

NSW Productivity Commission

# What we gain by building more homes in the right places

February 2024



## Acknowledgment 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



# Commissioner's foreword

Sydney's future residents have a big stake in the decisions we make about housing today. If we keep playing musical chairs with too few homes, it is the youngest and lowest-income people among us who will lose. We need more 'chairs' – and we need them in the right places.

This paper is the third in a series. Our first paper, *Building more homes where people want to live*, showed that building closer to the city is the best way to improve affordability. The second paper, *Building more homes where infrastructure costs less*, showed those same desirable places are often the cheapest for providing infrastructure.

This third paper shows that letting people build more homes in Sydney's inner areas offers economic, social, and environmental gains for everyone. And it shows the price we all pay, especially our most vulnerable, when we block people from building homes where they are needed.

With this series, I hope to help shift Sydneysiders' mentality from NIMBY to ADIMBY – Appropriate Density in My Back Yard.

This way, we can create a more productive city. People do better when they congregate together, talking with each other about their work, and living near their best job prospects.

This Sydney will also be a fairer city. More housing is the single best move we can make to lower the price of housing, for both buyers and renters. Having housing in the right places gives residents the opportunity to achieve their potential.

The people of Sydney are telling us how to do it: on average, they want more townhouses and apartments, and they want them as close as possible to the city.

This paper also argues we can make Sydney better as it gets denser. Other global cities have done it, and we can too. Late last year, I brought together over 120 people from industry, state and local government, and not-for-profits. We learned lessons from our friends across the Tasman. And we heard from home-grown experts in economics, planning, community housing, and local government. I'm confident we have the ideas and expertise to make density work for us.

Sydney has always grown and changed. We can preserve the gems of Sydney's history, heritage, and identity without locking young and disadvantaged people out.

Whether or not my acronym 'ADIMBY' catches on, we can rise to this challenge: to make Sydney better, to make space for all residents and future generations to flourish, contribute, enjoy, and leave their own mark on our wonderful city.



A handwritten signature in blue ink that reads "Peter Achterstraat". The signature is written in a cursive, slightly slanted style.

**Peter Achterstraat AM**

**NSW Productivity Commissioner**

# About the NSW Productivity Commission

The NSW Productivity Commission ('the Commission') was established by the NSW Government in 2018 under the leadership of the state's inaugural Commissioner for Productivity, Peter Achterstraat AM.

The Commission is tasked with identifying opportunities to boost productivity growth in both the private and public sectors across the state to continuously improve the regulatory policy framework and other levers the NSW Government can pull. Productivity growth is essential to ensure a sustained growth in living standards for the people of New South Wales, by fully utilising our knowledge and capabilities, technology and research, and physical assets.

The Commission's priorities include:

- fit-for-purpose regulation
- efficient and competitive NSW industries
- improved public service delivery
- climate-resilient and adaptive economic development.

Since its inception, the Commission has undertaken several reviews on productivity matters and published the landmark *Productivity Commission White Paper 2021: Rebooting the economy*.

More of the Commission's work can be found on our website: [productivity.nsw.gov.au](https://productivity.nsw.gov.au).

## Disclaimer

The views expressed in this paper are those of the NSW Productivity Commission alone, and do not necessarily represent the views of NSW Treasury or the NSW Government.

The NSW Productivity Commission's recommendations only become NSW Government policy if they are explicitly adopted or actioned by the NSW Government. The NSW Government may adopt or implement recommendations wholly, in part, or in a modified form.

## Abbreviations

|        |   |
|--------|---|
| ABS    | Australian Bureau of Statistics                       |
| CBD    | Central business district                             |
| GDP    | Gross Domestic Product                                |
| HCA    | Heritage Conservation Area                            |
| HILDA  | Household, Income and Labour Dynamics in Australia    |
| NAPLAN | National Assessment Program – Literacy and Numeracy   |
| OECD   | Organisation for Economic Cooperation and Development |
| PISA   | Programme for International Student Assessment        |
| R&D    | Research and development                              |
| SA     | Statistical Area (ABS)                                |
| SEIFA  | Socio-Economic Indexes for Areas                      |
| SEPP   | State Environmental Planning Policy                   |
| TDR    | Transferrable Development Right                       |

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# Executive summary

In the first two papers in this series, we explored the significant benefits of building more housing in the right places. *Building more homes where people want to live* showed that households will benefit when government regulation lets more of them live in the places that best suit them. *Building more homes where infrastructure costs less* showed that many of those places also have lower infrastructure-related costs.

This paper presents evidence that making housing more affordable and accessible in convenient, high-amenity locations offers a range of further economic, social, and environmental gains – gains that flow through the whole community.

## What we gain from abundant housing

By lowering housing prices and rents, we leave people with more money to spend on other things. Estimates suggest that if new apartment buildings completed in Sydney between 2017 and 2022 had been slightly taller – for example, an average of ten storeys instead of seven – unit rents would have dropped far enough to save the median unit-renting household \$1,800 a year.

As well as making housing cheaper, more abundant housing can help us tackle acute housing need. Low-income households spend proportionally more of their income on housing and are the most vulnerable to rental stress, dislocation, and homelessness.

While we delay doing this, young Sydneysiders are moving to other states where they can find good job opportunities without the housing cost.

## What we gain from density

Allowing more people the option of living in convenient, high-amenity locations brings broad-ranging benefits.

People can be more productive when they can live near their best job prospects. Workers in large, dense cities learn more, and more quickly, boosting their productivity and wages. Denser cities also tend to be more innovative.

Besides productivity, density can lead to:

- greater access to, and choice of, amenities such as playgrounds, restaurants, and shops
- less car dependency
- greater equality and inclusion (by allowing people to live closer to families, with shorter travel times)
- less exposure to extreme heat and natural disasters
- reduced greenhouse gas emissions and lower land use.

## How we can make density work for us

While there is clear demand for denser forms of housing, we need to plan for growth to make it happen.

Sydney has ample room to grow upwards. Compared with other leading global cities, Sydney has low-density inner suburbs. Manhattan, inner London, and most of Paris are far denser than inner Sydney. For the most part, this density reflects both the demand from people wanting to live near the city centre, and governments enabling it to happen.

Society benefits most when new homes are built in the places where people most want to live. But growth and change in a city can raise issues. To make density work, governments should:

- give weight to density's benefits as well as its costs



- give weight to the needs of potential future residents
- adapt open space to meet the needs of the changing population
- protect heritage in a strategic way that allows more new homes in high-demand inner areas.

# 1 What we gain from abundant housing

In this section, we show how New South Wales can prosper with more abundant and affordable housing. Specifically, we highlight three points:

- More abundant and cheaper housing increases NSW living standards, especially for renters and those with low- and middle-incomes.
- Affordable housing makes it easier for talented workers to stay and contribute to the NSW economy.
- Allowing people to live near their best employment opportunities will raise total productivity and improve living standards for everyone.

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## 1.1 More and cheaper housing is equivalent to a pay rise

Housing is central to our living standards, and the biggest expense for most households. Any improvement to housing costs is equivalent to earning a higher income.

So this question is worth asking: how much would more plentiful and cheaper housing improve NSW residents' real wages or purchasing power?

In our earlier paper *Building more homes where people want to live*, we posed a simple thought experiment: what if recently completed apartments had been allowed to be a bit taller? Here we build on this by showing how building more homes can have the same effect as raising people's incomes.

About 1,500 new apartment buildings were built in Sydney between 2017 and 2022.<sup>1</sup> These buildings averaged seven storeys and contained ten dwellings per storey (NSW Productivity Commission, 2023a). If instead we had permitted modestly denser development — for example, if apartments had averaged ten storeys instead of seven — then an extra 45,000 homes could have been provided, all without using any extra land and with minimal effect on neighbourhood character.

The additional 45,000 units would represent a little over two per cent increase in Sydney's private dwelling stock.<sup>2</sup> Typical rules-of-thumb suggest this extra supply would have lowered apartment prices and rents by 5.5 per cent, all else being equal (Saunders & Tulip, 2019). In dollar terms, this is a saving of about \$35 a week in rent on the median apartment – or \$1,800 a year. For a median-income earner, this is equivalent to a 2.75 per cent increase in their real purchasing power, similar to a typical year's wage rise.<sup>3</sup>

Housing costs could be reduced further still with higher densities and even more supply. The cost of supplying an additional dwelling provides a floor to how far dwelling prices could fall. In principle, this could be as much as 40 per cent for Sydney apartments.

A more concrete benchmark might be found in Auckland's experience. In 2016, Auckland upzoned about three-quarters of its residential land, opening up a large part of the city for low- and mid-rise medium-density housing. Recent evidence indicates that these changes have already generated planning permits for 22,000 new homes, equivalent to four per cent of its total housing stock (Greenaway-McGrevy & Phillips, 2023). Related evidence also suggests that rents have declined as

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<sup>1</sup> The exact figure is 1,555 buildings completed between from June 2017 to March 2022 (ABS Building Activity, unpublished).

<sup>2</sup> As at the 2021 Census count (ABS).

<sup>3</sup> Uses NSW median weekly earnings as of August 2022 (ABS, 'Employee earnings'). This is a 'first round' effect; in practice we might expect that higher real wages would attract people to stay or come to Sydney, reducing the benefit to existing residents.

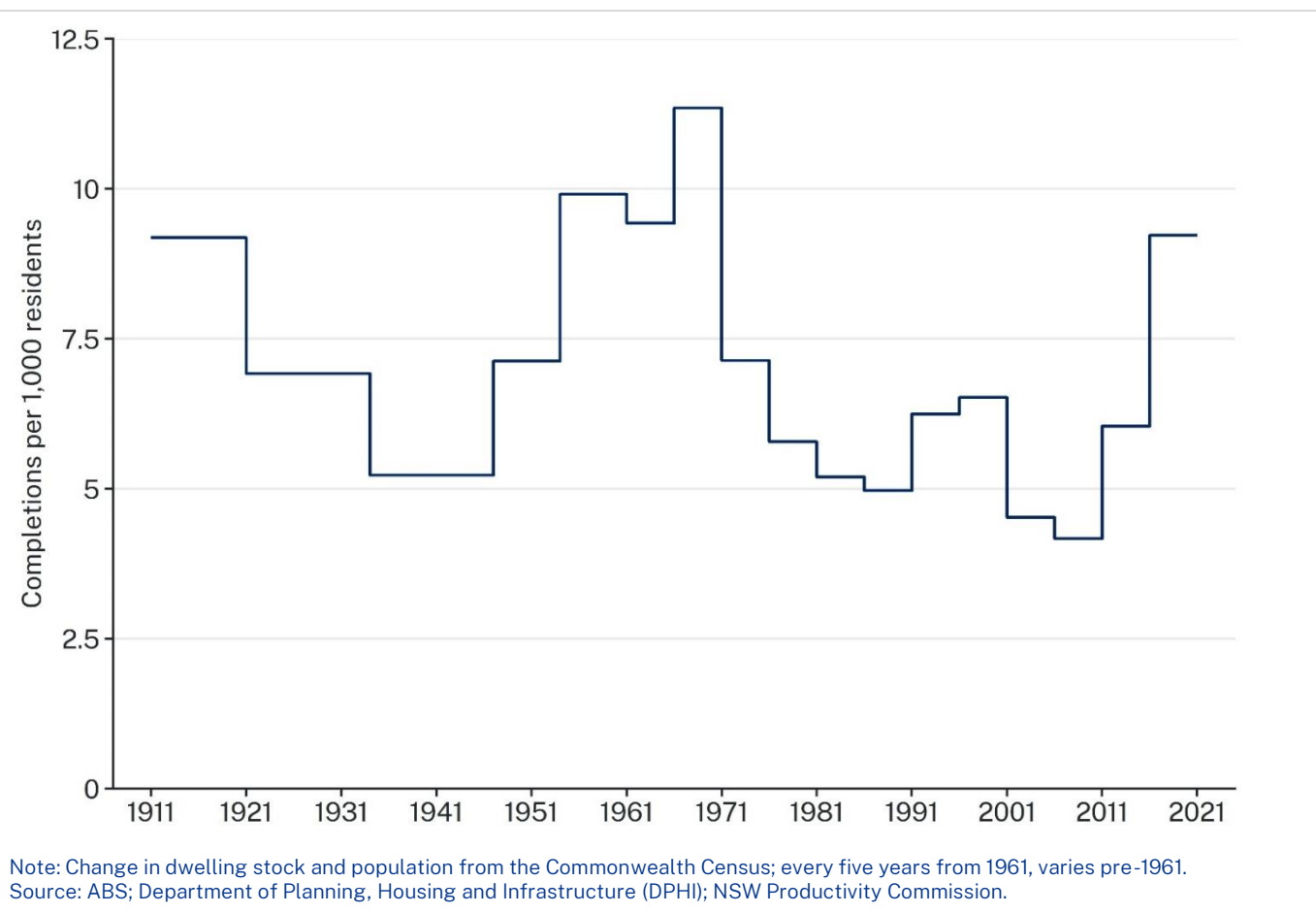
a result; most notably, three-bedroom Auckland dwellings can be rented at 22 to 35 per cent less than they would have been without the changes (Greenaway-McGrevy, 2023).

