



The Questions being asked.

AS/NZ 2890.1 – 2004 (Off-Street Car Parking Standard) has been the primary reference for minimum car parking standards across Australia since 2004 and was based on research into vehicle sizes using the roads in the late 1990's and early 2000's.

Since AS/NZ 2890.1-2004 was prepared :

- **Have vehicles using car parks got any longer or wider ?**
- **Do vehicles using car parks now need more space to manoeuvre ?**
- **Have they got any heavier ?**

And, do we need to change our car park design standards ?

TPS research has made some interesting discoveries, based on the following.

A sample of 2022 vehicle sales by the top 10 selling vehicle brands, representing 46 vehicle models, 614,000 vehicles and nearly 60% of all 1.10M SUV, Light Commercial (LC) and Sedan (SC) vehicle sales. (Light Commercial vehicles are defined by the Federation Chamber of Automotive Industries, FCIA. For example, Ford Ranger, VW Amarok etc).

66% of vehicle sales in the sample were SUV, 28% Light Commercial and the remainder were Sedans. This compares with sales reports of approximately 50% SUV, 25% Light Commercial and 25% Sedan in recent years. However, prior to 2022 period there were considerable tax incentives introduced which would have promoted sales of Light Commercial vehicles. For instance, in June 2022 when people were most conscience to mimimise tax, Light Commercials made up 37% of total sales in the top selling brands, compared with 28% for the 2022 year as a whole.

Some Relevant Facts

(Refs : FCIA, Budget Direct, CarsGuide, Aust Automobile Assoc, Bureau Infrastructure, Transport Research)

In 2022 there were about 1.1 million new SUV, LC and SC vehicles sold, out of a total of approximately 21 million registered vehicles in Australia. The top 10 manufacturers contributed about 60% of total sales.

There are now approximately 60 brands of vehicles and 380 vehicle models sold in Australia.

The average age of an Australian car is approximately 10.5 years. In 2021 there was an almost 50/50 split between people who had bought their car new, and those that had acquired it as used. However, this was probably due to a supply problem with new cars. About 30% of all vehicles on the road are now less than 5 years old.

In 2021, approximately 35% of all vehicles owned were sedans, whilst 50% of vehicles were SUVs and hatchbacks. Slightly less than 10% were 4x4 and utes.

It is predicted that in 2023, new vehicle sales will be made up of 30% Sedans, 46% SUV and 24% Light Commercial. However, trends suggest that SUVs will make up a larger proportion of sales than predicted probably primarily at the expense of Sedans. For instance, in 2021 SUVs represented 52% of sales, passenger Sedans 25% and light commercials 23%.

In early 2022, there were approximately 40,000 registered battery electric vehicles (BEVs), including 34,200 passenger cars, an increase of 118 per cent over 2021. Approximately 65% of all BEVs were Teslas. There were approximately 277,000 registered hybrid-electric vehicles (HEVs), an increase of 35 per cent over 2021.

So – what did we discover ?

Firstly, you need to recognise that quite apart from there being many manufacturers and models in the Australian market, of which we have investigated the top 10 manufacturers, there are also derivatives of particular models which have different characteristics. Consequently, TPS has primarily based research on “base” models. Also, it is apparent in the 2022 sales data of the top 10 manufacturers that Sedan Cars are probably underrepresented, probably due to the less popular Sedan car sales being sourced primarily from manufacturers outside the top 10. So, just keep those data qualifications in mind.

Here is a simple comparison of the 2022 sales data with AS/NZ 2890.1-2004.

