NSW Treasury

2025 GST Methodology Review

NSW Treasury Response to Draft Report transport addendum

29 August 2024

NSW GOVERNMENT

Acknowledgement of Country

We acknowledge that Aboriginal and Torres Strait Islander peoples are the First Peoples and Traditional Custodians of Australia, and the oldest continuing culture in human history.

We pay respect to Elders past and present and commit to respecting the lands we walk on, and the communities we walk with.

We celebrate the deep and enduring connection of Aboriginal and Torres Strait Islander peoples to Country and acknowledge their continuing custodianship of the land, seas and sky.

We acknowledge the ongoing stewardship of Aboriginal and Torres Strait Islander peoples, and the important contribution they make to our communities and economies.

We reflect on the continuing impact of government policies and practices, and recognise our responsibility to work together with and for Aboriginal and Torres Strait Islander peoples, families and communities, towards improved economic, social and cultural outcomes.

Artwork:
Regeneration by Josie Rose

Transport addendum to 2025 Draft Report

1.1 Context

- The Commission released its 2025 Draft Report on 5 July 2024. As part of the release of the 2025 Draft Report, the Commission included a chapter on the transport assessment, considering changes since the 2020 Review and implications for the assessment method.
- The Commission deferred release of its transport assessment GST distribution impacts, as well as associated impacts in the investment assessment, until analysis of 2022-23 state expense data was completed and new coefficients in the urban centre characteristics regression model were produced.
- The Commission released its Transport assessment addendum on 5 August 2024.

1.2 NSW Treasury responses

- NSW Treasury has responded to the key transport matters raised in the Draft Report as part of its main response in early August 2024. This submission should be read in conjunction with the initial NSW Treasury response to the Draft Report. This submission primarily responds to the Commission's addendum, though we reiterate some key matters from our Draft Report in this submission, including:
    - Concerns with the temporary increase in the blending ratio to 65:35, an adjustment for COVID-19, until the 2028 Update when 2026 Census data become available.
    - The need for an overall reduction or removal of the blending ratio through either the 2025 Review or the 2028 Update, particularly once data are unaffected by COVID-19.
    - The decision to model passenger numbers based on population rather than threshold-adjusted density, which understates the urban transport needs in Sydney.
    - The continued use of the ferry dummy variable, which will produce illogical results for assessing required ferry expenditure between states.

Draft Commission position:

- To maintain its Draft Report proposals for the urban transport recurrent assessment, excepting a ferry error correction.

- We note that the Commission has made no changes to its proposals for its recurrent urban transport assessment, except for the erroneous inclusion of non-urban ferry services. Our positions therefore reflect our initial submission to the Draft Report.
- The Commission's position to maintain its Draft Report proposals reflects its confidence in the robustness and theoretical justification for the existing Transport assessment methods. NSW Treasury broadly supports this view.
- Throughout the course of the 2025 Review, other states have presented a large volume of literature purporting to demonstrate that the Commission's methods and understanding of urban transport costs are somehow faulty. The Commission has seemingly concluded that, in the main, the literature provided does not support the arguments made in opposition to the urban centre characteristics model. NSW Treasury reached the same conclusion.

- Much has been made of the academic consensus for the existence of economies of density in the provision of public transport services. A review of these papers revealed that the accepted definition of economies of density in the transport literature refers to relationship between unit costs and the intensity of utilisation of capacity, holding network size fixed.
- It is incorrect to suggest the Commission's model is contrary to the accepted literature. The Commission's model does not relate service cost to the density or intensity of patronage on a fixed network (though it recognises the relationship through the inclusion of the log of passenger numbers in its cost equation). Instead, it relates service provision to the population density of an entire urban area, recognising that public transport patronage increases as urban density increases and this necessitates greater levels of service provision.

Draft Commission position:

- To revert to the existing blending ratio of 75:25 for the urban transport investment assessment, instead of using the temporary 63:35 ratio through to the 2028 Update.

