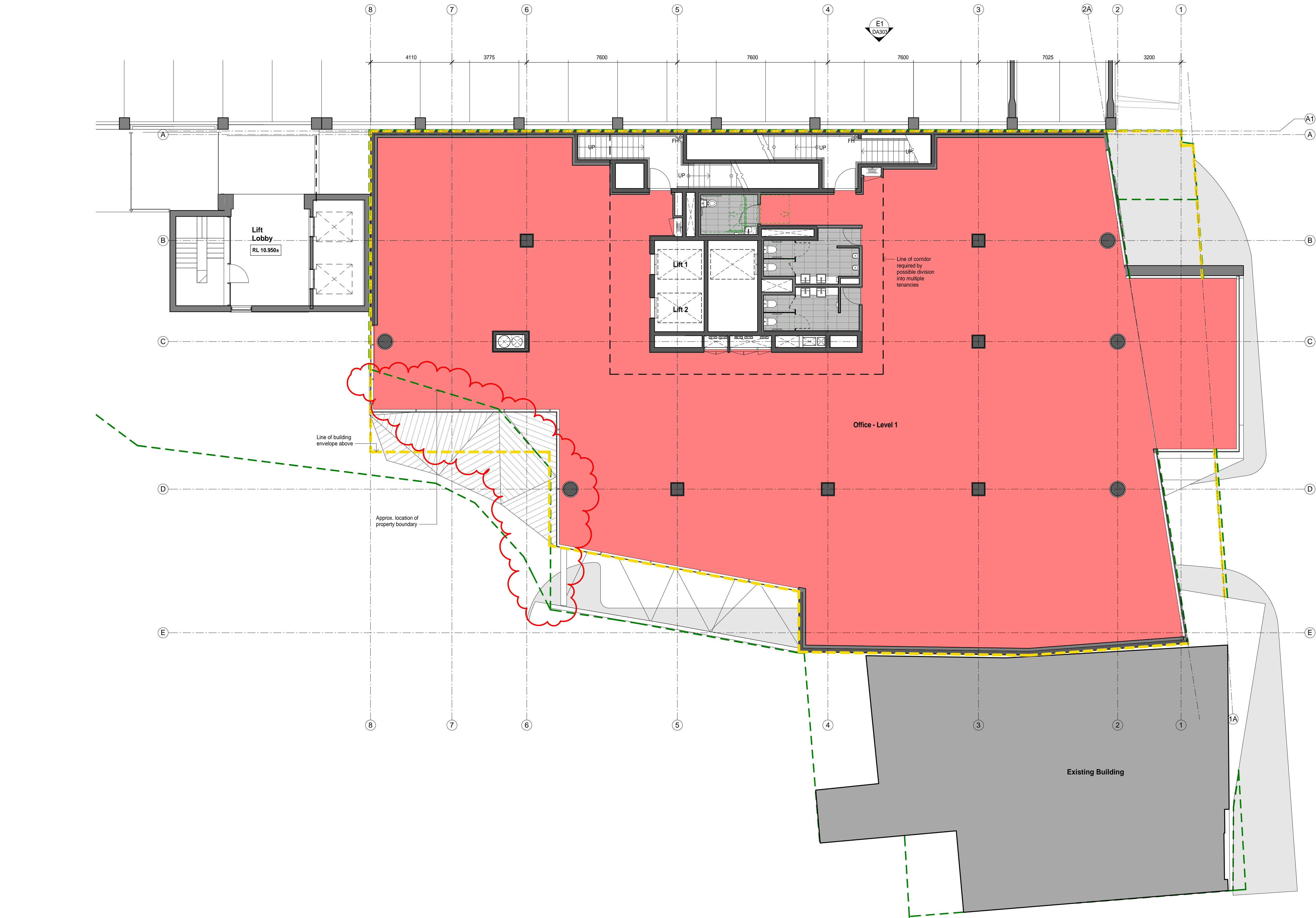
HOBART
1st Floor, 125 Collins Street
Hobart Tasmania 7000
t: 03 6224 9370

LAUNCESTON
Suite 4, 1st Floor 39 Paterson Street
Launceston Tasmania 7250
t: 03 6334 9590

e: admin@ksa.net.au

www.ksa.net.au





1 1st Floor - Office
1 : 100

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PLANNING APPLICATION

REVISIONS A 20/10/11 DA Amendment no.1	
DRAWING 1st Floor - Office	
PROJECT TITLE Mixed Used Development	
PRINCIPAL Raadas Property Pty Ltd	
PROJECT ADDRESS 36 Argyle Street, Hobart	
JOB NUMBER 1430	DATE 11/10/2016
SCALE @ A1 1 : 100	
DRAWN CC	DA202 A
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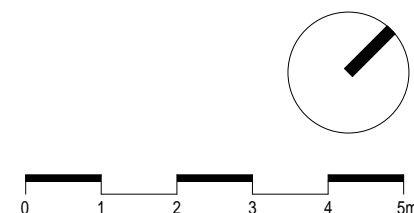


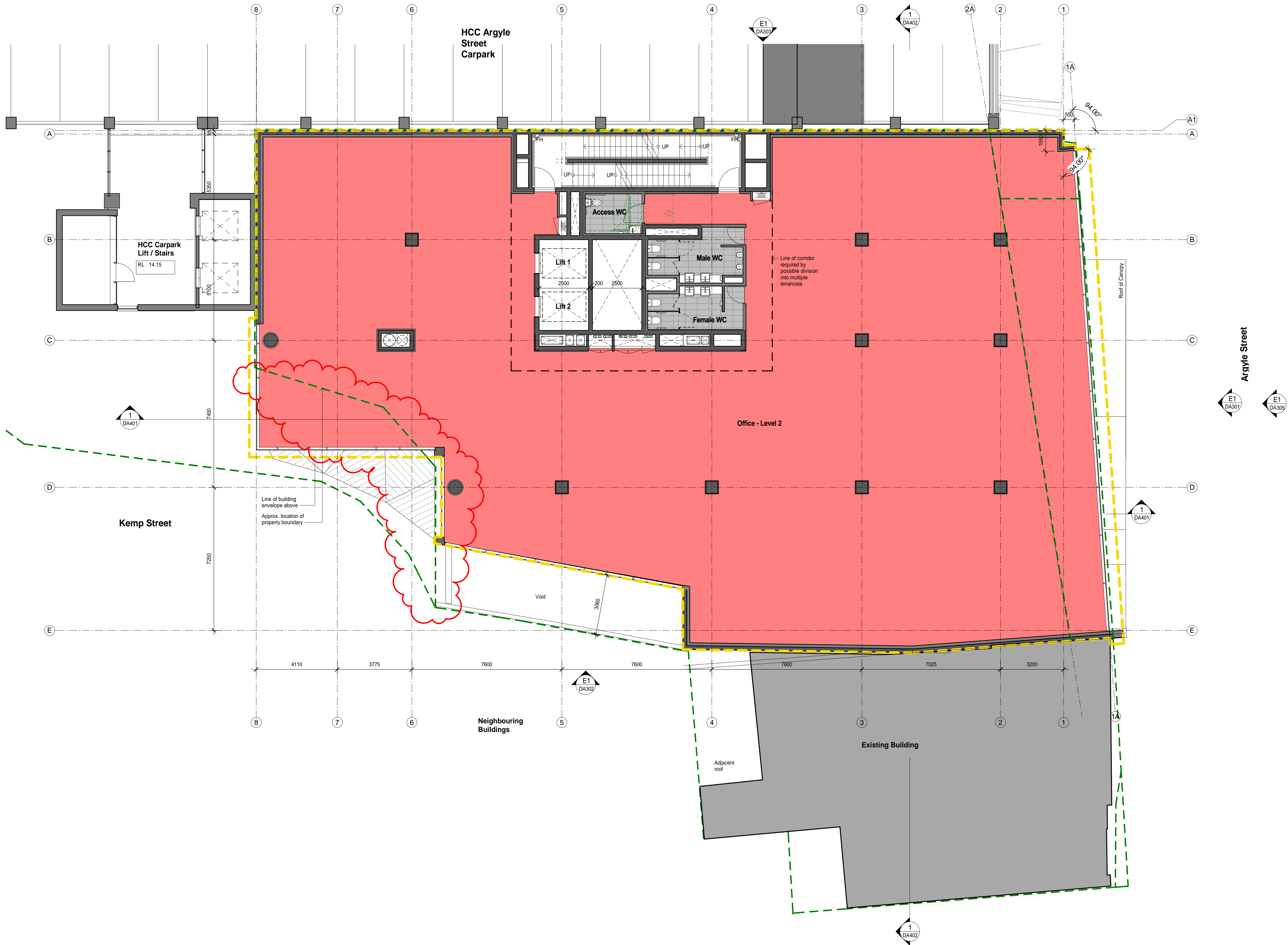
x-squared
ARCHITECTS

HOBART
1st Floor, 125 Collins Street
Hobart Tasmania 7000
t: 03 6224 9370

LAUNCESTON
Suite 4, 1st Floor 39 Paterson Street
Launceston Tasmania 7250
t: 03 6334 9590

e: admin@ksa.net.au
www.ksa.net.au





1 2nd Floor - Office
1 : 100

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PLANNING APPLICATION

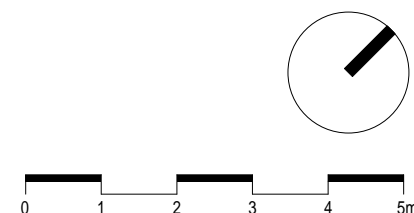
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PROJECT TITLE Mixed Used Development	
PRINCIPAL Raadas Property Pty Ltd	
PROJECT ADDRESS 36 Argyle Street, Hobart	
JOB NUMBER 1430	DATE 11/10/2016
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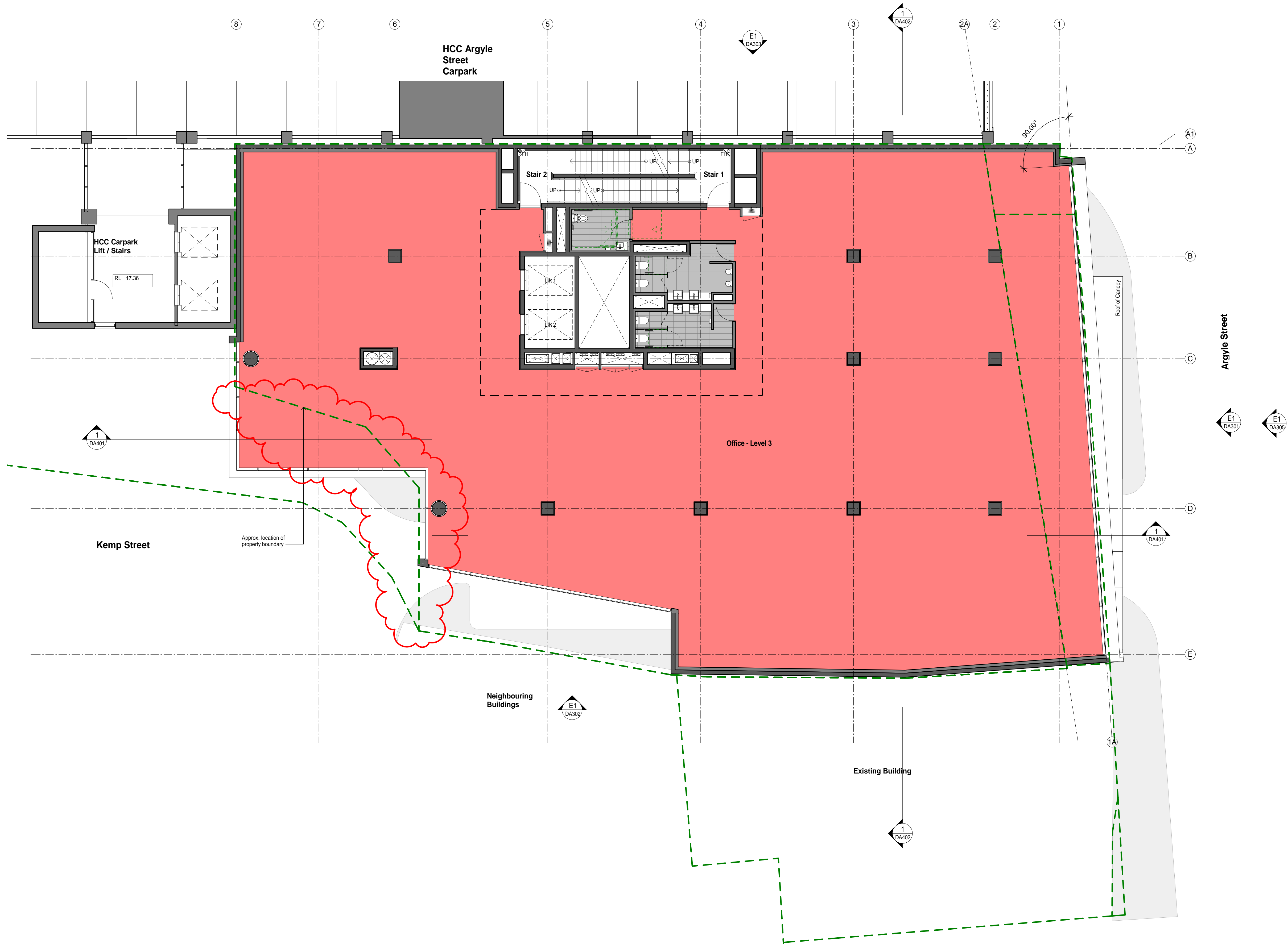
x-squared
ARCHITECTS

HOBART
1st Floor, 125 Collins Street
Hobart Tasmania 7000
t: 03 6224 9370

LAUNCESTON
Suite 4, 1st Floor 39 Paterson Street
Launceston Tasmania 7250
t: 03 6334 9590

e: admin@xs.net.au
www.xs.net.au





1 3rd Floor - Office
1 : 100

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PLANNING APPLICATION

REVISIONS A 20/10/11 DA Amendment no.1	
DRAWING 3rd Floor - Office	
PROJECT TITLE Mixed Used Development	
PRINCIPAL Raadas Property Pty Ltd	
PROJECT ADDRESS 36 Argyle Street, Hobart	
JOB NUMBER 1430	DATE 11/10/2016
SCALE @ A1 1 : 100	
DRAWN CC	DA204 A
CHECKED RF	

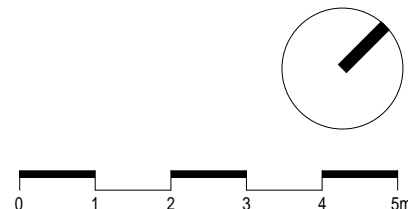


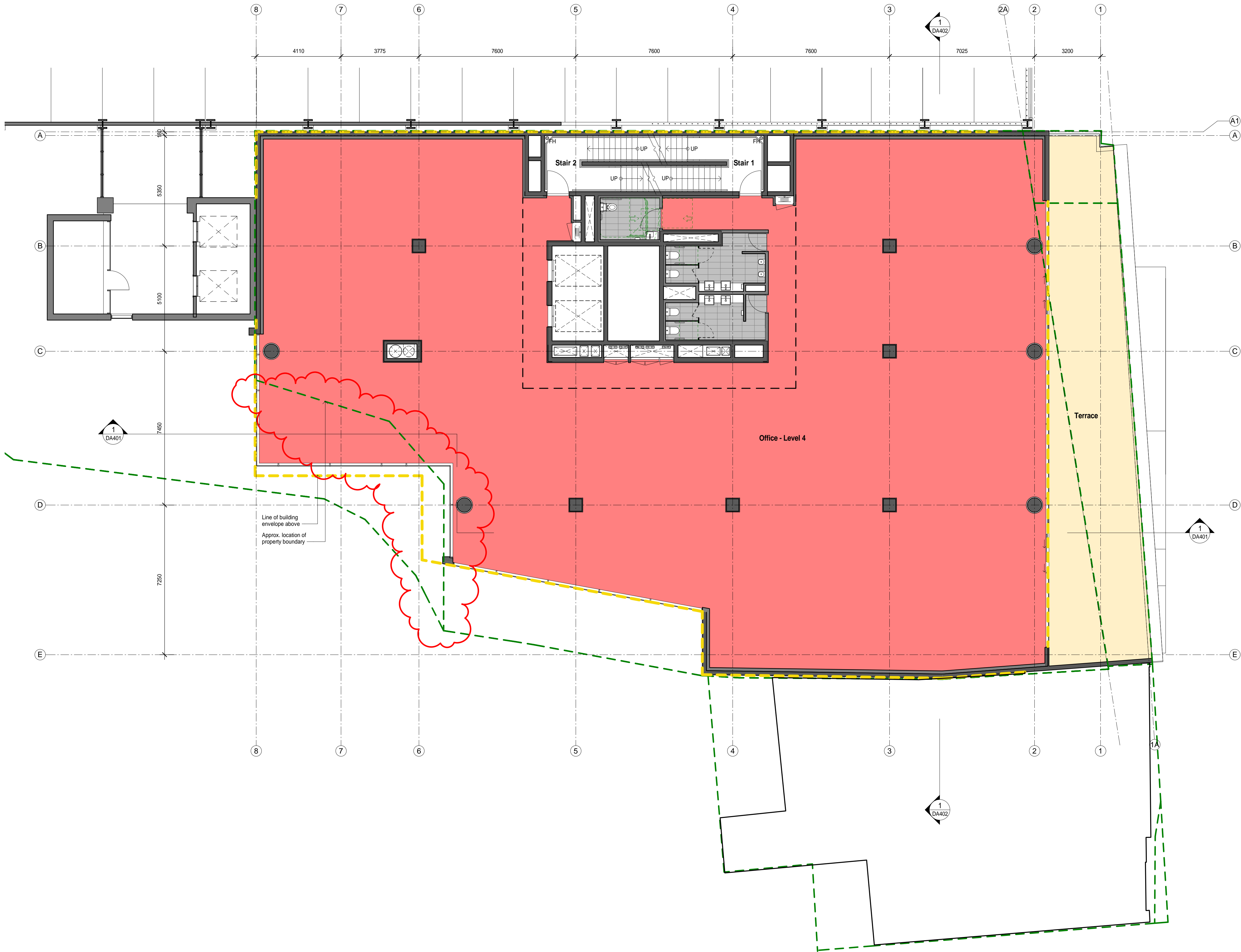
x-squared
ARCHITECTS

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www.ksa.net.au





1 4th Floor - Office
1 : 100

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PLANNING APPLICATION

REVISIONS A 20/10/11 DA Amendment no.1	
DRAWING 4th Floor - Office	
PROJECT TITLE Mixed Used Development	
PRINCIPAL Raadas Property Pty Ltd	
PROJECT ADDRESS 36 Argyle Street, Hobart	
JOB NUMBER 1430	DATE 11/10/2016
SCALE @ A1 1 : 100	
DRAWN CC	DA205 A
CHECKED RF	



