



Australian Electric Vehicle Association Inc.
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PO Box 5285
Clayton, VIC 3168
Email: secretary@aeva.asn.au

Date: 17th October 2021

To: The Australian Building Codes Board

Re: National Construction Code 2022 consultation paper

Dear Sir/Madam,

The Australian Electric Vehicle Association (AEVA) is a not-for-profit, volunteer-run organisation dedicated to promoting electric mobility for Australia. Formed in 1973, we represent the interests of electric vehicle (EV) owners and enthusiasts as well as many of the industries which support and by extension, prosper from electrified transport.

On behalf of our 1000+ members, we make the following submission to the National Building Codes Board in relation to changes to the 2022 National Construction Code.

The comments made in this submission were largely formulated by our subject matter expert, Mr Peter Campbell of AEVA's ACT branch. If you have any specific questions or need further clarification on matters enclosed, please contact Mr Campbell directly. For more general queries about EVs and EV policy in Australia, please feel free to contact us using the details in the letterhead.

Sincerely,

Chris Jones, National Secretary

NCC Public Comment Draft Response Sheet



This response sheet is to be used for submitting responses to the National Construction Code (NCC) 2022 Public Comment Draft.

How to use this response sheet

1. Provide your details including name, organisation and contact details.
2. Provide your response(s) to the Public Comment Draft. For each response you should include—
 - the relevant NCC volume(s) that your response relates to by clicking in the appropriate box(es);
 - the “**Clause/Figure/Table**” that you are responding to, e.g. J6D3(1)(a), Housing Provision Figure 7.2.3 or Table C2D2;
 - your “**recommended change to draft**”, e.g. it is recommended that the proposed drafting to J6D3(1)(a) be amended as follows...*(see example)*;
If you are not recommending a change, insert “N/A” in this field;
 - your “**comments/reasons for change**”. This should include justification to support your recommended change, e.g. heaters that emit light do not need to be excluded because these heaters have already been exempted by J6D3(3)(d) *(see example)*.
If you are including multiple “**comments/reasons**”, use dot points or a numbered list.
3. Submit your response using the online response form on the ABCB website.

Notes:

Completing all relevant fields will help to describe what change in the Public Comment Draft you are commenting on, what your alternative change is and why it should be made.

This response form is to only be used for submitting responses to proposed NCC amendments contained within the NCC 2022 Public Comment Draft. If you wish to make comments or a submission on documents that have been released with the Public Comment Draft, please follow the instructions accompanying that document.

Response Sheet

Your details

Name: Peter Campbell

Organisation: Australian Electric Vehicle Association

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Response(s)

NCC Volume(s): One Two Three Housing Prov. Livable Housing

Clause: JD94 (1)(a)

Recommended change to draft:

No change if the table is changed as suggested below.

Alternatively, 'in accordance with Table J9D4 in each storey of the carpark except that one (1) is the minimum number of distribution boards.'

Comment/reason for change:

As for the comment on the Table, AEVA recommends that at least 1 distribution board be required on each carpark storey for class 2, so that all residential units will be able to have EV charging added to easily to their allocated parking space. A situation of 'haves' and 'have nots' or easy vs. difficult to retro-fit units should be avoided. Staged addition of EV charging will be complicated enough for a future Owners Corporation to manage without creating unequal starting points for different units.

NCC Volume(s): One Two Three Housing Prov. Livable Housing

Clause: J9D4 (2)(a)(ii)

Recommended change to draft:

No Change – just a comment

Comment/reason for change:

The origin of the minimum 12kWh from 11PM to 7AM would appear to come from the minimum electrical supply capacity necessary to ensure an EVSE AC charging system turns on at all and supplies a useful charge.

An Electric Vehicle Supply Equipment (EVSE) charging outlet communicates with the on-board AC charger that is built-in to an electric vehicle in accordance with an international standard. The EVSE dictates the maximum charging current that the car's charger is permitted to draw. An EVSE outlet can set current limits down to a lowest limit of 6 Amps. $230V \times 6A = 1.4kW$. $1.4kW \times 8\text{hours} = 11kWh$, just under 12kWh. A typical electric car uses around 12-15kWh/100km around town. Thus, 12kWh/night is sufficient to support typical local driving, which is usually well under 100km/day.

