Student Accommodation

23 & 25 Lachlan Avenue, Macquarie Park

Revised Clause 4.6 Request

Prepared on behalf of Barcam Mac Park Pty Ltd . May 2022

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COVER

Proposed development when viewed northerly from Lachlan Avenue with Elouera Reserve in the background.

This Clause 4.6 Request has been prepared by:

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1 Introduction

1.1 OVERVIEW

The Statement of Environmental Effects for the proposed Purpose Built Student Accommodation (PBSA) facility has identified two contraventions to development standards concerning:

- a minor exception to the height of building standard under clause 4.3 of *Ryde Local Environmental Plan 2014* (RLEP 2014); and
- the departure from the motorcycle parking development standard under clause 30(1)(h) of *State Environmental Planning Policy (Affordable Rental Housing) 2009* (ARH SEPP).

Subclause 4.6 (2) of RLEP 2014 provides that *"development consent may, subject to this clause, be granted for development even though the development would contravene a development standard imposed by this or any other environmental planning instrument. However, this clause does not apply to a development standard that is expressly excluded from the operation of this clause."*

Accordingly, a formal request under clause 4.6 of Ryde LEP is provided for exceptions to the minimum motor cycle under the ARH SEPP as well as the maximum height of buildings development standard under the LEP.

Note that a detailed analysis is provided in Section 2 as to the veracity of the motorcycle parking development standard as well as establishing reasonable and precautionary alternative in order to properly assess this variation in accordance with the planning provisions and applicable case law as summarised in Section 1.2 below.

1.2 LEGAL FRAMEWORK

This request aims to meets the objectives of clause 4.6(1) of RLEP 2014, being

(a) to provide an appropriate degree of flexibility in applying certain development standards to particular development,

(b) to achieve better outcomes for and from development by allowing flexibility in particular circumstances,

and demonstrate for the purpose of clause 4.6 (4) and (3):

(a) that compliance with the development standards is unreasonable or unnecessary in the circumstances of the case, and

(b) that there are sufficient environmental planning grounds to justify contravening the development standards.

Case law *(such as Winten V North Sydney Council, Wehbe V Pittwater Council (2007) NSW LEC 827, Four2five V Ashfield Council etc*) provides guidance when considering an exception to development standards as follows:

- Is the planning control in question a development standard?
- What is the underlying object or purpose of the standard?
- Is non-compliance with the standard consistent with the aims of Cl 4.6?
- Is compliance with the development standard unreasonable or unnecessary in the circumstances of the case?
- Are there sufficient environmental planning grounds (specific to the site and particular to the circumstances of the proposed development) to justify contravening the development standard?
- Is the request well founded whereby Preston J (*Wehbe V Pittwater Counci)* provided five potential ways in which this may be established as follows
    1. *the objectives of the development standard are achieved notwithstanding non-compliance with the standard;*
    2. *Is the underlying objective or purpose of the standard not relevant to the development;*
    3. *Would the underlying objective or purpose be defeated or thwarted were compliance required;*
    4. *The standard has been virtually abandoned or destroyed by the consent authority's own actions in granting consents departing from the standard*
    5. *The zoning of the particular land is unreasonable or inappropriate so that a development standard appropriate for that zoning is also unreasonable and unnecessary.*

More recent case law (*Micaul Holdings v Randwick City Council, Moskovich v Waverley Council and Initial Action Pty Ltd v Woollahra Municipal Council for example*) has also established that:

- the written request has to adequately address everything necessary in clause 4.6(3), rather than the consent authority being "satisfied directly";
- the consent authority must be personally satisfied that development will be "consistent with" the objectives of the zone and the development standard;
- being "consistent with" objectives is not a requirement to "achieve" them but may be "compatible" with them or "capable of existing together in harmony";
- establishing that "compliance with the standard is unreasonable or unnecessary" does not always require that the objectives of the standard are achieved but also that it may not be achieved or would be thwarted by a complying development;
- clarification that while it may be desirable, it is not a requirement to achieve a better environmental planning outcome in *Initial Action Initial Action Pty Ltd v Woollahra Municipal Councill [2018] NSWLEC 118*.

2 Standards and Proposed Variations

2.1 HEIGHT OF BUILDING

The Height of Buildings development standard is contained in Clause 4.3(2) of the Ryde LEP 2014 and is subject to height of building development standard of 45 metres being category X on the LEP HOB Map.

The proposed building complies with the height development standard except for a corner of a boarding room by 1.415 m and parts of the lift overrun of 560 mm and plant room of 1.5 m central to the building roof as well as a portion of roof nearer its edge by 140 mm as shown in the diagrams below.

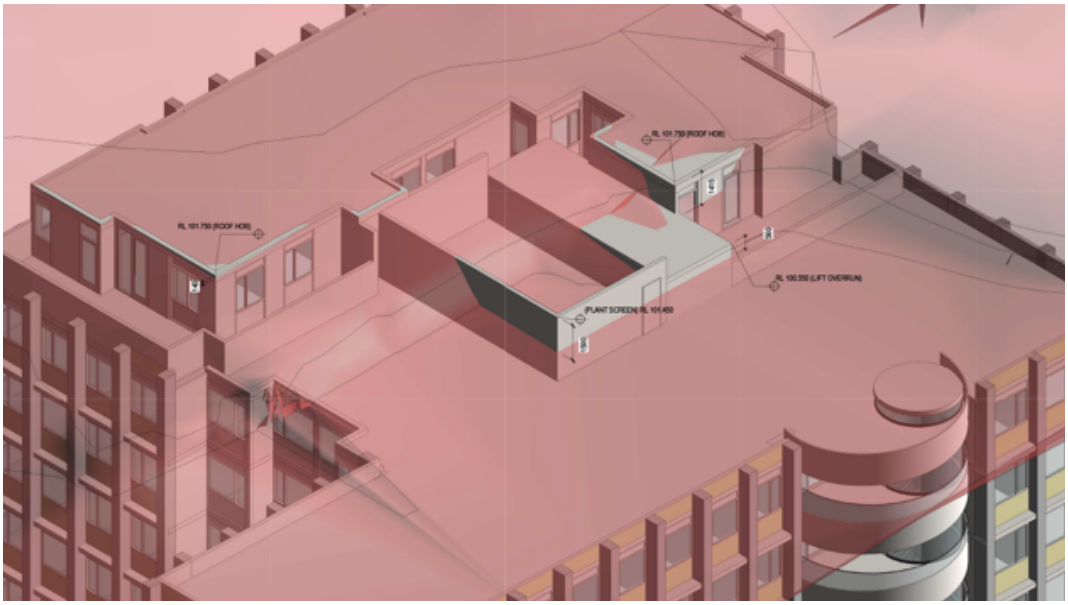


Diagram of height of building contraventions (Rothelowman)

The contraventions arise mainly because of an anomaly of the existing ground level as explained below, which interrupts the natural stepping of the building to coincide with the slope of the land.

2.2 MOTORCYCLE PARKING

The minimum motorcycle parking standard is contained within clause 30(1)(h) of ARH SEPP and requires 1 space for every 5 boarding rooms, which in the case of the proposed development is the same as the number of students.

This would equate to 97 spaces which is considered to be grossly excessive as explained below. As requested by Council, 21 motorcycle bays are instead proposed to serve the needs of 485 students to be accommodated on site.

The analysis below explores the veracity of the standard noting that, for example a rate of 1 motorcycle space for 5 students would mean that university students

represent some 32% of all NSW motorcycle riders despite comprising approximately 5% of the NSW population that are old enough to ride a motorcycle.

There is evidence that the demand of international university students residing in PBSAs for motorcycle parking is negligible but a precautionary approach is nonetheless adopted that has been informed by estimated motorcycle ridership of domestic students based on the statistical analysis presented below.

2.2.1 Background to Standard

The motorcycle parking standard has rarely been applied to some 40 off-campus Purpose Built Student Accommodation (PBSA) facilities in Sydney by a range of consent authorities including the predecessor to the Sydney North Planning Panel (73 Albert Ave, Chatswood 2011SYE120) as well as the Minister, Independent Planning Commission, Sydney Central and Eastern City Planning Panels, the Central Sydney Planning Panel, and Sydney, Willoughby, Bayside, Inner West and Randwick Councils.