Table 1 2022 Sales Based Estimates

	AS2890.1			2022 - SUV + LC + SC - Top 10				2022 - SUV + LC Top 10				2022 - SUV Top 10				2022 - LC Top 10			
	Small Car	85th	99th	Avg	50th	85th	99th	Avg	50th	85th	99th	Avg	50th	85th	99th	Avg	50th	85th	99th
Length (1)	4450	4910	5200	4767	4630	5325	5446	4787	4660	5325	5446	4551	4550	4850	5155	5345	5325	5351	5446
Width (2)	1700	1870	1940	1843	1840	1883	1977	1846	1855	1883	1977	1832	1839	1875	1977	1880	1855	1923	1995
Height (3)	2200	2200	2200	1691	1685	1852	1890	1706	1690	1852	1890	1655	1670	1775	1890	1842	1842	1852	1886
Weight (4)	n/a	n/a	n/a	1718	1620	2165	2285	1741	1625	2165	2285	1616	1560	2108	2285	2035	2110	2165	2206
Turn k-k (5)		11.60	12.60	11.34	11.40	11.90	12.70	11.40	11.40	12.50	12.70	11.07	10.90	11.80	12.50	12.20	11.80	12.50	12.80
Gnd Clear (Unladen) (6)		120	120	195	193	230	256	198	195	230	256	184	181	218	230	231	220	256	270

Note : 1	Does not include tow bars, bull bars etc.
Note : 2	Overall width including mirrors.
Note : 3	Not inc. roof racks etc. AS2890.1 does not specify veh heights. Rather, it specifies the minimum vertical clearance required for design of car parks.
Note : 4	AS2890.1 does not specify veh weights. Weights shown are kerb weights (unladen)
Note : 5	Ker-kerb wheel path diameter, not including body overhang to swept path..
Note : 6	AS2890.1 does not specify ground clearance. Rather, it specifies the minimum ground clearance standard for design.

Variation from AS2890.1

	AS2890.1			2022 - SUV + LC + SC		2022 - SUV + LC		2022 - SUV		2022 - LC			
	Small Car	85th	99th	85th	99th	85th	99th	85th	99th	Avg	50th (7)	85th	99th
Length (1)	4450	4910	5200	415	246	415	246	-60	-45	0	875	441	246
Width (2)	1700	1870	1940	13	37	13	37	5	37	0	155	53	55
Height (3)													
Weight (4)													
Turn k-k (5)		11.60	12.60	0.30	0.10	0.90	0.10	0.20	-0.10	0.00		0.90	0.20
Gnd Clear (Unladen) (6)													

From the above, we have drawn the following conclusions.

- Based on SUV sales alone, the B85 vehicle in 2022 passenger car sales (excluding LCs) is shorter than the AS/NZ 2890.1 B85 by about 60mm, but has got wider by approximately 5mm. However, the 2022 B85 SUV takes about 200mm more diameter to turn than the AS/NZ 2890.1 car, probably due to the growth in front wheel and 4 wheel drives over the past two decades.
- A significant apparent increase in extreme vehicle size relative to AS/NZ 2890.1 is highlighted in the analysis of all 2022 sales when Light Commercials are included with SUVs. That shows that the B85 vehicle on sale in 2022 was as much as 400mm or more in length, 15mm more in width and requires up to 900mm more diameter to turn than the B85 AS/NZ 2890.1 vehicle. Again, remember, these are based on 2022 sales and may not represent the national sales fleet at the moment. But it may indicate where we are headed !
- There is also further evidence that the upper extreme in vehicles size has increased significantly with the B99 vehicle now on sale probably being up 250mm longer, and 50mm wider, and requiring up to 200mm more diameter to turn than the AS/NZ 2890.1 B99 vehicle. Remember, these are based on 2022 sales and may not represent the national sales fleet at the moment.
- The above findings point to a significant increase in vehicle length, width and turn diameter of B85 and B99 vehicles on sale in 2022 compared with AS/NZ 2890.1 vehicles. This is being driven by both LC sales. That is, larger vehicles are getting more extreme in size.