## 1.2 The biggest gains will go to low- and middle-income earners

A high-productivity, high-amenity city like Sydney will naturally attract new arrivals – either from other parts of Australia or from overseas. Ideally, these newcomers will be accommodated by a growing housing stock, with only modest increases in housing costs (that is, prices and rents).<sup>4</sup> But if new home building is sluggish, population growth will slow, prices and rents will rise, and the inadequate housing stock will be rationed to those with the greatest financial means. In this sense, high housing costs operate like a regressive tax, with the burden falling disproportionately on low-income renters and future generations. Unfortunately, New South Wales has significantly curtailed the supply of new housing since the 1970s (Figure 1). The rate of homebuilding in the early 2000s fell even lower than during the Great Depression and World War II.

**Figure 1: Sydney has built less housing per capita in recent decades**

Net dwelling completions per 1,000 residents, annualised, Greater Sydney

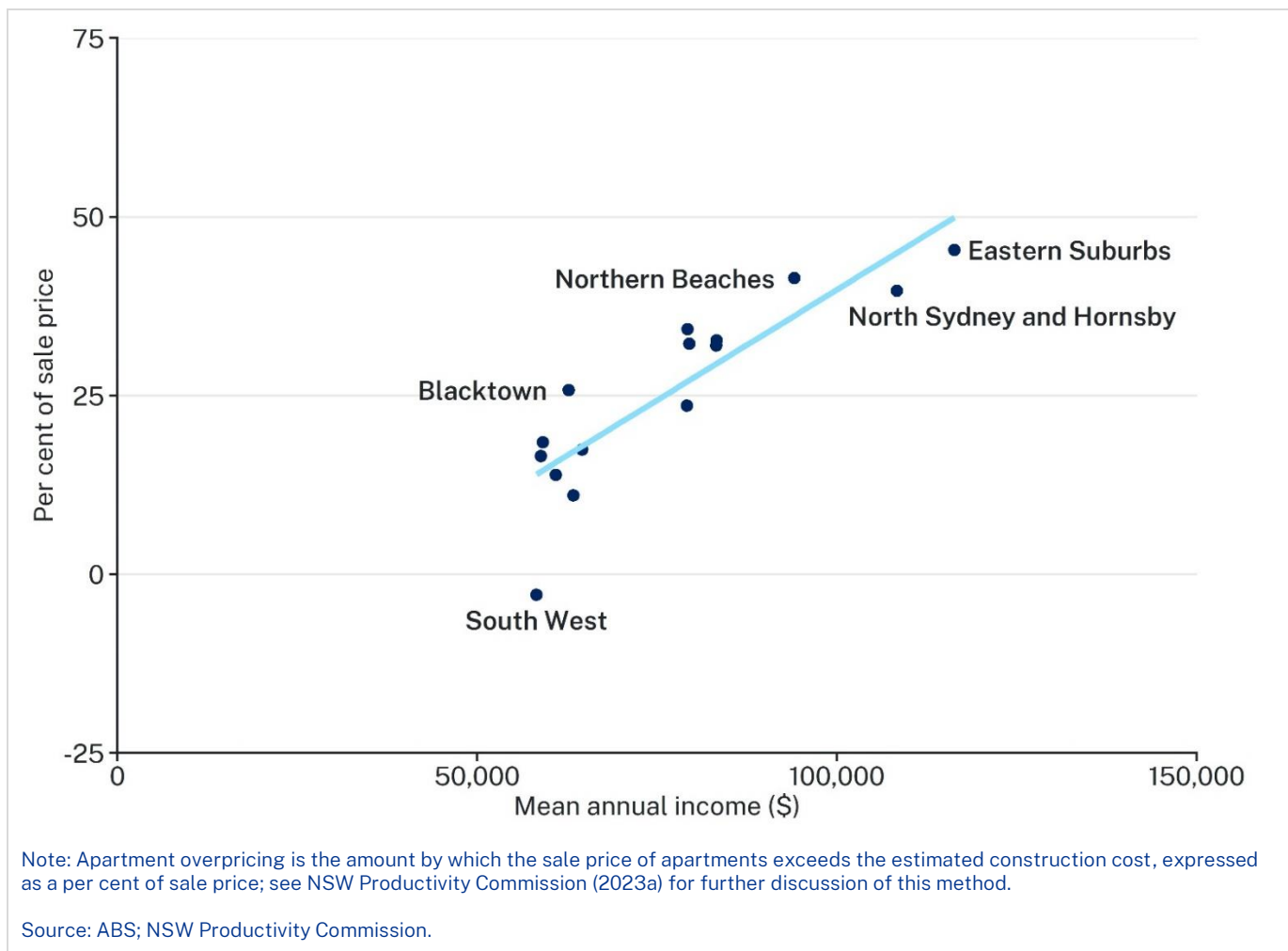


<sup>4</sup> In the absence of planning restrictions, housing costs should increase in line with marginal construction costs. The marginal cost curve for high-density housing in Australia’s capital cities is relatively flat, at least at current building densities, suggesting large increases in population could be accommodated with relatively small increases in unit dwelling costs (Kulish, Richards & Gillitzer, 2012; Jenner & Tulip, 2020).

Unsurprisingly, the parts of Sydney we have previously identified as having the largest shortage of apartments also have the highest average incomes (NSW Productivity Commission, 2023a, Figure 2). The reason is simple: only high earners can afford high home prices and rents.<sup>5</sup>

**Figure 2: High-income earners dominate overpriced areas**

Greater Sydney Statistical Area Level 4 (SA4) regions by apartment overpricing and mean annual income, 2019-20

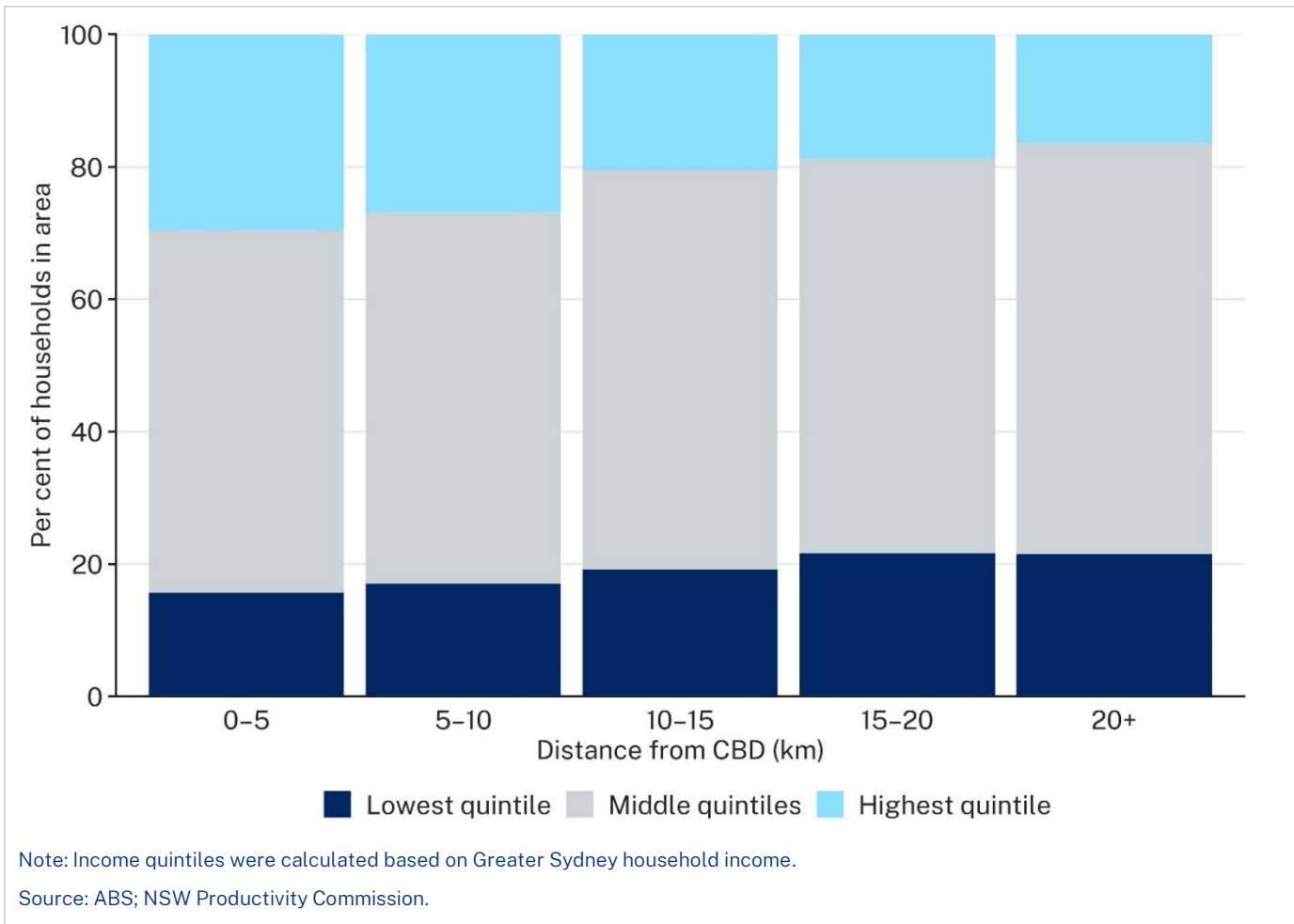


Indeed, low-income households have been losing the bidding war. In 2021, almost twice as many upper-income households lived within five kilometres of the CBD compared to the lowest income households (Figure 3). When housing is expensive, most low-income households have no choice but to live where jobs are harder to come by, where public amenities like the beach are less accessible, and where it is hotter.

<sup>5</sup> Gaubert & Robert-Nicoud (forthcoming) show that so long as housing is a necessity, desirable and productive locations will be dominated by high earners who can outbid those on lower incomes.

**Figure 3: Lower-income households are further from Sydney's CBD**

Households within each five-kilometre interval from Sydney's CBD, by income quintile, Greater Sydney, 2021



Low-income households also devote more of their income to meet their basic housing costs wherever they live. New South Wales' lowest-income households spent 33 per cent of their income, on average, on housing in 2019/20. This is triple the share of the richest households, who spend around 10 per cent of their income.<sup>6</sup>

The housing cost burden on the poorest households has also increased over time, while the highest-income households are still spending the same amount of their income on rent as they were in the mid-1990s (Figure 4).

Renting households in Greater Sydney were particularly hard hit, with low-income households spending between one-third and half of their after-tax income on rent in 2021 (Figure 5).<sup>7</sup>

<sup>6</sup> This is consistent with the idea that housing is a subsistence good, or a necessity. In economic terms, demand for housing services is income inelastic (Albouy, Ehrlich & Lui, 2016; Finlay & Williams, 2022).

<sup>7</sup> These patterns are consistent with a vast US literature that shows high housing costs impose a housing-inclusive 'wage penalty' on lower-skilled workers (Hoxie, Shoag & Veuger, 2023; Diamond & Moretti, 2021). Relatedly, Parkhomenko (2022) argues that expensive housing leads to a hollowing out of the middle class, since these households are better able to relocate in response to price shocks.