Most PBSAs in Sydney do not provide student car or motorcycle parking due to a lack of need or demand from international students that mostly utilise these facilities. As noted in the SEE Supplemental Comparative Analysis, a review of available PBSA assessments and determinations shows a high level of consistency amongst authorities in the application of the ARH SEPP provisions including allowing no student car and/or motorcycle parking.

The Traffic Impact Assessment advice provided by TTPP at Appendix 1 comments from observations of Court proceedings that that the standard appears to have originated from a proposition that boarding house residents might be able to afford a motorbike when they could not afford a car. There is also no evidence of an intention to apply this reasoning or the standard to PBSAs.

TTPP is unable to find any numerical basis for the required provision of 1 motorcycle space per 5 rooms. It is noted that the RTA *Guide To Traffic Generating Developments* (*2002)* does not provide advice on boarding houses nor student accommodation in general, but encourages surveys or observations in consultation with Councils be used to determine parking estimates.

2.2.2 Observations and Surveys

The TTPP advice notes 17 PBSAs to which it is familiar, of which 15 have no motorcycle parking without observable impacts such as on-street parking of motorcycles. The exception of two facilities, one of which is an UNSW on-campus accommodation, are supplied with motorcycle parking rates of 1 per 10 and 20 students.

The same absence of external parking impacts from the lack of student parking in some 40 Sydney PBSA listed in the Supplemental Comparative Analysis, including those in more suburban locations such as Chatswood, Mascot and Stanmore, is readily observable in their immediate context while appearing to have never been raised as a planning issue.

In the *Explanation of Intended Effect for a new Housing Diversity SEPP (2020),* the Department of Planning, Industry and Environment proposed that car parking provision be removed for purpose built student housing and motorcycle parking be converted to a non-discretionary, 'must not refuse' provision only. (Note that the separate PBSA provisions were not proceeded with at the request of universities whose developments are assessed under alternate provisions without standards.)

The Urbanest Sydney Central facility at 483 Wattle Street Ultimo approved in 2012 is one of a few facilities that provides motorcycle parking to the prescribed standard (albeit counting cluster bedrooms as one 'room') resulting in provision for 86 spaces. However, recent enquiries by Baracam indicate that the motorcycle parking provision is mostly unutilised.

TTPP also reference in its advice, a travel behaviour questionnaire of the Urbanest Quay Street 330 student facility undertaken by Cardno for a PBSA DA at Redfern determined in 2012. In summary, the findings of the survey revealed that:

- 76% of occupants studied at nearby University of Sydney or UTS, with the remainder attending at more remote universities;
- for trips with a study purpose only, 1% travelled via motorbike/scooter (23% public transport, 65% walked);
- for trips with a work purpose, 2% travelled via motorbike/scooter, (23% public transport, 59% walked, 2% taxi); and
- for trips with a social/recreational purpose, 0% travelled via motorbike/scooter or (2% travelled as a car passenger, 33% public transport, 61% walked, 4% taxi)

Finally, TTPP also noted a Travel Demand Survey it undertook at at Macquarie University which showed that only 1% of students and visitors to the campus used motorcycles to travel to the University.

2.2.3 Student Motorcycle Ownership Analysis

Given that the motorcycle parking standard applied to student accommodation is without a substantive basis and in consideration of the limitation of available surveys, a precautionary approach may be prudent by analysing student motorcycle ownership in general to inform an assessment of the potential needs of the facility.

A paper entitled "*Characteristics of motorcycle riders in NSW*" by de Rome, L, et al. for the Proceeding of the 2013 Australasian Road Safety Research, Policing &

Education Conference (Appendix 2) provides a detailed analysis of motorcycle ridership in NSW.

The study concluded that a motorcyclists profile "of an aging population with almost two thirds aged over 40 and novice riders of average age 30" and that "the results indicate that due to some owners of multiple machines, the use of the database of registered vehicles may overestimate the size of the active riding population".

There were 187,181 NSW registered motorcycles in 2012 although the study suggests that active ridership may be 19% less or 151,626. The study provided an age profile of NSW riders which may be matched with the age profile of university students and total population to estimate the number of active university student motorcycle riders.

The following table provides an estimate of NSW university student motorcycle ridership by applying the assumption that the ridership patterns of university students are typical for all persons, analysed in the age cohorts adopted by de Rome et al. in their Study.

Table of 2012 NSW population, onshore university students and motorcycle ridership.

Age	2012 NSW Population	%	Rider age profile % (1)	No. (1)	Onshore uni students	No.	% of NSW Pop'n Riders	Uni student-age riders	%
<17	1,560,396	21.4%	0	-	0.3%	899		-	
17-20	377,803	5.2%	4.8%	8,985	37.0%	110,806	0.0%	2,635	2.4%
21 - 25	506,335	6.9%	8.7%	16,286	27.3%	81,945	2.4%	2,635	3.2%
26 - 39	2,314,869	19.6%	23.0%	43,054	23.3%	69,939	3.2%	2,104	3.0%
(17-39)				68,325		262,690	3.0%	7,375	2.8%
40 - 59	1,430,731	26.6%	48.9%	91,537	11.2%	33,719	4.7%	1,591	4.7%
60+	1,939,035	20.4%	13.8%	25,832	0.8%	2,505	1.7%	43.52	1.7%
na	1,486,834		0.8%	1,498					
Total	7,301,134	100%	100%	187,192	100.0%	299,813		7,375.59	2.5%

Sources:

(1) "*Characteristics of motorcycle riders in NSW*" by de Rome, L, et al. for the Proceeding of the 2013 Australasian Road Safety Research, Policing & Education Conference

Remainder ABS :

- Estimated Resident Population for New South Wales, by Age, by Statistical Geography, Persons – 30 June 2012
- All Domestic Students by State, Higher Education Provider and Broad Field of Education, Full Year 2012
- All Students by State, Higher Education Provider, Mode of Attendance, Type of Attendance and Gender, Full Year 2012
- All Domestic Students by Age Group and Broad Level of Course, Full Year 2012

On the assumption that NSW on-shore university students (that is, domestic and international students attending universities in NSW) have average motorcycle

ridership characteristics as the general NSW population, then approximately 2.5% of all university students would have possession of a motorcycle to ride.

If this analysis is applied to the age cohort of 17-39 which is more typical of university students that would reside in a PBSA, then ridership increases to 2.8%, or 1 in 35 rooms/students, which is in stark contrast to the ARH SEPP development standard which assumes a ridership level of 20%, or 1 in 5 rooms/students.

Adoption of a motorcycle parking rate for PBSAs based on estimated onshore university student ridership is likely to be still excessive given that:

- the assumptions adopted in the analysis, including the total number of NSW riders, are weighted conservatively so as to not underestimate ridership, and
- PBSAs are predominantly resided by international students which have barriers (including unfamiliarity with road rules and driving conditions, purchasing and disposing of vehicles, licences etc), or practical needs to obtaining or utilising a motorcycles for travel as demonstrated by observation and limited surveys.

To overcome any ownership barriers, a shared motorcycle scheme has been investigated by Barcam and found that a motorcycle/scooter hire operation carries inherent and excessive risks not feasibly acceptable to student accommodation providers. Risks of injury and death associated with riding of motorcycles and scooters pose an unacceptable responsibility on the operator, with prohibitive insurance requirements and a limited number of potential users.

By way of example, Go-Get as one of the leading car share providers do not operate motorcycle based schemes reflecting these inherent risks. However, there are a number of independent operators that hire motorcycles/scooters from $80 per week, which is substantially less than for car hire.

2.2.4 Conclusion

It may be argued that sufficient evidence suggests a motorcycle parking rate of 0%-1% for student parking is adequate for PBSAs which has been accepted by a wide range of consent authorities in the determination of most of some 40 relevant development consents.

However a rate of 2.8% is considered a reasonable basis to estimate maximum student motorcycle parking needs that is both generous and precautionary should the facility be utilised for domestic students, or international motorcycle ridership substantially increases, some time the future.

Applying the rate of 2.8% motorcycle student ridership to provide 1 motorcycle parking space per 35 students, results in a requirement of 14 motorcycle spaces for the development whereby the proposed provision of 21 spaces exceeds this by 50% .