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t: 03 6334 9590

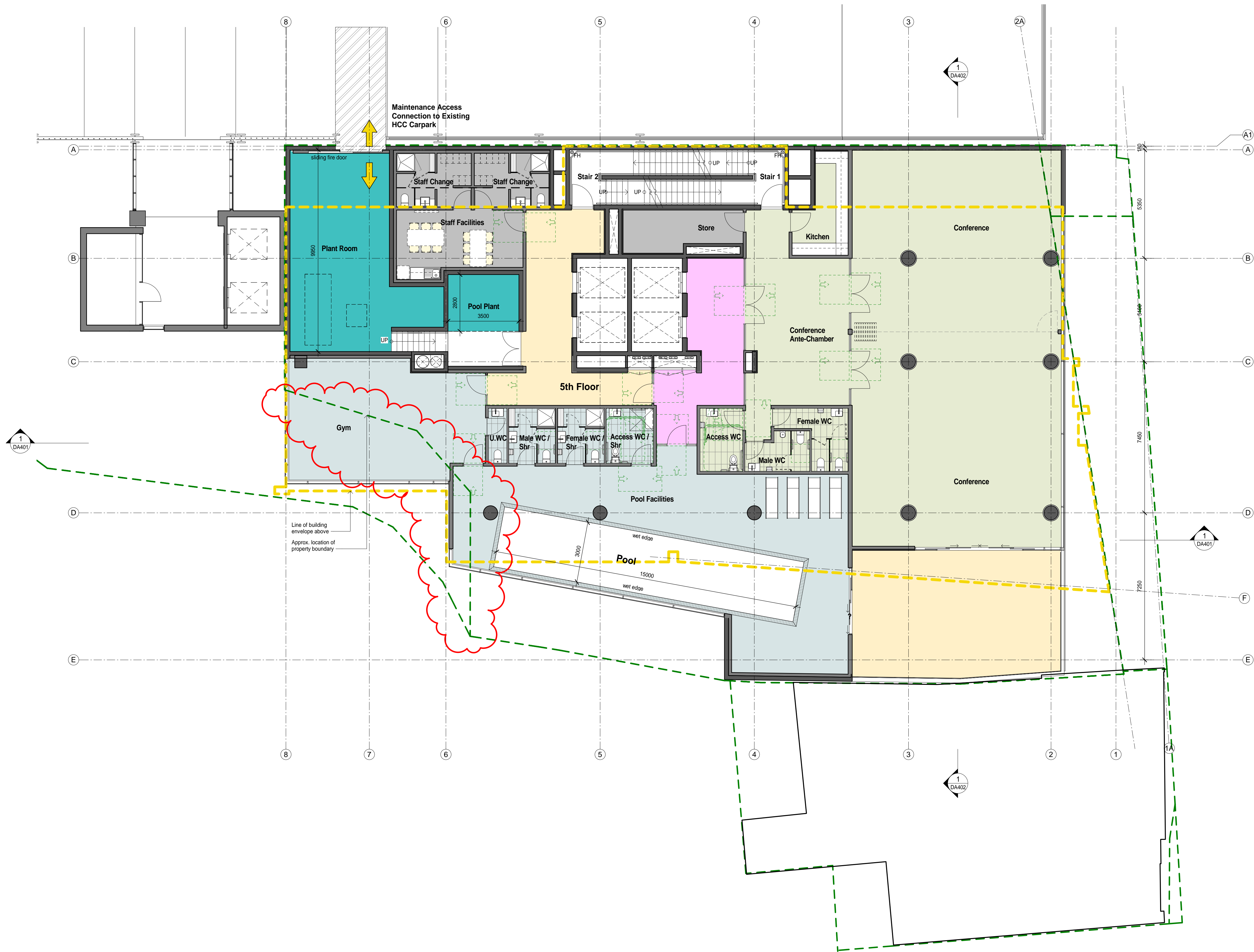
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1 Proposed 5th Floor Plan - Offices and Plan

1:100

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PLANNING APPLICATION

REVISIONS

A 20/10/11 DA Amendment no.1

DRAWING
5th Floor - Conference, Recreation & Staff Facilities

PROJECT TITLE
Mixed Used Development

PRINCIPAL
Raadas Property Pty Ltd

PROJECT ADDRESS
36 Argyle Street, Hobart

JOB NUMBER
1430

DATE
11/10/2016

SCALE @ A1
1:100

DRAWN
CC

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RF

DA206

A

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1 6th Floor - Hotel (16 rooms)
1 : 100

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PLANNING APPLICATION

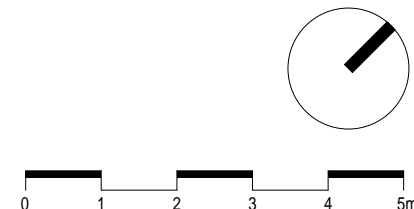
REVISIONS A 20/10/11 DA Amendment no.1	
DRAWING 6th Floor - Hotel 1	
PROJECT TITLE Mixed Used Development	
PRINCIPAL Raadas Property Pty Ltd	
PROJECT ADDRESS 36 Argyle Street, Hobart	
JOB NUMBER 1430	DATE 11/10/2016
SCALE @ A1 1 : 100	
DRAWN CC	DA207 A
CHECKED RF	

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1 7th Floor - Hotel 2

1 : 100

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PLANNING APPLICATION

REVISIONS
A 20/10/11 DA Amendment no.1

DRAWING
7th, 10th & 11th (Hotel Levels 2, 5 & 6)

PROJECT TITLE
Mixed Used Development

PRINCIPAL
Raadas Property Pty Ltd

PROJECT ADDRESS
36 Argyle Street, Hobart

JOB NUMBER
1430

DATE
11/10/2016

SCALE @ A1
1 : 100

DRAWN
CC

CHECKED
RF

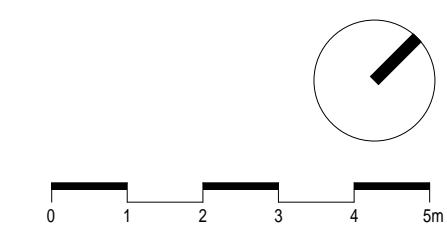
DA208 A

x-squared
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1 8th Floor - Hotel 3

1:100

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PLANNING APPLICATION

REVISIONS
A 20/10/11 DA Amendment no.1

DRAWING
8th & 13th Floors (Hotel Levels 3 & 8)

PROJECT TITLE
Mixed Used Development

PRINCIPAL
Raadas Property Pty Ltd

PROJECT ADDRESS
36 Argyle Street, Hobart

JOB NUMBER
1430

DATE
11/10/2016

SCALE @ A1
1 : 100

DRAWN
CC

CHECKED
RF

DA209 A

x-squared
ARCHITECTS

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1 9th Floor - Hotel 4

1:100

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PLANNING APPLICATION

REVISIONS A 20/10/11 DA Amendment no.1	
DRAWING 9th & 12th Floors (Hotel Levels 4 & 7)	
PROJECT TITLE Mixed Used Development	
PRINCIPAL Raadas Property Pty Ltd	
PROJECT ADDRESS 36 Argyle Street, Hobart	
JOB NUMBER 1430	DATE 11/10/2016
SCALE @ A1 1 : 100	
DRAWN CC	DA210 A
CHECKED RF	



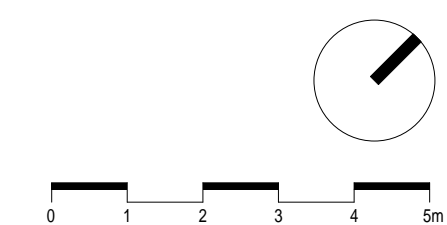
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1 14th Floor - Apartment Level
1 : 100

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PRELIMINARY

REVISIONS
A 20/10/11 DA Amendment no.1

DRAWING
14th Floor Apartments
(Hotel Level 9)

PROJECT TITLE
Mixed Used Development

PRINCIPAL
Raadas Property Pty Ltd

PROJECT ADDRESS
36 Argyle Street, Hobart

JOB NUMBER
1430

DATE
11/10/2016

SCALE @ A1
1 : 100

DRAWN
CC

CHECKED
RF

DA211 A



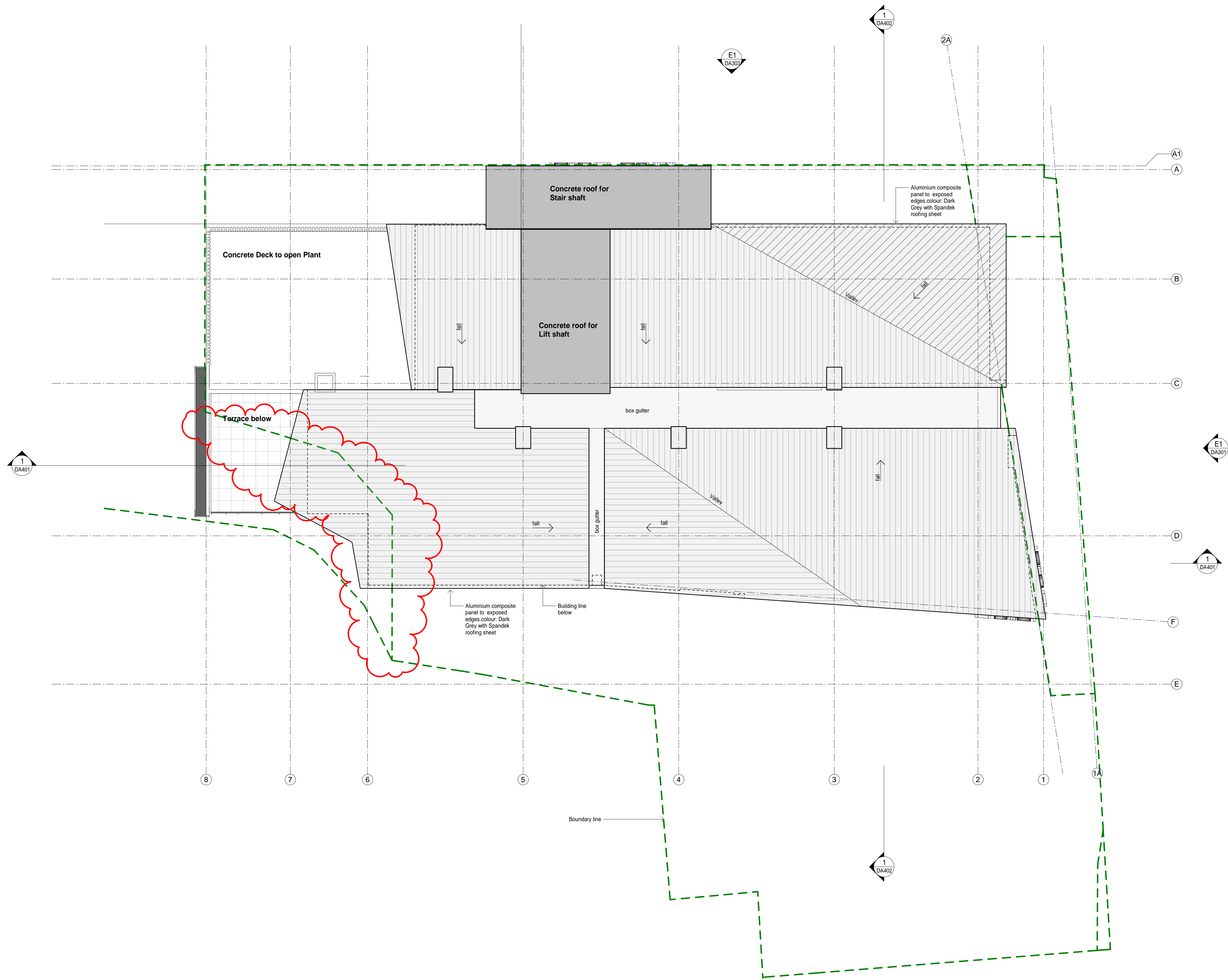
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PLANNING APPLICATION

REVISIONS
A 20/03/11 DA Amendment no.1

DRAWING
Roof Plan

PROJECT TITLE
Mixed Used Development

PRINCIPAL
Raadas Property Pty Ltd

PROJECT ADDRESS
36 Argyle Street, Hobart

JOB NUMBER
1430

DATE
11/10/2016

SCALE @ A1
1 : 100

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DA212 A

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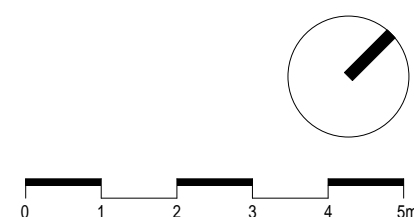
LAUNCESTON
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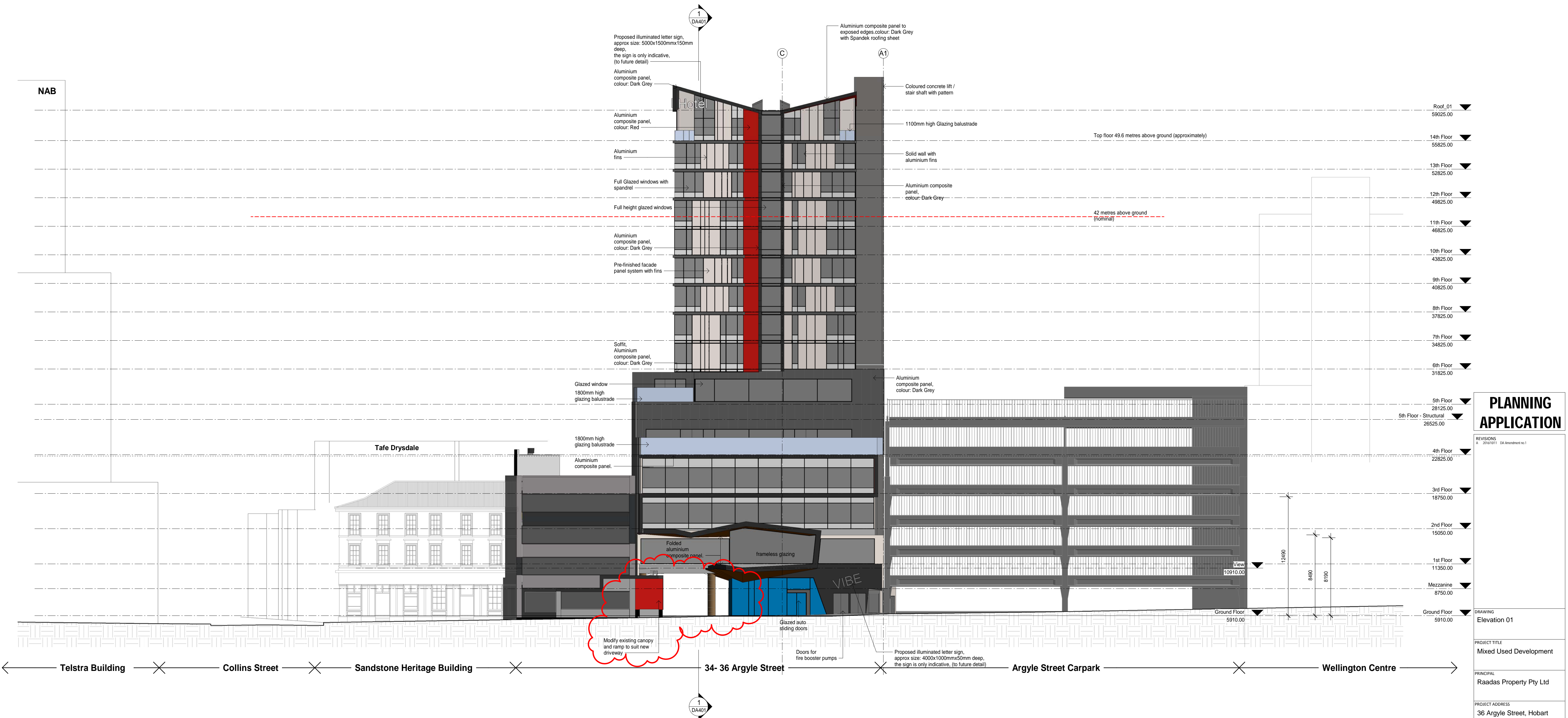
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1 Roof Plan

1 : 100

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PLANNING APPLICATION

REVISIONS

A 20/03/11 DA Amendment no.1

DRAWING

Elevation 01

PROJECT TITLE

Mixed Used Development

PRINCIPAL

Raadas Property Pty Ltd

PROJECT ADDRESS

36 Argyle Street, Hobart

JOB NUMBER

1430

DATE

11/10/2016

SCALE @ A1

1 : 200

DRAWN

CC

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RF

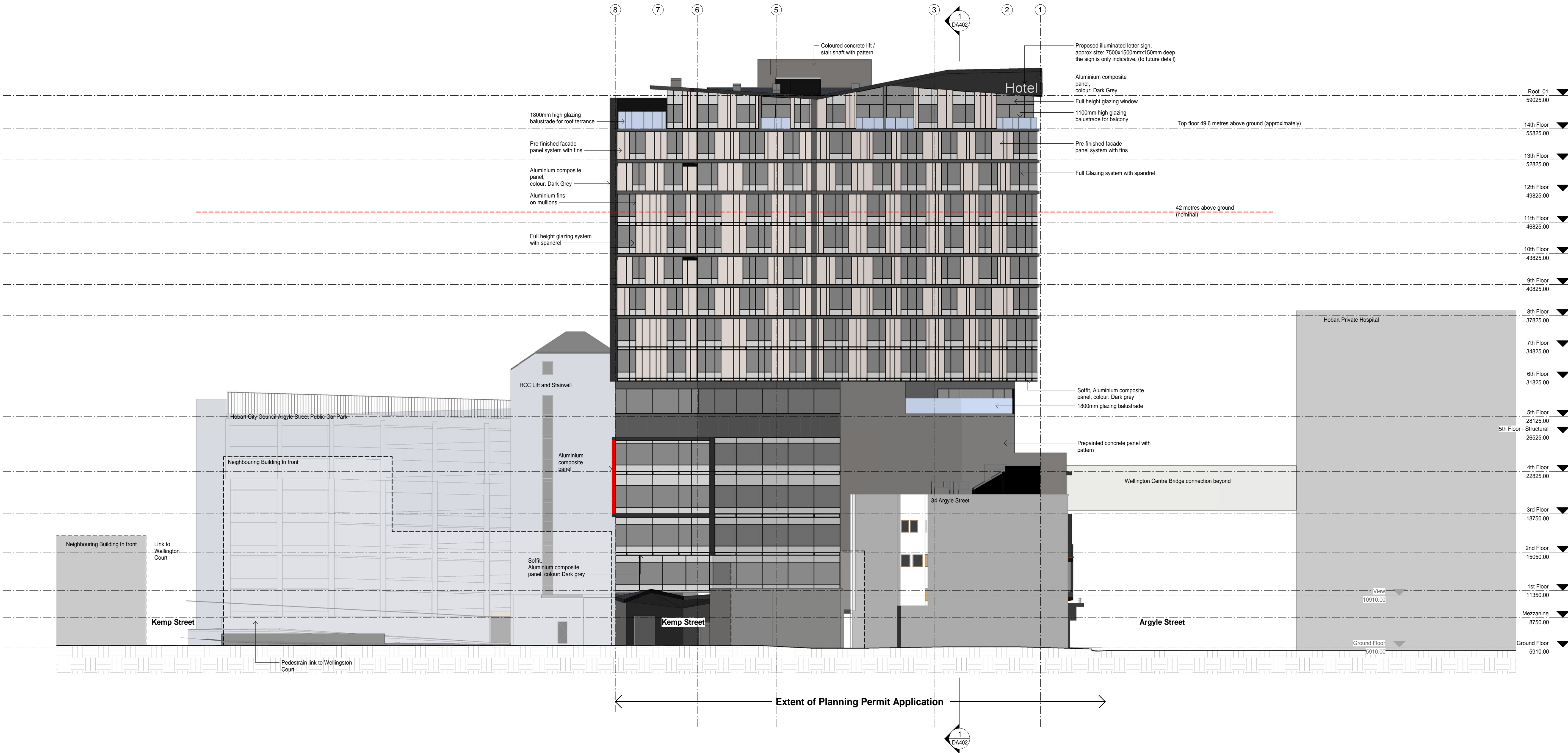
DA301

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1 Elevation 01
1 : 200

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PLANNING APPLICATION

REVISIONS
A 20/03/11 DA Amendment no.1

DRAWING

Elevation 02

PROJECT TITLE

Mixed Used Development

PRINCIPAL

Raadas Property Pty Ltd

PROJECT ADDRESS

36 Argyle Street, Hobart

JOB NUMBER

1430

SCALE @ A1

CC

CHECKED

RF

DATE

11/10/2016

1 : 200

DRAWN

CC

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RF

DA302

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1 Elevation 02 - DA Amendment