Figure 4: Rising housing costs have squeezed low-income earners most

NSW household disposable income spent on housing costs over time, by income quintile

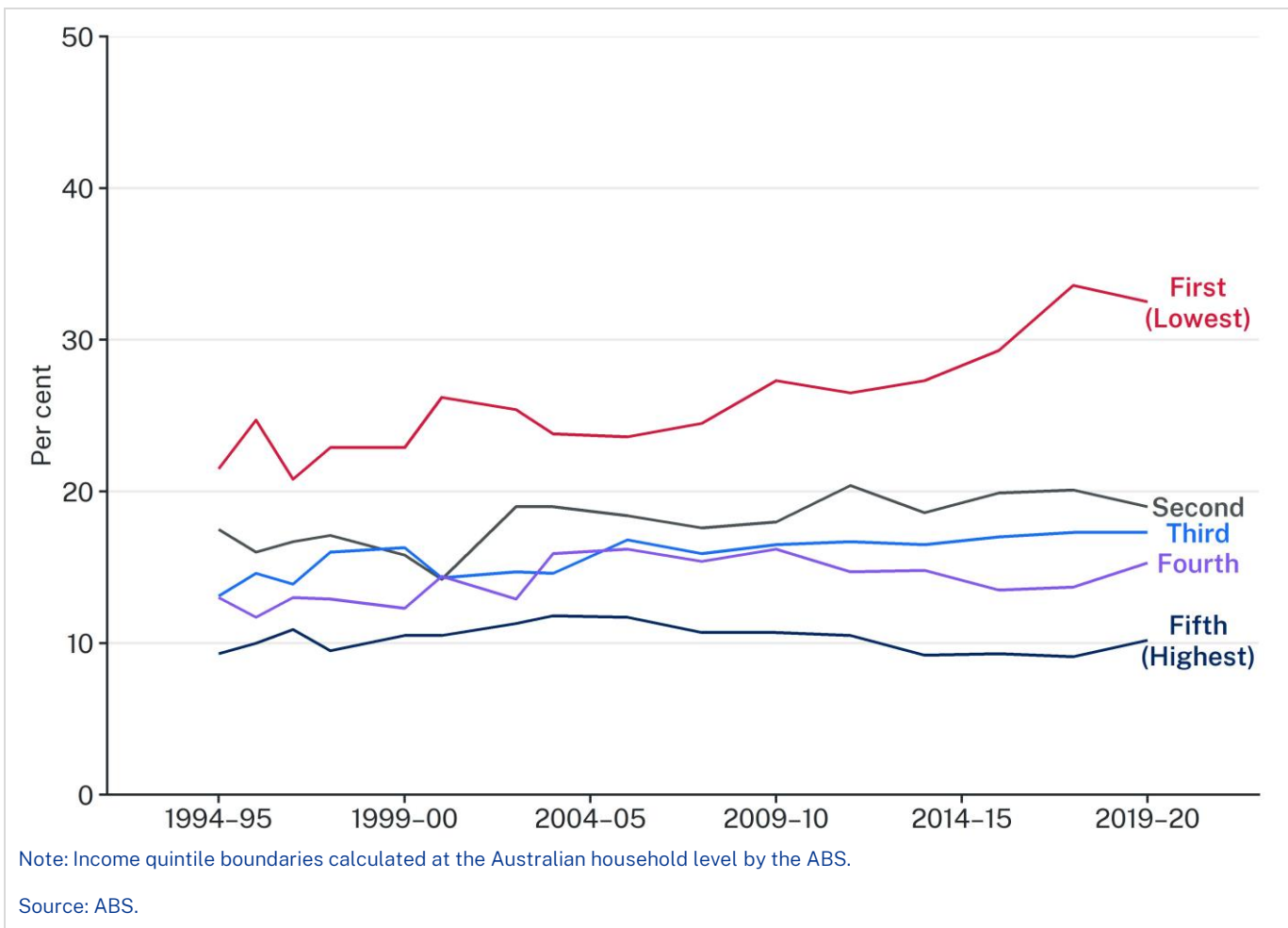
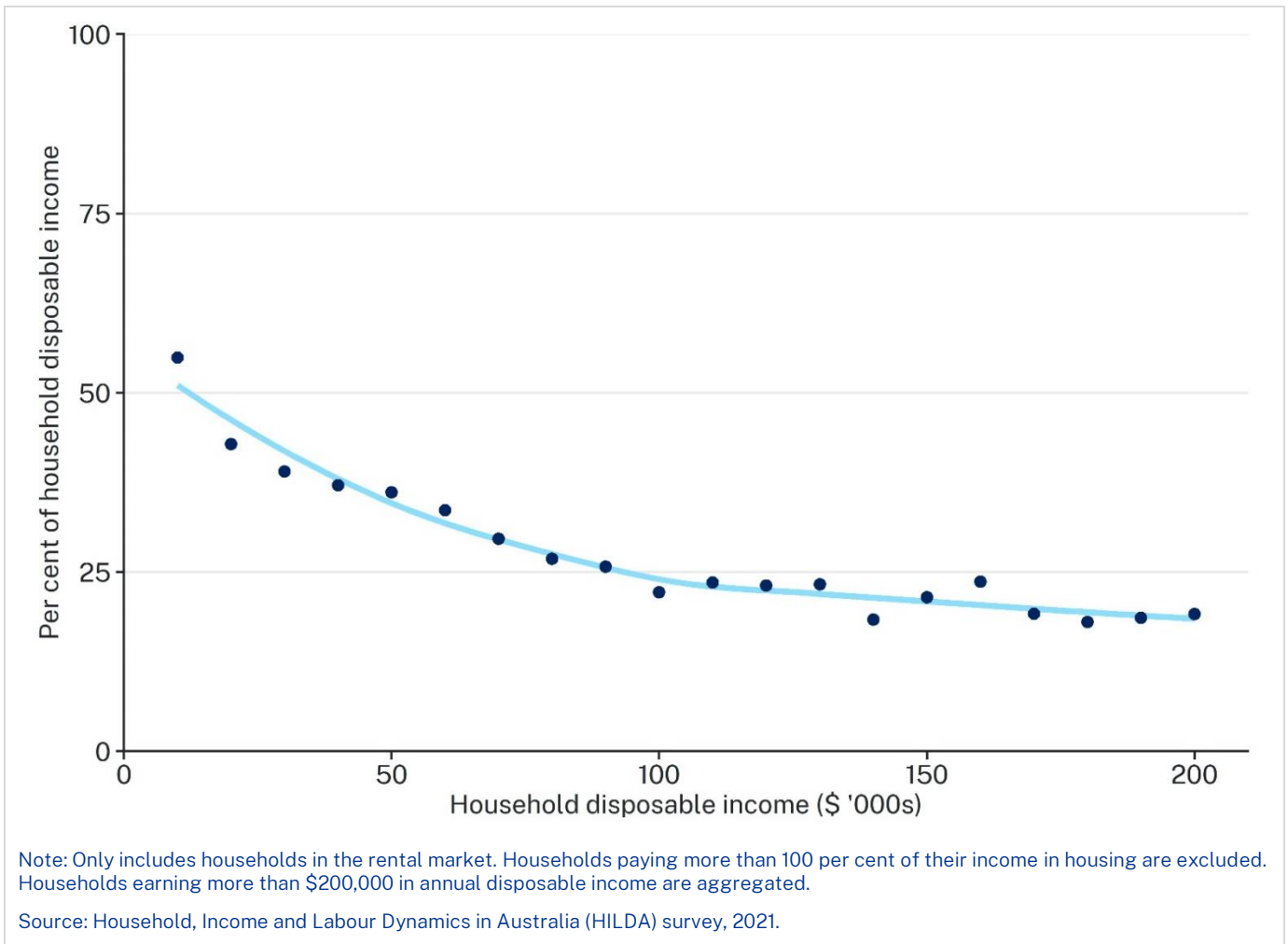


Figure 5: Lower-income households spend more of their income on rent

Rent expenses against household disposable income, Greater Sydney, 2021



### 1.3 Housing affordability reduces homelessness

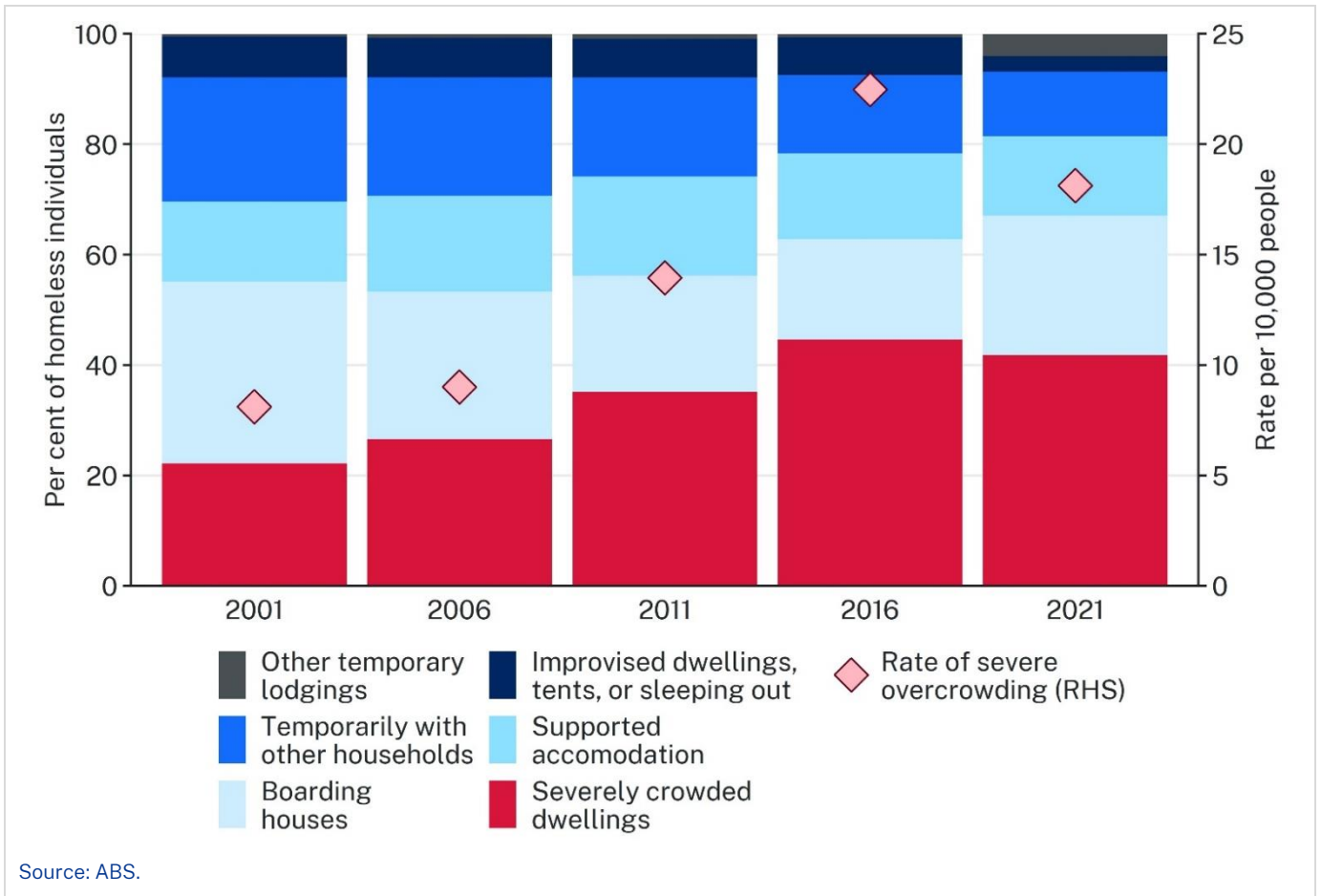
Because they spend so much of their incomes putting a roof over their heads, low-income households have less left over to save or to cover other expenses. This makes them less resilient to negative events like losing a job, unanticipated medical expenses, or cost-of-living increases. Being unable to respond to these kinds of setbacks can push lower-income households into homelessness (Batterham et al., 2021). Higher-income households can better manage these events by reducing discretionary spending, drawing down on savings, or relocating to more affordable areas.

People often assume homelessness is driven by characteristics some homeless individuals have, like mental illness and/or drug abuse. But structural factors play a major role, especially in determining the overall level of homelessness. In Australia, housing affordability is an important factor in entry into and exit from homelessness (Productivity Commission, 2022; Johnson et al., 2018; Bevitt et al., 2015). Studies of US cities similarly find that homelessness is related to high housing costs (Colburn & Aldern, 2022; Horowitz, Hatchett & Staveski, 2023). Housing stress is one of the most common reasons for seeking specialist homelessness services (Australian Institute of Health and Welfare, 2021).

Homelessness is often narrowly understood as ‘rooflessness’ or ‘sleeping rough’ (Pawson, 2021). But living in a severely overcrowded dwelling is also recognised as a form of homelessness. The proportion of NSW residents living in severely overcrowded dwellings has also risen sharply since

2001, and it has been the most common form of homelessness in NSW since 2011 (Figure 6).<sup>8</sup> This form of homelessness is likely driven by rents rising relative to the incomes of the least well-off (Brackertz, Davison & Wilkinson, 2019).