- We support the position to not temporarily increase the blending ratio in the investment assessment. We do not support the proposed increase identified in the Draft Report and, as a first step, agree with the Commission's decision to revert the existing blending ratio in recognition of COVID-19 not materially impacting state investment decisions.
- As per the Commission's addendum, *'investment decisions are determined over a longer timeframe [and] the effects of COVID-19 have not exerted as significant an impact'*.[1] The initial position to align the investment blending to the recurrent blending should have reflected this point. We agree with the Commission's logic in reverting back to the existing 75:25 blending ratio.
- However, as per our Draft Report response, we believe that such a decision does not go far enough in recognising the robustness and reliability of the urban characteristics model. In the absence of any data concerns from COVID-19, the Commission should be looking to reduce or remove the blending ratio based on the outputs from the 2025 Review.
- For the recurrent component of the urban transport assessment, we considered that the blending ratio should be reduced or removed entirely once appropriate data are available, which is expected in the 2028 Update. This position recognised the Commission's concerns over possible COVID-19 impacts. COVID-19 data concerns do not apply to the investment assessment.
- The Commission has satisfied itself that the urban characteristics model is robust and reliable, and that the investment assessment is reasonably unaffected by COVID-19 data concerns. Given the investment blending ratio is not materially impacted by COVID-19 data concerns, it is clearly appropriate to undertake a reduction or removal of the blending ratio as part of the 2025 Review.

NSW Treasury position:

- To remove the proposed temporary increase to the blending ratio and retain the existing ratio until 2026 Census data become available in the 2029 Update.
- For the Commission to seek authority to review and implement a reduction or removal of the blending ratio as part of the 2028 Update.

[1] 2025 Methodology Review – Transport addendum August 2024, paragraph 18.

- Through our Draft Report response, NSW Treasury opposed the introduction of a temporary increase to the blending ratio for urban transport, through to the 2028 Update. We reiterate those points, particularly the recognition that the increased confidence in the robustness and reliability of the urban characteristics model should offset temporary COVID-19 data concerns.
- The Commission's position is that the proposed changes to the transport regression model will improve the estimates of state expenditure needs. This is eminently reasonable. If the Commission considers that this has been demonstrated, after updating its model, then it should be seeking to reduce or remove the level of blending. In the absence of any COVID-19 data concerns, we believe the Commission would be fully considering this course of action.
- The Commission's proposal to increase the blending ratio is motivated by data concerns alone, with these concerns specifically related to the impacts of COVID-19. At the same time, the Commission has satisfied itself that the urban characteristics model is robust and reliable.
- The increased confidence in the robustness of the model should offset the temporary COVID-19 data concerns that are the basis for the temporary blending ratio increase. We therefore do not support the Commission's decision to temporarily increase the level of blending
- In light of updated modelling, the Commission should (1) reverse its position to introduce a temporary increase to the blending ratio and (2) seek authority to reduce or remove the existing blending ratio as part of the 2028 Update when 2026 Census data are available.
- As per earlier points, this deferral should only be considered for the recurrent component of the urban transport assessment. The Commission should be undertaking a reduction or removal of the existing blending ratio in the investment assessment as part of the 2025 Review.

NSW Treasury position:

- For the Commission to confirm the temporary nature of the blending ratio adjustment.

- We are concerned about an inconsistency between the Commission's positions in the Draft Report and the addendum regarding the temporary nature of the blending ratio.
- As per the Commission's Draft Report, '*once fit for purpose 2026 Census data become available in 2028, the blending ratio will return to the 75:25 split*'.[2] The temporary increase is explicitly identified by the Commission as responding to potential data issues related to COVID-19. While we do not support the temporary increase given the robustness of the model, we acknowledge the concern that the Commission may have regarding temporary impacts on data quality.
- However, in the Transport addendum, the Commission identifies that '*it will consider the precise specification of the model and* ***whether the temporary proposed increase in blending should be removed'***.[3] We are concerned about this inconsistency in framing.
- It is unclear why there is any question of removing the temporary blending ratio, considering the Commission explicitly identifies its relationship to COVID-19 impacting data. 2026 Census data will not be impacted by COVID-19. There is no case for retaining the temporary increase to the blending ratio. The Commission should confirm the change is temporary, though ideally, should not implement the temporary increase to the ratio at all.

[2] 2025 Methodology Review – Draft Report June 2024, Transport, paragraph 211.

[3] 2025 Methodology Review – Transport addendum August 2024, paragraph 10.

NSW Treasury position:

- To replace the rail dummy variable approach to modelling passenger numbers with an approach that is driven by population-weighted density (PWD).