3 Clause 4.6 Assessment

3.1 ARE THE PLANNING CONTROLS DEVELOPMENT STANDARDS?

The subject planning controls relating to maximum building height and minimum motorcycle parking are development standards under the definition within the *Environmental Planning and Assessment Act 1979* as follows *(EP&A Act, Part 1 Section 4. Definitions)*

> ***development standards*** *means provisions of an environmental planning instrument or the regulations in relation to the carrying out of development, being provisions by or under which requirements are specified or standards are fixed in respect of any aspect of that development, including, ….*
>
> *(c) the character, location, siting, bulk, scale, shape, size, height, density, design or external appearance of a building or work,*
>
> *(g) the provision of facilities for the standing, movement, parking, servicing, manoeuvring, loading or unloading of vehicles,…..*

3.2 ASSESSMENT AGAINST THE PURPOSE/OBJECT OF THE STANDARD

3.2.1 Height of Building

The objectives of the height of building development standard under clause 4.3 of Ryde LEP 2014 are:

> *(a) to ensure that street frontages of development are in proportion with and in keeping with the character of nearby development,*
>
> *(b) to minimise overshadowing and to ensure that development is generally compatible with or improves the appearance of the area,*
>
> *(c) to encourage a consolidation pattern and sustainable integrated land use and transport development around key public transport infrastructure,*
>
> *(d) to minimise the impact of development on the amenity of surrounding properties,*
>
> *(e) to emphasise road frontages along road corridors.*

The objectives of the height of building controls will remain satisfied by the exceedances as they are minor in nature, will not distort the presentation of the building nor its proportions at its street and other frontages.

The building will also remain in character to future nearby development which will be subject to the same building height and will not meaningfully change the relationship with taller future buildings to the immediate north-east of the site subject under a 65m height limit.

The main height variations are central to the building and will not influence overshadowing impacts especially in the winter months during main daylight hours. The 140mm roof intrusion at the roof edge will generate less shadowing then if the building was built to the boundary setback and otherwise, will have a negligible impact.

The exceedances will not be able to be discerned from the public domain and would be imperceptible to existing and future developments particularly having regard to the stepping of buildings to the undulating topography.

Accordingly, the proposed building height minimises impact on the amenity of surrounding properties and does not discourage consolidation pattern and sustainable integrated land use and transport development around key public transport infrastructure.

Therefore, the proposed height variations will still achieve the objectives for the height of building standard.

3.2.2 Motorcycle Parking

The ARH SEPP does not provide objectives for the motor cycle development standard nor are standards generally addressed in the aims of the Policy.

It may be assumed that the objective is to provide for the reasonable needs of the occupants in ensuring orderly development outcomes and minimise impacts from street parking.

It should be accepted that the definition of 'boarding houses' includes a broad range of accommodation types which will vary in their needs and that PBSAs have unique characteristics not shared with typical boarding houses. The Traffic Impact Assessment and attached advice addresses this issue in pointing out that:

- the site is surrounding by well-established pedestrian and cycle infrastructure with high frequency public transport services and tertiary educational campuses; and
- future student tenants are less likely to rely on motorcycles for transport due to cost, ownership, licence and familiarity constraints and would rely instead on more affordable and readily avaiable forms of transport being public transport, bicycles and walking.

Confirmation of the limited need is reflected by the negligible provision of motorcycle parking at most of some 40 PBSA with no noticeable impacts of an unsatisfied demand for on-street parking spaces adjoining or nearby the facilities.

A more detailed analysis of a potential maximum need for motorcycle parking is provided in Section 2.2 from which it may be concluded that the proposed development will satisfy the implied objective of the motorcycle parking standard.

3.3 IS NON-COMPLIANCE CONSISTENT WITH THE AIMS OF CL 4.6?

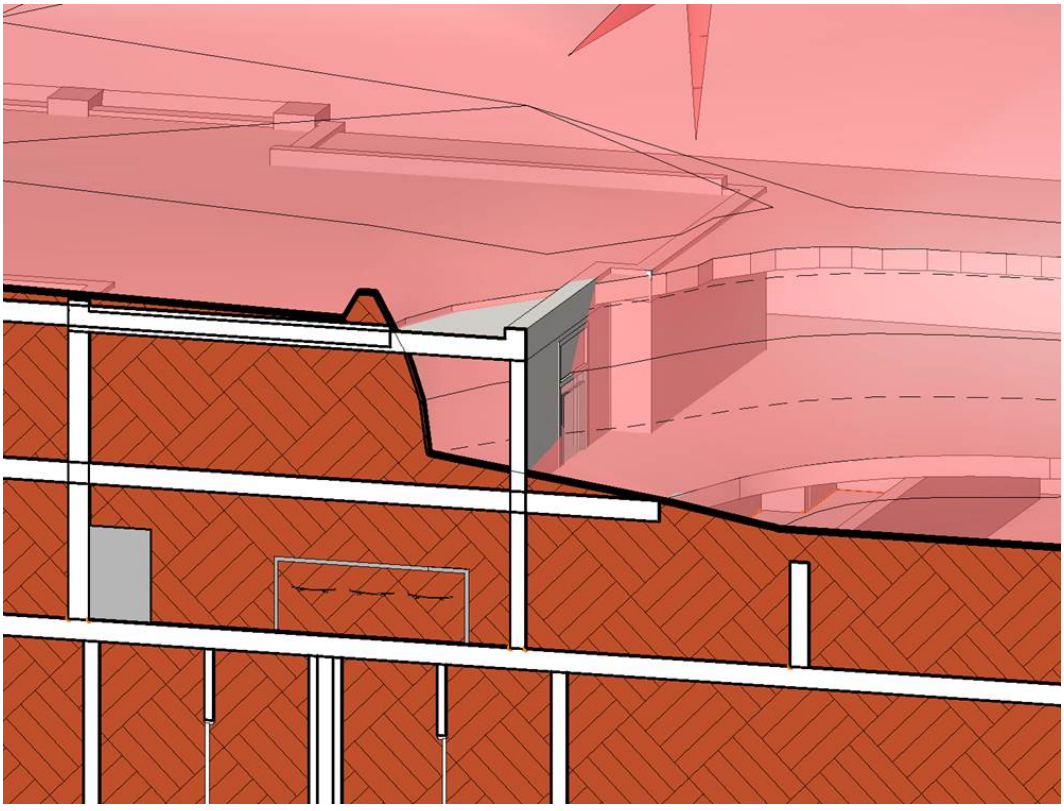
The aims of Clause 4.6 are:

(a) to provide an appropriate degree of flexibility in applying certain development standards to particular development,

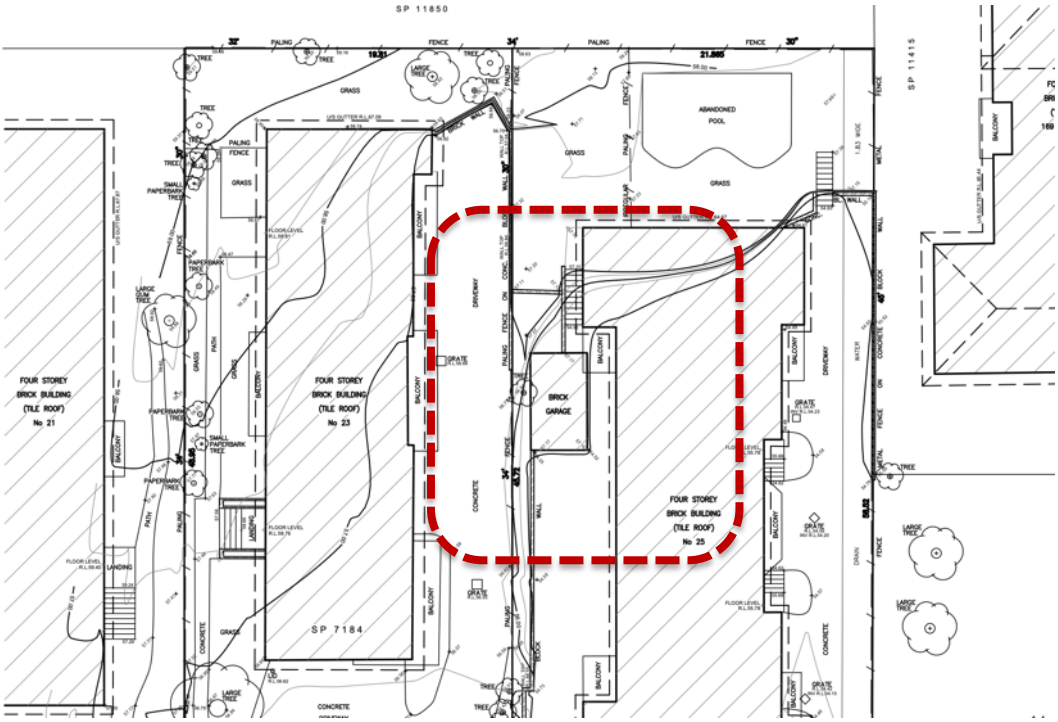
(b) to achieve better outcomes for and from development by allowing flexibility in particular circumstances.