**Figure 6: Overcrowding is the most common form of homelessness in NSW and has been rising over time**  
Homelessness type and number of people living in severely overcrowded dwellings over time, NSW



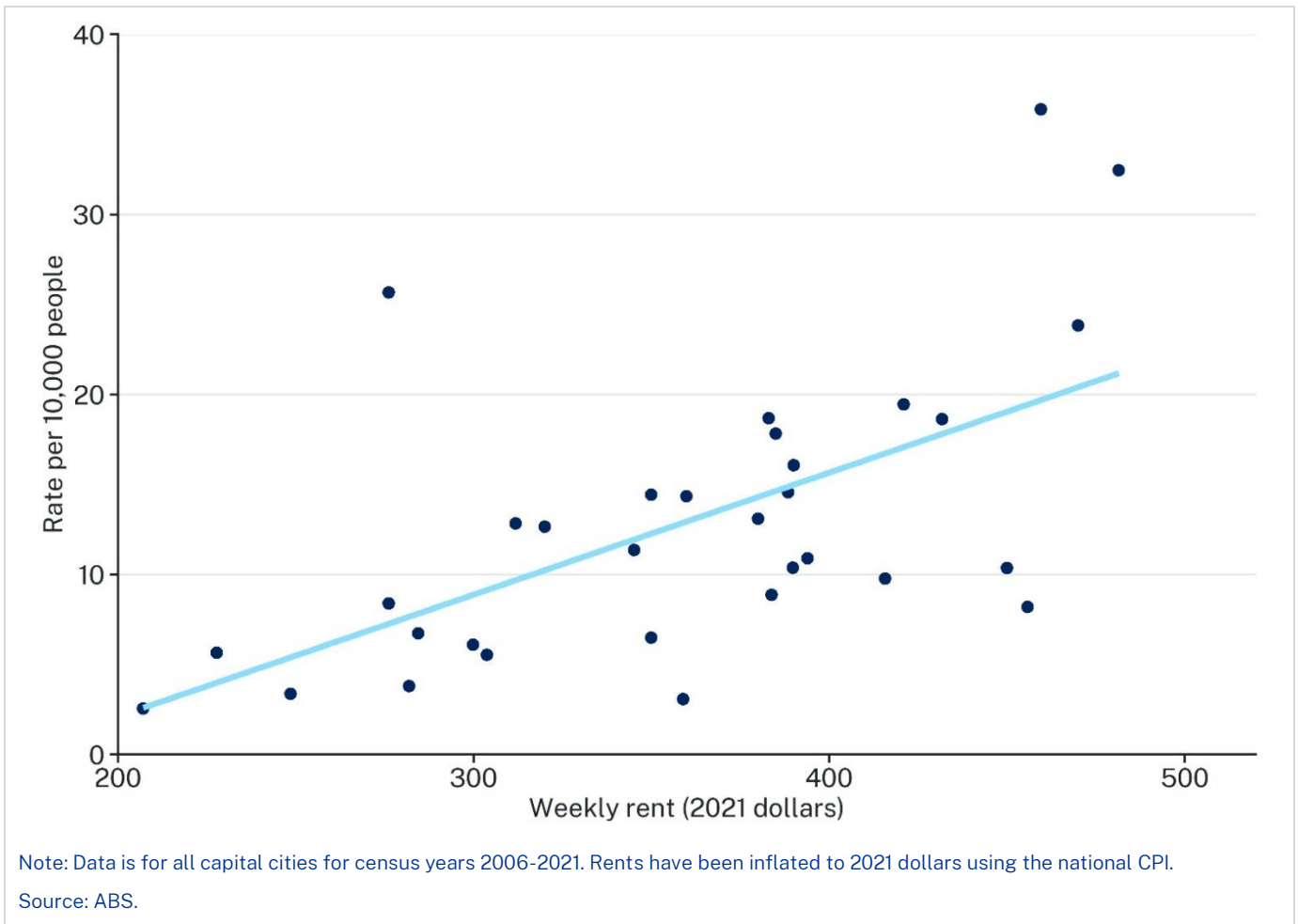
Indeed, across Australian capital cities, there is a strong positive relationship between median rents and the rate of overcrowding (Figure 7). Cities with higher real rents tend to see a higher proportion of their population living in severely overcrowded dwellings. Living in overcrowded housing has been associated with poorer health and increases the risk of domestic and family violence (Productivity Commission, 2022).

<sup>8</sup> The ABS defines a severely overcrowded dwelling as where four or more additional bedrooms would be required to meet the Canadian National Occupancy Standard (a benchmark for how many bedrooms are required for particular living arrangements). The dip in the incidence of overcrowding in 2021 likely the result of COVID-19 pandemic policy responses (Australian Housing and Urban Research Institute, 2023).



Figure 7: Overcrowding has increased with rents across Australian capital cities

Number of people living in severely overcrowded dwellings against median rent



## 1.4 More housing lets families access high-scoring schools

One of the most important ways state governments can make societies fairer and more equal is by offering everyone access to quality public education. Historically, a high proportion of NSW residents, from various backgrounds and income levels, have chosen to send their children to public schools (Carroll & Harris, 2023).

But access to public schools is dependent on where families can live. Public schools generally only accept students living within their ‘catchment area’. School choice therefore factors into a households’ housing choice: real estate agents use school catchment areas as an important selling point, and real estate websites now give users the option to search for homes by catchment area.

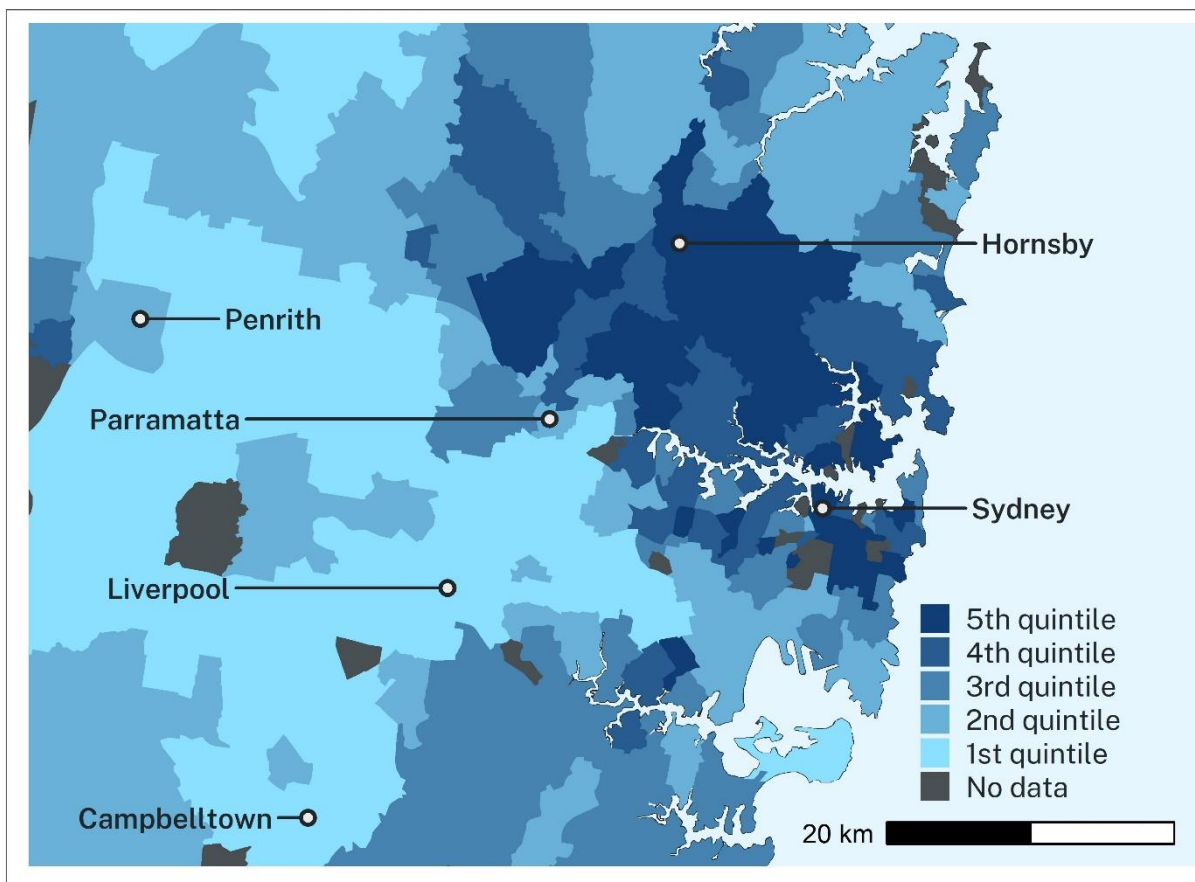
In New South Wales, households are paying a premium to live in certain catchment areas. On average, households pay a 2.7 to 3.3 per cent premium to reside within a high-scoring school zone (Tchatoka & Varvaris, 2021).<sup>9</sup> For a Sydney house of \$1.5 million, this would translate to an additional \$50,000. This likely understates the total cost of living close to high-ranking schools. It only captures the *extra cost* of being on either side of a catchment boundary, rather than the full cost of living in a higher-scoring area.

<sup>9</sup> Apartments and units were excluded from this study.

Sydney’s high-scoring primary schools are clustered in certain parts of the city – including northern Sydney, the Eastern Suburbs, and Inner West (Figure 8). A family that can pay the high entry price to live in these areas will have abundant schooling options, whereas those who cannot afford to live in these areas have fewer choices.

**Figure 8: Sydney’s high-scoring public primary schools are clustered in certain parts of the city**

Year 3 National Assessment Program – Literacy and Numeracy (NAPLAN) numeracy score quintile, by postcode, 2022



Note: Average Year 3 NAPLAN numeracy scores in each postcode are weighted by school size. No data indicates a postcode where a public primary school is not present.

Source: Australian Curriculum, Assessment and Reporting Authority (ACARA); NSW Productivity Commission.

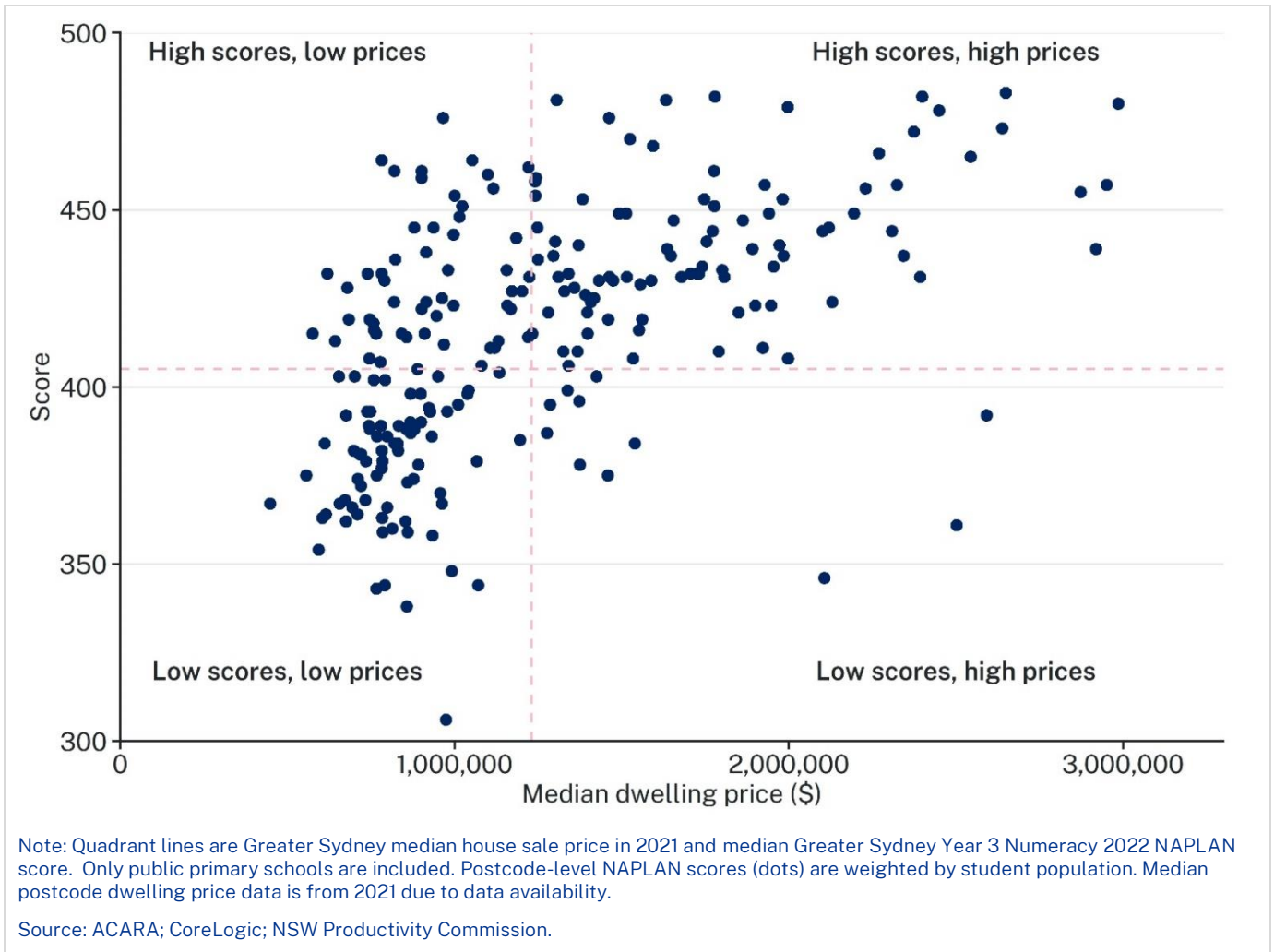
The expense of living near Sydney’s high-ranking schools is particularly harmful for students from lower socio-economic backgrounds. An OECD study found that Australian students from disadvantaged backgrounds who attend advantaged schools on average score 86 points higher in Programme for International Student Assessment (PISA) science testing than their peers attending disadvantaged schools (OECD, 2018). This is equivalent to three years’ schooling.