AEVA agrees that this is a reasonable minimum requirement.

We comment below in more detail on the operation of networked EVSEs to dynamically adjust up from that 6A minimum the charging current that a vehicle is permitted to take. This enables a charging control system to vary the charging rates of plugged-in vehicles according to 1) the available headroom between a building's total supply capacity and the

actual electrical load of the rest of the building, and 2) the number of plugged-in vehicles still charging.

NCC Volume(s): One Two Three Housing Prov. Livable Housing

Clause: J9D4 (2)(b)

Recommended change to draft:

'be sized to support the future installation of a 7kW (32A) type 2 networked EVSE charging outlets in 100% of the car parking spaces assuming that 25% of those outlets could be operating simultaneously at 32A, and'

Comment/reason for change:

It is usual for apartments to have parking spaces allocated and linked to particular units as part of the 'units plan' or 'strata plan' that is registered by the developer. Changing the plan after it is registered has high administrative barriers in all jurisdictions, including special or unopposed resolutions of the Owners Corporation. Provision for easy retrofitting of charging in only 25% of spaces would create a situation of 'haves' and 'have not' units. The first units to add charging might do so easily and inexpensively to the detriment of later units. As units change hands, there could be charging facilities in the parking spaces of units that don't yet want charging while other units might find it difficult to have charging added.

A fundamental principle in strata titled properties is that all unit owners should have equitable access to use and enjoyment of the common property, a principle that would be offended by setting up a situation where a 25% minority can easily obtain greater amenity from the common property electrical supply than the remaining unit owners. In recognition of this principle, state and territory strata legislations generally require a high threshold such as a special (75%) resolution to grant 'special privileges' for exclusive use of common property to individual unit owners.

AEVA agrees that an electrical supply capable of delivering up to 32A to 25% of spaces is sufficient if it is also capable of up to 16A to 50% of spaces. In principle, it could also deliver up to 8A to 100% of spaces, which tallies neatly with the requirement in part (2)(a)(ii) to deliver 12kWh at a minimum during an 8 hour period overnight.

To illustrate how this would work in practice: Imagine a building's vehicles coming home of an evening and many, perhaps a majority, being plugged in. While long-range vehicles might not plug in every night, inexpensive local-range vehicles and motorbikes might need a charge every night. At first, on the evening peak, the building load would be close to the maximum for the building and no vehicles would commence charging. The networked EVSE charging control system would prevent any vehicle charging. Later in the evening as the building load declines, the networked EVSE outlets would tell their respective connected vehicles that they are now permitted to start charging at 6A (1.4kW). As the evening continues, some vehicles will quickly finish charging having small battery capacities or having not driven far. The remaining vehicles will then be told by their EVSEs that they may now step up to (say) 8A and then to 10A as more vehicles finish charging and drop off the system and the non-vehicle building load reduces. At all times, the vehicle charging load would be regulated so that it plus the remainder of the building load remains under the building's limit. Eventually, only a minority (<25%) would be still charging at up to 32A in the early morning when the balance of the building load is low.

Charging at 32A/7kW for 5 hours in the early morning would provide 35kWh, which would provide 200km of range to most electric cars. Any vehicle to be used for a long trip the next day would be very likely to be charged to 100% by breakfast time. Any vehicle capable of over 400km that returned home from a long trip with a low state of charge would be assured of returning to >50% state of charge overnight.

In summary, AEVA endorses the principle of using a charging control system with the features that are already part of the EVSE standards (the ability to dynamically control and vary charge rates) to equitably share a building's headroom for charging among all vehicles that want to charge. This would avoid the expense of increasing the supply capacity of the building and the capacity of the local electricity network and it automatically moves vehicle charging off the evening peak with benefits to the electricity grid generally.

Many vehicle manufacturers have given dates between 2025 and 2035 for full electrification of their products and many national governments have put similar end dates on the registration of new fossil fuel vehicles, as is necessary to comply with Paris emission reduction commitments. It is likely therefore that most of the vehicles housed in class 2 buildings will be plug-ins within two decades.