1 : 200

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t: 03 6334 9590

e: admin@xsa.net.au

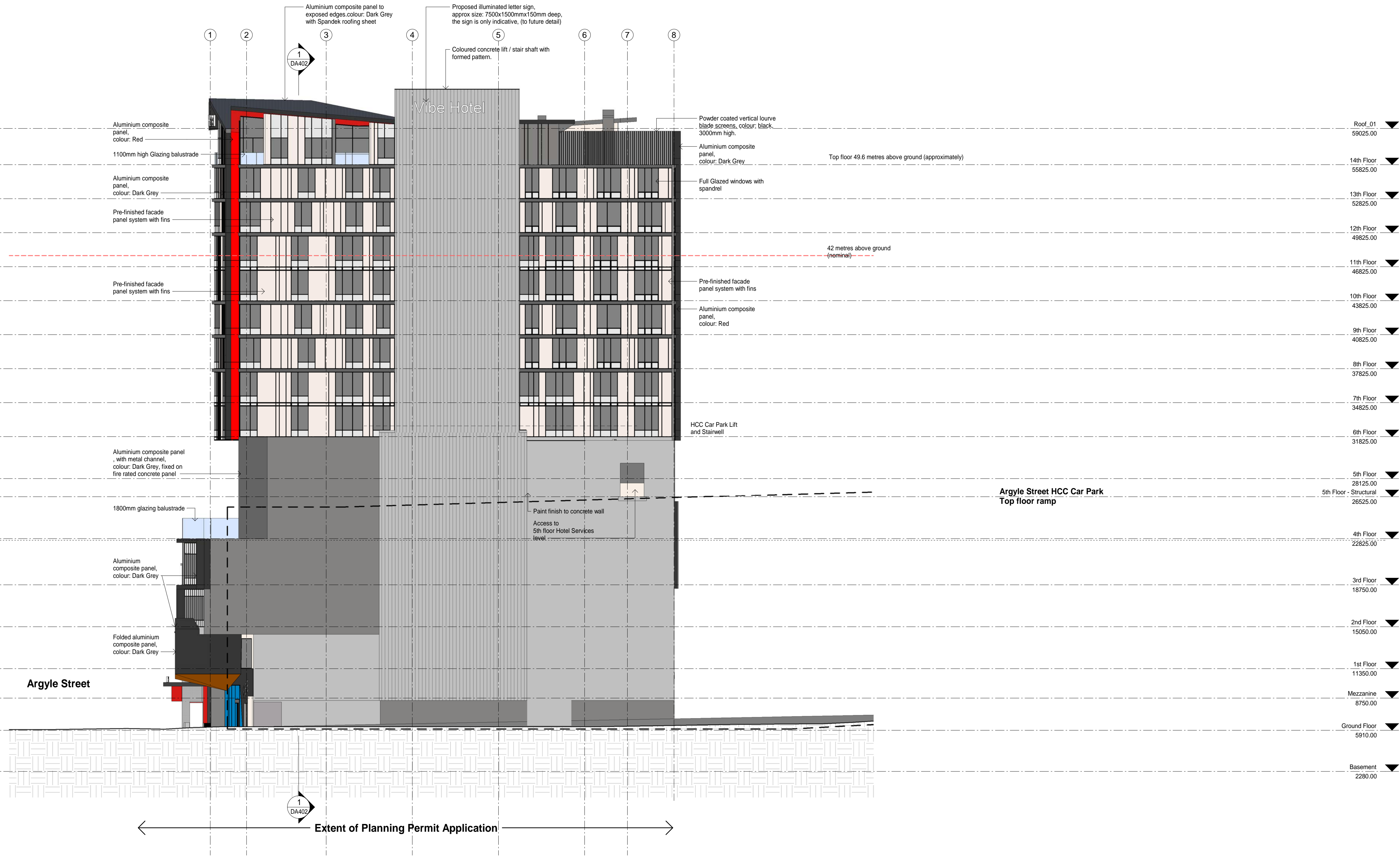
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1 Elevation 03 - DA Amendment

1 : 200

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PLANNING APPLICATION

REVISIONS

A 20/10/11 DA Amendment no.1

DRAWING

Elevation 03

PROJECT TITLE

Mixed Used Development

PRINCIPAL

Raadas Property Pty Ltd

PROJECT ADDRESS

36 Argyle Street, Hobart

JOB NUMBER

1430

DATE

11/10/2016

SCALE @ A1

1 : 200

DRAWN

CC

CHECKED

RF

DA303

A



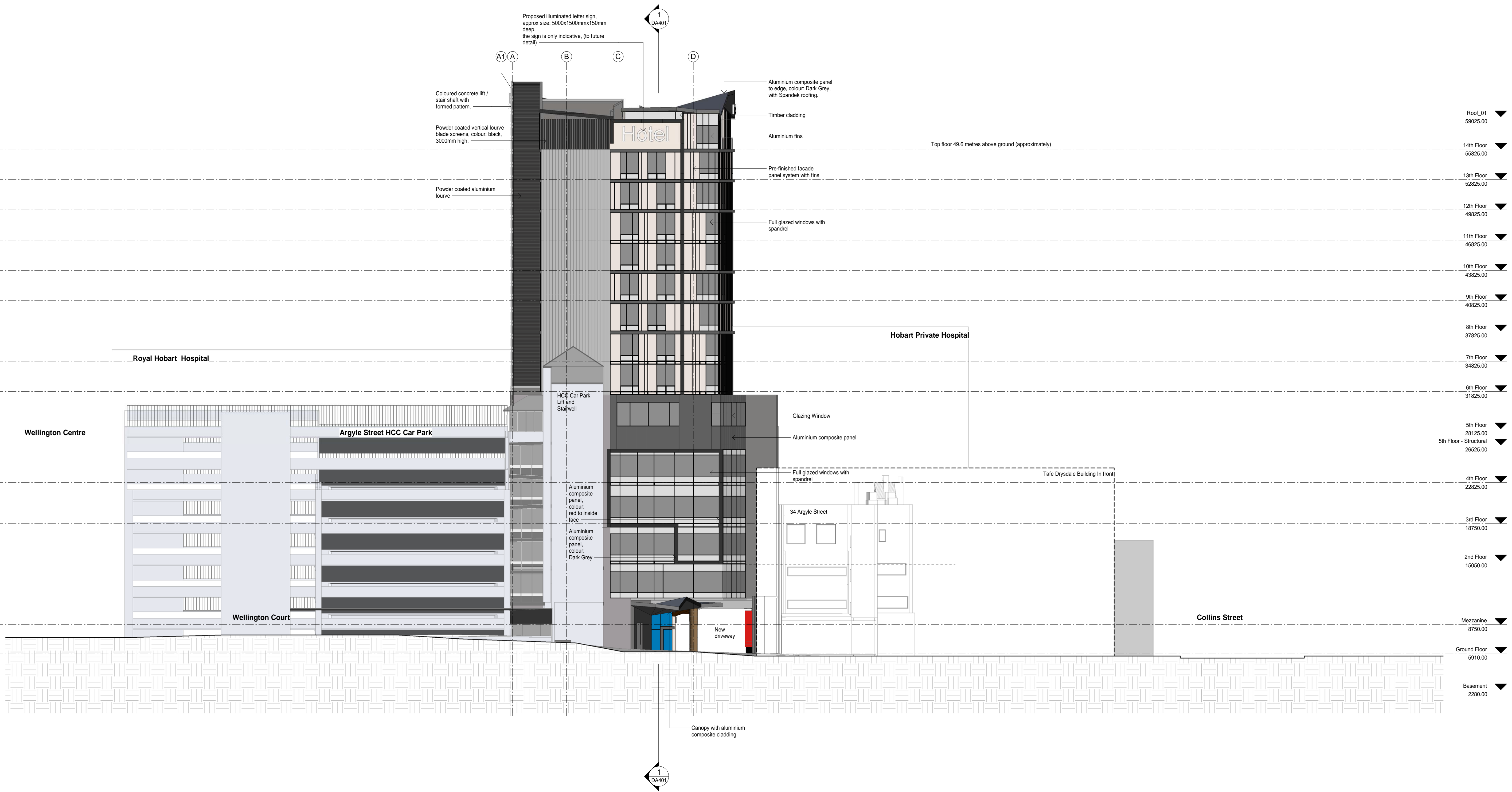
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Launceston Tasmania 7250
t: 03 6334 9590

e: admin@ksa.net.au

www.ksa.net.au





Roof_01	59025.00
14th Floor	55825.00
13th Floor	52825.00
12th Floor	49825.00
11th Floor	46825.00
10th Floor	43825.00
9th Floor	40825.00
8th Floor	37825.00
7th Floor	34825.00
6th Floor	31825.00
5th Floor	28125.00
5th Floor - Structural	26525.00
4th Floor	22825.00
3rd Floor	18750.00
2nd Floor	15050.00
Mezzanine	8750.00
Ground Floor	5910.00
Basement	2280.00

PLANNING APPLICATION

REVISIONS
A 20/03/11 DA Amendment no.1

DRAWING
Elevation 04

PROJECT TITLE
Mixed Used Development

PRINCIPAL
Raadas Property Pty Ltd

PROJECT ADDRESS
36 Argyle Street, Hobart

JOB NUMBER
1430

DATE
11/10/2016

SCALE @ A1
1 : 200

DRAWN
CC

CHECKED
RF

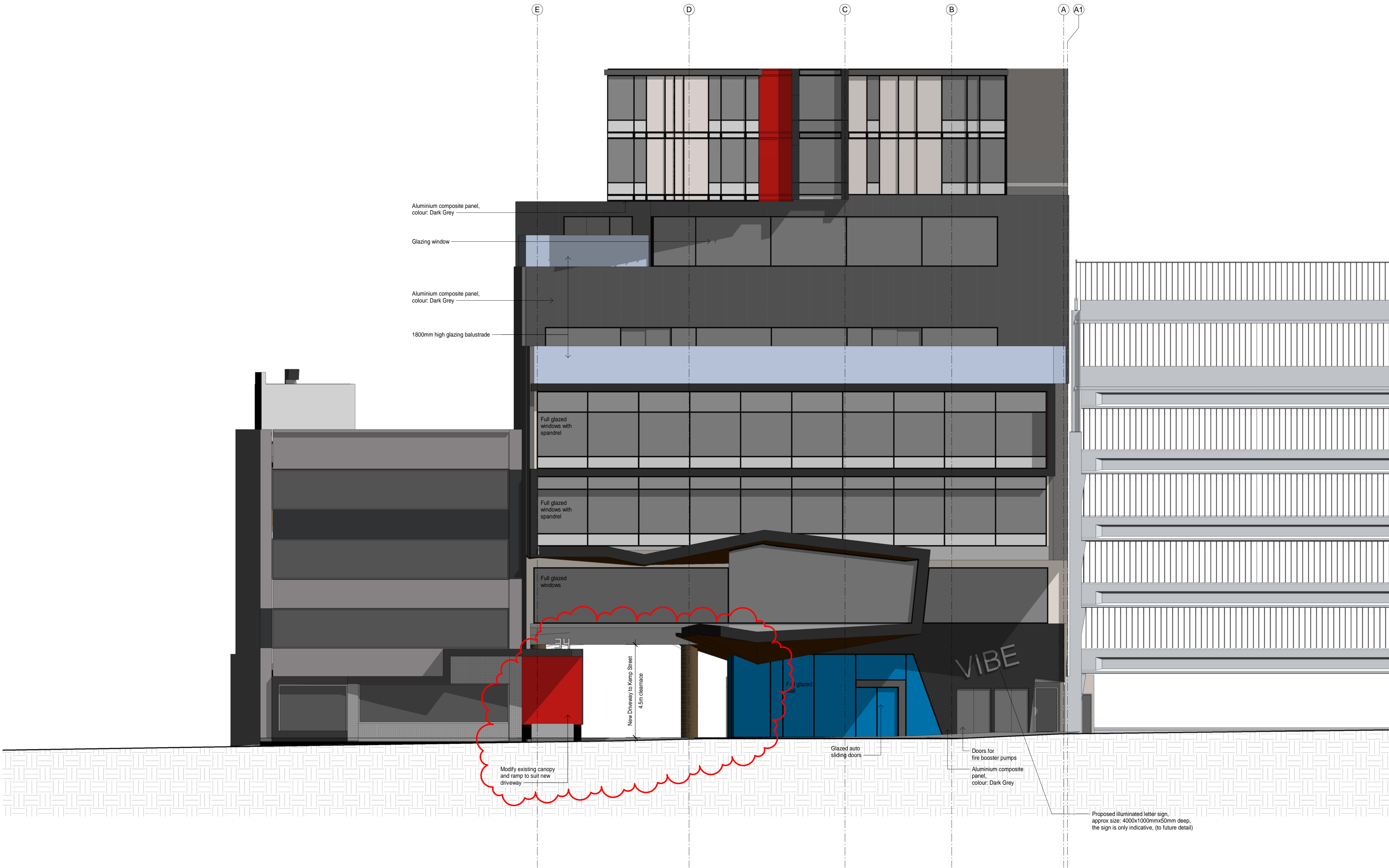
DA304

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1 Elevation 04 - DA Amendment
1 : 200

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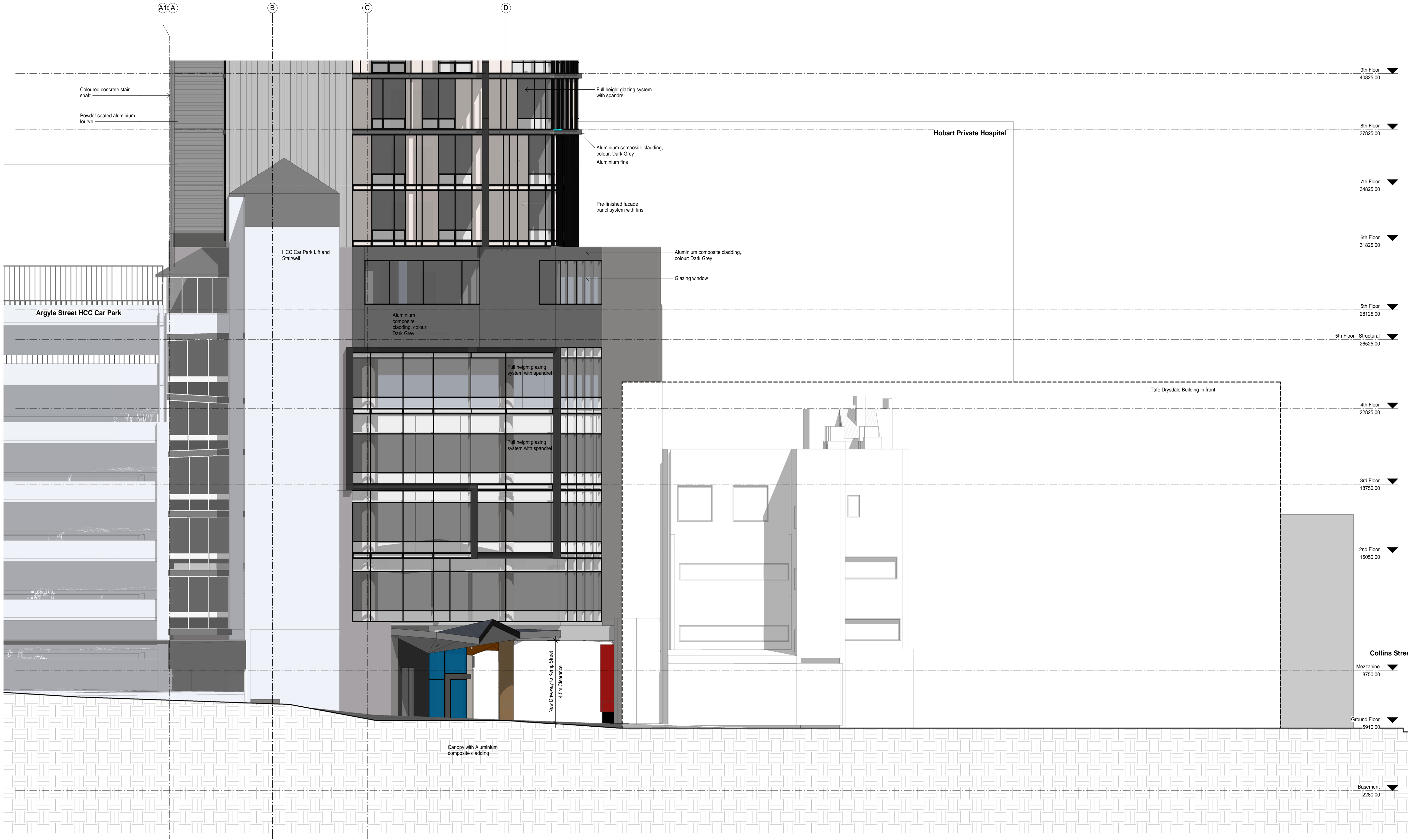
PLANNING APPLICATION

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DRAWING Elevation 05	
PROJECT TITLE Mixed Used Development	
PRINCIPAL Raadas Property Pty Ltd	
PROJECT ADDRESS 36 Argyle Street, Hobart	
JOB NUMBER 1430	DATE 11/10/2016
SCALE @ A1 1 : 100	
DRAWN CC	DA305 A
CHECKED RF	

1 Elevation 05
1 : 100

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PLANNING APPLICATION

REVISIONS
A 20/03/11 DA Amendment no.1

DRAWING
Elevation 06

PROJECT TITLE
Mixed Used Development

PRINCIPAL
Raadas Property Pty Ltd

PROJECT ADDRESS
36 Argyle Street, Hobart

JOB NUMBER
1430

SCALE @ A1
1 : 100

DRAWN
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DATE
11/10/2016

DA306 A



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e: admin@xsa.net.au

www.xsa.net.au

1 Elevation 06 - DA Amendment
1 : 100

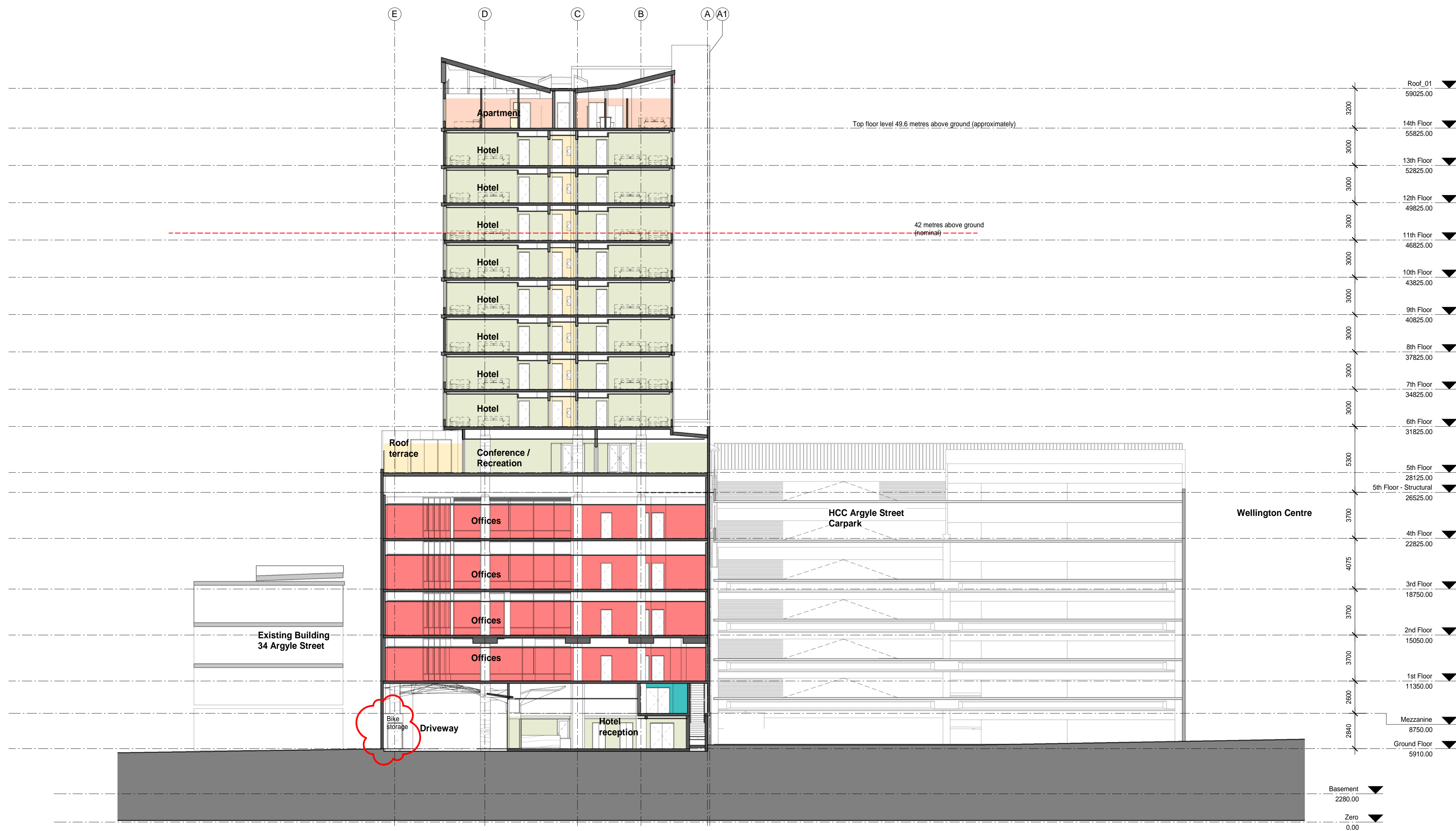
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1 Section B - DA Amendment
1 : 200