While areas with high-scoring schools do tend to have higher housing costs (Figure 9), there are also some high-scoring public schools in areas with more affordable housing options. The top left quadrant of Figure 9 shows some areas with high-scoring schools that have relatively low median dwelling prices; for example, Erskineville, Kensington, Artarmon, and Burwood. The availability of apartments in these areas makes access to high-scoring schools possible for lower-income families that are willing to economise on space. A two-bedroom unit in an area like Artarmon might cost a similar amount to a small free-standing house in Sydney’s outer suburbs. Some families are willing to make this kind of trade-off, and they should have the choice.

Allowing more homes to be built in areas with high-scoring schools can put them within the reach of more families. Of course, schools do have capacity constraints, and growth in an area can require upgrades, new school builds, or catchments to be redrawn.

Figure 9: Affordable housing is available in some high-scoring school areas

Median dwelling price (2021) and mean Year 3 Numeracy NAPLAN score, by postcode, 2022



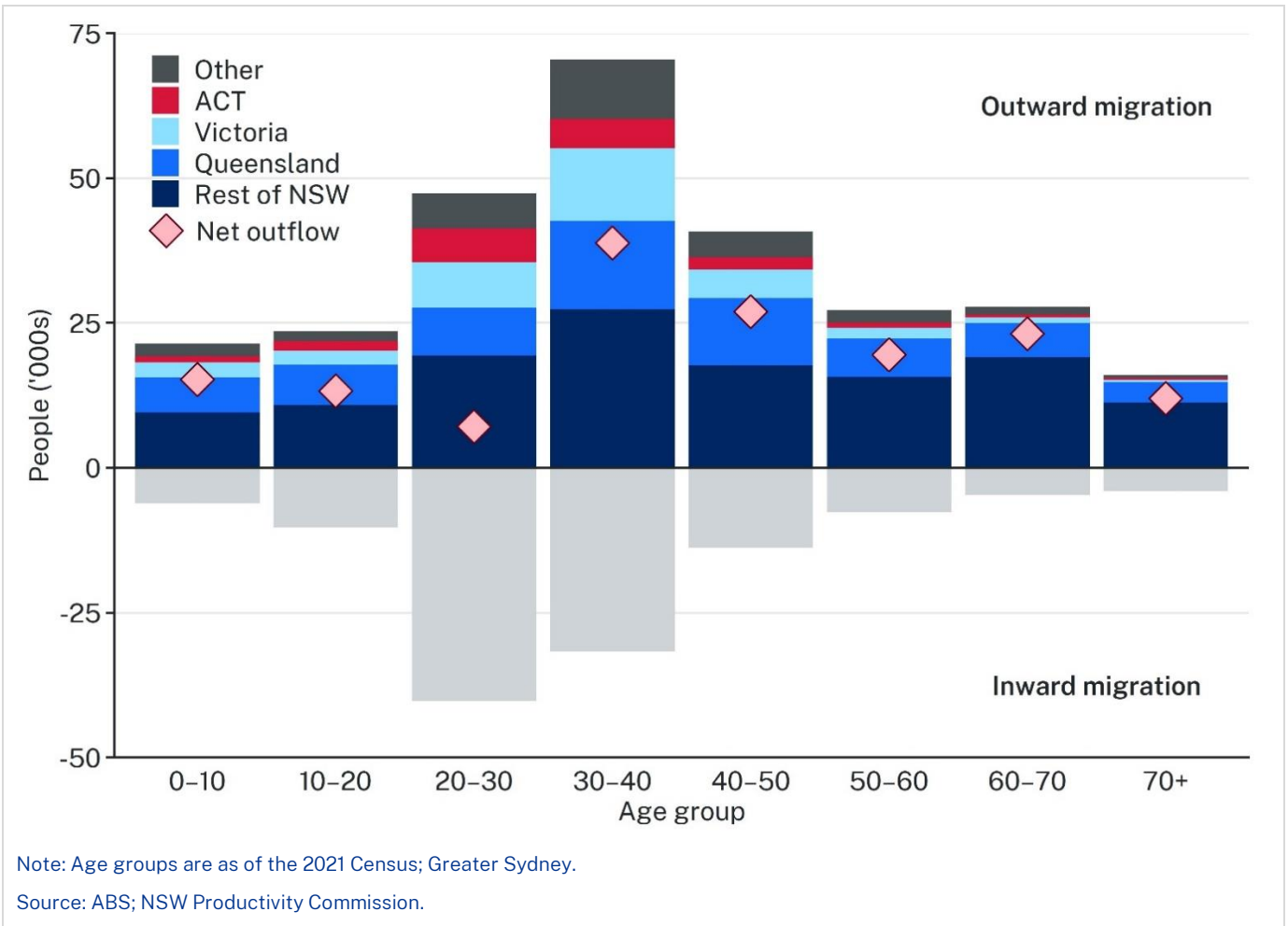
## 1.5 Abundant housing boosts the economy

The discussion so far has focused on how constraints on housing supply directly affect NSW households through high house prices and rents. If we zoom out though, constrained residential construction also drags on the state's overall productivity and economic growth.

To understand why, we can start by noting this fact: while Sydney has among the highest average wages in Australia, over recent years it has consistently lost population to other states and regional NSW (Figure 10). It is not only 'grey nomads' who leave Sydney, either. Rather, approximately two out of every three departures are from the working-age population – that is, those aged between 25 and 64. And 30-40-year-olds make the largest contribution to outflows, at around 35,000 net departures between 2016 and 2021.

**Figure 10: Sydney’s young adults are moving to more affordable areas**

Migration from Sydney to other destinations and migration to Greater Sydney, 2016 to 2021



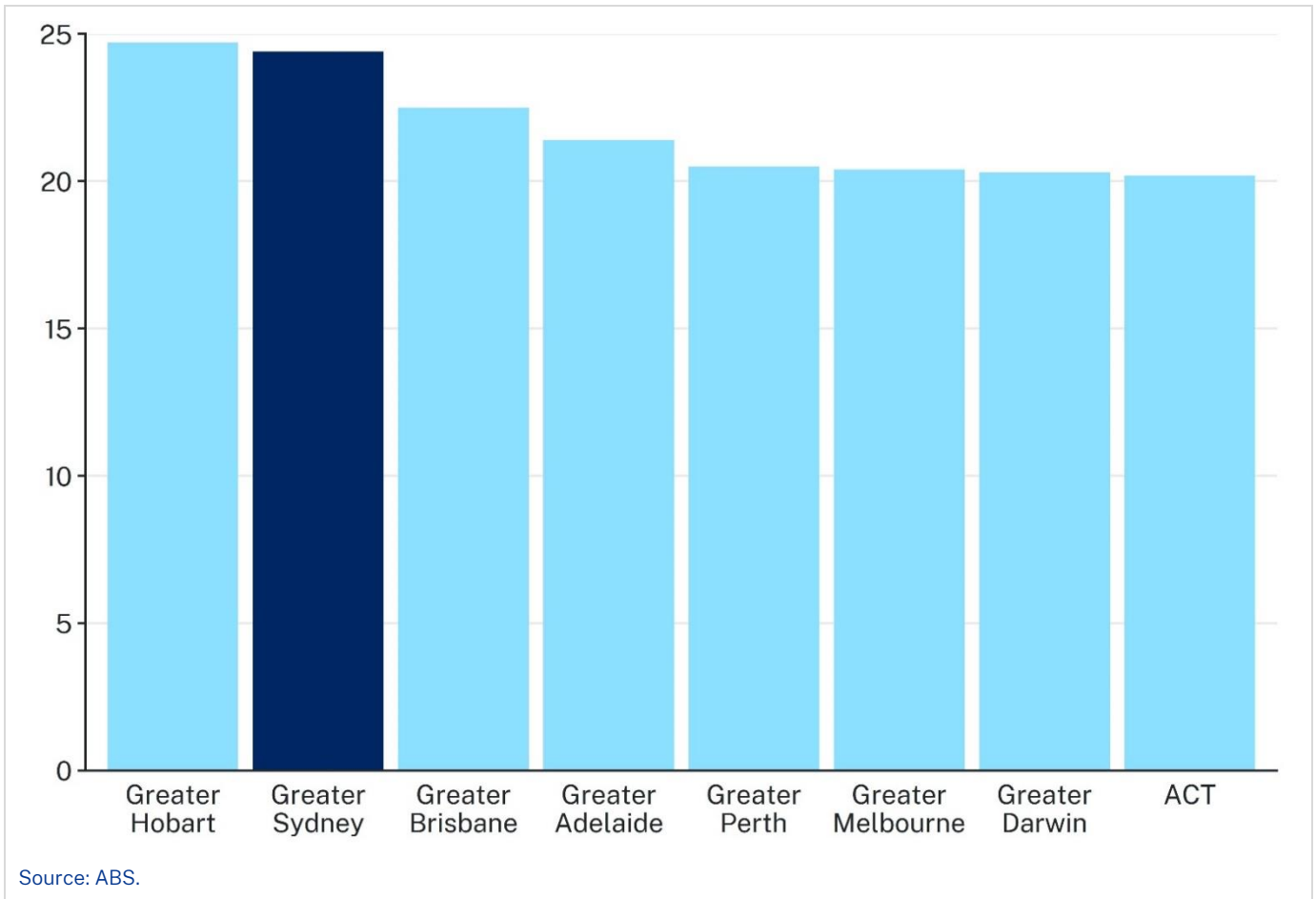
Why do we see this outmigration from Sydney and New South Wales? A simple explanation is that Sydney’s high housing costs erode much of the benefit of its higher wages. In Sydney, the typical household living in a private rental spends almost a quarter of its income on housing (Figure 11). In Melbourne, this figure is only one-fifth, or 20 per cent. This difference implies significant differences in real living standards.

To make the comparison more tangible, consider a couple who are both mid-career teachers, at the end of their lease and deciding whether to stay in Sydney or relocate to Melbourne. Both can expect to earn \$1,300 per week after tax – or \$68,000 per year – in either location (Education NSW, 2022; Education Victoria, 2023). At face value, they appear equally well-off in either city. The story changes, however, once we account for housing costs. A typical dwelling in Sydney costs \$34,000 a year to rent, but only \$26,000 a year in Melbourne. This means the couple’s ‘real’ income, or wages net of housing costs, is about eight per cent higher in Melbourne than Sydney.<sup>10</sup>

<sup>10</sup> This pattern is consistent with international cities known to have unresponsive, or inelastic, housing markets. For example, in London median household incomes are 14 per cent higher than the UK average before housing costs, but only 1 per cent higher than the UK average after housing costs (Phillips & Agrawal, 2020). Ganong & Shoag (2017) demonstrate the significance of land use regulations and high housing costs in reducing migration from low-income to high-income areas.

**Figure 11: Renters give up more of their income in Sydney than in other capitals**

Median ratio of private rental housing costs to gross household income by capital city, 2019-20



As we can see, high housing costs price workers out of living near their best employment prospects. This inevitably lowers labour productivity. Why? Put simply, workers produce less output per hour when they cannot access their most suitable job. This is why several US-based studies find large productivity benefits from relaxing planning restrictions. These benefits range from two to 10 per cent of gross domestic product (GDP) (Bunten, 2017; Glaeser & Gyourko, 2018; Herkenhoff, Ohanian & Prescott, 2018; Hsieh & Moretti, 2019; Duranton & Puga, 2023).

How big might these effects be in Australia? We provide some first-pass, illustrative calculations (see Appendix A for details).<sup>11</sup> Our results suggest that relaxing housing supply restrictions could boost total output by up to 1.5 per cent of GDP.<sup>12</sup> This boost comes from the fact that cheaper housing in high-wage locations lets more people improve their earning potential.

In our illustrative calculations, Sydney would grow its workforce by about 45 per cent, or 1.3 million people. Canberra, Perth, Brisbane, and Melbourne would also see sizeable gains in employment, reflecting their urban wage premiums. Most of the new arrivals would come from rural and regional areas, which currently have below-average wages.

<sup>11</sup> We use the simplified model sketched out by Glaeser & Gyourko (2018), instead of the full-scale Rosen-Roback model employed by Hsieh & Moretti (2019) and others, due its tractability and feasibility to execute using publicly available Australian data.

<sup>12</sup> The estimate is lower for Australia than the U.S. mainly because income inequality is much less widespread across Australian cities than US metros. To illustrate, in our estimates, the largest proportional increase in employment occurs in Canberra, which grows its workforce by more than half. In the US, by comparison, the largest increase in employment is in New York, where the workforce approximately doubles. The estimate also does not capture any benefit that would be generated by intra-city migration, which may be more important in an Australian context.