When the development is tested against the underlying objectives of the standards, compliance would not be inconsistent with the aims of the clause because the proposed height variation is a reflection of an anomaly in the contour of the existing ground level as reflected by the diagram below and confirmed in the architectural drawings and survey.

It should be noted that the building steps one storey in height to coincide with the fall of the land between the two properties which have been modified to accommodate existing buildings as shown on the survey.



Cross section of proposed building showing effect of the irregular fall of the land with height intrusions (Rothelowman) in the area generally highlighted in the extract of the survey below.



In regard to the provision of motor cycle spaces, as discussed in Section 2.2, it is clear that the prescribed motorcycle parking rate when applied to a PBSA is grossly excessive and will be mostly unutilised.

Flexibility is required in order to adopt an evidence based and precautionary motorcycle parking rate for the proposal to meet a potential maximum demand from students as suggested in Section 2.2. Adoption of a more realistic but still generous rate provides for a better planning outcome in the economic use of resources and land .

It is considered that development as proposed to be varied will also still satisfy the objectives of the B4 zone

- *To provide a mixture of compatible land uses.*
- *To integrate suitable business, office, residential, retail and other development in accessible locations so as to maximise public transport patronage and encourage walking and cycling.*
- *To ensure employment and educational activities within the Macquarie University campus are integrated with other businesses and activities.*
- *To promote strong links between Macquarie University and research institutions and businesses within the Macquarie Park corridor.*

The proposed exceptions are therefore a case where flexibility in the application of the development standards is justified in the circumstances and will still satisfy and not undermine the objectives of those standards nor the objectives of the zone.

It is further considered that the proposed exceptions to the development standards will result in a better planning outcome for and from development by allowing flexibility to:

- enable an orderly stepping and configuration of the building to respond to the slope of the land and its immediate context; and
- properly provide for the transport needs of students which generally have limited motorcycle use.

3.4 IS COMPLIANCE UNREASONABLE OR UNNECESSARY IN THE CIRCUMSTANCES?

Strict compliance with the relevant provisions is considered unreasonable and unnecessary in the circumstances of the case of building height as it would impose a distorted building configuration which would be disproportional to the effects of the contraventions as discussed above, are minor in nature, and will have no perceptible adverse impacts.

It is also considered unreasonable and unnecessary in the circumstances of the case to impose compliance to the motorcycle parking standard when it is demonstratable that it grossly exceeds the likely demand for motorcycle use, especially given the location and the nature of the accommodation and its students as found in other larger scale purpose built student accommodation closely associated with university campuses in Sydney.

3.5 ARE THERE SUFFICIENT GROUNDS TO JUSTIFY CONTRAVENTION?

As discussed above, the contravention of the building height standard results from irregular site topography as applied to a logical configuration and stepping of the building to suite the site and context.

The exceptions to height are minor in nature and mostly limited to the centre of the roof in association with the stepping of the building; will not lead to perceptible adverse shadowing or visual impacts to the public domain; will not undermine the objectives of the standard nor result in additional development potential than that permitted.

The contravention of the motor cycle standard is well justified by the analysis provided in Section 2.2 while noting that the facility is in close proximity to the University and will be well served by public transport and walking and cycling routes to a wide range of retail, personal and public servicers and employment.

Accordingly, it is considered that there are sufficient grounds to contravene the building height and motorcycle development standards as proposed.

3.6 IS THE REQUEST WELL FOUNDED?

This request under clause 4.6 of Ryde LEP 2014 to vary the height and motorcycle parking standard is considered to be well founded as the proposed development remains consistent with the relevant objectives, nature and intent of the development standards as well as ARH SEPP and the Ryde LEP in general.

In the case of the building height contravention:

- the development as proposed is based on a well-reasoned design response to the topography of the existing ground level, which was previously terraced, and
- the exceptions are modest in nature but will marginally result in better planning and design outcomes appropriate the site, location and context.

In the case of the motorcycle parking standard, with reference to the 'Wehbe tests' noted in in Section 1.2 and as demonstrated in Section 2.2:

- the objectives of the development standard are still achieved and will be exceeded;
- the underlying purpose of the standard conceived for affordable boarding housing is not relevant to the development of a PBSA;
- the application of the standard to PBSAs has been 'virtually abandoned or destroyed' by accumulated consent authority determinations in granting consents significantly departing from the standard and noting that there are no locational or other characteristics of the proposal that sufficiently distinguish it from these determinations in regard to the application of the standard; and
- a proper, generous and precautionary provision of motor cycle parking will be available to meet the needs of future students.

Strict compliance with the development standards in the circumstance would therefore result in unnecessary design limitations and excessive motor cycle parking supply and consequently, a diminished planning outcome.

The proposed contraventions do not add to the perceptible impacts to the public domain nor result in any adverse effect on the amenity of the surrounding area in general, and adjoining properties, land uses and activities in particular.

4 Conclusion

The proposed exceptions to the development standards contained in Ryde LEP 2014 Clause 4.3 Height of Buildings and ARH SEPP clause 30(1)(h) Motorcycle parking standards for boarding houses is well justified having regard to the provisions of clause 4.6 of the LEP.

It is concluded from this assessment, that the proposed contraventions to the development standards as described, do not undermine or frustrate the underlying objectives to those standards and that the request is well founded.

In particular, there are sufficient grounds to justify the variation of the relevant development standards and that compliance would be unreasonable and unnecessary in the circumstance especially as no adverse impacts to the public or nearby properties will arise.

The proposed contravention to standards will also result in a better planning and design outcome to allow a logical configuration of the building and stepping to accommodate the slope of the land while ensuring that excessive motorcycle parking provision does not lead to adverse outcomes.

The exceptions will not result in development inconsistent with the locality. The development as designed remains consistent with the underlying intent and purpose of the standards and the objectives of the respective zone.

It is therefore concluded that the objectives and requirements of clause 4.6 is satisfied as:

- an appropriate degree of flexibility is warranted in the circumstance to achieve a better planning outcome for and from development by allowing that flexibility (cl.4.6(1));
- compliance with the height of building and motorcycle parking development standards is unreasonable and unnecessary in the circumstance and there are sufficient environmental planning grounds to justify contravening the development standards as proposed. (cl.4.6(3)); and
- this written request has adequately addressed the matters required to be demonstrated in establishing the above and that the proposed development will be in the public interest because it is consistent the objectives of the standards and the objectives for redevelopment within the respective zone in response to the planning for the Herring Road Precinct (cl.4.6(4)).

Appendices

TTPP – Motorcycle Parking Advice

“Characteristics of motorcycle riders in NSW” (2013) de Rome, L., Fitzharris, M., Baldock, M., Fernandes, R. Ma, A., & Brown, J. *Proceeding of the 2013 Australasian Road Safety Research, Policing & Education Conference 28th – 30th August, Brisbane, Queensland*

Our Ref: 19350

27 April 2022

Barcam
Level 3, 8 Clifford Avenue,
Fairlight, New South Wales, 2094

Dear Sir,

RE: 23-25 LACHLAN AVENUE, MACQUARIE PARK
MOTORCYCLE PARKING

I understand that the Panel has raised an issue in relation to Motorcycle parking and in particular, they require greater planning justification for the clause 4.6 variation.

I understand from observations in Land & Environment Court proceedings that motorcycle provision for boarding houses was originally included as it was thought that boarding house residents might be able to afford a motorbike when they could not afford a car. I have been unable to find any numerical basis for the required provision of 1 motorcycle space per 5 rooms.

In addition, in terms of student accommodation, this is not borne out by the sites I have reviewed or been involved with. I have tabulated below the number of beds and motorcycle bays provided at some of these sites below.