- While we supported a modelling approach to estimate passenger numbers in our Draft Report, noting this addresses issues of policy neutrality, we remained concerned that the Commission intends to continue with a dummy variable approach to the existence of rail services.
- The inclusion of a rail dummy variable results in a discontinuity in modelled passenger numbers where a jurisdiction moves from using buses to providing the same level of services via rail.
- It is for this reason we suggested a more policy neutral approach which sees passenger numbers driven by PWD. Our Tranche 1 submission demonstrated that this fitted the data well for urban centres with a population weighted density of more than 1,750[4].
- The Commission has expressed concerns with the arbitrariness of the chosen threshold below which passenger numbers per 10,000 residents show virtually no relationship to PWD. The discontinuity in the relationship between public transport use and PWD is not surprising. The shift to using public transport only arises when congestion costs become too great. It is for this reason that there appears to be little relationship between low levels of PWD (and therefore low levels of congestion) and public transport use.
- Naturally, in adopting a threshold-based approach to modelling passenger numbers, the Commission will need to undertake its own analysis to determine the best and most appropriate threshold. In doing so, the threshold will not be arbitrary but will reflect reasonable assumptions about transport service use and will have statistical validity.
- The purpose of modelling public transport numbers is to overcome questions of policy neutrality, such as the level of fares charged by jurisdictions. We believe modelling passenger numbers based on PWD results in a superior fit to real world data as shown in our Tranche 1 submission.
- Not adjusting for the presence of urban areas which are of such low density as to render commuter-based public transport irrelevant is skewing the Commission's passenger modelling and significantly understating Sydney's transport task.
- If modelled correctly, any difference between the modelled and actual number of passengers for an urban area would reflect deviations from average state policy. It is implausible that Sydney's higher actual patronage is explained by policy alone, when we have demonstrated that Sydney's roads are the most congested in the country. This congestion – along with concentrated employment – result in large numbers of public transport passengers in Sydney.
- Further, we have repeatedly demonstrated that Sydney's congestion is driven by its unique geography and historical patterns of development. Sydney is bordered by the ocean to the east, mountains to the west, and significant national parks, rivers and floodplains to the north and south. These features constrain Sydney's geographical footprint and inflate its density, which in-turn drives congestion. These factors are exacerbated by Port Jackson, which necessitates the funnelling of traffic over a limited number of harbour or river crossings, creating bottlenecks that congest the entire road network.
- The Commission's approach significantly understates the policy-neutral need of Sydney to provide public transport given the actual number of passengers observed and the characteristics that drive this level of patronage, which is largely a result of traffic congestion.
- We disagree with the Commission's assertion that the use of a density variable to model passenger numbers results in double counting of this variable in estimating the transport expenditure needs of states. Density is

[4] This threshold was based on PWD calculated using SA1 boundaries. With the shift to the population grid or SA2s for PWD purposes, the threshold will need to be re-estimated.

used in the cost regression to estimate the impact of demand on net costs. It is reasonable that density also be used to model demand, since it is congestion – caused by density – which drives demand.

NSW Treasury position:

- For the Commission to fully investigate the optimal measure of population-weighted density as part of its proposed forward work on the transport assessment.

- NSW has previously supported moving away from using SA1 boundaries to measure PWD due to the risk of significant volatility identified in the 2024 Update. We considered the SA2 measure and the square kilometre grid as reasonable alternatives.
- As part of its future work plan, the Commission should more fully investigate which alternative is most fit for purpose. An appropriate measure should correspond to the level at which density drives urban transport use and planning decisions..
- In our Tranche 1 submission, we proposed using SA2 boundaries. Our view was that SA2s effectively represent the level at which planning decisions are made. We also considered that the measure's sensitivity to boundary changes and differences in its application across states were both minimal.
- In our supplementary transport submission, we provided analysis on the reasonableness of using the square kilometre grid. An ideal element of this measure was that it could provide consistently sized and shaped sub-areas, though would require technical adjustments to account for the grid not aligning to ABS SUA boundaries.
- Overall, our position in the supplementary transport submission remained that SA2s were the preferred measure for calculating PWD, as it best reflected the level at which people experience density, but that the square kilometre grid would also be viable.

*'Ideally the choice of the subareas should be based upon a judgement about the size of the area for which the experience of density is **most appropriate for the question at hand**'.*[5]

- The experience of density is fundamental to this assessment. The Commission should not only be aiming to select the ideal measure of PWD. The Commission should be determining what is the best measure of **the effect of population-weighted density on states' urban transport task**.
- In considering the measures, we produced a comparison of population-weighted capital city densities using alternative geographic structures. This included SA1s, the km grid, and SA2s. This comparison identified that the relative ranking of cities was reasonably consistent across the measures.
- In the Commission's Draft Report, the PWD of each state's capital city is also compared across the three key measures. From this analysis, we have developed a comparative ratio of PWD measures, using Hobart as the standard of comparison. This comparison is included at Table 1.

[5] Ottensmann, J.R., The Use (and Misuse) of Population-Weighted Density, 2021.