In practice it is more than just housing costs that stop people moving. Family connections and location-specific amenities, in particular, matter a lot to people. This is an important limitation of this type of analysis.<sup>13</sup> Our estimates imply, for example, that the Gold Coast would lose a considerable share of its workforce, since wages there are lower than average. But for many residents, the lower wages are a worthwhile trade-off for access to pristine beaches, good surfing, and a vibrant nightlife. Similarly, our estimates imply that Canberra's population would increase significantly, reflecting its above-average wages. But this does not allow for the fact that a wage premium may be necessary to attract coastal workers who are not used to colder winters and hotter summers.

Our findings point in a similar direction to some recent analysis by the Committee for Sydney (2023). The Committee estimates that Sydney's poor housing affordability costs \$10 billion per year. The loss flows from:

- **A loss of talent:** Cities with expensive housing find it harder to retain talented workers because they make it more difficult to purchase a property, save for a deposit, or rent affordably. The Committee estimates this will cost Greater Sydney at least \$1.5 billion per year over the next decade, with at least 10,000 workers per year migrating to other cities, and fewer international students staying on upon completing their studies.
- **Reduced innovation:** Expensive housing means fewer inventors and innovators will call Sydney home. That means fewer new businesses, fewer patents, and less research and development (R&D) spending. The Committee estimates this could be costing Sydney \$2.9 billion per year.<sup>14</sup>
- **Lower productivity:** Extra labour costs must be paid to compensate workers for expensive housing and retain talent (\$3.2 billion); workers earn lower disposable income and therefore spend less (\$2.5 billion); and productivity is lost to inefficient commutes (\$1.1 billion).

## 2 What we gain from allowing density

How a city grows is also important to its economic, environmental, and social fabric. Dense, walkable cities tend to be more productive, innovative, and resilient to a changing climate than their low-density, sprawling counterparts.

When we speak of 'allowing density', we are talking about giving more people the choice to live in locations that suit their needs. Sydneysiders who wish to, and can afford to, live in big inner-city houses with gardens can do so. But not everyone wants, or can afford, this option. Many would like to live in an affordable, well-located apartment with a community garden or public park nearby. They should have that option too.

This is not to say that there are not costs or challenges in accommodating more people in the same locations. But the best available evidence suggests that society benefits overall from doing so (Ahlfeldt & Pietrostefani, 2019).<sup>15</sup>

Ahlfeldt & Pietrostefani (2019) review a wide range of literature and identify a range of both positive and negative effects of density, including higher wages and rents, shorter travel, worse congestion, and air pollution. They also identify a range of *associations*, where the causal link hasn't

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<sup>13</sup> Another limitation of our analysis is that we omit human capital from the discussion, as do Glaeser & Gyourko (2018). This is important because it may be that differences in human capital mean that new entrants to Sydney, Melbourne, etc, cannot earn the average wage of incumbents in these cities. See Card, Rothstein & Yi (2023) for a detailed discussion of these dynamics in the U.S.

<sup>14</sup> The authors assume 10 per cent fewer patents over a decade than would have otherwise occurred because researchers and inventors move elsewhere. They further assume 10-20 fewer well-funded startups emerge each year over five years.

<sup>15</sup> Ahlfeldt & Pietrostefani (2019) suggest that a one per cent increase in density leads to a 0.05 per cent increase in quality of life for people living in high-income countries. These results are consistent with more recent research that finds relaxing existing height constraints could increase welfare by almost 6 per cent in developed countries (Ahlfeldt, Baum-Snow & Jedwab, 2023).

been demonstrated, but are important considerations for policymakers. These include increased innovation, increased variety of consumer goods, a greater ability to preserve green space, reduced crime, and better health outcomes.

Closer to home, recent analysis by Infrastructure Victoria found that denser potential growth path scenarios outperformed more dispersed scenarios on nearly all metrics (Box 1).

#### **Box 1: Compact growth offers large benefits**

Infrastructure Victoria is using scenario analysis aiming to understand the consequences of choosing different growth paths for the state. Their analysis explores five different urban growth pathways:

- dispersed city: Melbourne's growth areas have many more detached homes
- consolidated city: Melbourne's inner and middle areas have many more medium-density homes
- compact city: Melbourne's inner areas have many more high-density homes
- network of cities: regional centres have many more homes
- distributed state: regional towns and rural areas have many more homes.

The scenario analysis found that the compact city scenario would deliver tens of billions of dollars in additional benefits over a dispersed approach. The biggest benefits were derived from allowing people to live in the locations that suited them best. This scenario also increased employment, incomes, and had environmental benefits of reduced land usage and greenhouse gas emissions.

The compact city scenario created much more affordable housing in Inner Melbourne, better job accessibility, higher employment rates, and higher wages than all other scenarios. In contrast, in other scenarios, poor housing affordability pushes households further from the city centre.

Source: Infrastructure Victoria (2023), CIE (2023).

It is not hard to see why dense, urban centres generate positive economic spillovers. Cities with truly global scale — for example, New York, London, and Tokyo — create abundant opportunities for workers to interact and learn from others with valuable knowledge in their industry. The larger pool of labour in these cities also provides more opportunities for workers to find the employment that best suits their skillset and interests (and vice versa for businesses finding suitable employees).

Residents of these cities also benefit from their economies of scale. For example, local infrastructure with high fixed costs — such as bridges, heavy rail, or shared sporting facilities — are much more feasible to provide when they can be enjoyed by a larger population in a given area.

Similarly, the case for housing density in a changing climate is also straightforward. Providing more homes in well-located suburbs allows more people to access locations that have milder climates, and that are less exposed to natural hazards such as floods and bushfires. An additional environmental payoff comes from shortening family members' commutes to work, school, the shops, and the beach, which reduces pollution within our city.

We discuss these benefits in more depth in this section.

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## 2.1 Density boosts wages and innovation

Cities exist, fundamentally, because people are more productive when they congregate together (Glaeser, 2008). Research in various global economies has found that workers in larger and denser cities earn more than their small-city counterparts.<sup>16</sup> Australia appears to broadly follow this pattern: workers in Sydney earn an average of \$77,000 annually, almost 25 per cent more than in Adelaide, Australia's fifth-largest city (Figure 12).

Of course, this could reflect decisions by more skilled workers to locate in larger cities (rather than higher density boosting their productivity). The best available evidence, however, suggests that city size and density actually lead to higher productivity. A reasonable interpretation of the literature is that a 10 per cent increase in employment density could *cause* wages to increase by up to 0.4 per cent (Ahlfeldt & Pietrostefani, 2019).<sup>17</sup>

Why do workers in large cities earn more? Evidence suggests it is largely because they learn more, and more quickly.<sup>18</sup> Between 50 and 75 per cent of the urban wage premium is due to the more valuable experience workers gain in large cities (De la Roca & Puga, 2017; Baum-Snow & Pavan, 2012).<sup>19</sup> These benefits also appear to be portable: workers continue to earn a premium after they relocate to small- and medium-sized cities (Eliasson & Westerlund, 2023). The premium is larger for those who begin their careers with a high capacity for learning.

Consider a doctor working at a large city hospital. Compared to a counterpart at a small rural hospital, they will likely be exposed to a wider variety of illnesses and treatment options. They will also learn from a deeper pool of colleagues with more specialist expertise than them. These experiences, combined with the doctor's pre-existing natural ability, will likely lead to greater skill development over their career. They can take this highly sought-after expertise with them throughout their career. This underlines the economic payoff to the whole of society from ensuring that young people at the start of their careers can access housing in large and highly productive cities like Sydney.

Large cities also appear to confer an immediate wage and productivity benefit to workers upon arrival. This might reflect firms' greater abilities either to share local infrastructure or to draw upon a wide variety of intermediate input suppliers.

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<sup>16</sup> See Glaeser (2012), Baum-Snow & Pavan (2012), De la Roca & Puga (2017), and Combes, Duranton & Gobillon (2008) for international evidence. Meeke (2022) documents the causal relationship for Australia.

<sup>17</sup> We use 'up to' here to convey that Ahlfeldt & Pietrostefani (2019) note that net of selection effects the results approximately halve.

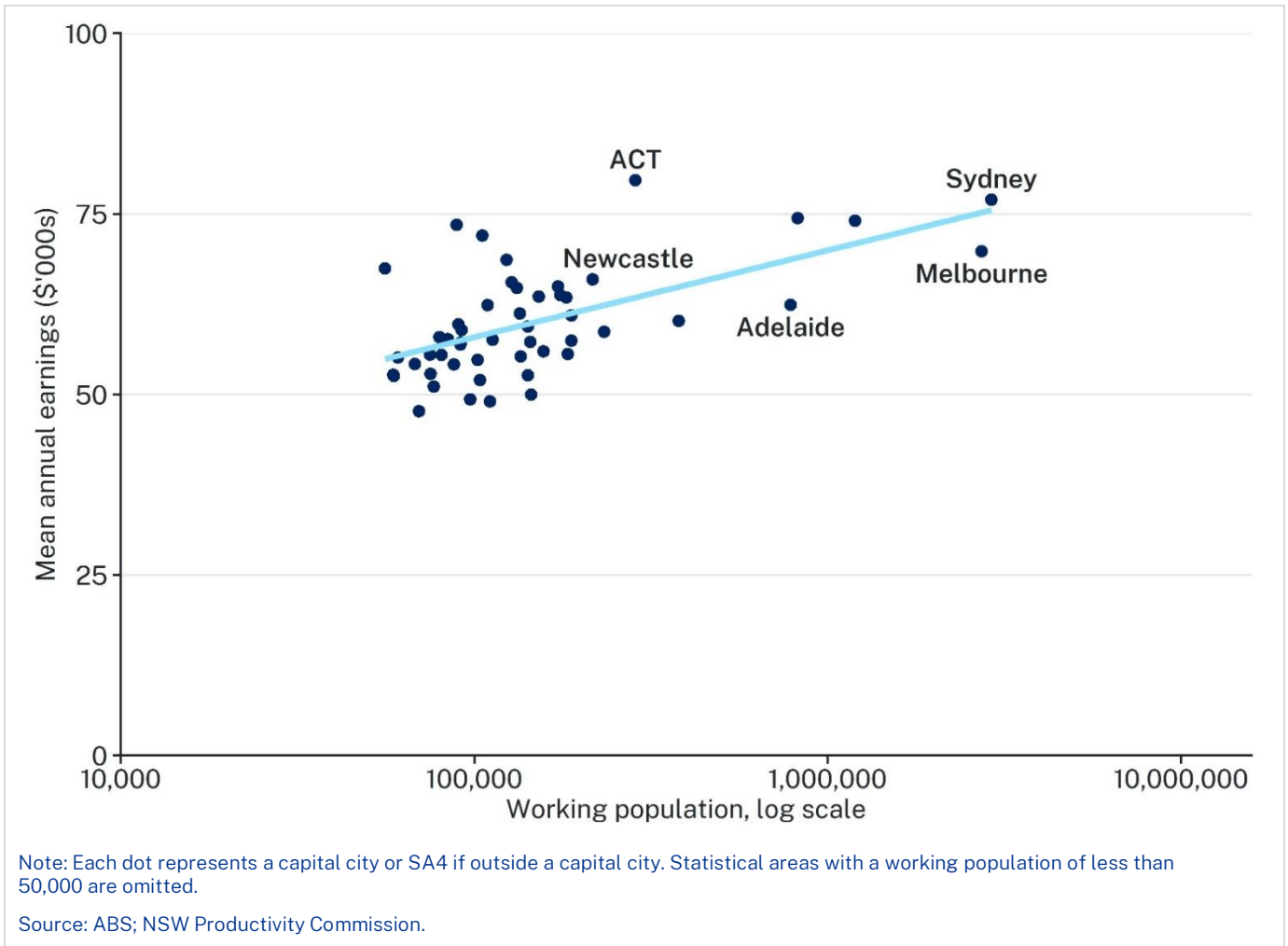
<sup>18</sup> Glaeser and Ressenher (2010) find that in the US this relationship really only exists in 'skilled' cities, with little connection between wages and population in 'unskilled' cities.

<sup>19</sup> Baum-Snow & Pavan (2012) do not find that 'job match quality' plays an important role in explaining higher wages in larger cities.



Figure 12: Workers in larger cities earn more on average

Larger Australian cities by working population and mean annual earnings, 2019-20



Another possible factor in the ‘urban wage’ premium is that larger labour markets might allow workers and firms to find better ‘matches’; that is, employment that most suits workers’ skills and interests, and firms’ business needs. For instance, a journalism and communications graduate in Sydney can potentially work for several different newspapers, radio or television stations, or online publications, or pursue a career in public relations. With so many options available, chances are high that one will suit them. In contrast, the same graduate in rural Queensland will typically have just one local newspaper with whom to ply their trade. Similarly, the local media in a small city will only have a small potential workforce to draw upon.