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PLANNING
APPLICATION

REVISIONS

A 20/10/11 DA Amendment no.1

DRAWING

Section B

PROJECT TITLE

Mixed Used Development

PRINCIPAL

Raadas Property Pty Ltd

PROJECT ADDRESS

36 Argyle Street, Hobart

JOB NUMBER

1430

DATE

11/10/2016

SCALE @ A1

1 : 200

DRAWN

CC

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RF

DA402

A



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Launceston Tasmania 7250
t: 03 6334 9590

e: admin@ksa.net.au

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Appendix B

AUTOTRACK PATHS

PRELIMINARY - NOT FOR CONSTRUCTION

B99 VEHICLE PATH

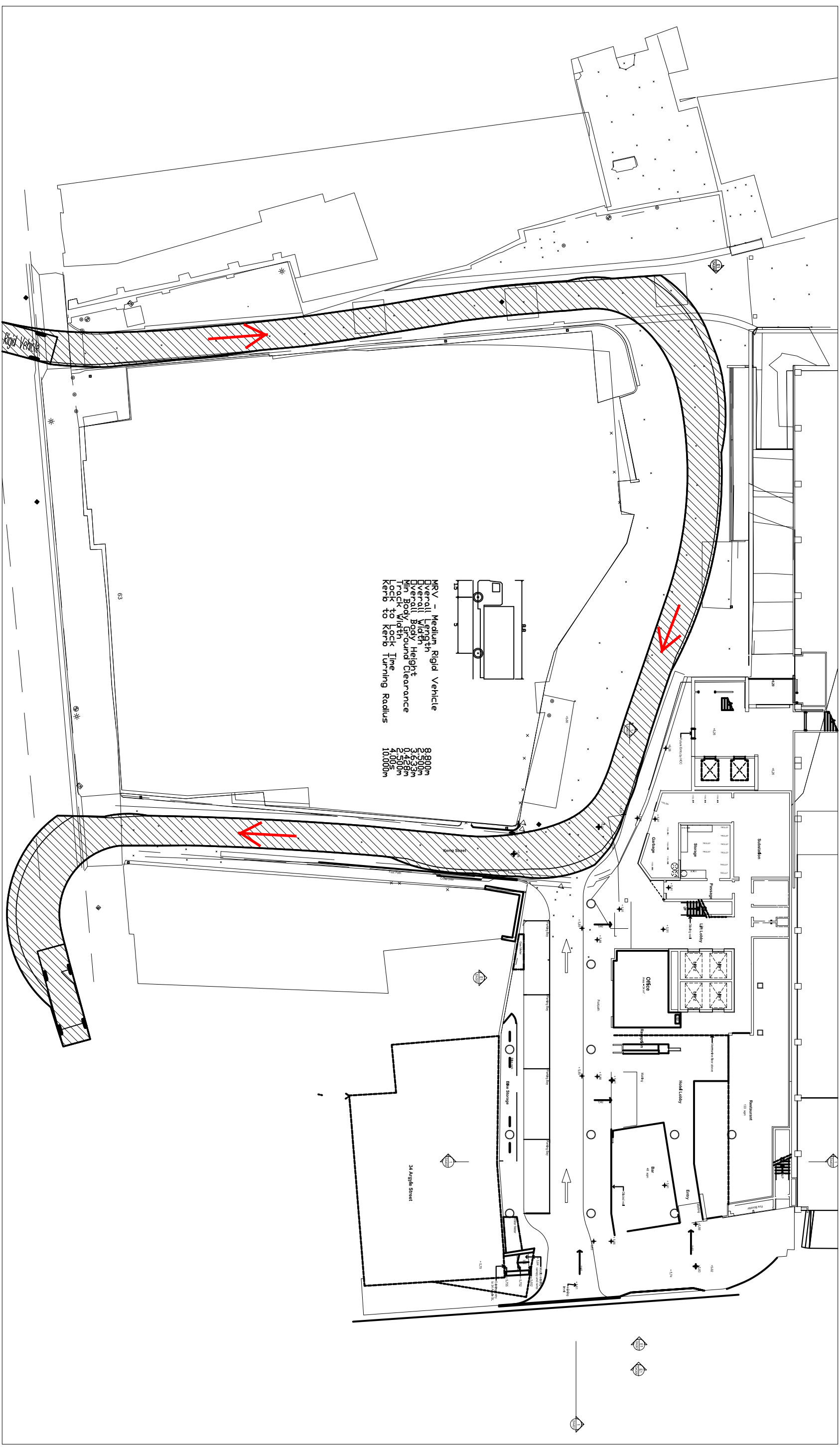
APPROVED BY:-	DATE: / /										
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SCALES	1:150 @ A3										
DRAWN	DF										
DESIGN	JF										
ISSUE:	1										
PROJECT NO. 13J270	DRAWING NO. -D- P10										

FAX +61 (0)3 6225 0618
EMAIL: info@howarthfisher.com

A side-view diagram of a car. The front wheel is at the top, and the rear wheel is at the bottom. The distance from the front wheel to the rear wheel is labeled as 3.05. The width of the car is labeled as 0.95.

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1	FOR CLIENT REVIEW	ISSUE	BY	APPROVED	DATE
			DF	JF	12/10/16



PRELIMINARY - NOT FOR CONSTRUCTION

8.8 M MEDIUM RIGID VEHICLE PATH
X-SQUARED obo RAADAS PROPERTY PTY LTD
36 ARGYLE ST MIXED USE DEVELOPMENT
36 ARGYLE ST, HOBART, 7000

HOWARTH FISHER & ASSOCIATES
Ply Limited
ACN 119 043 051
STRUCTURAL, CIVIL, TRAFFIC ENGINEERS
AND PROJECT MANAGERS
13 WILLOWDALE AVENUE, SANDY BAY - 7005
PH +61 (0)3 6225 0619
FAX -61 (0)3 6225 0618
EMAIL m@howarthfisher.com

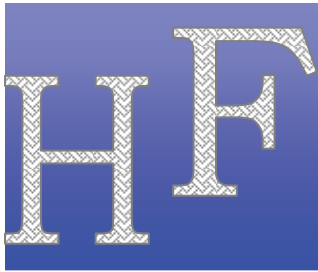
[illegible]

DATE		APPROVED BY:-	
/ /			
ISSUE:		SCALES 1:150 @ A3	
1		DRAWN DF	
		DESIGN JF	
DRAWING NO		PROJECT NO.	
P13		13J270	
-D-			
DOCUMENT IDENTIFICATION			



Appendix C

HFA REPORT



Howarth Fisher and Associates

ACN 119 043 051

Structural, Civil and Traffic Engineering

Structural and Civil Engineering

Project Design and Management
Forensic Engineering and Structural Inspections
Research and Development Facilitators

Traffic Engineering

Traffic Management Studies and Traffic Impact Assessment
Expert Witness Representation
Road Safety Audits

36 Argyle Street Mixed Use Development Traffic Impact Assessment Report



REVISED FINAL REPORT

Prepared for

Raadas Property Pty Ltd

Date

November 2014

Prepared by


Joanne Fisher

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1.2	Project Details	1
2.	Scope of Consultancy	2
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Appendix A	Development Plans
Appendix B	Autotrack Paths

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Name		Signature	Date
Authorised by:	Joanne Fisher		12 th November 2014



1. Introduction

1.1 Client Details

This document has been prepared for the following:

Client Name: Richard Doedens

Address: Raadas Property Pty Ltd

1a/26 Mornington Road

Mornington, Tasmania 7018

Client Contact: Richard Doedens and Keith Drew

1.2 Project Details

The report is undertaken for the site at 36 Argyle Street, Hobart.

A copy of the proposed development plans can be found at **Appendix A**.

2. Scope of Consultancy

The scope of consultancy involves the following:

- To obtain background information and plans.
- To liaise with architects.
- To undertake site visit.
- To measure sight distances to comply with the conditions in the *City of Hobart Planning Scheme*.
- To assess parking requirement and compliance with *AS2890.1: Off street parking 2004*.
- To assess impact on surrounding intersections.
- Assess access provision in accordance with *AS2890.1: Off street parking 2004*.
- Assess sustainable transport provision.
- Run Autotrack.
- Document findings in a Traffic Impact Assessment report.

3. Location of the Development

Figure 1 shows the location of the proposed development in the context of the surrounding street network.

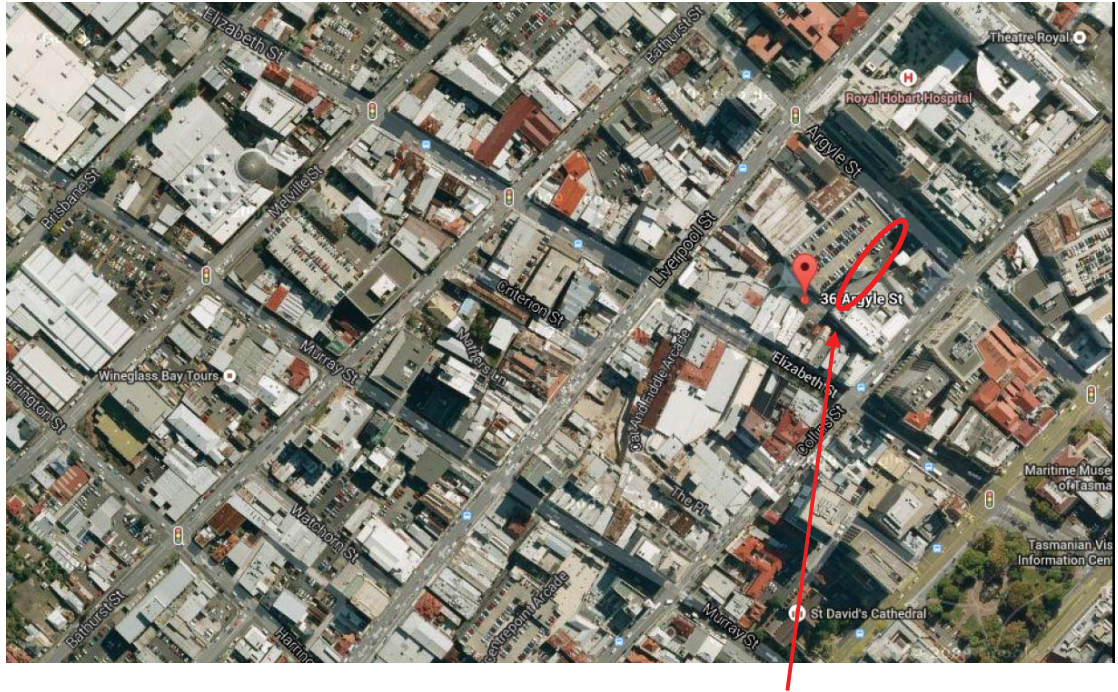


Figure 1: Location (source: GoogleMaps)

4. Existing Situation

4.1 Site Details

The site is located at 36 Argyle Street, Hobart. The site will have frontage onto both Kemp Street and Argyle Street.

Argyle Street acts as a major collector road within the city, providing a main northbound route out of the City of Hobart.

Kemp Street is a local access street, performing an access and service function to existing land uses, particularly in the morning, as well as providing all day loading facilities and short term parking. There are no formally defined footpaths and the road has a shared pedestrian and vehicle facility, with low vehicular operating speeds.

4.2 Road Width

The existing access to the site is via Argyle Street which is 15 metres wide (including 3 through lanes and 2 parking lanes). There are some sections of Kemp Street where parking and loading bays are provided on both sides in addition to the travelling lane (~13 metre wide cross section) and other narrower sections where the road travelling lane width is minimum 3 metre wide, there are some sections with an additional 2.5 metre parking bays (5.5metre cross section).

Both Argyle and Kemp Street operate in a one way direction.

4.3 Traffic Volumes

Hobart City Council has advised of the following traffic volumes.

- Argyle Street / Collins Street Intersection–

AADT Annual Average Daily Traffic - 19,199 vehicles per day

PM Peak Hourly Flows – 1,573 vehicles per hour¹

- Kemp Street - AADT Annual Average Daily Traffic

Peak Hourly Flows – 16 vehicles per hour²

¹ Based on SCATS data supplied by the Department of State Growth 2014 .

The SCATS data for Argyle Street and Liverpool Street shows that there are 20,894 vehicle per day (AADT) travelling through this intersection. There are ~1,814 vehicles an hour travelling through this intersection during the evening peak hour.³

4.4 Posted Speed Limits

Argyle Street and Kemp Street are subject to the urban default speed limit of 50km/hr. However, given the width and functional constraints of Kemp Street, this street operates at a maximum speed of approximately 20km/hr.

4.5 Accident History

In line with standard traffic engineering practice the accident history for the past five years has been obtained from the Department of Infrastructure, Energy and Resources, (DIER). The results of the findings are outlined below:

There have been a total of twelve accidents in the vicinity of 36 Argyle Street. Of these twelve accidents, there have been three rear end accidents, three accidents involving vehicles in the same lane, three left rear end accidents and one accident involved a vehicle driving left into an object or parked vehicle. Two of the accidents involved vehicles parking, one involved of a vehicle pulling out of an access and another involved pulling out of a space and failing to give way.

There has been one accident on Kemp Street in the past five years, the accident is described as *a parked car run away* and involved two vehicles.

4.6 Proposed Development

The proposed development comprises the following land uses:

- 115 room hotel (including 6 disabled rooms), incorporating a gym, business centre and linen and bin store.
- Childcare centre (70 childcare spaces).
- Consulting suites for Doctors or office space (1936m²).
- Retail including specialty shops and café (895m²)
- Hotel reception (52m²)

² Based on traffic data collected on Monday 11th August 2014 by Howarth Fisher and Associates.

5. Assessment of Trip Generation

5.1 Existing Trip Rates

The existing land uses at the site comprise the following:

A 28 space at grade car park with accesses onto Argyle Street and Kemp Street as shown in the photograph below:



Photograph 1: Showing the off street car park which currently occupies the site.

³ This is based on data collected in September 2014

5.2 Proposed Trip Generation

The *New South Wales, Road Traffic Authority, Guide to Traffic Generating Developments 2002* is a nationally recognised reference document for determining trip generation rates.

Table 3: Additional Trip Generation for Proposed Development

Land Use	Trip Generation Rates	Total
<i>115 Room Hotel</i>	Assumed motel ⁴	345 trips per day
	Daily vehicle trips = 3 per unit	115 x 0.4 = 46
	Evening peak hour trips = 0.4 per unit	trips during the evening peak
<i>Child care Centre</i> <i>599m²</i> <i>70 spaces for children</i>	Based on Long day care rates	56 trips between 7am - 9am (28 trips per hour).
	0.8 peak vehicle trips per child between 7am – 9am	21 trips between 2.30 - 4pm (14 trips per hour).
	0.3 trips per child between 2.30pm- 4pm	49 trips between 4pm - 6pm (25 trips per hour).
	0.7 trips per child between 4pm- 6pm	
<i>Offices</i> <i>(853m²+853m²+230m²)</i> <i>1936m²</i>	Daily Vehicle Counts	194 trips per day
	10 per 100m ²	
	Evening peak hour 2 per 100m ² gross floor area	39 trips during evening peak hour
<i>Retail Specialty shops including café⁵</i> <i>895m²</i>	Daily trip rates to speciality shops 555A(SS) per 1000m ²	497 trips per day
	V(P) = 56A (0.895) vehicle	51 trips during evening peak hour
	V(P) - 4.30pm - 5.30pm	

⁴ Definition of Motel in the NSW, RTA, Guide to Traffic Generating Developments, 2002, is more similar to the proposed hotel, the hotel definition is more similar to a pub.

⁵ Based on 895m² of being specialty shops. (48m² + 94m² + 220m² + 26m² + 45m² + 301m² + 161m² = 895m²)

	1162 trips per day minus 56 trips ⁶ associated with commuter car park = 1106 trips per day
<i>TOTAL</i>	161 trips during the evening peak hour minus 28 trips associated with current use = 133 trips per day
<i>25% Reduction for linked and multi purpose trips</i>	830 trips per day 100 trips during evening peak hour

5.2.1 Reduction for Linked and Multi Purpose Trips

The incidence of linked and multi purpose trips can reduce overall trip generation rates. A linked trip is a side track trip, for example a person calling in to the childcare centre on their way home from work. A multi purpose trip is where more than one shop or facility is visited.

Further reductions in trip rates can be attributed to the likely high proportion of public transport trips. The trip rates used in the table are based on individual land use trip generation in isolation from other land uses.

Consideration needs to be given to the prevalence of common usage of the various land uses. Notably, the restaurant and shops are likely to be used by hotel guests and residents. Therefore, the trip generation has been double or triple counted. This report has calculated a 25% discount associated with linked or multi purpose trips. This will reflect a reduction associated with, for example, dropping children off at the Child Care Centre on the way to work or shopping and eating at the café whilst staying at the hotel.

It is expected the Child Care Centre would be primarily used by city workers who would travel to the Central Business District (CBD), either by public transport, by car if they have an available parking space, or by parking in the Council car park for a short period and then parking elsewhere.

⁶ 28 x 2 = 56 daily trips (in and out of the commuter car park)

Some people may be dropped off at the Kemp Street entry. However, this drop-off zone is to be designated 'no parking' requiring the driver to remain with the vehicle, or move on immediately after the passengers exit the car. It is anticipated that this facility will be used by taxis or people who arrange for lifts to and from work or from the airport. It is assumed the office occupants would arrive on foot unless they have an allocated leased car space in the adjacent Council car park.

5.2.2 Hotel

The hotel development will generate an estimated 46 trips during the evening peak hour. The trip rates are based on worst case scenario of 100% occupancy, typically occupancy will be lower. Typically 85% occupancy rates may be more appropriate, however worst case scenario of trips based on 100% occupancy rates have been considered.

5.2.3 Long Day Care Centres

It has been advised by the proponent of the development that the Child Care Centre will operate as a long day care facility.

As outlined in the NSW, RTA, Guide to Traffic Generating Developments, 2002:

Surveys were undertaken in 1992 of pre-school, long day care and before/after care centres in the Sydney region. The best indicator of peak traffic generation was found to be the number of children that attended each centre. The time that activity was at a peak varied with the differing operating hours of the child care centre. Pre-school centres typically peak in the periods 8am – 9am and 2.30- 4.00pm. Long day care centres typically have peaks in both commuter peak periods. The vehicle trip generation rates given below are the mean peak generation rates for each centre type in the periods specified.

Rates

Table 3.6: Traffic Generation Rates

Centre Type	Peak Vehicle Trips / Child		
	7am- 9am	2.30am- 4pm	4pm-6pm
<i>Pre – school</i>	1.4	0.8	-
Long day care	0.8	0.3	0.7

Before / after care	0.5	0.2	0.7
---------------------	-----	-----	-----

Factors

The centres surveyed had between 25 - 60 children attending pre-schools, between 29 - 66 children in long day care and between 22 – 55 children in before / after school care. The gross floor area was the next best indicator of traffic generation. The centres surveyed had gross floor areas in the range 145-470m² for pre schools, 160 – 595m² for long day care centres and 52 - 150m² for before and after care. The mean floor area per child was 6.7m² for pre-schools, 7.8m² for long day care and 3.3m² for before / after care.

The mean proportions of children transported to each centre type by car was 94% for the pre- schools, 93% for the long day care and 75% for the before and after school care.

Parking demand was highest for the pre -school and lowest for the before / after school care, averaging over all centres 0.23 cars per child at any one time, with the average length of stay for all centres being 6.8 minutes⁷.

Given the centre will operate as long day care centre the main staff movements will occur after the evening peak when most of the trips to this site will occur.

5.2.4 Consulting Suites for Doctors or Offices

As outlined in the NSW, RTA, Guide to Traffic Generating Developments,2002:

Offices

The car parking requirements for office and commercial developments vary with the parking policies of local government areas. It is the responsibility of local government to determine parking policy in commercial centres. Distinction needs to be drawn between whether the parking demand is to be met on site (unrestrained situation) or whether car parking supply is to be used as a policy tool to restrict commuter movement by private vehicles into a commercial centre (restrained situation). On this basis the following car parking provision is recommended.

The development's location in the centre of the City (Central Commercial and Administrative Zone) means that the development does not have any car parking requirement.

⁷ NSW RTA Guide to Traffic Generating Developments

5.2.5 Impact of the Development on Surrounding Intersections

The worst case scenario will occur during the evening peak period when an assumed 100 trips will be generated by the proposed development. Given that there is limited parking associated with this site it is not assumed that all trip destinations will be to the site itself and there will be disbursement of trips onto the network to other parking locations.

Hotel Traffic

Of these trips ~ 46 will be associated with the hotel and some of them will use Kemp Street as the main drop off and pick up zone associated with the hotel development. Traffic volume counts undertaken by Howarth Fisher show that there were 16 vehicles per hour using Kemp Street. If half of the visitors to the hotel utilise the drop off pick up the total flows on Kemp Street will increase to 39 vehicles per hour. Kemp Street can clearly cater for this increase.

It is assumed that these 23 movements will also utilise the Kemp Street and Collin Street intersection and the Collins Street Argyle Street intersection. Given that the SCATS data provided by DIER shows that 1573 vehicles use this Collins Street / Argyle Street intersection during the evening peak and 19,199 vehicles use this intersection daily. The 23 vehicles coming from the drop off and pick up zone will represent an increase of 1.46%.

It is assumed that the remaining 23 evening peak vehicles that do not use the drop off and pick up zone associated with the hotel will go straight to the Market Place and Bathurst Street car parks. These car parks provide ~ 1400 spaces, which are available 24hr/ 7 days a week. The extra 23 trips will be absorbed into the existing peak hour flows and in to the network and will again reflect a negligible increase in traffic flows and impact on intersections.