Table 1: Ratio comparison of density measures across states' capital cities

Ratio	Syd	Mel	Bri	Per	Ade	Can	Dar	Hob
SA1s	3.62	2.57	1.72	1.34	1.27	1.66	1.34	1.00
SA2s	2.76	1.98	1.52	1.36	1.36	1.28	1.19	1.00
Square kms	3.04	2.22	1.57	1.46	1.48	1.52	1.34	1.00

Source: Calculation derived from 2025 Draft Report, Transport chapter, Table 1.

- From this, we assumed the km grid and SA2 measures would produce reasonably similar assessed expenses, primarily for larger states. At minimum, we expected that SA2s and the square kilometre grid would typically produce closer outcomes to each other than to the SA1s.[6]
- Assuming a similar outcome, we then considered which measure would better align with the Commission's supporting principles. We acknowledged the Commission's interim position to use the square kilometre grid to be conceptually sound.
- From the Commission's testing, however, it is evident that the measures do not produce reasonably similar results in the model. Based on material variances between all three measures, we contend that further investigation is required to determine whether SA2 or the km grid best represents the urban transport task.
- In comparing the measures, the Commission analysed three issues to determine which would be preferable:
    - Volatility,
    - Consistency of areas within boundaries, and
    - Functional considerations.
- **Volatility** – The Commission found the square kilometre grid had the smallest change in PWD for most capital cities between censuses. We agree the grid is less volatile than the other two measures, though SA2s are clearly preferable to SA1s. The extent of the volatility in SA2 data does not appear to be a material encumbrance to its use. It would be appropriate for volatility to again be evaluated against 2026 Census data, when available.
- **Consistency of areas within boundaries** – The Commission considers the consistent treatment of land a major benefit of the grid. We concur a standardised area size is beneficial. However, there are potential issues to consider. Grid boundaries will fail to recognise sub-density, which can be significant enough to impact the urban transport task. The boundaries will also understate PWD in areas with natural geographic features, compared to areas with no or minimal geographic features.
- **Functional considerations –** The Commission noted our position that SA2s better reflect public transport networks, before identifying ABS guidance that they are not designed for that specific purpose. The Commission proceeded to then not consider the square kilometre grid against this same criterion. While the grid is an international standard of measuring PWD, this does not necessarily mean it is an ideal measure of how PWD impacts a state's urban transport task.
- Under this framework, we do not consider that the Commission has fully evaluated all aspects of selecting a PWD measure. As stated earlier, we consider that in selecting the measure of PWD, the Commission should have regard to the measure's relevance to the task at hand – Measuring the impact of density on state urban transport decisions.

[6] It is acknowledged that this presumption was not able to be based on the detailed underlying calculations undertaken for the Commission's regression model.

- The provided analysis implies there are no benefits to the use of SA2s over the square kilometre grid. We dispute this implication. While the Commission may find that the square kilometre grid is preferred, there are disadvantages in its use relative to the SA2 measure, including:
    - Inability of the grid to map to existing ABS geographies, resulting in greater complexity and less transparency in calculations.
    - The SA2 measure better reflecting the level at which transport decisions are made by commuters and planners by capturing localised population-weighted density increases.
    - The grid understating the density of areas with natural geographic features (such as rivers and waterways) compared to areas without those same features.
- **Inability to map to existing ABS geographies** – Unlike SA2s, the square kilometre grid is not aligned to other ABS geographic structures. This has required the Commission to implement a complex and less transparent method of allocating residents across multiple urban centres. While the Commission considers the empirical validity is maintained, it does not negate that the SA2 is preferable to the square kilometre grid in this regard.
- **Level at which transport decisions are made –** The Commission identifies that the SA2 measure was not designed with a focus on transport use; however, the grid was not designed for this purpose either. In the absence of a measure specifically designed for this purpose, the Commission should assess which measure better represents the state transport decisions in response to PWD.
- As recognised in the 2020 Review, Sydney's high population density is mainly due to non-policy influences and historical patterns of development.[7] While all states generally pursue urban densification in preference to sprawl (with growth boundaries), the capacity of Sydney to pursue urban sprawl is effectively at its limit due to topography. Accordingly, Sydney planning decisions are made in a context where densification is the only viable policy. This means hyper-localised developments are a driving factor in shaping the urban transport task.
- Using the example of the Green Square town centre development, there is a material difference in how changing density is recognised between SA2s and the grid. Boundary adjustments to SA2s can identify this hyper-localised development, with the surrounding areas being split from one to three SA2s between the 2016 and 2021 Censuses, with associated increases in measured PWD. This reflects genuine changes in the experience of density for residents in these areas, while not being as volatile as measures based on SA1 boundaries which are much smaller and relate to much smaller populations.
- The grid does not as effectively respond to this type of development as its boundaries are static and, as a consequence, the increased population can be distributed across small sections of multiple square kilometres. This suggests that while the SA2 picks up the PWD that the state must respond to in providing transport, the square kilometre grid cannot always identify significant changes in PWD at the level transport decisions are made.
- While hyper-localised developments may have caused too much volatility at the SA1 level, these developments remain a driver of urban transport planning. These are still picked up in SA2s, and with a lower volatility than SA1s. State transport decisions are required to respond to these impacts. In contrast, the grid will not as effectively reflect these changes, as the boundaries are not sensitive to shifting population patterns. This can effectively understate density at the level at which public transport decisions are made.
- **Natural geographic features impact density** – The Commission identifies that the boundaries of the grid will not be impacted by the treatment of geographical features. While we agree that this is a benefit of the grid in standardising the area used in PWD calculations, it does mean that the grid will understate PWD in areas with certain natural geographic features.
- Consider two separate square kilometre grids with the same population (and located entirely in a single SUA). The first grid has only 50 per cent of the area as land, while the second grid has 100 per cent of the area as land. Under the grid measure, both areas will have the same measured density, despite the population in the