The evidence for such ‘matching effects’ is mixed. Some research has found that ‘high-quality’ workers are more likely to work for ‘high-quality’ firms in large, dense cities (Dauth et al., 2022). Others, however, have found that ‘match quality’ does not make much of a contribution to the higher wages we see in large cities (Baum-Snow & Pavan, 2012).

Research looking at firms, rather than workers, has also suggested the productivity benefits of building up rather than out (Combes et al., 2012). Firms, like workers, appear to be more productive when they locate in large, dense cities.<sup>20, 21</sup> This effect is found both internationally and in Australia.

<sup>20</sup> Combes et al. (2012) test the hypothesis that large cities may exhibit more cutthroat competition, pushing out lower-productivity firms, against the alternative that large cities make all firms more productive (that is, agglomeration effects dominate). They conclude in favour of agglomeration effects.

<sup>21</sup> It is worth noting that the agglomeration effects appear to be about three times as large for the most productive firms compared with the least productive firms (Combes et al., 2012). Gaubert (2018) has made the point that this difference may mean that sorting could reinforce and magnify agglomeration economies.

Firms in the NSW services sector appear to accrue large agglomeration benefits (Bellofatto, Dominguez & Dwyer, 2022). In contrast, young NSW manufacturing firms may actually be better off locating in non-urban areas as the agglomeration effects are unlikely to justify the higher costs and congestion of inner urban areas.

Large cities also produce an outsized share of innovation and R&D activity. A doubling of employment density is associated with a 20 per cent increase in the number of patents per capita, which is a commonly used proxy for innovation (Carlino, Chatterjee & Hunt, 2007, Ahlfeldt & Pietrostefani, 2019).

As with the effect on workers' wages and productivity, these effects are thought to arise from an increased ability for firms to share inputs, obtain better employer-employee matches, and take advantage of knowledge spillovers (Carlino & Kerr, 2015). Some of the best early evidence for these effects was that the inventors of patents were more likely to cite other inventors when they lived nearby (Jaffe, Trajtenberg & Henderson, 1993). More recent research points in a similar direction: inventors in larger cities tend to cite more locally-produced research than inventors in smaller cities, suggesting density helps facilitate knowledge sharing (Moretti, 2019).

These results suggest that New South Wales pays a social cost when it tries to deal with its housing problems simply by 'decentralising' or 'spreading out' jobs and population across Sydney.

Despite this, some argue that governments should focus on moving jobs. Attempts to relocate employment have had mixed success elsewhere. In the US and Canada, governments have set up enterprise or empowerment zones, trying to raise local employment by incentivising firms to move into disadvantaged areas. But some studies indicate that these incentives create few additional jobs, or that these jobs are filled by people commuting in from other areas (see Peters & Fisher, 2002; Kolko & Neumark, 2010).

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## 2.2 Denser neighbourhoods enjoy more amenity and choice

Density creates amenities for consumers, including better access to shops and places to eat. These amenities tend to scale with the size and density of the population (Ahlfeldt et al., 2015; Kaufman et al., 2022). This growth of available amenities does not necessarily displace or compromise the community's access to distinctive local stores (Glaeser, Luca & Moszkowski, 2023).

Many Sydneysiders would attest to this from firsthand experience. Residents of denser inner-city areas have much better access to retail centres – either by car or public transport – than those living in the outer suburbs (Committee for Sydney, 2017). About one quarter of Sydneysiders living in apartments live less than 500 metres from shops and recreational facilities, compared with less than one in 10 of those living in detached homes (McCrinkle, 2017).

Being close to amenities also makes communities more walkable – something many look for when choosing a place to live. Some value being able to walk to a range of restaurants. Others value being able to grab some ingredients for dinner from the supermarket, or to take the kids to a nearby playground without getting in the car. The most 'walkable' neighbourhoods in Sydney, measured by the time to walk to amenities like shops, parks and schools, are concentrated in inner areas (Walk Score, 2023).<sup>22</sup>

Denser neighbourhoods can also help local businesses thrive. If a neighbourhood has enough people, a variety of businesses will spring up to serve it. In some cases, a neighbourhood goes on to become well-known for having a cluster of similar businesses, like restaurants or retailers. At first glance, the idea that businesses would choose to locate near their competitors may seem surprising. It could promote fierce price competition that might reduce profitability for all businesses in the cluster. But, in fact, the opposite can happen: in such a cluster, individual

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<sup>22</sup> The 40 most walkable suburbs in Sydney are within 10 kilometres of the Sydney CBD. Rockdale is the highest-ranked suburb outside 10 kilometres, ranked 47<sup>th</sup>.

restaurants or retailers can benefit from the foot traffic generated by their rivals, particularly if customers are attracted from outside the area by the prospect of wider choice (Leonardo & Moretti, 2022). The historic Dymocks Building on Sydney’s George Street, for example, hosts a cluster of wedding-related businesses: dress shops, jewellers and beauty salons; there are in fact 42 jewellery or jewellery-related businesses in the one building.<sup>23</sup>

There is evidence to suggest that people living in denser cities do enjoy a greater variety of goods and services. US-based estimates indicate that doubling the population of a city is associated with a 20 per cent increase in the number of available grocery products. The residents of more densely populated cities also seem to benefit from lower prices. For instance, they seem to pay less for their groceries and household items on a quality-adjusted basis (Handbury & Weinstein, 2015).<sup>24</sup>

Restaurants provide another example: people living in denser cities enjoy a greater range of cuisines and quality (Berry & Waldfogel, 2010). With a larger customer base, restaurants appear to react by varying their offerings, providing consumers with greater choice on factors like price, quality, and the type of cuisine (Leonardo & Moretti, 2022). This optionality is highly valued. In fact, it appears that much of the benefit that residents derive from increased restaurant choice is from the option to visit a location that matches their preferences, rather than a reduced travel time (Couture, 2014).

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## 2.3 Living close by fosters equality and inclusion

People want to live close to their family and friends – and in denser cities with more varied housing options, more people can. These social connections and networks are vital in their own right. But they also matter to the economy because people can leverage relationships to find jobs, capture new social and business opportunities, better enjoy the amenities available in their city, and benefit from community support. In fact, evidence suggests that:

- when people move, they strongly prefer places where they have more contacts living close by
- about half of the typical costs of moving are related to how the move changes the person’s proximity to their social network (Büchel et al., 2020).

This means that cities that enable proximity to connections matter for our wellbeing.

Because dense, compact cities enable better access to jobs, they can also facilitate greater upward mobility; that is, they can make it easier for individuals to move to a higher income bracket relative to their parents. An Australian study finds that children who grow up in locations with ‘better’ outcomes – e.g. higher parental incomes – experience better outcomes in adulthood, including adult income, educational attainment, and marriage (Deutscher, 2020).

People living in big, dense cities benefit from shorter commute times to work and better access to job-relevant information and social networks, compared to less dense areas. Indeed, people who live farther away from employment centres – particularly those on lower incomes – are more constrained in their ability to look for jobs (Kneebone & Holmes, 2015). Descriptive evidence suggests that upward mobility is higher in cities with shorter commute times, which may act as a proxy for other factors such as lower-income inequality (Chetty et al., 2014).

Greater access to jobs in denser cities is especially important for women and their economic opportunities. This is at least in part because women appear to be disproportionately affected by longer commuting times than men. For instance, a 10-minute increase in commuting time decreases the probability of married women participating in the labour market by more than four percentage points in the US (Farré, Jofre-Monseny & Torrecillas, 2023). In contrast, there is no

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<sup>23</sup> Jewellery-related businesses include gem traders, gold traders, and watch stores.

<sup>24</sup> Handbury & Weinstein (2015) note that prices *appear* higher in larger cities. This is because residents of larger cities disproportionately shop in stores that charge high prices in general and also tend to spend less time searching for bargains.

effect on male participation. The effect for women increases with the number of children in their care, suggesting that gendered parental responsibilities are important in explaining the need to work close to home.<sup>25</sup>

Similarly, women especially benefit from proximity to their family that is enabled by abundant and affordable housing in high-demand neighbourhoods. Married women with young children are four to ten percentage points more likely to be active participants in the labour force when they live close to their mothers or mothers-in-law, compared with those living further away (Compton & Pollak, 2014). This is because family proximity often helps alleviate childcaring responsibilities; for example, having a family member available to pick up a sick child from school can make a significant difference for women in deciding whether or not to continue their participation in the labour force.

Density also fosters inclusion for people of all ages and at different life stages. Areas dominated by large, low-density, freestanding homes do not cater well for younger people moving out of home, or for older people looking to downsize while staying in their neighbourhood. At the same time, high prices and a lack of new housing in these areas tend to lock out young families and new migrants. The result is that local populations are ageing faster than otherwise. Two examples are Haberfield and Mosman, where the median age is eight to nine years older than Greater Sydney as a whole.

In contrast, new housing supply facilitated by increased density brings with it a greater variety of housing types that suits a variety of budgets. This provides more choices for people of all ages.

#### **Box 2: Density works for social housing**

The NSW Government provides and funds social housing services to support households in two broad cohorts, or groups:

- those that will need social housing for an extended period –the ‘safety net cohort’
- those that can be assisted to achieve housing stability and greater independence, and therefore have more temporary needs – the ‘opportunity cohort’.

To maintain existing service levels, further investment is needed by governments and non-government partners. The priority waiting list for housing – typically including those experiencing homelessness – has increased from 4,511 at end-June 2013 to 8,163 at end-October 2023 (Department of Communities and Justice NSW, 2021, and Department of Communities and Justice NSW, 2023). Meanwhile, the stock of social housing has declined as a share of the total dwellings (NSW Treasury, 2023).

Social housing residents also need the housing to be in convenient locations. As with market housing residents, social housing residents value easy access to public transport, public open space, education and health services, and – particularly for the opportunity cohort – access to employment, education, and training. The productivity benefits of well-located social and affordable housing include access to work opportunities, but also broader training (such as financial literacy), and access to social networks in mixed-income neighbourhoods (Nygaard & Kollmann, 2023).

The type of social housing need is changing too. Households are typically smaller; increasingly, individuals or couples that do not need a three-bedroom suburban house. In inner areas, the demand for smaller dwellings is even stronger.

The NSW Government has been using a mixed-community approach to delivering social housing. One model, Communities Plus, redevelops existing government-owned sites (usually already in good locations such Waterloo and Macquarie Park) into a mix of 60 to 70 per cent market

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<sup>25</sup> In the presence of children, the effect becomes larger: a 10-minute increase in commuting decreases the probability to participate by 4.25 percentage points for those with one child, compared with up to 5.8 percentage points among those with three or more children.

housing, 30 per cent social housing, and a minimum of five per cent affordable housing. It combines the social housing with private housing to secure more and higher-quality social and market housing in the places that give people access to the amenities and opportunities they need.

The NSW Government has also committed to ensuring that sales of government surplus land for residential development require 30 percent of the dwellings across those sites to be a mix of social and affordable housing.

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## 2.4 Infill development helps us adapt to climate change

Where we house our future residents affects their exposure to destructive natural hazards. Decisions about housing also affect how much the residents and buildings in our cities contribute to climate change. Why? Because where we live affects how far we commute, how much energy we need to use to heat and cool our homes, and the amount of land we take up that could be preserved for the environment.

Centrally located, infill development can allow more people to live in areas with lower hazard risk (such as flooding and bushfires). It also reduces the number and length of costly and polluting commutes we take to work each day. Allowing more dwellings in the temperate parts of the city, especially the Sydney CBD and coastal areas of the city, also means we need less energy to cool and heat those homes.

The highest flood and fire risks in Greater Sydney are in the Western Parkland City and the north-west part of the Central River City, where a large amount of greenfield housing supply has been built in recent years (Reporter et al., forthcoming). In contrast, residents in the most established inner- and middle-ring suburbs face minimal flood or fire risk.<sup>26</sup>

Sydney's West is also much more susceptible to high temperatures during summer. The average summer maximum in Penrith is five degrees higher than in the CBD and coastal regions of Sydney (Figure 13). Temperatures are more extreme, too: Penrith has had more than five times the number of very hot days (over 35 degrees) as the CBD between the summers of 2007-08 and 2022-23 (360 days in Penrith versus 66 in the CBD). With climate change, Western Sydney will face more frequent and severe heatwaves over the next 50 years, impacting both households and the economy (Committee for Sydney, forthcoming).