Childcare Centre Traffic

Based on long day care centre flows it can be assumed that 25 trips will be made to/ from the child care centre in the evening peak hour. The RTA guide estimates 0.7 trips per child during the 2 hour period 4-6pm period.

Most of the parents would likely use the Argyle Street car park for pick up and drop off to the child care centre.

An additional 13 trips through the Collins Street /Argyle Street intersection and an assumed 13 trips through the Argyle Street / Liverpool Street car park will reflect just over a 0.8% increase in flows using the intersections in the peak hour.

The exit of the Argyle Street car park has been designed to cater for capacity flows. The location of a pedestrian crossing facility to the south of the car

park exit onto Argyle Street allows gaps in the through traffic stream for vehicles exiting the car park.

Office

Hobart City Council does not actively encourage commuter parking within the city centre. It is not assumed that all office workers will park in the Argyle Street car park, given the cost implications of the long term parking. However, there will be a proportion of consulting room / office workers who use the lease spaces. If 40 spaces are used for this purpose it can be assumed that the majority of the workers will leave during the evening peak hour. If 75% leave during the evening peak (a reduction has been made for people who work part time, medical consultants who work early / late shifts,) this will reflect an additional 38 trips through the intersection of Collins Street and Liverpool Street. This reflects a 2% increase in traffic at this intersection during the evening peak hour. Currently there are approximately 20,894 vehicles travelling through this intersection during the day of which there are 1,814 during the evening peak hour.

The location of the mixed use development in the middle of a city, provides an opportunity to integrate best practice, land use and transport planning, by locating development in areas which reduce the need to travel, especially by car. For example, by locating child care in the city centre, people are not required to make separate trips on the network. The development's location actively manages the pattern of urban growth to make the fullest use of public transport and focus major generators in city centres near to public transport interchanges.

6. Assessment of Parking

6.1 Existing Situation

There are currently 28 parking spaces⁸ associated with the existing site.



Photograph 1: Showing existing off street parking provision at the site

6.2 Parking Requirements

The site is located within precinct 2 of the Central Commercial and Administrative Zone. There is no parking requirement associated with the zone as outlined in the City of Hobart Planning Scheme.

⁸ It has been assumed that there would be 28 trips from the site in the evening peak hour and these have been deducted from the trips at Table 3 of this report (ref: trip generation –page 8).

Table 4: Parking requirements for the proposed development based on the Typical Requirements of the City of Hobart Planning Scheme

Land Use	Parking Rates	Total Requirement
<i>115 Room Hotel</i>	<i>2 spaces per 3 bedrooms + 1 space per 2m² of bar floor area + 1 space per 2 employees</i>	<i>76.6 + 5 = 81.6 spaces</i>
<i>Childcare Centre</i> <i>70 spaces for children</i>	Assumed similar to primary school 1 space per 2 staff (12 staff) = 6 spaces + 4 spaces for visitors	11 spaces
<i>Office / Consulting Suites for Doctors</i> <i>1936m²</i>	1 space per 80m ² 1 space per 30m ²	24.2 spaces 65 spaces
<i>Retail</i> <i>Specialty shops including café</i> <i>895m²</i>	1 space per 45m ²	19.8 spaces
TOTAL		137 -178 spaces

Table 4: Parking requirements for the proposed development based on the Typical Requirements of the NSW RTA Guide to Traffic Generating Developments 2002.

Land Use	Parking Rates	Total Requirement
<i>115 Room Hotel</i>	1 space per 4 bedrooms for 3 and 4 star hotels	29 spaces
<i>Childcare Centre 70 spaces for children</i>	1 space per four children in attendance	18 spaces
<i>Office / Consulting Suites for Doctors 1936m²</i>	1 space per 80m ² 1 space per 30m ² Assumed restrained demand ⁹	24.2 spaces - 65 spaces
<i>Retail Specialty shops including café 895m²</i>	1 space per 45m ²	20 spaces
TOTAL		92 spaces - 132 spaces

There is a requirement for between 92 and 178 spaces associated with the proposed development. 40 spaces are to be leased from the Council and dedicated to the development leaving a shortfall of between 52 – 138 spaces.

There are many off street car parks in the vicinity of the site, including the Argyle Street Council car park (950 spaces), the Market Place car park (~800 spaces) which is open 24hours / 7 day per week and the newly opened

⁹ As outlined in section 5.6 of *Parking Requirements for Specific Land Uses-NSW RTA Guide to Traffic Generating Developments*.

Bathurst Street / Argyle Street (~650 spaces) car park which is also open 24hours / 7 days per week.

Given the location of the proposed development within the Central Commercial and Business zone there is no requirement for parking to be provided.

6.3 Proposed Parking Provision

The proposed layout of the drop off and pick up parking can be found in Appendix A. Furthermore, it is proposed to lease 40 spaces from the City of Hobart's Argyle Street car park. These spaces will be available for staff in the office and consulting suites and for hotel staff. Furthermore, there is a dedicated drop off and pick up facility proposed on Kemp Street and a drop off and pick up facility which will operate during the inter car park peak period on Argyle Street. The proponent has had discussions with officers at Council, regarding the lease of 40 car spaces within the Argyle Street carpark. Notwithstanding that, it is expected that a lease will be formalised on the basis of these discussions, any such car parking or agreement is not required by the planning scheme and is beyond Council's consideration of this Development Application.

Consideration could also be given to consulting with Hobart City Council to increase the number of parent / child car parking spaces in the vicinity of the lifts which provide access into the development on the 5th floor. This will help improve the drop off and pick up facility to the childcare centre and ensure that parents can leave their vehicle and take their child safely via the lift to and from the childcare centre.

It will also ensure that the drop off and pick up zone on Kemp Street is solely used for high turnover drop off and pick up associated with the hotel. Hotel staff will need to ensure that the operation of this facility is managed so that there is minimal disruption to the operation of Kemp Street, particularly at peak times. Evening peak hour trip generation to a 115 room hotel is in the order of 46 trips per hour. Given the location of the site, in the middle of the city, it is expected that the actual trip generation to the hotel will be lower due to higher public transport use (taxi and *airporter* bus). Turnover should be expedited by hotel staff managing the drop off and pick facility. Staff will also assist with baggage, advise of the location of the reception and where to find long term parking. Many guests who arrive at the hotel without excessive baggage, and who are familiar with the hotel's location, are likely to park off site and walk to the hotel development.

The drop off and pick up facility will be predominantly used:

- for those with bags;
- for those with a passenger(s) who can check in separately from the driver;
- for those with a mobility issue and ;
- for those who arrive via taxi or airporter bus.

It is expected that the hotel (through staff, publications and internet) will advise those guests who wish to use of the drop off and pick up facility of its location. Other guests who do not wish to use the drop off and pick up facility will be directed and advised of the nearest 24hr / 7 day car park sites at Market Place and Bathurst / Argyle Street during the booking process. It is also envisaged tourist directional signage from Collins to Kemp Street will be used to direct people to the Kemp Street drop off and pick up zone.

6.4 Dimensions and Manoeuvring

The existing Argyle Street car park spaces have been designed in accordance with the *Australian Standard 2890.1: Off street parking 2004*. These bays will be directly associated with the hotel and office land use and therefore the minimum requirement for user class 2 hotel car parking is 2.5metre wide x 5.4metre long bays with 5.8metre wide aisles. All the bays in the existing car park exceed this requirement.

Disabled bays also exist within the car park and are located in the vicinity of the lifts.

The parallel bays along the hotel frontage of Kemp Street, will also comply with the Australian Standards for on street parking.

The end bays for light vehicles are dimensioned at 2.3metres wide by 5.5metre long. Any mid bays which can be provided will be 6.1metres long x 2.3metres wide.

6.5 Impact of the Development on On-Street Parking

Consideration needs to be given to the prevalence of common usage reducing the total demand and / or the parking demand associated with the various land uses. Notably, the cafe and shops are likely to be predominantly used by hotel guests and therefore the parking requirement associated with these uses has been double or triple counted.

The hotel's location, in the middle of the city, will make it an ideal location for a City break, which will typically involve people arriving at the hotel on an *Airporter* bus or by taxi and then walking or using public transport during their City stay.

The location of the hotel, near the hospital, also makes the site ideally situated for people who need to visit the hospital. There are a number of off street car parks located near the site, which make the location less dependent on on-street parking. The off-street car parks near this hotel site will make it affordable and accessible for people to use for overnight parking. Many national and international city based hotels require guests to utilise off site paid parking.

Valet parking is another option which could be considered, basically requiring the hotel staff to drive the hotel visitors' vehicles to an off site parking facility from the drop off and pick up zone on Kemp Street. The Market Place car park is located in close proximity to the hotel and opens 24 hours a day seven days per week.

It is proposed that at off peak times and particularly at night / early morning when the Argyle Street car park is closed, the three metered car parking spaces on the Argyle Street frontage also be made available for loading and hotel drop off and pick up. Whilst this facility cannot be relied upon for much of the day it will provide a useful off peak facility.

7. Assessment of Access

7.1 Existing Situation Access Width

Vehicular access into the site will be via the Argyle Street car park, which provides access to the 40 leased car parking spaces. The Council car park is an existing structure and has been designed to comply with the requirements of the Australian Standards.

Access to the drop off and pick up zone is via Kemp Street, the width of this road varied from ~5metres wide to 13 metre wide.



Photograph 1: The access to the drop off and pick up zone is via Kemp Street.

7.2 Planning Scheme Access Widths Requirement

As the Argyle Street car park is an existing facility it has been designed to comply with the full requirements of the Australian Standards.

7.3 Access Provision

The location of the access and egress points can be found on the plan at **Appendix A**. The access at the Argyle Street car park has been designed to cater for the full capacity of the car park and will be compliant with the access requirement as outlined in the Australian Standard.

The Kemp Street servicing and drop off facility for the hotel will comprise an on street facility only. Again Kemp Street is an existing road and therefore is compliant with width requirements.

It is suggested that a dedicated pedestrian facility at the development side of the loading and drop off bays be provided to ensure pedestrian amenity is maintained.

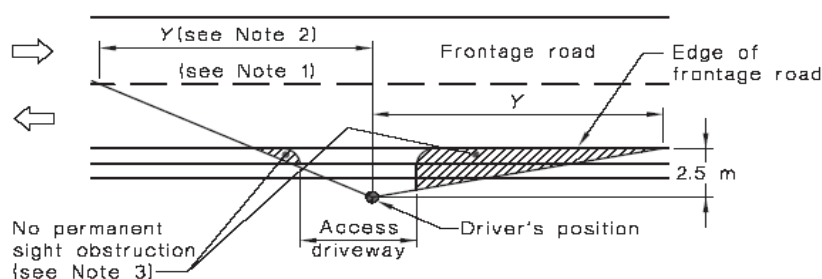
8. Assessment of Sight Distance

In accordance with Australian Standard 'AS2890.1: 2004 Off-street parking,' the sight distances from the egress point has been determined both for vehicles and pedestrians. The requirement of sight distance according to standards and the existing situation has been assessed as follows:

3.2.4 Sight distance at access driveway exits

Access driveways need to be located and constructed so that there is adequate entering sight distance to traffic on the frontage road and sight distance to pedestrians on the frontage road footpath for traffic entering the frontage road, as follows:

- Entering sight distance* Unsignalized access driveways shall be located so that the intersection sight distance along the frontage road available to drivers leaving the car park or domestic driveway is at least that shown in Figure 3.2.
- Sight distance to pedestrians* Clear sight lines as shown in Figure 3.3 shall be provided at the property line to ensure adequate visibility between vehicles leaving the car park and pedestrians on the frontage road footpath.



Frontage road speed (Note 4) km/h	Distance (Y) along frontage road m		
	Access driveways other than domestic (Note 5)		Domestic property access (Note 6)
	Desirable 5 s gap	Minimum SSD	
40	55	35	30
50	69	45	40
60	83	65	55
70	97	85	70
80	111	105	95
90	125	130	Use values from 2 nd and 3 rd columns
100	139	160	
110	153	190	

FIGURE 3.2 SIGHT DISTANCE REQUIREMENTS AT ACCESS DRIVEWAYS

The sight distance from the Kemp Street access was measured as follows.



Photograph: Shows sight distance to the south exceeds 100 metres and is in excess of 69 metres required in the AS2890.1 from the Kemp Street egress

There are no right turn movements allowed out onto Collins Street or Argyle Street.



Photograph: Shows sight distance to the east exceeding 100 metres and in excess of 69 metres required for an egress onto a 50km/hr road.

8.1 Pedestrian Sight Distance

The pedestrian sight distance at the access on to Collins Street will be maintained as outlined in figure 3.3 of AS2890.1 below:

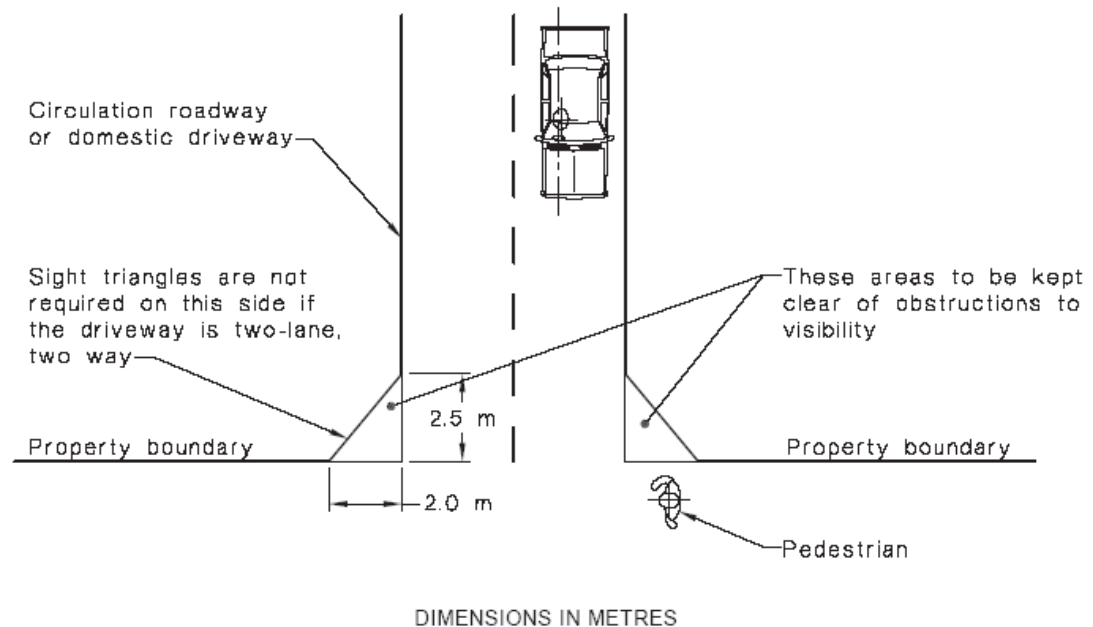


FIGURE 3.3 MINIMUM SIGHT LINES FOR PEDESTRIAN SAFETY

9. Servicing Requirements

Servicing will be via the pre-existing loading bays in the vicinity of the development on Kemp Street and the conversion of some existing parking areas to loading zones.

There is currently a dedicated loading zone, with two bays, in Kemp Street adjacent to the proposed development site. This loading zone is operational between 8am – 6pm Monday to Friday. Consideration may be given by Council to extend the hours of its operation to include early mornings and later in the evenings (6am- 8pm) to ensure servicing facilities are available for the hotel and other development land uses.



Photograph showing the location of the existing loading zone on Kemp Street.

There are three metered parking bays on Argyle Street which are restricted to use before 10.30am and after 2pm Monday to Friday. Consideration could be given to utilising this area as a loading zone before 8am and after 6pm to facilitate early morning and late night servicing to the various land uses in the proposed development site.



Photograph showing the restrictions to the on street metered parking area on Argyle Street in the vicinity of the development site.

Typical servicing will be via an 8.8-metre medium rigid truck or a smaller 6.4 metre rigid truck.

The Argyle Street car park can also provide a servicing function for light vans, (these vehicles would need to be lower than the vehicle height clearances of less than 2 metres). A dedicated loading zone could be provided through the allocation of a car parking space for this purpose. Ideally this would be located near the development site access into the Argyle Street car park which is located on the 5th floor, (the conversion of a space for loading purposes would be subject to Council approval).

There are two 15 minute parking areas on the one way ingress to the main loading zone on Kemp Street. One or both of these bays could be used for an additional loading facility if demand warrants further servicing facilities. It is suggested that the servicing facilities be monitored and additional servicing facilities provided in this area as and when required.



Photograph showing a possible area for further servicing in the Kemp Street.

The southern corner of the Drysdale building will be protected via the provision of a new bollard.

9.1 Autotrack Paths

Three truck Autotrack paths diagrams are shown at Appendix B of this report.

- 13J270 (P4) 8.945m refuse vehicle (tandem axle).

This vehicle can utilise the service / loading bay and completely clear the pick up and drop off zone associated with light vehicle parking at the hotel. The Autotrack path shows clearances between the vehicle body and kerb edges in excess of 300mm (specifically 447 and 302mm) on Kemp Street. This vehicle has a better turning radius than the Australian Standard 8.8metre medium rigid truck. It should be noted that the HCC refuse vehicle is ~ 6.8metres in length and has adequate clearances to the kerb as shown in the photographs below.





Photographs: Showing actual clearances to the footpaths by the Hobart City Council's refuse vehicle.

- 13J270 (P3) Australian Standard 8.8metre medium rigid design truck.

This turning template has a wider turning radius and represents a conservative scenario.

Whilst the truck can utilise the proposed service and loading bay and can completely avoid both the car parked in the drop off and pick up zone and the zone itself. The truck has clearances of 88mm and 151 mm between the kerb and the body envelope of the truck.

- 13J270 (P5) Australian Standard 8.8 metre medium rigid truck.

The 8.8 metre vehicle will perform better when the pick up and drop off zone is available for manoeuvring. Clearances of 221mm and 309mm between the kerb and the body of the truck can be achieved (79mm short of the Council's 300mm requirement on the southern side of Kemp Street). This side of Kemp Street has a kerb only. This kerb is not a footpath.

Vehicles with a larger turning radius (similar to the 10 metre radius shown on the Australian Standard 8.8metre medium rigid truck can manoeuvre within the drop off and pick up zone to achieve a greater clearance. In reality most vehicles perform better than the Australian Standard 8.8metre medium rigid truck design vehicle template.

A dedicated pick up and drop off zone has been marked and shown on the plans in Appendix B.

The traffic flows in Kemp Street have been counted during the evening peak period 4.45pm-5.45pm and totalled 16 vehicles per hour. Kemp Street can clearly accommodate the increased traffic flows associated with the

proposed drop off and pick up facility at the front entrance to the hotel and the service vehicle facility.

It is also proposed that the three metered parking spaces on Argyle Street can also be used for off peak, on road servicing, for 8.8metre service vehicles at specific times of the day and night when traffic flows into the Argyle Street car park are low.

The Argyle Street car park can also provide a servicing function for light vans, (these vehicles would need to be lower than the vehicle height clearances of less than 2 metres). A dedicated loading zone could be provided through the allocation of a car parking space for this purpose. Ideally this would be located near the development site access into the Argyle Street car park which is located on the 5th floor, (the conversion of a space for loading purposes would be subject to Council approval). This additional servicing option would reduce the impact on Kemp Street and would be ideal for some of the smaller delivery vehicles servicing the site. This dispersion of servicing trips to the site would ensure that the Kemp Street drop off / pick up and servicing facility would continue to operate in free flow conditions.

10. Sustainable Transport Requirements

10.1 Buses

The proposed site is well served with public transport services and is located in proximity to a number of different bus routes, notably all the services operating to the northern and eastern suburbs. The development will also be located in close proximity to the Main Hobart Bus Station on Elizabeth Street. The bus services provide a convenient, accessible and sustainable transport link to the site.

The location of the proposed development in close proximity to the CBD and the Hobart Bus Interchange reduces the car-based dependence to access this site. Efforts to promote both general bus use and the Airporter bus to the site will be supported. The development is in a location where there is a good choice of transport modes other than the car. This will lead to an increased proportion of non-car based movements to the development site.

The Hobart Hopper bus service provides a free Saturday bus service from the street frontage in Argyle Street to various locations in the City, including Elizabeth Street bus interchange and Salamanca, providing a useful and sustainable link to other bus, coach services. This will hopefully reduce the necessity for car based trips for many hotel guests.

10.2 Bicycles

Bicycle parking is provided at the site to facilitate and encourage access to the site by bicycle. Hobart City Council is providing and expanding a network of bicycle facilities within the vicinity of the site.