The Transport Planning Partnership
Suite 402, 22 Atchison Street
ST LEONARDS NSW 2065

Project Name	Address	DA No.	Beds	Approved Motorbike Parking Bays	*# Motorbike Parking Bays per Bed*
Urbanest, Cleveland St ARH SEPP	157-163 Cleveland St	SSD-4949-2011	**461**	**0**	*0.00*
Urbanest Darling Harbour (stage 1) ARH SEPP	41 Darling Dr, Sydney	SSD 15_7133	**635**	**0**	*0.00*
Urbanest Darling Harbour (stage 2) ARH SEPP	41 Darling Dr, Sydney	SSD 6010 MOD 1	**668**	**0**	*0.00*
14-20 Gardeners Rd ARH SEPP	14-20 Gardeners Rd, Kingsford	DA/1009/2010	**144**	**15**	*0.10*
Iglu Central	1 Regent Street, Chippendale	D/2011/515	**98**	**0**	*0.00*
Urbanest, Quay St	83 Quay St, Haymarket	D/2008/2103	**334**	**0**	*0.00*
Iglu Redfern	66 Regent St, Redfern	SSD 14_6724	**370**	**0**	*0.00*
Iglu Broadway (Blocks 3B, 3C & 10, Central Park)	9 Kensington St, Chippendale	11_0090	**267**	**0**	*0.00*
Iglu Central Park (4S)	6 Central Park Ave, Chippendale	SSD-5700-2012	**826**	**4**	*0.00*
UniLodge @ UNSW	1 Lorne Ave, Kensington	DA/1026/2002	**233**	**0**	*0.00*
Iglu Chatswood	73 Albert Ave, Chatswood	DA-2011/575/H (D)	**396**	**0**	*0.00*
Kensington Colleges (Baxter, Basser & Goldstein)	High St, Kensington	DA/748/2011	**920**	**48**	*0.05*
New College Village	215A Anzac Parade, Kensington	DA/241/2007	**319**	**0**	*0.00*
University Terraces		DA/494/2011	**399**	**0**	*0.00*
Parking Analysis -DA Approved, Not yet constructed/operational					
Iglu, Summer hill ARH SEPP	74 – 75 CARLTON CRESCENT, SUMMER HILL	DA 10.2018.220.1	**368**	**0**	*0.00*
Scape, Wilson Lane	288 Wilson Street DARLINGTON NSW 2008	D/2016/1388	**216**	**0**	*0.00*
Scape, Pemulwuy	Pemulwuy Precinct 3, 77-123 (odd) Eveleigh Street, Redfern	SSD 8135 MOD1	**596**	**0**	*0.00*
Iglu Redfern II	80-88 Regent Street, Redfern	SSD 9275	**265**	**0**	*0.00*

These sites show zero parking spaces for motorcycles and even the sites at which motorbike parking is provided, the provision is between 1 motorcycle space per 10 beds and 1 motorcycle space per 20 beds

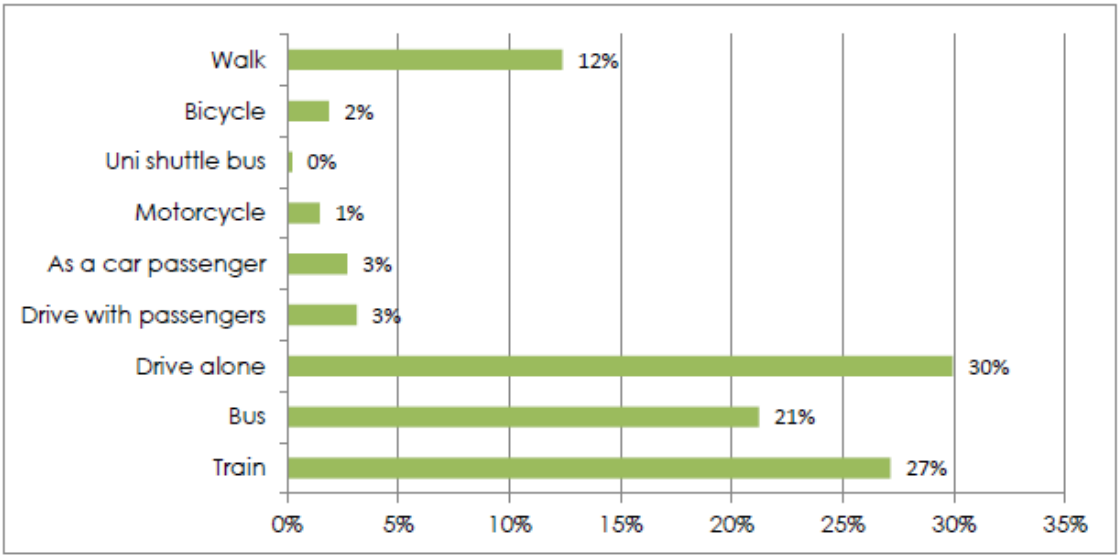
Of particular interest is the site at Urbanest Quay Street. A travel behaviour questionnaire of the occupied site was conducted by Cardno around 2012 to understand travel behaviour at the site in order to support the traffic work at another site being considered in Redfern. The findings from that survey at Urbanest Quay Street site were as follows:

- 76% of residents studied at either University of Sydney or UTS
- for trips with a study purpose:
  - 0% of respondents travelled via car
  - 23% used public transport
  - 65% walked, and
  - 1% travelled via motorbike/scooter
- for trips with a work purpose:
  - 0% of the respondents travelled via car
  - 23% used public transport
  - 59% walked
  - 2% travelled via motorbike/scooter, and
  - 2% took a taxi
- for trips with a social/recreational purpose
  - 0% of the respondents travelled via car
  - 2% travelled as a car passenger
  - 33% used public transport
  - 61% walked
  - 0% travelled via motorbike/scooter or bicycle, and
  - 4% took a taxi
- bicycles are the transport mode of choice for the respondents; 14% said that they owned or planned to own a bicycle during their stay at Urbanest which compares with 10% for a car and 6% for a motorbike/scooter
- of those that took public transport, approximately 70% outlined that this was their preference as it was either faster, cheaper or more convenient than the other alternatives
- 14% of respondents said they either owned, or planned to own, a bicycle during their residences at Quay Street
- of the residents that owned a car, 40% parked in a paid parking space and 60% used a friend or relatives' space
- for 55% of residents, their friends and relatives did not visit by car and of those visitors who arrived by car, 66% visited once per week or less.

I would also point out that the undersigned undertook a Travel Demand Survey at Macquarie University which showed that only 1% of students/visitors to the campus used motorcycles

3.1 What is your main mode of transport to Macquarie University?

Figure 3.1: Main mode of transport to Macquarie University



Source - GTA Travel Demand Study 2014

Finally, I also note that "*council support the applicant's Clause 4.6 Request to vary a development standard set out under the Affordable Housing SEPP, providing only 21 spaces where 77 are required.*'

It is my view therefore that sites with zero motorcycle parking can be supported but a provision of 1 space per 20 beds (i.e. 20 spaces in this instance) would allow those students who want to ride a motorcycle to park at the proposed accommodation.

We trust the above is to your satisfaction. Should you have any queries regarding the above or require further information, please do not hesitate to contact the undersigned on 8437 7800.

Yours sincerely,

Ken Hollyoak
Director

Characteristics of motorcycle riders in NSW

de Rome, L.[ab], Fitzharris, M.[c], Baldock, M.[d], Fernandes, R.[e], Ma, A.[e], & Brown, J.[ab]

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Abstract

Research identifies age, experience, exposure and motorcycle type as contributing factors to motorcycle crashes, but the prevalence of these factors in the rider population is unknown. This study quantifies the characteristics of riders in NSW. Motorcyclists (n=506) were surveyed at 25 motor registries across NSW. A multi-stage stratified random sampling plan identified the survey sites, based on socioeconomic indicators, using registrations as a proxy for the population. Post-stratification weighting for age and gender based on motorcycle registration data was used to generate population-level frequency distributions. Almost half (49%) of the motorcyclists in NSW are aged 40-59 years, 23% aged 26-39 and 14% aged16-25. On average NSW riders have been riding for 16 years, including 30% with over 20 years and 27% with less than six years' experience. Forty-two percent ride almost daily, 32% only weekends and 9% only weekdays, they ride on average approximately 7 hours per week. Most ride motorcycles (88%) and 12% ride scooters. Forty percent of riders have LAMS (Learner Approved Motorcycle Scheme) machines, including 28% of fully licensed riders. Ownership of multiple machines suggests the State registrations database may overestimate the active rider population by approximately 15%. The data presented is valuable for strategic planning and policy decisions towards interventions to reduce motorcycle casualties in Australia.