In order to eliminate the apparent bias in the top 10 manufacturer sales data away from SUV sales (and LC sales to a lesser extent), we made weighted estimates of 2022 vehicle sales and AS/NZ 2890.1 data. *(Whilst the weighted data may not be technically correct, it does provide an approximation of how the entire vehicle fleet may have recently changed or be changing.)*

Table 2 Estimated Current National Fleet Characteristics

	AS2890.1			(SUV+LC)x75% + (AS2890.1)x25%				SUVx50% + AS2890.1x50%				SUVx50% + LCx25% + AS2890.1x25%			
	Small Car	85th	99th	Avg	50th	85th	99th	Avg	50th	85th	99th	Avg	50th	85th	99th
Length (1)	4450	4910	5200	4818	4723	5221	5385	4730	4730	4880	5178	4839	4834	4990	5239
Width (2)	1700	1870	1940	1852	1859	1880	1968	1851	1855	1873	1959	1854	1851	1886	1972
Height (3)	2200	2200	2200	1830	1818	1939	1968	1927	1935	1988	2045	1838	1846	1901	1967
Weight (4)	n/a	n/a	n/a												
Turn k-k (5)		11.60	12.60	11.45	11.45	12.28	12.68	11.33	11.25	11.70	12.55	11.48	11.30	11.93	12.60
Gnd Clear (Unladen) (6)		120	120	179	176	203	222	152	151	169	175	180	176	203	213

Note : 1 Does not include tow bars, bull bars etc.
 Note : 2 Overall width including mirrors.
 Note : 3 Not inc. roof racks etc. AS2890.1 does not specify veh heights. Rather, it specifies the minimum vertical clearance required for design of car parks.
 Note : 4 AS2890.1 does not specify veh weights. Weights shown are kerb weights (unladen)
 Note : 5 Ker-kerb wheel path diameter, not including body overhang to swept path..
 Note : 6 AS2890.1 does not specify ground clearance. Rather, it specifies the minimum ground clearance standard for design.

Variation from AS2890.1

	AS2890.1			(SUV+LC)x75% + (AS2890.1)x25%		SUVx50% + AS2890.1x50%		SUVx50% + LCx25% + AS2890.1x25%	
	Small Car	85th	99th	85th	99th	85th	99th	85th	99th
Length (1)	4450	4910	5200	311	185	-30	-23	80	39
Width (2)	1700	1870	1940	10	28	3	19	16	32
Height (3)									
Weight (4)									
Turn k-k (5)		11.60	12.60	0.68	0.07	0.10	-0.05	0.33	0.00
Gnd Clear (Unladen) (6)									

From the above, we have drawn the following conclusions.

- Based on equal weighting to 2022 SUV sales alone and B85 AS/NZ 2890.1, it appears that the B85 vehicle in the current national fleet excluding light commercials (LC) has not got any longer but has got about 5mm wider and takes about 100mm more diameter to turn. The B99 doesn't appear to have got any longer but has got about 20mm wider but still takes the same diameter to turn as the B99 AS/NZ 2890.1 vehicle. These estimates do not represent the probable effect of Light Commercial (LC) vehicles and should only be taken to reflect probable passenger vehicle dimensions in the current national fleet. That is, vehicles designed for the sole purpose of transporting passengers.
- When relative weightings more representative of recent sales including LCs are applied together with applying a weighting of 25% of AS/NZ 2890.1 dimensions etc. to reflect passenger cars now in the national fleet, it appears that B85 vehicle in the fleet has become 80mm longer, 15mm wider and takes up to 350mm greater diameter to turn. The B99 vehicle has become 40mm longer, 35mm wider and takes about the same diameter to turn as the AS/NZ 2890.1 B99 vehicle.
- Again, the above findings point to a significant increase in vehicle length and turn diameter of B85 and B99 vehicles in the national fleet since AS/NZ 2890.1 - 2004 was prepared. This is being driven by both LC sales. That is, larger vehicles are getting more extreme in size.

So, here is what we have concluded with respect to the questions being asked.
(It should be noted that AS/NZ 2890.1-2004 specifies B85 as the “design vehicle” for off-street car parks and only recommends that the B99 vehicle be used for checking ramp and other access arrangements.)