Bicycle access may be particularly attractive for short distance trips. The site is located in close proximity to local residential catchments, which could be potential generators of bicycle movements to the site for staff and shoppers. By promoting and facilitating cycling to the site, we are encouraging a shift away from private cars to less environmentally damaging modes.

10.3 Pedestrians

There are 2.4-metre wide footpaths along the Argyle Street road frontage to the development site. Furthermore, there are many traffic signal controlled pedestrian crossing facilities along the length of Argyle Street in addition to a

pedestrian crossing facility which is located in close proximity to the site. These will provide a useful link between the hospital and the proposed hotel.

The site is conveniently located near to the Central Business District (CBD) of Hobart as well as Salamanca and Brooke Street Pier (which acts as an interchange for tourist based trips via bus, bicycle and ferry). Hobart City Council has a good network of footpaths within the CBD, which provide a safe, controlled pedestrian environment. Again, this will typically lead to an increased proportion of non-car based movements to the development site.

A pedestrian visibility splay has been provided from the Kemp Street access onto Collins Street in line with the requirements of AS2890.1: Off street Parking 2004. The Kemp Street shared pedestrian and vehicular environment provides a safe low speed, low vehicle flow area for people walking to the hotel and mixed use development.

There will be a pedestrian connection between Kemp Street and Argyle Street through the ground floor arcade. The arcade will remain open to the public whenever the Council car park is open, being 8am to 10pm, without any restrictions. Easily accessible stairs, lifts, and a one-way (up) escalator will facilitate circulation between the arcade floors.

10.3.1 Hotel

Hotel guests will arrive and depart from the hotel by:

Taxi, mini-bus (Airporter shuttle bus) or be dropped off at the Kemp Street hotel entrance, and then proceed on foot to the hotel reception for check-in. Check-in would most often occur in the afternoon or evening, but could be at anytime to a lesser extent.

Guests with cars will either park them at a convenient location elsewhere (for example there is a privately owned car park at Market Place which provides access 24hours a day / 7 days a week in close proximity to the hotel.) There are also other pay and display car parks which are conveniently located within walking distance to the site. From these car parks people would proceed to the hotel site on foot. Others may be directed to available leased car spaces in the adjacent Council car park. The guests would then take the lift to the ground floor reception for check-in, and then use the lifts to take them to their room on the hotel floors.

Check-out would most often occur in the mornings over an extended period from early to mid-morning. It should be noted that these hotel based movements are counter-cyclical to the business hours of movements to the office areas and the childcare centre providing temporal distribution of pedestrian and vehicular demand to the site.

10.3.2 Childcare Centre

It is assumed that most people who arrive at the childcare centre either

- Travel to the city by bus and then walk from the bus mall / bus stop with their child and drop them at the child care centre.
- Park remotely from the development site at a work based parking facility and then walk to the site with their child.
- Park in the Argyle Street car park and then walk or take the lift to the childcare centre. There is lift access from the car park on the fifth floor which provides a direct link from the car park to the child care centre, which is located on the fourth floor.
- Live close to, or in the city, and walk from home to the childcare facility.

10.3.3 Offices / Consulting rooms

It is assumed that people in the offices / consulting rooms have leased or private parking either within the Argyle Street car park or elsewhere.

Other people who work in the offices will travel to work as other typical city workers do, by foot, public transport or by bicycle, walking into the site via Kemp Street or Argyle Street.

11. Conclusion and Recommendations

The proposed development has been assessed in relation to the following:

- **Trip Generation**

The proposed development has been assessed in relation to trip generation during the evening peak hour. The evening peak hour depicts worst case scenario conditions for a hotel and retail land use and therefore the proposed development is typically likely to generate approximately 100 trips per hour. The extra trips will be absorbed into the existing peak hour flows and in to the network and will reflect a negligible increase in traffic flows and impact on intersections.

The location of the mixed use development in the middle of a city, provides an opportunity to integrate land use and transport planning by locating development in areas which reduce the need to travel, especially by car. For example, by locating child care in the city centre, people are not required to make separate trips on the network. The developments location actively manages the pattern of urban growth to make the fullest use of public transport

- **Parking**

The site is located within precinct 2 of the Central Commercial and Administrative Zone. There is no parking requirement associated with the zone as determined by the City of Hobart Planning Scheme.

- **Sight Distance**

The sight distance from the Kemp Street access exceeds 100metres to the north and therefore exceeds the requirement of the Australian Standard of 69 metres.

- **Servicing Requirements**

Servicing will be via the pre-existing loading zone located on Kemp Street and possibly via a service facility for small vans within the Argyle Street car park itself an early morning and late evening servicing facility on Argyle Street. An option to provide early morning and late night on street servicing, on Argyle Street, is also proposed. Consideration could also be given to converting the 15 minute parking bay (opposite the existing loading zone) on Kemp Street for servicing purposes provides an additional servicing facility option.

Autotrack has been used to model the swept path of a vehicle through the site. Typical servicing will be via an 8.8-metre medium rigid truck or a smaller 6.4 metre small service vehicle.

The traffic flows in Kemp Street have been counted during the evening peak period 4.45pm- 5.45pm and totalled 16 vehicles per hour. The road can clearly accommodate the increased traffic flows associated with the proposed drop off and pick up facility at the front entrance to the hotel and the service vehicle facility which will be provided on Kemp Street.

Argyle Street car park can also provide a servicing function for light vans, (these vehicles would be subject to vehicle height clearances of less than 2 metres). A dedicated loading zone could be provided through the dedication of a car parking space for this purpose.

- **Sustainable Transport Requirements**

- **Buses**

The location of the proposed development in close proximity to the CBD and the Hobart Bus Interchange reduces the car-based dependence to access this site. Efforts to promote bus access to the site will be supported. The development is in a location where there is a good choice of transport modes other than the car. This will lead to an increased proportion of non-car based movements to the development site.

- **Bicycles**

Bicycle parking is currently available in the vicinity of the site and it has been advised by Council that it is under utilised. The close proximity of the bike parking facility to the site will facilitate and encourage access to the site by bicycle. Hobart City Council is providing and expanding a network of bicycle facilities within the vicinity of the site.

- **Pedestrians**

There are 2.4-metre wide footpaths along the Argyle Street road frontage to the development site. Furthermore, there are many traffic signal controlled pedestrian crossing facilities along the length of Argyle Street in addition to a pedestrian crossing facility which is located in close proximity to the site and would these will provide a useful link between the hospital and the hotel. There is a 1.7metre wide footpath along Kemp Street providing a link from Collins Street to the proposed hotel and mixed use development.



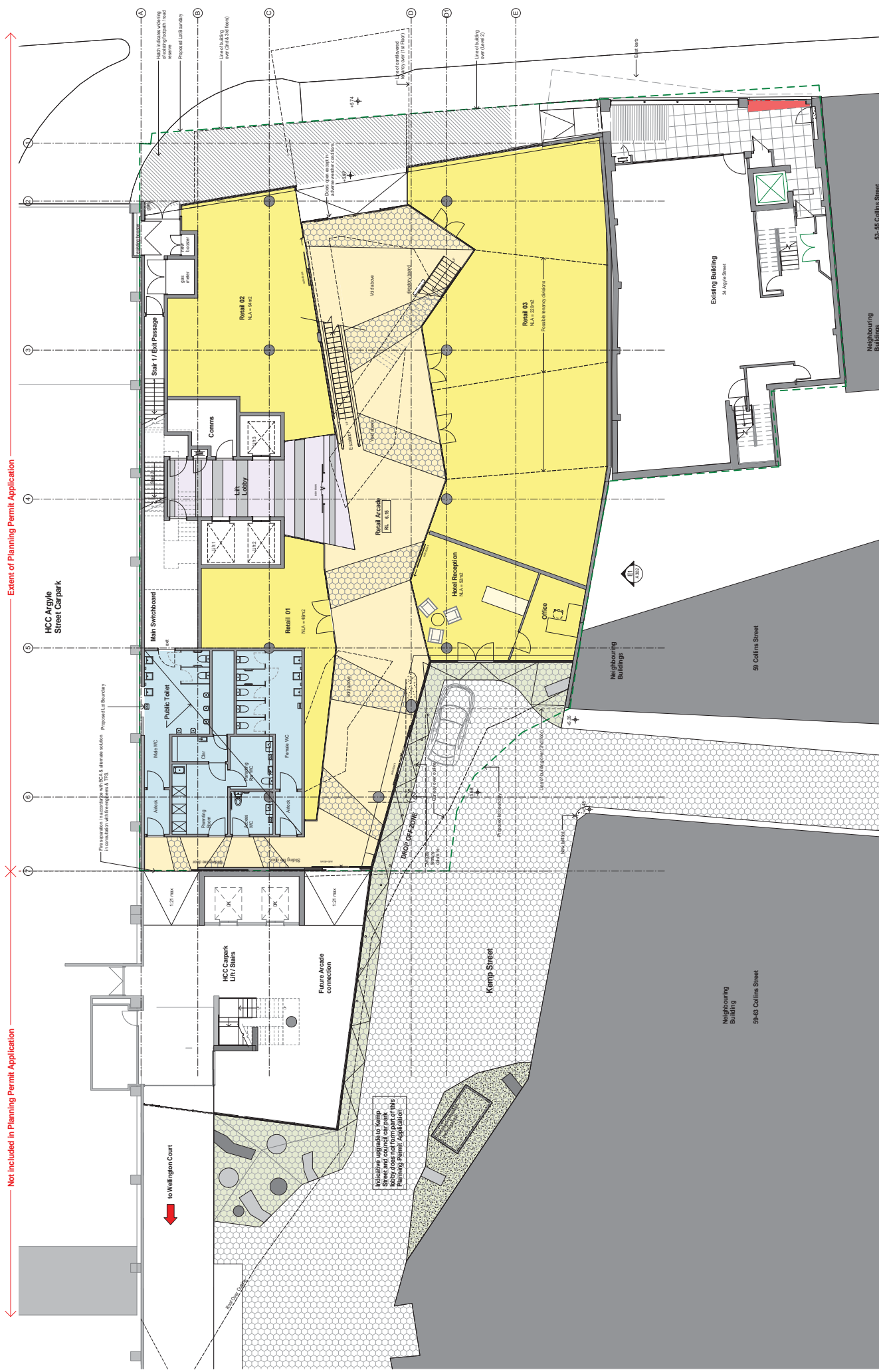
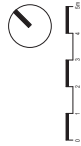
Appendix A

DEVELOPMENT PLANS

PLANNING APPLICATION

[illegible]

41a Sulaimania Place
Indahat Taiping 70000
t: 05 6224 7077
f: 05 6224 7078
e: advice@quantumradio.co.uk



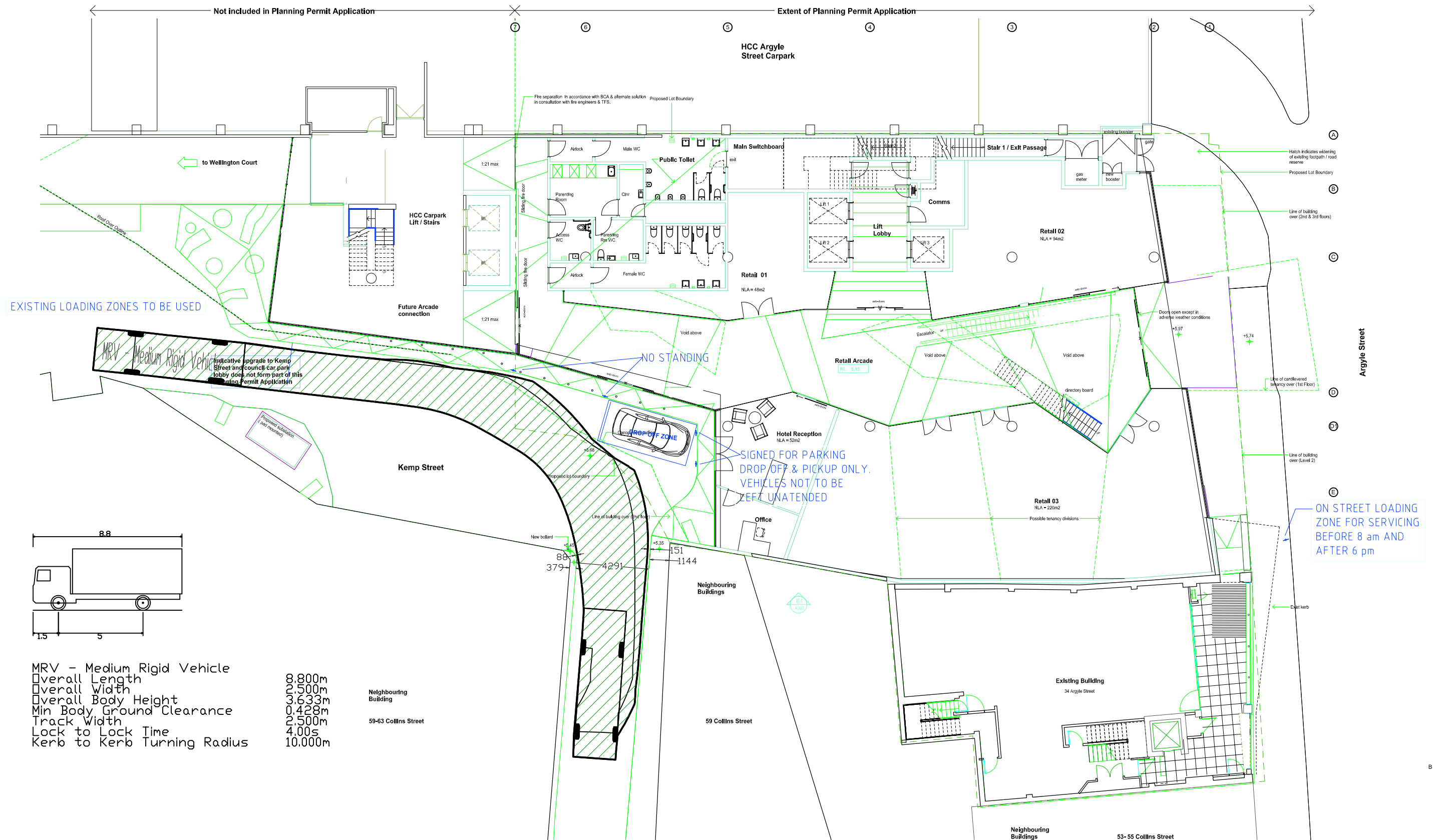
Indicative upgrade to Kemp Street and council car park lobby does not form part of this Planning Permit Application

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Appendix B

AUTOTRACK PATHS



PRELIMINARY - NOT FOR CONSTRUCTION

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NO	REVISION	DATE	BY	APPROVED	DATE
5	ARCHITECT ADJUSTMENT OF THEIR SURVEY	DF	JF		17.10.14
4	ARCHITECT CHANGES TO LAYOUT	DF	JF		23.09.14
3	REFINED A TRACK PATH	DF	JF		18/09/14
2	REVISED LAYOUT	DF	JF		25/08/14
1	FOR CLIENT REVIEW	DF	JF		13.08.14
ISSUE					



HOWARTH FISHER & ASSOCIATES
 Pty Limited ACN 119 043 051
 STRUCTURAL, CIVIL, TRAFFIC ENGINEERS
 AND PROJECT MANAGERS.
 13 WILLOWDENE AVENUE, SANDY BAY - 7005
 PH +61 (0)3 6225 0619
 FAX +61 (0)3 6225 0618
 EMAIL: info@howarthfisher.com

X.SQUARED obo RAADAS PROPERTY PTY LTD
 36 ARGYLE ST MIXED USE DEVELOPMENT
 36 ARGYLE ST, HOBART, 7000

8.8 M TRUCK AUTOTRACK PATH

APPROVED BY:-	DATE: / /
SCALES 1:100 @ A3	ISSUE: / /
DRAWN DF	6
DESIGN JF	
PROJECT NO. 13J270	DOCUMENT IDENTIFICATION -D- P3
DRAWING NO.	

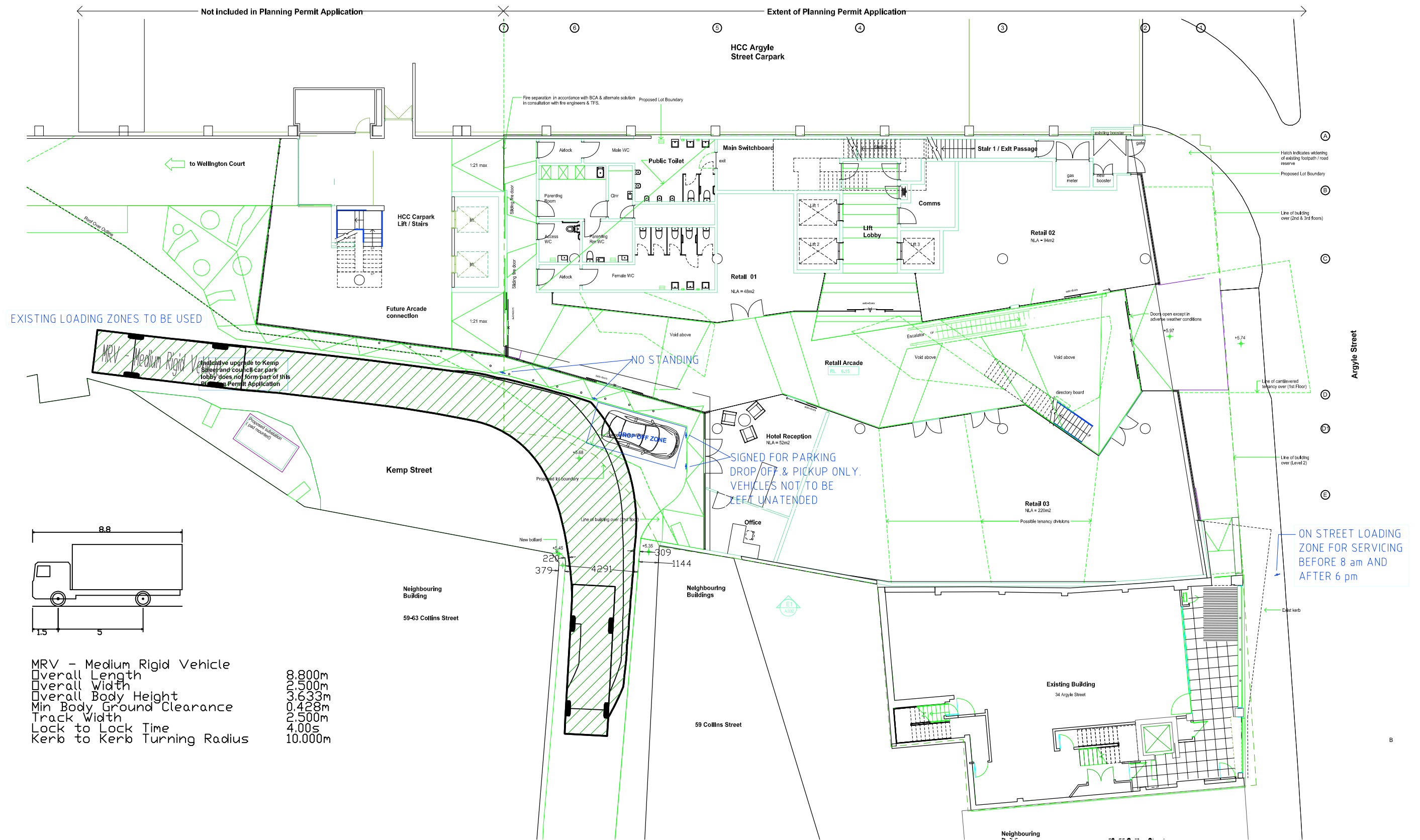


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6	HCC REQUESTED CHANGES TO LOADING ZONE	DF	JF	12.11.14
5	ARCHITECT ADJUSTMENT OF THEIR SURVEY	DF	JF	17.10.14
4	ARCHITECT CHANGES TO LAYOUT	DF	JF	23.09.14
3	REFINED A TRACK PATH	DF	JF	18/09/14
2	REVISED LAYOUT	DF	JF	25/08/14
1	FOR CLIENT REVIEW	DF	JF	13.08.14
	ISSUE	BY	APPROVED	DATE

X.SQUARED obo RAADAS PROPERTY PTY LTD
36 ARGYLE ST MIXED USE DEVELOPMENT
36 ARGYLE ST, HOBART, 7000

8.945 TANDEM REFUSE VEHICLE

APPROVED BY:--		DATE: / /
SCALES	1:100 @ A3	ISSUE: 6
DRAWN	DF	
DESIGN	JF	
PROJECT NO. 13J270		DRAWING NO. -D- P4



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6	HCC REQUESTED CHANGES TO LOADING ZONE	DF	JF
5	ARCHITECT ADJUSTMENT OF THEIR SURVEY	DF	JF
4	ARCHITECT CHANGES TO LAYOUT	DF	JF
3	REFINED A TRACK PATH	DF	JF
2	REVISED LAYOUT	DF	JF
1	FOR CLIENT REVIEW	DF	JF
ISSUE		BY	APPROVED
		DATE	