Introduction

Motorcycle and scooter riders represent increasing proportions of road crash casualties due to the rapid expansion of the motorcycle market over the past decade (Peden et al., 2004, Rogers, 2008). Known collectively as powered two wheelers (PTW), Australian registrations have increased over 93% since 2002 compared to 30% for all vehicles (ABS, 2012). By 2009, PTWs accounted for over 27% of all serious road crash injuries, although only 4% of registrations (ABS, 2012; Henley, & Harrison, 2012). PTW riders have the highest rate of serious injury admissions with 1,346 cases per 100,000 registered vehicles compared to 134 for car occupants (Henley, & Harrison, 2012).

Strategies to reduce the crash and injury risk of riders depend on the accurate identification of causal and risk patterns, including demographic and behavioural factors and exposure. Knowing the prevalence of those factors in the rider population is important for setting priorities for strategy and intervention development. Estimates of the population at risk of PTW crash injury are generally based on the numbers of licensed riders or registered PTWs in the wider population (Lin & Kraus, 2008). Each approach has limitations as neither account for actual riding exposure to risk. In addition licence numbers exclude those who ride unlicensed, and over-estimate the active riding population in jurisdictions where ex-riders' licences are automatically renewed with their driver's license. Such as the case in NSW, where the number of individuals holding rider licences substantially exceeds the number of registered vehicles (Harrison & Christie, 2005). In 2012 there were 525,002 licensed riders on record, but only 187,192 registered PTWs, indicating some 2.8 licence holders for each registered PTW (RTA, 2012a, 2012b). The number of registered vehicles is generally accepted as the most reliable estimate of the population of active riders using administrative data, despite not accounting for those with multiple machines nor those riding borrowed or work-related machines (Lin & Kraus, 2008).

The aim of this study was to establish the prevalence of key rider characteristics and measures of rider exposure across NSW. The aim was to provide a robust baseline against which to establish priorities for motorcycle crash countermeasures.

Method

A survey of PTW owners was conducted at 25 motor registry offices in NSW in July, 2012. Motor registries were selected as appropriate survey sites on the assumption that all PTW owners have an equal probability of visiting a motor registry for the purpose of renewing or up-grading their license.

Survey sites were selected through a multi-stage stratified random sampling plan following the World Health Organisation's guidelines on probability sampling (WHO, 2012). The Australian Index of Socio-economic Advantage/Disadvantage (SIEFA) classifies statistical divisions such as post codes according to their socioeconomic characteristics (ABS, 2006). Scores on SIEFA are standardised allowing categorisation into quartiles on a continuum of advantage to disadvantage. Using the post codes of registered PTWs as a proxy for active riders, the geographic distribution of the rider population was classified according to the SEIFA quartiles into four strata on socio-economic status.

Sample size calculations indicated that a minimum sample of 400 would provide estimates with a precision within 10%. The post codes of motor registries across NSW were classified by quartile on the SEIFA Index and the number to be included as survey sites was selected from each strata in proportion to the number of registered owners in each strata.

Data on average weekly motorcycle licence renewals was then used to estimate the number of registries within each strata that were required to recruit the minimum numbers of active riders in a single week. Working on the assumption that one third of licensed riders (Ratio of licences per registered motorcycle = 2.8) would own a currently registered motorcycle, those registries with less than 20 renewals per week (98/155) were excluded for study efficiency (RTA, 2012a, 2012b). Survey sites were randomly sampled from the remaining 57 registries by strata. The final survey frame consisted of 25 motor registries as illustrated in Table 1.

Table 1. Sampling frame of registered motorcycles and motor registry offices by SIEFA Index of Local Government Area.

Quartiles on the SIEFA Index for LGAs	Registered motorcycles NSW, 2012		Registries eligible (n)	Registries surveyed (n)
Disadvantaged (<25%)	16,376	8.7%	6	3
Moderate disadvantage (26-50%)	29,629	15.8%	9	3
Moderate advantage (51-75%)	66,995	35.8%	22	7
Advantaged (76%<)	74,181	39.6%	30	12
Total	187,181	100%	67	25

Eligible participants were registered owners of a motorcycle or scooter aged 17 or older who were recruited by researchers in the waiting areas of motor registries. Ethics approval for this study was obtained from the University of NSW Human Research Ethics Committee.

All data analysis was performed using SAS version 9.2 (SAS, 2012). Sample weights were constructed using standard weighting procedures (Chen & Gorrell, 2008). Post-stratification weighting for over and under sampling at different sites by gender and age group was used to generate population-level figures for the population of registered motorcycle owners. Population weighted estimates of the proportion of riders in each rider characteristic category were generated using the SurveyFreq procedure to estimate percentages and corresponding 95% confidence

intervals (CI). Rao-Scott Chi-Square Test was used to estimate the strength of associations where appropriate.

Results

Across the 25 motor registries selected for the survey, 13, 897 customers were approached and over 90% eliminated by the screening question, with 1,073 (8%) identified as eligible for the study i.e. a registered owner of a motorcycle or scooter. Usable surveys were obtained from 47% (n=506) of eligible customers. Eligible non-participants included 26% (n=275) who declined to take part, mostly due to a lack of time, 27% (n=273) who agreed to complete the survey on-line, but did not and 6% (n=66) who left the registry without completing the survey.

Table 2. Response rates across all motor registry offices.

	Number n (Colum %)	**Responses n (Colum %)**	**Completed n (Row %)**
Customers approached	13,897 (100%)		
Owned registered PTW	1,073 (7.7%)		
Declined/ ineligible		275 (25.6%)	
Agreed to complete			
Survey on line		376 (35.0%)	103 (27.4%)
Survey on-site		469 (43.3%)	403 (85.9%)
Total completed			506 (47.2%)

The weighted frequency distribution was adjusted for variations in sample size and population density between survey sites. The age distribution of respondents included a significantly higher proportion of younger riders (17-25 years) than is reflected in the registration database (14% versus 8%, X^2=22.463, p<0.001). There was also a higher proportion of female respondents than registered owners of PTWs, although the difference was not statistically significant (X^2=1.068, p=0.586). These differences were taken into account and weights used to adjust the distribution to be consistent with that of the known age and sex distribution in the NSW registrations database including the proportion of missing data. Table 3 shows the resulting population profile and indicates that high proportions of active riders reside in advantaged socio-economic areas.

Table 3. Weighted frequency distribution of registered owners by socio-economic status on the SEIFA Index.

SIEFA Quartile	**Sample frequency**	**Weighted frequency**	**Weighted percentage %**	**Weighted percentage 95% confidence limits %**
Disadvantaged (<25%)	64	20245	10.8	2.5 – 19.1
Moderate disadvantage (26-50%)	114	34460	18.4	8.1 – 28.7
Moderate advantage (51-75%)	149	61491	32.8	20.9 – 44.8
Advantaged (76%<)	179	70996	37.9	22.8 – 53.1
Total	506	187192	100.0	

Weighted estimates of the characteristics of the NSW population of riders

The average age of the rider profile is 43.2 years and mostly (87%) male. As shown in Table 1, young riders (aged 17-20) comprise just 5% and those aged 21 – 25 another 9% of the population compared to 23% middle aged (26-39) and 63% older (aged 40+), which is consistent with the

NSW vehicle registrations database (RTA, 2012a, 2012b). Four out of five hold unrestricted rider licences (78%) compared to with novice riders with learners representing (9%) & provisional licences (7%, 3%). A high proportion also held car licences (92%) but a lower proportion of 17-20 year olds (82%). Just 1% admitted to being unlicensed, either because their licence had been suspended or cancelled (0.6%) or they had never owned one (0.4%). Other licences held included heavy vehicles (23%) and light commercial vehicles (17%). The most common styles of machine were sports and cruisers (35%, 21%), scooters (12%) were the third most common style. Machines with engine capacity less than 500cc represented 37%, whereas those over 1000cc comprised 29%.