The question needs to be answered in two parts.

- How do most recent vehicles on sale compare with AS/NZ 2890.1 – 2004 ?
- How do current vehicles on the road compare with AS/NZ 2890.1 – 2004 ?

The following table sums up the findings.

Table 3 Comparison With AS/NZ 2890.1 – 2004 B85 and B99 Vehicles

	2022 Vehicle Sales (Top 10)							Probable National Fleet at 2022	
	AS2890.1			SUV		SUV + LC + PC		SUVx50% + LCx25% + AS2890.1x25%	
	Small Car	85th	99th	85th	99th	85th	99th	85th	99th
Length (1)	4450	4910	5200	-60	-45	415	246	80	39
Width (2)	1700	1870	1940	5	37	13	37	16	32
Turn k-k (5)		11.60	12.60	0.90	0.10	0.30	0.10	0.33	0.00

Have vehicles using car parks got any longer or wider ?

Yes.

Recent Sales

The B85 and B99 SUV on sale are 60mm and 45mm shorter than the AS/NZ 2890.1 B85 and B99 vehicles. However, the B85 SUV on sale is about 5mm wider, whilst the B99 is up to 40mm wider. Remember, that only represents vehicles specifically designed for passenger transport, excluding light commercials (LCs).

When all vehicle sales (including LCs) are considered, the length of a B85 and B99 vehicle on sale is in the order of 400mm and 250mm wider than the AS/NZ 2890.1 vehicles. The width of the B85 and B99 vehicles is up to 15mm and 40mm wider.

The National Fleet

The B85 and B99 now on the road (the national fleet) are up to 80mm and 40mm longer, and 20mm and 35mm wider than the AS/NZ 2890.1 vehicles.

Do vehicles using car parks now need more space to manoeuvre ?

Yes.

Recent Sales

The current B85 and B99 SUV vehicles on the road probably take as much as 900mm and 100mm more diameter to turn than AS/NZ 2890.1 B85 and B99 vehicles.

When all vehicle sales are considered, the B85 and B99 vehicles on the road probably take about 300mm and 100mm more diameter to turn than AS/NZ 2890.1 B85 and B99 vehicles.

The National Fleet

The B85 vehicle on the road probably takes up to 350mm more diameter to turn than the AS/NZ 2890.1 B85 vehicle. However, the B99 appears to require the same diameter as the AS/NZ 2890.1 B99 vehicle.

Have they got any heavier ?

We will leave this for another day as AS/NZ 2890.1 does not specify vehicle weights for B85 and B99 vehicles. However, our analysis does suggest that the weight of a B85 vehicle is now about 300kg more than the typical B85 sedan car in the 1990's (eg. Holden Commodore sedan).

Do we need to change our car park design standards ?

The TPS investigations give support to at least considering the following changes to car parking design having regard to the need to minimise consequences for land, structure and other construction costs.

- a. Maintain the length of bays at 5.40m across all categories of user, providing the following minimum aisle and bay dimensions are implemented.
- b. Increase minimum bay widths to 2.60m across all categories of user, excepting increase widths to 2.70m for short term convenience parking where parking is specifically intended for the loading/unloading of goods and passengers (eg. childcare centres etc.).
- c. Increase minimum aisle dimensions across all categories of user to 6.20m, excepting increase to 6.50m for short term convenience parking (eg. 15 minutes duration).
- d. Increase the width of Disabled Parking Bays to 2.6m together with a minimum adjacent loading zone of no less than 2.0m.

Note : The length of the "small car" as defined in AS/NZ 2890.1 is equivalent to the 40th percentile SUV sold by the top 10 manufacturers in 2022 and the 30th percentile of all car sales. However, the width of the AS/NZ 2890.1 "small" car is equivalent to only the 5th percentile of SUV and less than 5% of all cars sold by those manufacturers in 2022. This is evidence of the need to review the definition of a small car bay width.