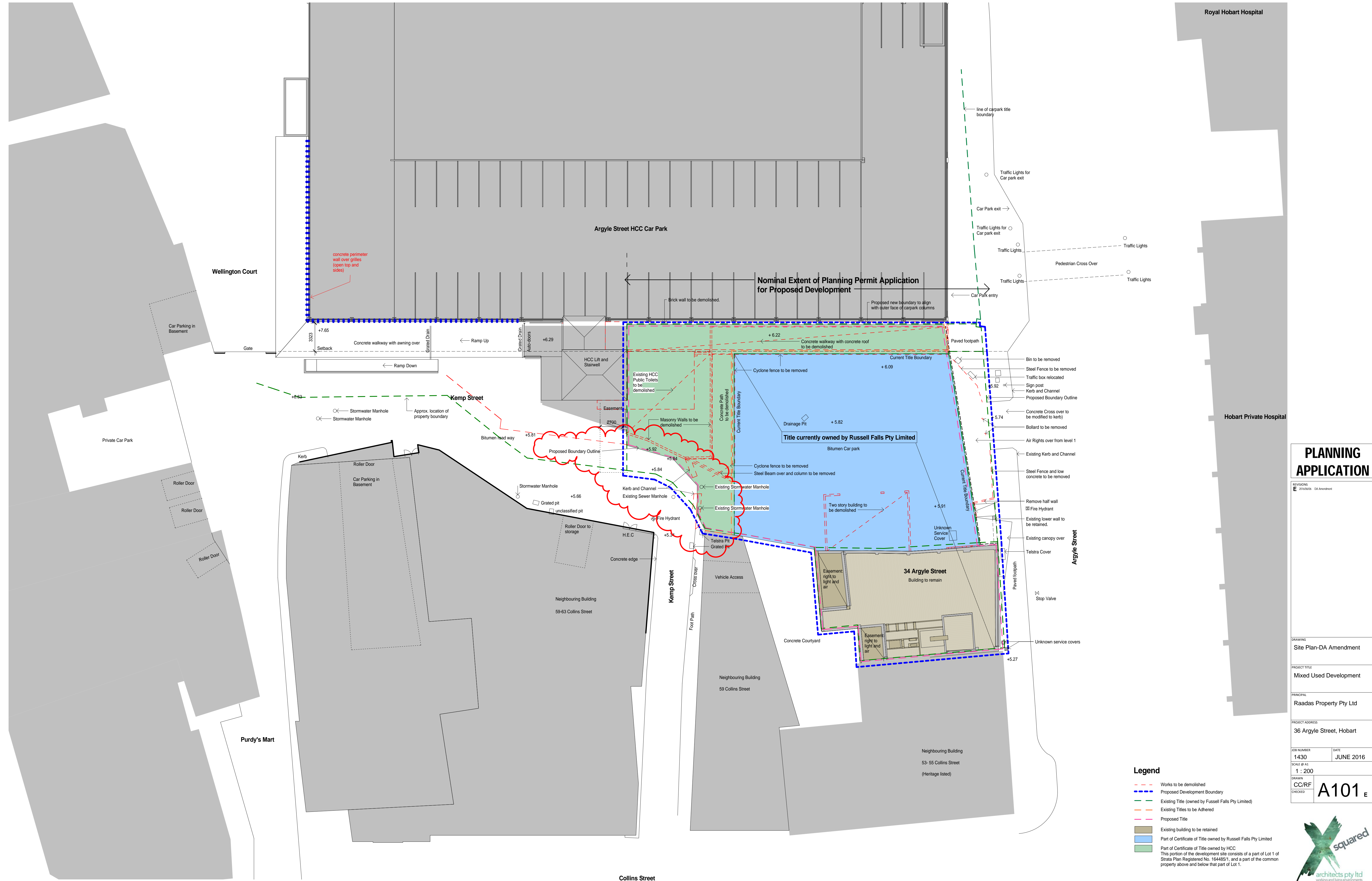


HOWARTH FISHER & ASSOCIATES
 Pty Limited ACN 119 043 051
 STRUCTURAL, CIVIL, TRAFFIC ENGINEERS
 AND PROJECT MANAGERS.
 13 WILLOWDENE AVENUE, SANDY BAY - 7005
 PH +61 (0)3 6225 0619
 FAX +61 (0)3 6225 0618
 EMAIL: info@howarthfisher.com

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 36 ARGYLE ST MIXED USE DEVELOPMENT
 36 ARGYLE ST, HOBART, 7000

8.8 M TRUCK AUTOTRACK PATH

APPROVED BY:-		DATE:
SCALES 1:100 @ A3		ISSUE:
DRAWN DF		6
DESIGN JF		
PROJECT NO. 13J270	DOCUMENT IDENTIFICATION -D-	DRAWING NO. P5



PLANNING APPLICATION

REVISIONS
E 2016/06/06 DA Amendment

DRAWING
Site Plan-DA Amendment

PROJECT TITLE
Mixed Used Development

PRINCIPAL
Raadas Property Pty Ltd

PROJECT ADDRESS
36 Argyle Street, Hobart

JCS NUMBER
1430

DATE
JUNE 2016

SCALE @ A1
1 : 200

DRAWN
CC/RF

CHECKED
A101 E

Legend

- Works to be demolished
- Proposed Development Boundary
- Existing Title (owned by Fussell Falls Pty Limited)
- Existing Titles to be Adhered
- Proposed Title
- Existing building to be retained
- Part of Certificate of Title owned by Russell Falls Pty Limited
- Part of Certificate of Title owned by HCC
This portion of the development site consists of a part of Lot 1 of Strata Plan Registered No. 164485/1, and a part of the common property above and below that part of Lot 1.



1st Floor, 125 Collins Street
Hobart Tasmania 7000

t: 03 6224 9370
e: admin@xsquaredarchitects.com.au

www.xsquaredarchitects.com.au

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1 Ground Floor
1:100

PLANNING APPLICATION

REVISIONS
E 01/06/2016 DA Amendment

DRAWING
Ground Floor Plan - DA Amendment

PROJECT TITLE
Mixed Used Development

PRINCIPAL
Raadas Property Pty Ltd

PROJECT ADDRESS
36 Argyle Street, Hobart

JOB NUMBER
1430

DATE
JUNE 2016

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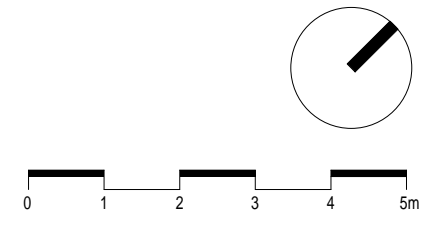
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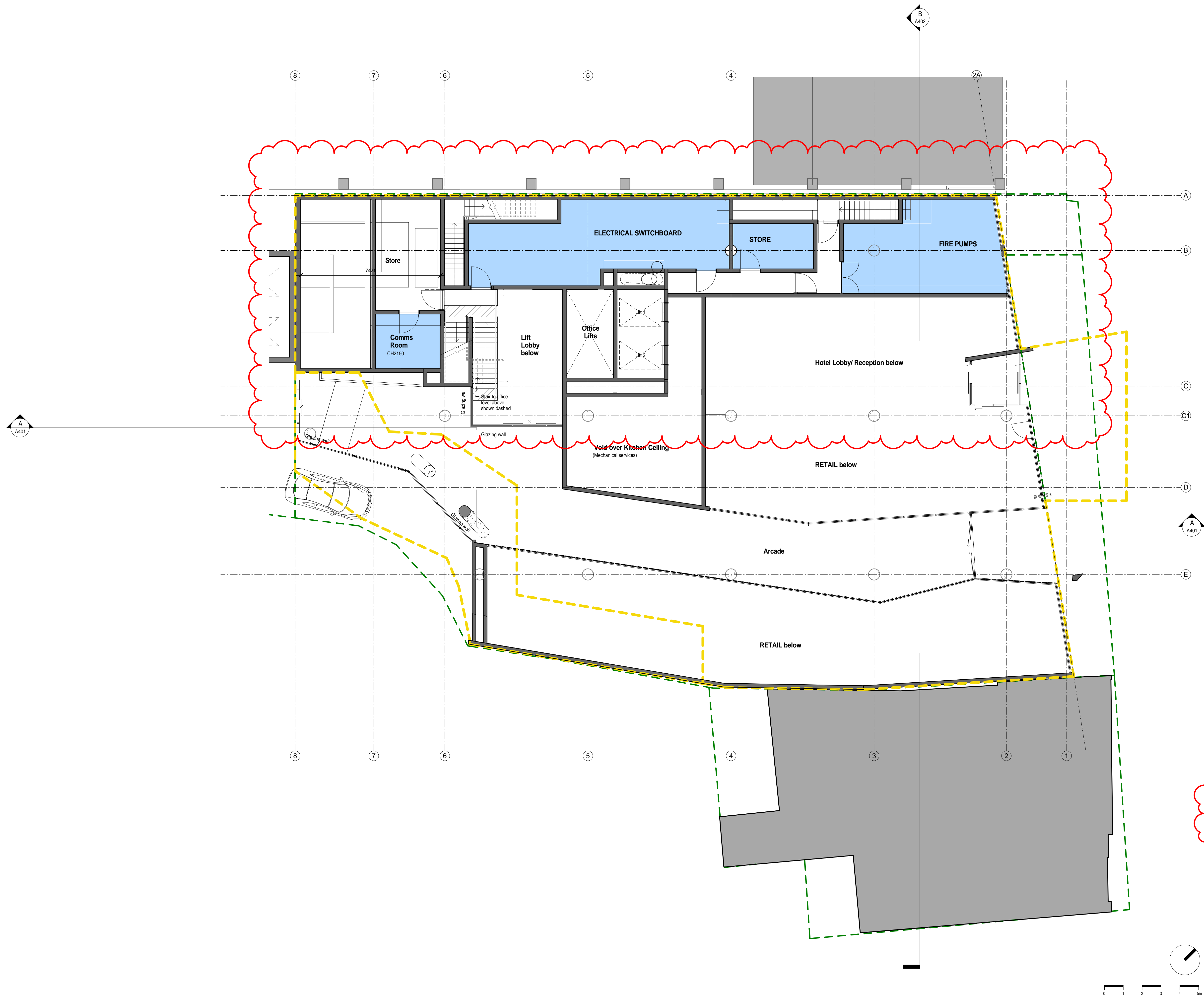
DA DRAWING A201 Rev D



1st Floor, 125 Collins Street
Hobart Tasmania 7000
t: 03 6224 9370
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PLANNING APPLICATION

REVISIONS
E 20/06/2016 DA Amendment

DRAWING
Mezzanine - DA Amendment

PROJECT TITLE
Mixed Used Development

PRINCIPAL
Raadas Property Pty Ltd

PROJECT ADDRESS
36 Argyle Street, Hobart

JCS NUMBER 1496	DATE JUNE 2016
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016/06/06 DA Amendment

016/06/06 DA Amendment

First Floor - DA Amendment

Fixed Used Development

Quadas Property Pty Ltd

CT ADDRESS
Argyle Street, Hobart

NUMBER	DATE
30	JUNE 2016

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DA DRAWING A202 Rev D



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1 2nd Floor - Office
1 : 100

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Argyle Street

PLANNING APPLICATION

REVISIONS
E 20/06/16 DA Amendment

DRAWING
2nd Floor - Office - DA Amendment

PROJECT TITLE
Mixed Used Development

PRINCIPAL
Raadas Property Pty Ltd

PROJECT ADDRESS
36 Argyle Street, Hobart

JOB NUMBER
1430

DATE
JUNE 2016

SCALE @ A1
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DA DRAWING A203 Rev D

Xsquared
architects pty ltd
working and living environments

1st Floor, 125 Collins Street
Hobart Tasmania 7000

t: 03 6224 9370
e: admin@xsquaredarchitects.com.au

www.xsquaredarchitects.com.au



1 3rd Floor - Office
1 : 100

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Argyle Street

PLANNING APPLICATION

REVISIONS

E 20/06/2016 DA Amendment

DRAWING
3rd Floor - Office - DA Amendment

PROJECT TITLE
Mixed Used Development

PRINCIPAL
Raadas Property Pty Ltd

PROJECT ADDRESS
36 Argyle Street, Hobart

JOB NUMBER
1430

DATE
JUNE 2016

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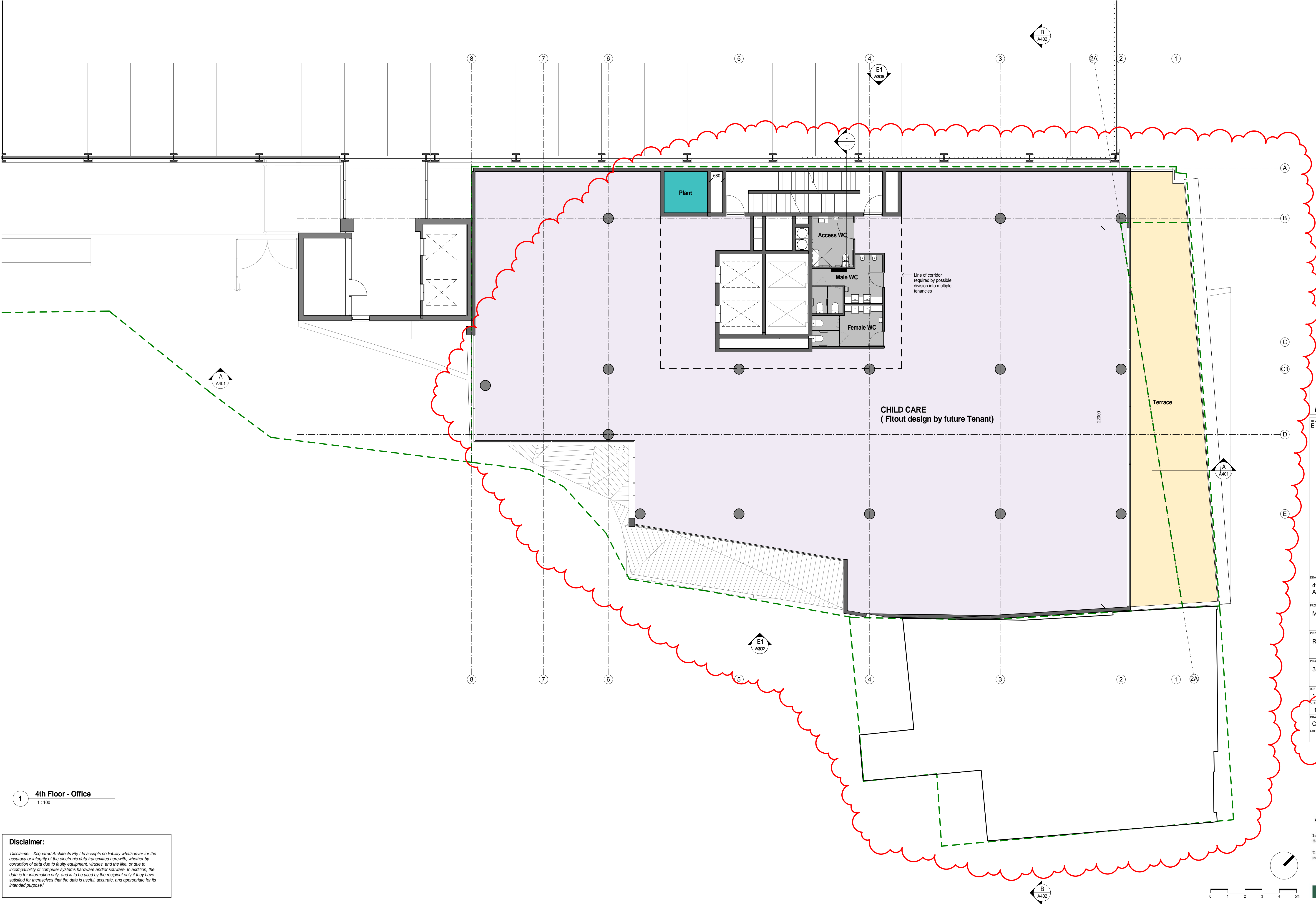
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DA DRAWING A204 Rev D



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working and living environments

1st Floor, 125 Collins Street
Hobart Tasmania 7000
t: 03 6224 9370
e: admin@xsquaredarchitects.com.au
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1 4th Floor - Office
1 : 100

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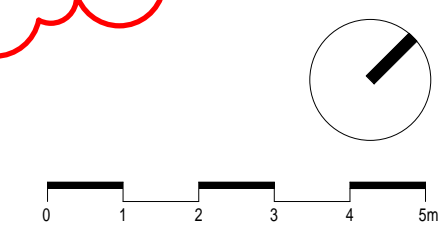
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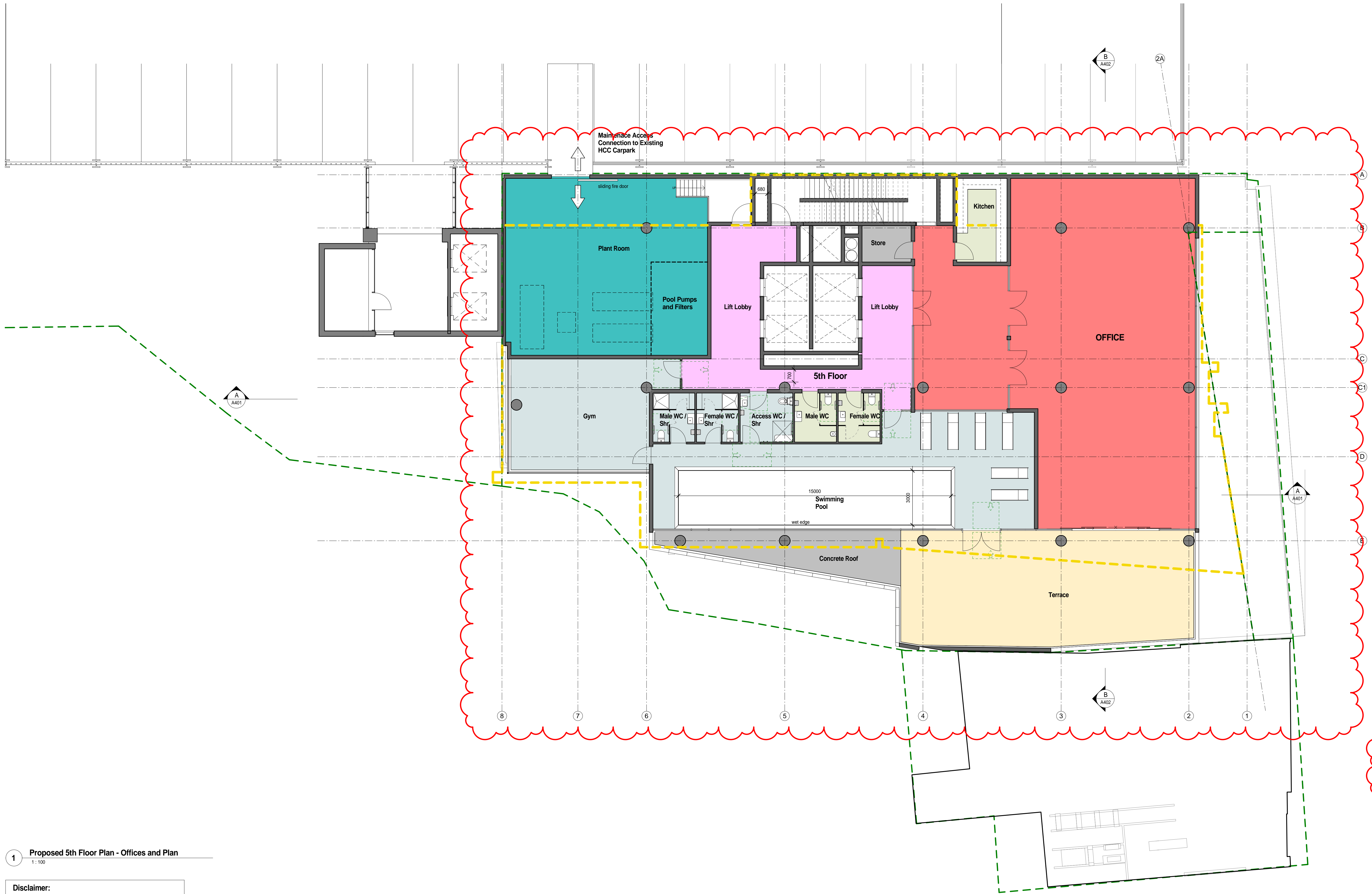
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E	20/06/2016 DA Amendment
DRAWING	
4th Floor Office - DA Amendment	
PROJECT TITLE	
Mixed Used Development	
PRINCIPAL	
Raadas Property Pty Ltd	
PROJECT ADDRESS	
36 Argyle Street, Hobart	
JOB NUMBER	DATE
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1st Floor, 125 Collins Street
Hobart Tasmania 7000
t: 03 6224 9370
e: admin@xsquaredarchitects.com.au