NCC Volume(s): One Two Three Housing Prov. Livable Housing

Clause/Figure/Table: J9D4(2)(c) and (d)

Recommended change to draft:

No Change

Comment/reason for change:

AEVA endorses these provisions and has the following comments that might be helpful for providing guidance in due course for the application of these provisions of the building code:

There are various different ways the Owners Corporation (OC) might handle billing for vehicle charging. One option would be to outsource billing to a vehicle charging provider. If doing so, the future OC would need to be mindful of provisions in strata legislation that limit the length of any service contract. This is essentially to prevent the developer giving to a lucrative service contract to his cousin for the next 25 years. A charging provider might especially be a good option where parking is not allocated to individual units. In that case, the charging provider's phone app or RFID card would enable billing to the relevant vehicle owner, regardless of who parks where.

Another option is to make it all part of an embedded network that the OC might have with solar PV and batteries supplying the units. In this case, things get potentially more complicated. The Australian Energy Regulator (AER) has strict requirements for embedded networks involving 'premises' (i.e. the units of an apartment block). These include a requirement for metering to meet certain higher standards for reliability and precision. On the other hand, the AER does not regard vehicles as 'premises'. The key difference is that a vehicle can go elsewhere for its electrical supply if it doesn't like the deal offered by the OC whereas a unit can't move. An OC might prefer to only supply vehicles since embedded networks that include units have far stricter requirements to ensure fairness and equity.

A simple option would be for the OC to have a flat rate Peak Demand Tariff for its common property supply with a retailer and use a timer to exclude vehicle charging during the several hours of the evening peak, regardless of the building load. Then simple kWh counters would be enough for the OC to read periodically and bill residents pro rata for their kWh consumption for vehicle charging.

NCC Volume(s): One Two Three Housing Prov. Livable Housing

Clause: J9D4(2)(e)

Recommended change to draft:

No Change

Comment/reason for change:

AEVA endorses these draft provisions. These various classes of commercial buildings generally have a singular owner in contrast to a class 2 building that is owned by an Owners Corporation made up of many individual unit owners, some resident and some landlords. It would be much easier for the owners of these other building classes to simply let out or otherwise manage parking spaces, with or without EV charging, according to their preferences without any need to ensure equity among tenants.

Setting up a less-than-100% minimum requirement for EV-readiness is endorsed on the grounds that it will be much easier for the singular future owners of these building classes to build out further provision if they wish.

NCC Volume(s): One Two Three Housing Prov. Livable Housing

Clause: J9D4(3) and (4)

Recommended change to draft:

Probably no change required.

Comment/reason for change:

AEVA endorses the requirement that cable trays be provided with sufficient space to carry cabling capable of 32A from distribution boards to close to each parking space in a class 2 building, and that they be labelled for that purpose.

We note that wifi often works poorly in the basements of apartment blocks so the specified space should be sufficient for both power cabling and network communications cabling.

NCC Volume(s): One Two Three Housing Prov. Livable Housing

Table: J9D4

Recommended change to draft:

It is recommended that Table J9D4 be amended as follows—

First and second lines of the table be combined such that at least one electrical distribution board for EV charging is provided for every storey that includes any parking spaces, at least in the case of class 2 buildings (apartments).

The 'Limitations' statement could make it clear that the table applies to all classes other than 'stand-alone 7a', if that is the intention.

Comment/reason for change:

1. It seems that the table is intended to apply generally. However, the first line imposes a limit on apartment blocks. We recommend that all apartment block parking spaces should be able to have charging installed without great impediment. A small apartment block might have only 9 parking spaces on a particular parking level. Those spaces might be allocated individually to particular units and consequently these would be the only places where residents of those units would be permitted to park. So, it would be necessary for them to have the option to connect their allocated parking space to a distribution board. Otherwise, a situation could be created where some units are able to have EV charging added easily to their allocated parking spaces while other units are not able to have charging added without much greater expense.
2. J9D4(1)(a) indicates that the table applies to apartment blocks, class 2, and the 'Limitations' statement indicates that it does not apply to 'stand-alone Class 7a' buildings. However, it is not clear that the table applies to other classes.