Table 4. Demographic characteristics of NSW rider profile

Factor	%	95%CI
Age group		
17-20	4.8	1.3 – 8.2
21 - 25	8.7	4.4 – 13.1
26-39	23.0	16.4-29.5
40 - 59	48.9	14.8 – 56.0
60+	13.4	9.0 – 17.9
Sex		
Male	87.3	83.2-91.4
Female	12.7	8.6-16.8
Motorcycle licence status		
Learners	9.2	5.8-12.6
P1	7.1	3.4-10.7
P2	3.2	1.3-5.1
Full/unrestricted	78.0	73.1-82.8
Unlicenced*	1.2	0.0-3.1
Holds a car licence		
17-20	81.7	57.9-100
20-25	89.5	78.6-100
26-39	96.9	93.0-100
40-59	93.5	90.5-96.4
60+	86.4	75.7-971
Type of motorcycle		
Sports	34.6	28.8-40.5
Cruiser	20.6	16.1-25.0
Scooter	12.2	7.0-17.3
Standard/commuter	9.9	6.3-13.4
Touring, including sports tourer	7.6	4.0-11.3
Off road	6.4	4.0-8.8
Adventure/adventure tourer/dual sport	6.1	3.4-8.8
Engine capacity		
<100cc	1.1	0.3-1.9
100-199c	9.3	5.4-13.2
200-499c	26.9	20.3-33.5
500-999c	29.7	25.1-34.3
1000-149	22.5	17.4-27.6
≥1500cc	6.9	3.4-10.3
Missing	3.7	1.4-6.0

****Including lapsed, suspended & never had one.***

As Figure 1 shows females were 12.7% of the total, but 17.0% of young riders (16-25

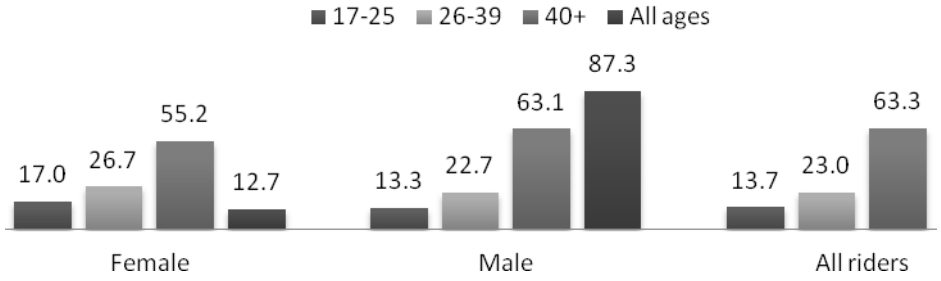

Figure 1. NSW riders - distribution by age & gender

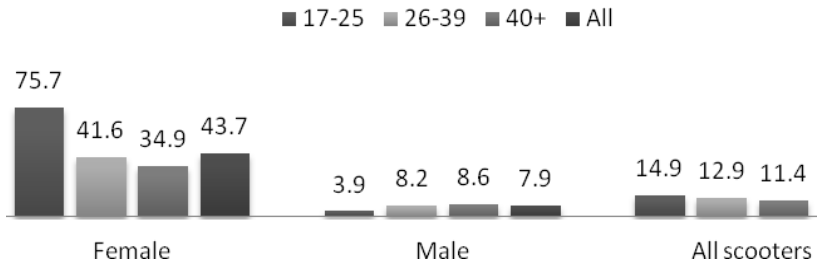

Figure 1. Proportion who ride a scooter by age & gender

Females were also more likely to ride scooters than males (X^2=40.07, df=2, p<.0001), a trend which is apparent in all age groups (Figure 2). Figure 2 shows the proportions of rider licences by age group. While the majority of learners were aged under 26 years, their average age is 30, due to the proportion of older learners including 23% aged 40 or more. The two youngest groups comprised just 39% of P1. They represent 65% of P2 but this is due to exemptions for those aged over 25 years. Overall just over half (52%) of novice riders were aged 26 or under. The majority of those with unrestricted licences were older riders with an average age of 46.4.

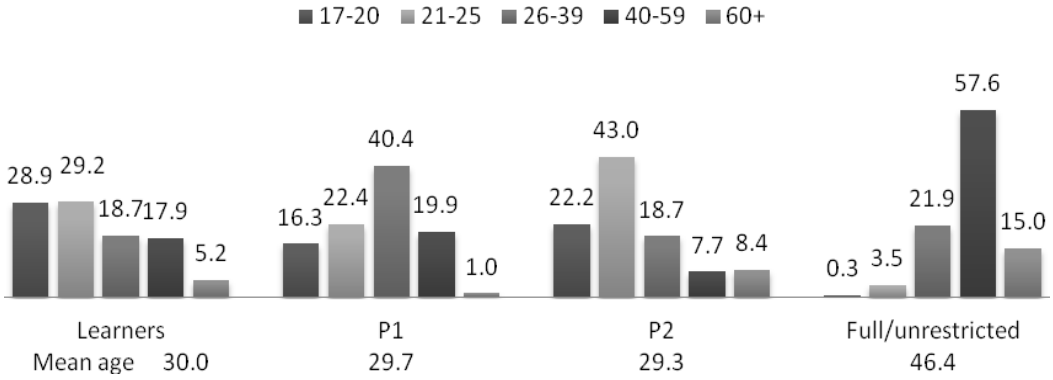

Figure 2. Age groups by licence status.

Exposure

The average rider had 16.2 years of riding experience (Interquartile Range 3.8 – 27.0) although 27% were in the first five years of riding. Almost one in five had obtained their motorcycle learner licence (19%) within the past three years and a similar proportion (18%), had passed the motorcycle licence test in that time (2010-2012). The average time spent on learner licences was 5.7 months before obtaining the provisional licence. The mean hours ridden each week was 6.7, but a little higher for those with Learners (8.3) and P2 licences (7.8). It also included 10% who rode less than 2 hours, 43% who rode between 2-5 hours and 15% who rode more than 30 hours per week. While almost half (49%) reported riding up to 100kms per week, some 22% rode over 300 kms.

Recreation was the most common reason for riding, but over half (54%) commuted or used their motorcycle for general transport. Off road riding was reported by 40%. Riders rode every day (42%) or only on weekends (32%), fewer rode only during the week (9%). The majority mostly rode in company with other riders (80%) than alone (23%). Travel by car accounted for the majority of kilometres traveled by 65% compared to motorcycle (20%).

Table 5. Exposure characteristics of NSW rider profile

Factor	%	95%CI
Years riding experience		
Less than 1	1.6	0.4 – 2.8
Less than 2	4.9	1.6 – 8.2
2 - 5	20.1	14.6 – 25.6
6 - 10	15.6	11.8 -19.4
11 - 15	6.8	3.8 – 9.9
16 - 20	10.2	5.6 – 14.8
21- 30	12.8	9.2 – 16.4
More than 30	14.8	9.7 – 19.8
Not stated	13.2	9.3 – 17.2
Distance ridden in past 12 months		
Less than 50kms	22.0	16.2-27.9
50-100kms	26.8	20.8-32.7
101-200kms	16.0	11.1-20.8
201-300kms	10.3	7.9-12.6
301-400kms	6.0	3.5-8.4
Over 400kms	15.8	9.3-22.3
Unknown/can't remember	3.2	1.4-5.0
Hours ridden per week		
0 - 5	54.3	48.1 – 60.5
6 – 10	25.9	19.8 – 31.9
10 - 20	7.7	4.7 – 10.6
21 – 30	1.8	0.5 – 3.2
30+	1.6	0.0 – 3.3
Missing	8.7	5.5 – 11.8
How frequently rides		
Everyday	41.8	36.2-47.3
Weekends only	31.7	24.9-38.6
Weekdays only	9.3	5.8-12.8
Reasons for riding		
Recreation	82.3	77.4-87.2
Commuting/general transport	53.9	45.5-62.4
Off-road	39.6	31.7-47.5
In past year most kilometres travelled by		
Motorcycle	19.8	13.3-26.3
Car	65.0	57.9-72.1
Mainly rides		
Alone	22.9	18.1-27.7
With one or more other riders	80.5	74.1-86.8
Any crashes in past 3 years		
None	83.9	79.3-88.5
Once	10.6	7.0-14.1
2 or more	3.1	1.2-5.1
Not stated	2.4	1.1-3.7

While younger riders appeared to be less likely than older riders to average high weekly travel distances, these differences were not significant.