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1 Proposed 5th Floor Plan - Offices and Plan
1:100

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PLANNING APPLICATION

REVISIONS
E 20/06/2016 DA Amendment

DRAWING
5th Floor - Conference and Recreation - DA Amendment

PROJECT TITLE
Mixed Used Development

PRINCIPAL
Raadas Property Pty Ltd

PROJECT ADDRESS
36 Argyle Street, Hobart

DRAWING NUMBER
1430
SCALE @ A1
1 : 100
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DA DRAWING A206 Rev D



1st Floor, 125 Collins Street
Hobart Tasmania 7000
t: 03 6224 9370
e: admin@xsquaredarchitects.com.au

www.xsquaredarchitects.com.au



Argyle Street

PLANNING APPLICATION

REVISIONS
E 20/06/16 DA Amendment

DRAWING
6th Floor - Hotel Level 1 - DA Amendment

PROJECT TITLE
Mixed Used Development

PRINCIPAL
Raadas Property Pty Ltd

PROJECT ADDRESS
36 Argyle Street, Hobart

JCS NUMBER
1430

DATE
JUNE 2016

SCALE @ A1
1 : 100

DRAWN
Author

CHECKED
A209 E

DA DRAWING A207 Rev D



1st Floor, 125 Collins Street
Hobart Tasmania 7000

t: 03 6224 9370
e: admin@xsquaredarchitects.com.au

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1 6th Floor - Hotel (16 rooms)

1 : 100

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1 7th-13th Typical Hotel Floor (17 rooms)
1:100

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PLANNING APPLICATION

REVISIONS
E 20/06/2016 DA Amendment

DRAWING
7th-Hotel Level 2 - DA Amendment

PROJECT TITLE
Mixed Used Development

PRINCIPAL
Raadas Property Pty Ltd

PROJECT ADDRESS
36 Argyle Street, Hobart

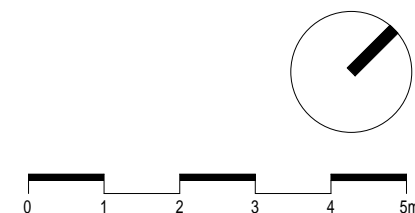
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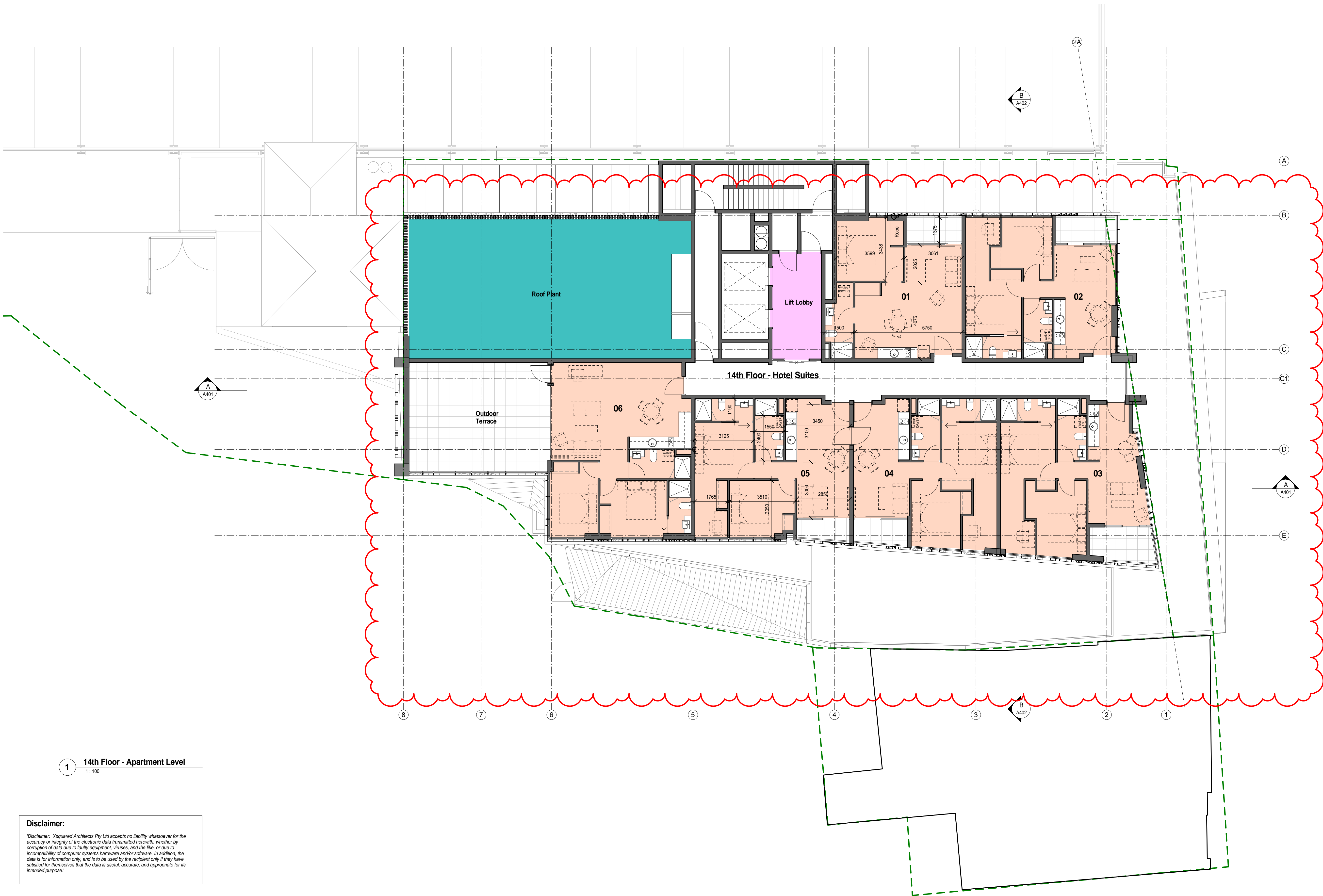
DA DRAWING A208 Rev D



1st Floor, 125 Collins Street
Hobart Tasmania 7000
t: 03 6224 9370
e: admin@xsquaredarchitects.com.au

www.xsquaredarchitects.com.au





1 14th Floor - Apartment Level
1:100

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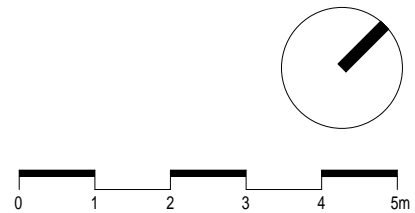
PLANNING APPLICATION

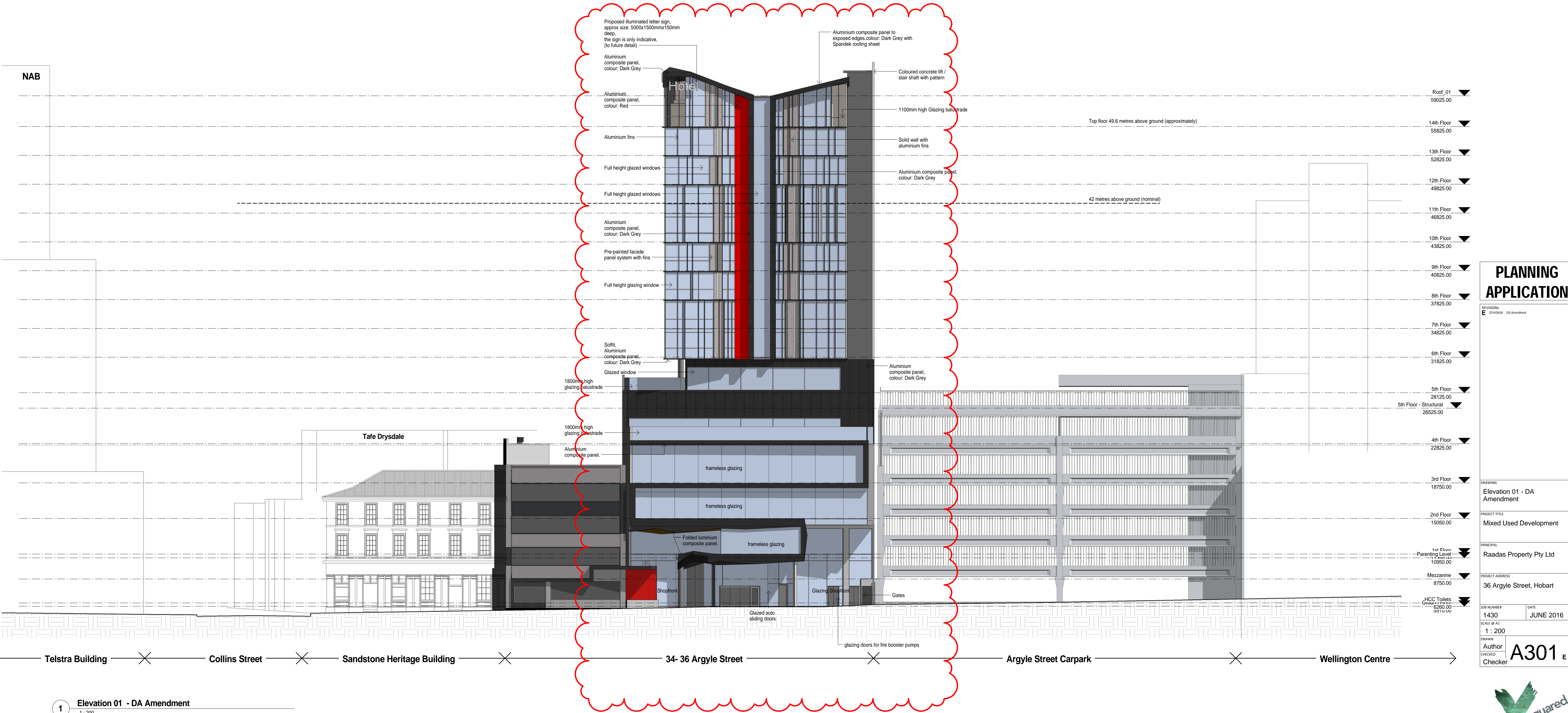
REVISIONS	
E	27/05/2016 DA Amendment



1st Floor, 125 Collins Street
Hobart Tasmania 7000
t: 03 6224 9370
e: admin@xsquaredarchitects.com.au

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PLANNING APPLICATION

REVISIONS
E 01/2016 DA Amendment

DRAWING
Elevation 01 - DA Amendment

PROJECT TITLE
Mixed Used Development

PRINCIPAL
Raadas Property Pty Ltd

PROJECT ADDRESS
36 Argyle Street, Hobart

JOB NUMBER
1430

DATE
JUNE 2016

SCALE @ A1
1 : 200
DRAWN
Author
CHECKED
Checker



1st Floor, 125 Collins Street
Hobart Tasmania 7000
t: 03 6224 9370
e: admin@xsquaredarchitects.com.au

www.xsquaredarchitects.com.au

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1 Elevation 02 - DA Amendment

1 : 200

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PLANNING APPLICATION

REVISIONS
E 01/06/2016 DA Amendment

DRAWING
Elevation 02 - DA Amendment

PROJECT TITLE
Mixed Used Development

PRINCIPAL
Raadas Property Pty Ltd

PROJECT ADDRESS
36 Argyle Street, Hobart

JOB NUMBER
1430

DATE
JUNE 2016

SCALE @ A1
1 : 200

DRAWN
Author

CHECKED
Checker

A302 E

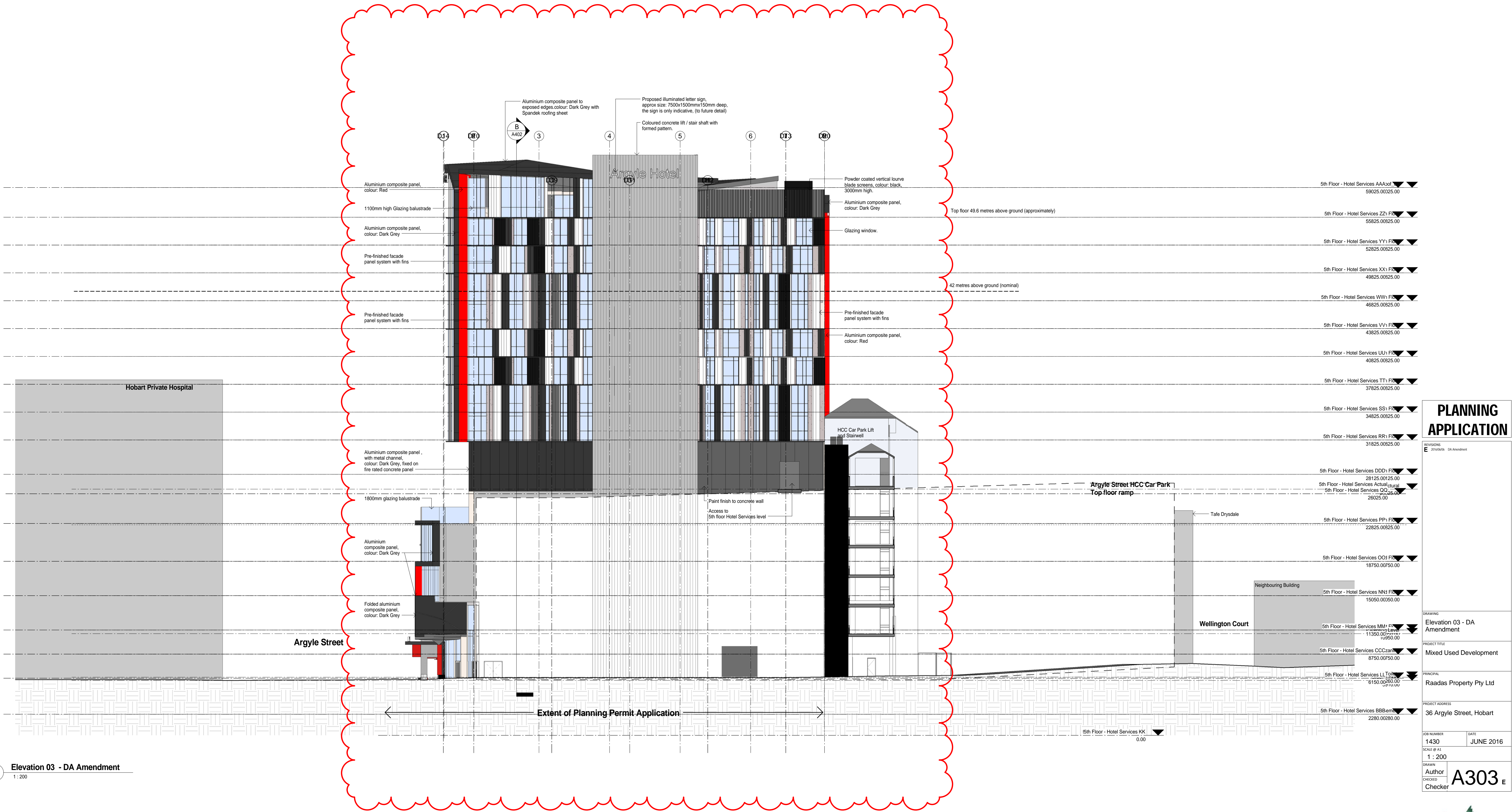


1st Floor, 125 Collins Street
Hobart Tasmania 7000

t: 03 6224 9370
e: admin@xsquaredarchitects.com.au

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0 1 2 3 4 5m



1 Elevation 03 - DA Amendment
1 : 200

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PLANNING APPLICATION

REVISIONS
E
01/2016 DA Amendment

DRAWING
Elevation 03 - DA Amendment

PROJECT TITLE
Mixed Used Development

PRINCIPAL
Raadas Property Pty Ltd

PROJECT ADDRESS
36 Argyle Street, Hobart

DCA NUMBER
1430

DATE
JUNE 2016

SCALE @ A3
1 : 200

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Author

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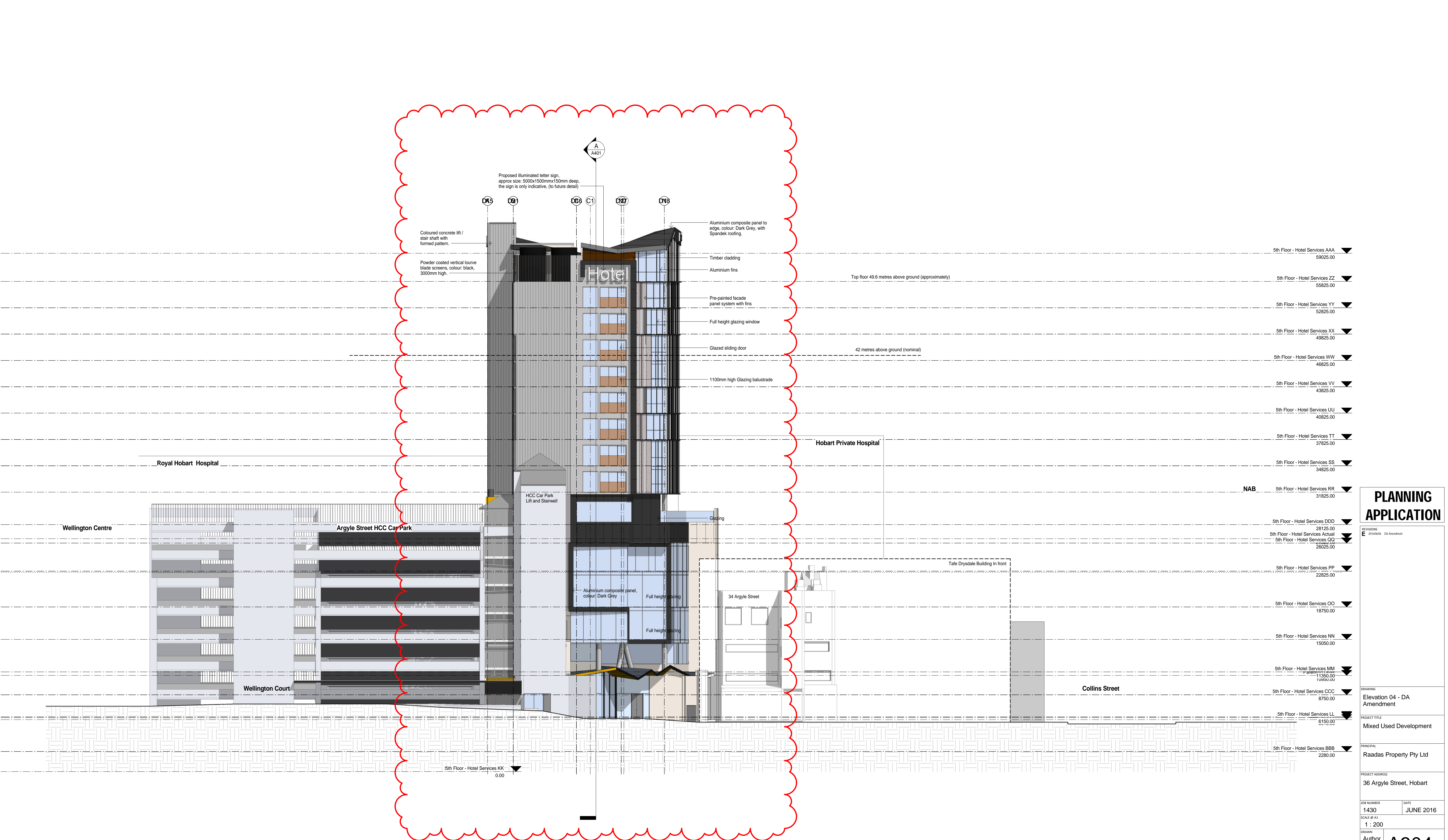
A303 E



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t: 03 6224 9370
e: admin@xsquaredarchitects.com.au

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1 Elevation 04 - DA Amendment
1 : 200

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PLANNING APPLICATION

REVISIONS
E 2016/06/06 DA Amendment

DRAWING
Elevation 04 - DA Amendment

PROJECT TITLE
Mixed Used Development

PRINCIPAL
Raadas Property Pty Ltd

PROJECT ADDRESS
36 Argyle Street, Hobart

JCS NUMBER
1430

DATE
JUNE 2016

SCALE @ A1
1 : 200

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Author

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1st Floor, 125 Collins Street
Hobart Tasmania 7000
t: 03 6224 9370
e: admin@xsquaredarchitects.com.au

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