[7] 2020 Review Volume 2, Transport chapter, paragraph 47.

first grid living in a significantly denser environment. Using an SA2 measure, it will appropriately recognise the higher density for the first area, based on the proportion of available land.

- While the Commission has promoted the reasonable benefits of the grid's static boundaries, we consider that there should have been further recognition of its drawbacks.
- Given the variance in the results between the square kilometre grid and SA2s, our view is that the Commission needs to continue investigating the ideal method of measuring population-weighted density as part of its forward work program. While we do not consider SA1s would be the ideal method, SA1s should still be compared against the square kilometre grid and SA2s.
- The ideal method should be one that best represents the actual urban transport tasks of states (and subsequent equalisation need), while still meaningfully addressing other supporting considerations in the Commission's work.

NSW Treasury position:

- The Commission must replace the ferry dummy variable with an alternative method of measuring ferry commuter use.

- In our initial response to the Draft Report, we opposed the Commission's decision to retain the ferry dummy variable. The Commission's method currently attributes the same per capita assessed expenditure requirement to urban areas with ferry services, regardless of the extent or complexity of ferry operations as part of the overall commuter task in a state.
- With the release of the transport addendum, we must reiterate our view that the ferry dummy variable is inappropriate, as the updated regression outputs in the transport addendum clearly demonstrate the practical concerns with the existing ferry dummy variable.
- Any method that provides for a fixed per capita cost for any urban area that operates a ferry will clearly and materially overstate the cost of networks with simple ferry connections and materially understate the cost of networks with complex connections. This has significant implications for GST distribution.
- Table 2 compares the extent of ferry services used by employed persons in SUAs that have been allocated a ferry under the dummy variable approach. This compares six SUAs across New South Wales, Victoria, Queensland, Western Australia, and Tasmania.

Table 2: Comparison of ferry usage between SUAs identified with the dummy ferry variable

Rate of Ferry Usage	Sydney	Melbourne	Brisbane	Perth	Hobart	Newcastle - Maitland
% of total SUA population	0.17%	0.01%	0.11%	0.01%	0.01%	0.02%
% of total SUA population, excluding non-travellers	0.41%	0.02%	0.26%	0.03%	0.02%	0.06%
% of total SUA employed worker population	0.25%	0.02%	0.21%	0.02%	0.03%	0.05%
% of total SUA employed work population, excluding non-travellers	0.48%	0.04%	0.42%	0.05%	0.06%	0.11%

Source: 2016 Census – Counting Persons (Place of Enumeration), 2016 Census – Counting Employed Persons (Place of Work).

- We have used 2016 Census data to show travel to work patterns, due to the impact of COVID-19 on 2021 Census responses. Table 2 demonstrates material differences in the nature of the ferry-borne transport task for Sydney and Brisbane relative to all other significant urban areas. These differences clearly relate to the geographic features of the relevant cities, with Sydney being settled around a large harbour with numerous bays along the Parramatta River. By retaining the dummy ferry variable, the Commission ignores these differences.
- The difference in genuine service need is almost certainly materially more impactful than the extent of potential policy influences. We are concerned the Commission instead considers these policy influences too great a limitation, and that it is preferable to retain a ferry dummy variable that produces an illogical equalisation outcome. This entrenches a bias against states where ferries are a larger share of the urban transport task, namely New South Wales and Queensland.
- The Commission must revisit its decision to assess state ferry expenditure requirements using a ferry dummy variable. The approach mischaracterises state transport needs. There are better alternatives available to the Commission in fixing this assessment.
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