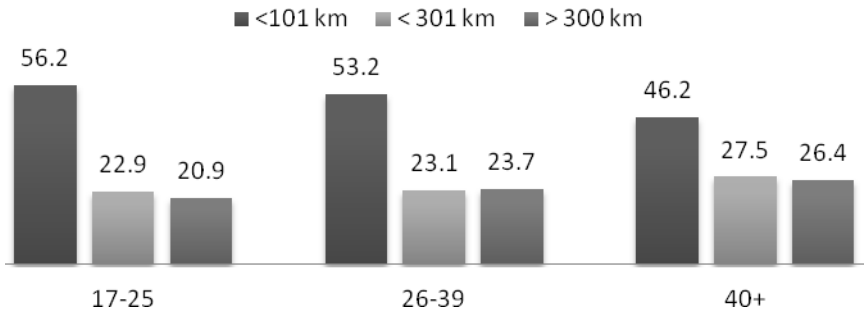

Figure 3. Age groups by average distance travelled per week

Overall 12% had crashed in the past 3 years. Older riders were least likely to have crashed, whereas 23% of young riders had at least one crash in the past 3 years, including 10% who had 2 or more crashes. Middle aged riders had a similar prevalence of at least one crash, but fewer multiple crashes than the young riders. Figure 4 illustrates the differences between age groups, which were statistically significant (X^2=17.48, df=6, P=0.01). There was no association with licence status and risk of having crashed in the past 3 years, when age was controlled.

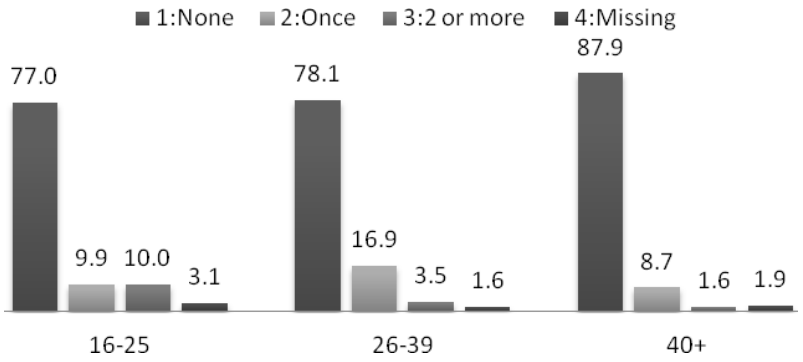

Figure 4. Age groups by crashes in the past 3 years

Traffic violations within the past 3 years were reported by 31% of riders with a higher proportion occurring in control of a car than bike (22% versus 11%) The proportion of riders reporting violations while riding included speeding (8%), failing to stop at red lights or stop signs (1%) or to display learner or provisional licence plates (0.6%) and alcohol (0.2%).

Motorcycles were ridden by 88% with just 12% scooters. LAMS (Learner Approved Motorcycle Scheme) machines were ridden by 40% of respondents including 28% of fully licensed riders. LAMS were ridden by a substantial proportion of unrestricted licensed riders in each age group, although there was a decreasing trend with age. The LAMS machines ridden by fully licensed riders encompassed the range of PTW classes including 25% scooters.

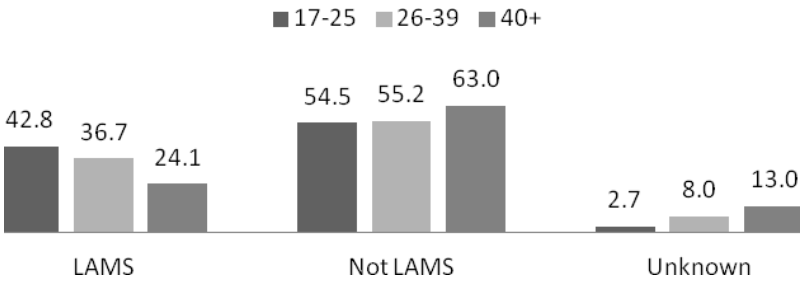

Figure 5. Age group of those with unrestricted licences riding LAMS.

Most (81%) own a single machine (either motorcycle or scooter), 13% owned two, 3% owned three and 2% owned 4 or more machines. The majority were the registered owner of the machine they had ridden most frequently over the past 12 months (94%). Of those who reported having mostly ridden a work related (1%) or borrowed machine (2%) over the past 12 months, over half (56%) also owned their own machine. Taking account of age factors in multiple ownership, this suggests that the number of registered motorcycles may over estimate the size of the active rider population by approximately 15% (95%CL:26% - 6%).

Discussion

The survey was successful in achieving a sample that is broadly consistent with the distribution by age, gender and socioeconomic status in the State database of registered owners. The outcome is a unique and valuable profile of the motorcyclist population in NSW. The study has provided measures of exposure in terms of average hours and kilometres ridden per week according to age and license status. It has also provided the basis for revising estimates of the active riding population in NSW suggesting that this may be some 19% less than the number of registered motorcycles.

The age profile is of particular interest as while the majority are aged over 40, new entrants are more likely to be young adults than teenager. This is quite different to the profile of new car drivers 80% of whom are aged between 18-25 in NSW 80%.(RTA, 2010) This is consistent with earlier studies and has implications for tailoring the features of graduated rider licensing schemes to be age appropriate (de Rome et al., 2010). Unlike novice drivers, most riders had other transport options with a high proportion also licensed to drive a car, although this was relatively less likely for those aged 17-20. This latter may reflect the relative ease of access to obtaining a rider licence compared to driver licence due to the latter requirements for supervised driving practice.

The predominance of males in the rider population has been a long standing known characteristic, but earlier predictions of increasing participation by women appear to be supported by a higher proportion of females in the young rider group compared to older groups (ATSB, 2004). Women were also more likely to ride scooters and may constitute a target group for specifically tailored initiatives such as rider training and promotion of suitable protective clothing.

The majority rode for recreation and while more than half also reported commuting, far fewer reported riding only on weekdays confirming the findings of other studies that transport convenience is not the primary motivation in this population (de Rome et al., 2010; Haworth, 2010). Measures of exposure in terms of hours and kilometres travelled for novice riders were also consistent with earlier work (de Rome et al., 2010). Older riders were significantly less likely to have crashed in the past 3 years, compared to middle aged or younger riders. The results suggest that the first 3 years may be the most risky, as middle aged riders were as likely as the young riders to have had at least one crash but less likely to have had more than one in the past 3 years, however

these differences were not statistically significant. The finding that riders had a higher incidence of traffic violations associated with driving than with riding may indicate higher levels of exposure in terms of hours driving, or that they have a lower perception of risk in a car compared to a bike. Future work could investigate the associations between violations while driving versus riding and relative crash involvement.

The key strength of the study is in the nature of the data obtained from a single sample, which links demographic details, risk factors and self-reported violations –and the methodology of using a robust sampling frame. The methodology is a well-established approach to estimating population values, which overcomes the limitations of cross sectional samples that cannot be generalised to the whole population (Ciol et al., 2006). The development of a robust sampling frame was aided by the availability of key demographic data about the target population from the State road authority (Roads & Maritime Services, personal communication). A further advantage was the State system of photographic licences, which requires all individuals to attend a motor registry in person to renew their licence. This meant that all licensed riders have an equal probability of attending a motor registry. It was also cost effective as the survey could be conducted at a number of registries systematically selected through the sampling frame.

There were also some limitations to the study. The motor registries excluded due to levels of licence renewals tended to be those servicing rural and remote areas due to lower overall population density and a higher proportion were also in the lower two quartiles for socioeconomic advantage. In order to compensate for this limitation, the known proportion of registered motorcycle owners living in those regions was applied in determining the required sample sizes for those quartiles. Perhaps the major limitation as a potential source of bias is in relation to those who declined to take part in the survey. Most gave lack of time as their reason for non-participation, which may be quite reasonable as the survey took some 20 minutes to complete. While it was not possible to determine whether participants were different from non- participants in terms of the data collected, the distribution of the pre-weighted sample was relatively closely aligned with the NSW motorcycle registrations database in terms of age and gender. Finally, all data collected here is self–report data and although anonymous, there is some potential bias in participants possibly reporting what they think they should be doing rather than what they actually do. This may be particularly relevant for further use of the data investigating potential predictors of violations and crash involvement.

Conclusions

The resulting profile is of an aging population of motorcyclists with almost two thirds aged over 40 and novice riders of average age 30. They average 7 hours riding per week and while a high proportion ride daily, the majority use a car for over half of the total kilometres travelled. The results indicate that due to some owners of multiple machines, the use of the database of registered vehicles may overestimate the size of the active riding population.

This study has produced a profile of the motorcyclist population in NSW and their characteristics including measures of exposure and the prevalence of known predictors of crash risk. The survey was successful in achieving a sample that is broadly consistent with the distribution by age, gender and socioeconomic status in the State database of registered owners, however the representativeness of the sample in terms of crash and infringement risk is unknown. The resulting profile may be accepted for policy purposes as being representative of the population of registered owners.

Acknowledgements

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