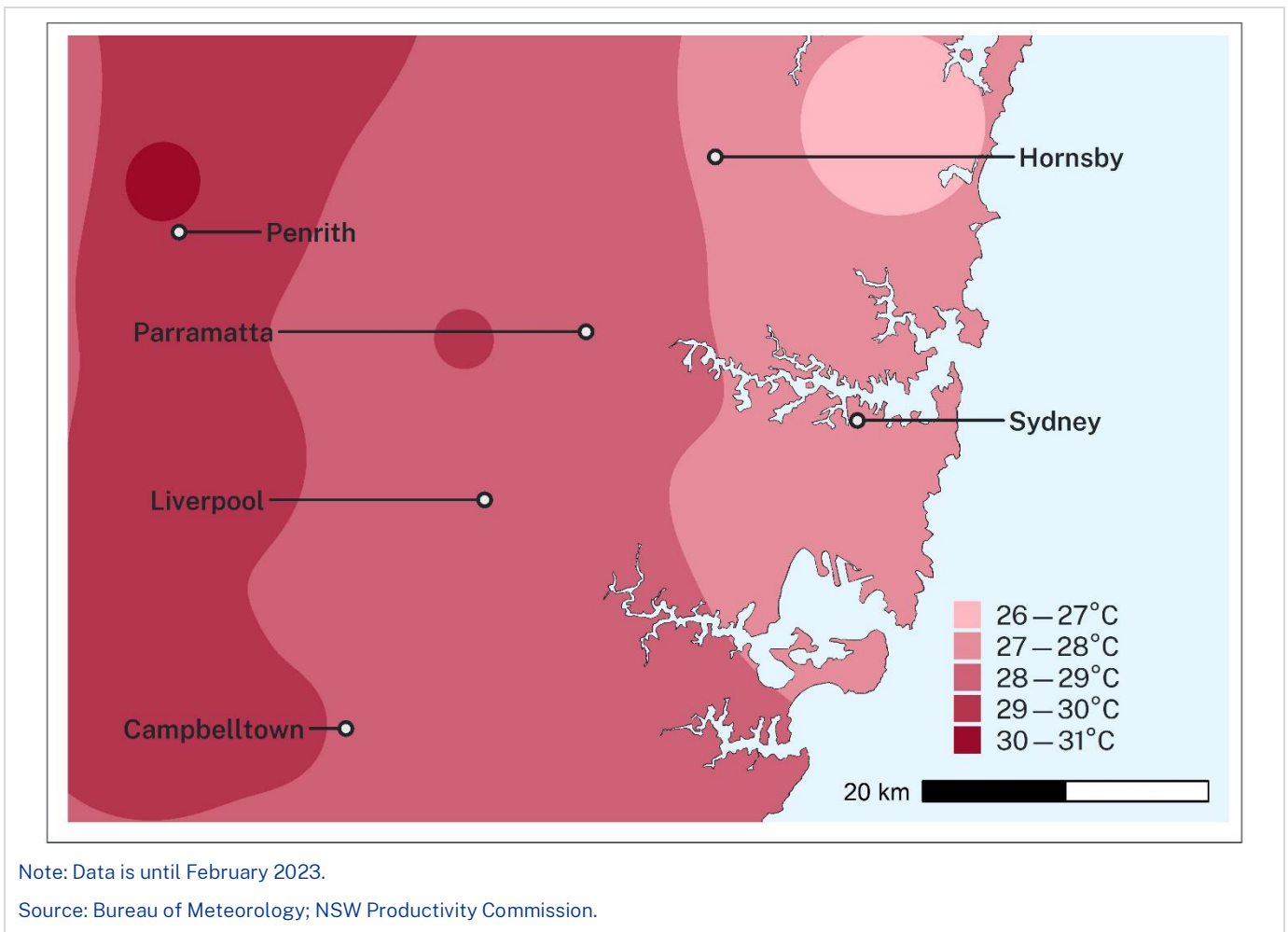
Heatwaves have been responsible for more deaths than any other natural hazard in Australia, and disproportionately impact children, the elderly, Indigenous communities, and people with pre-existing diseases and disabilities (Argüeso et al., 2015). They place additional stress on our infrastructure, with hospital admissions across New South Wales rising during heatwaves (Climate Council, 2019). Building more houses in the temperate parts of the city — near the coast — can minimise residents' exposure to these sweltering conditions.

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<sup>26</sup> Hutley et al. (2022) estimated that 1 in 25 Australian properties will be effectively uninsurable by 2030.

**Figure 13: Eastern Sydney is significantly cooler than the West in summer**

Average summer daily maximum temperature, 2008–2023



Increasing residential densities in locations with milder climates also reduces citywide household energy use, since fewer people need to heat and cool their homes. Around 40 per cent of household energy use in Australia is for heating and cooling (Department of Climate Change, Energy, the Environment and Water, 2023). In Western Sydney, where much new greenfield development has taken place, households pay up to 40 per cent more on electricity bills than coastal residents, reflecting the extra energy needed for cooling due to the higher average temperatures (Santamouris, 2017, as cited in Miletic, 2017).

## 2.5 Density reduces commutes and transport emissions

Higher urban density is associated with shorter commutes and reduced car use. This is primarily because residents of well-located, high-density housing are nearer to their destinations of travel and therefore commute shorter distances. Higher density also tends to make public transit a more viable option (Deuskar et al., 2021).<sup>27</sup> Sydney-specific analysis suggests that the marginal congestion generated by building additional infill dwellings is far greater in outer areas for these same reasons (NSW Productivity Commission, 2023b).

Indeed, European cities like Paris, London, and Amsterdam have more than double the urban density of Sydney and about half the transport energy use per capita (see Figure 6 in Deuskar et

<sup>27</sup> Smaller residences tend to have lower emissions related to home cooling and heating (Duranton & Puga, 2020; OECD, 2012).

al., 2021). The causal effect is likely smaller, however, than this straightforward comparison would suggest. A 10 per cent increase in density leads to a 0.6 per cent reduction in car travel across the city (by distance; Ahlfeldt & Pietrostefani, 2019).

Analysis by the Committee for Sydney suggests that re-orienting Sydney toward infill development could reduce the use of private vehicles by up to 5,200 kilometres per dwelling annually, relative to greenfield development (Metcalf & Frecklington, 2022, Table 16). At face value, this suggests that, on average, infill development could reduce annual carbon emissions by 883 kilograms per dwelling, or about six per cent of a typical household's carbon footprint.<sup>28</sup> A French study similarly suggests that a family living on the suburban fringe uses six extra tanks of fuel per year compared to one in the city centre (Blaudin de The, Caratino & Lafourcade, 2020).

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## 2.6 Building up can save more space for the public and the environment

Higher-density housing also conserves space. A doubling of a city's building height is associated with a long-run decrease in its area of approximately 15-17 per cent (Ahlfeldt, Baum-Snow & Jedwab, 2023). This implies that building up rather than out can go a long way to preserving fertile agricultural land, as well as sensitive ecosystems in greenfield areas, such as those on Sydney's western floodplains. Past research has suggested that limiting urban sprawl via infill development can help prevent the loss of natural habitat and native species (Johnson, 2001; Dorsey, 2003).

Denser forms of housing also make it easier to preserve public open space *within* cities. Singapore is a leading example. Though it has more than ten times Sydney's population density, parks and gardens occupy almost half its land.<sup>29</sup>

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## 2.7 Carbon emissions differ by building type

The contribution of a city's shape to climate change must also factor in the greenhouse gases that are emitted in creating buildings – so-called 'embodied emissions'.

Significant amounts of carbon dioxide are created in the production of concrete, steel, and glass, three very important materials used for multi-level buildings such as apartments (Pomponi et al. 2021). As such, apartments embody more emissions in their construction than detached houses on a per dwelling basis.<sup>30</sup>

Whether infill development is a less carbon-intensive way to provide housing therefore depends on whether the higher upfront emissions of construction are offset by the lower future flow of operational emissions. In Infrastructure Victoria's recent scenario analysis for the state, a 'compact growth' scenario was estimated to generate 1.8 megatons less CO<sub>2</sub>-equivalent than the 'dispersed growth' base case (Centre for International Economics, 2023; see also Box 1). This was despite an additional 15.5 megatons in embodied emissions from higher density apartment buildings in the 'compact growth' scenario.

A further complicating factor is that infrastructure itself, such as new roads, rail, and pipes for water and sewage, have their own embodied carbon profile. So high-density cities that require less

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<sup>28</sup> Australia's average emissions intensity for passenger vehicles in 2018 was 169.8 g/km of carbon emission. (5,200km\*169.8g = 882,960g of emissions (National Transport Commission, 2020). The average household is responsible for approximately 14,000 kilograms of carbon emissions each year (Olsen, 2020).

<sup>29</sup> Ahlfeldt & Pietrostefani (2019) find high density cities have a higher density of green space within the functional economic area, but highlight uncertainty about this relationship.

<sup>30</sup> The per-square-metre embodied emissions from an apartment are significantly higher than a detached house, but this is partly offset by the smaller size of an apartment (Centre for International Economics, 2023).

of this infrastructure, at the margin, will have lower infrastructure-related but higher residential embodied carbon emissions.

Even among apartment building types, embodied emissions seem to vary significantly. Over a 60-year building lifecycle, Pomponi et al. (2021) estimate that 'Parisian-style' density (so-called 'high-density low-rise' buildings) have less than half the embodied emissions of 'Manhattan-style' high-rises (so-called 'high-density high-rise'). A key limitation of their analysis, however, is that they do not account for the effect of higher density on transport emissions.

Notwithstanding these uncertainties, we give ourselves the best chance of net environmental gains by building in locations that will minimise transport and operational emissions. Building carbon-intensive buildings in car-dependent outer areas would be a worst-case scenario for greenhouse gas emissions.



# 3 How we can make density work for us

Allowing more homes to be built in convenient, high-amenity locations offers clear benefits. Auckland made housing supply and affordability a priority. Its example shows that it is possible to deliver many more homes in good locations across the city and bring down housing costs.

Sydney has plenty of room to let people live in a place that better meets their needs. Only a few very small parts of the city – such as the centre of the CBD – have densities approaching those in other global cities such as London (Figure 14).

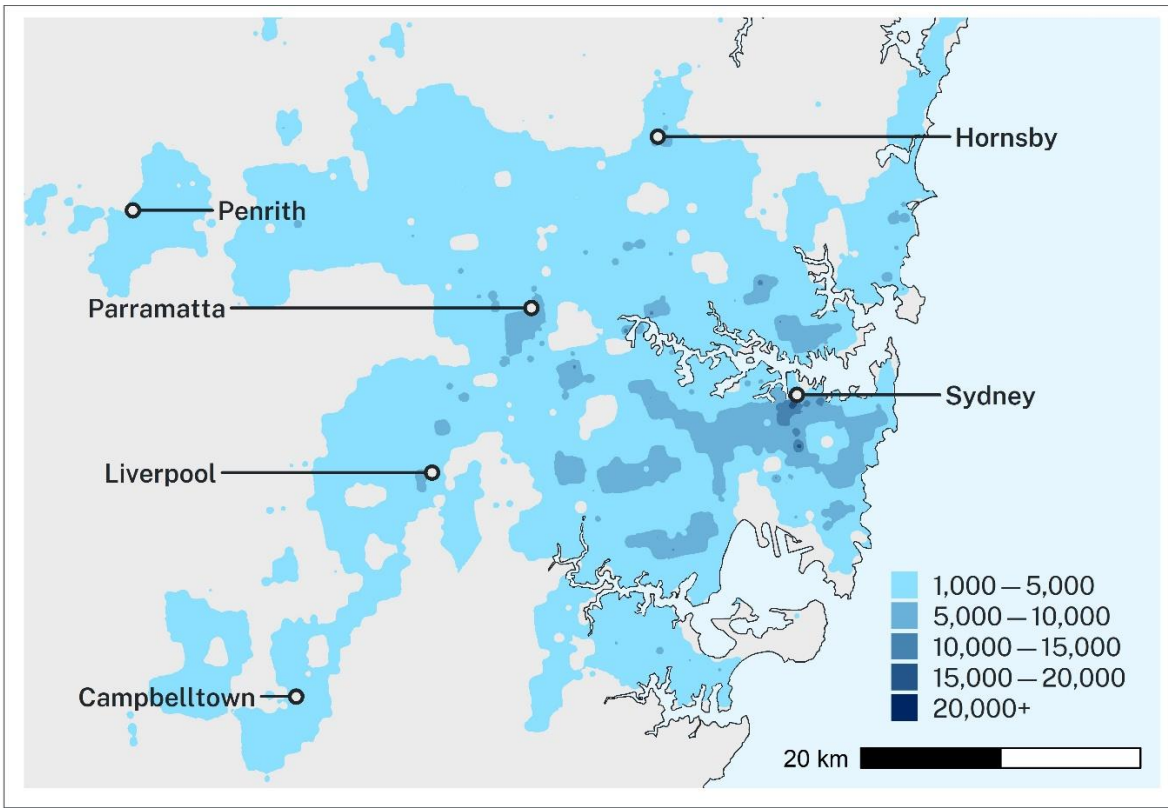
So why does Sydney find it so hard to increase density?

This section offers a few considerations for policymakers:

- In talking to the community, give weight to the benefits as well as the costs.
- Give weight to the needs of potential future residents.
- Adapt open space to meet the needs of the changing population.
- Protect Sydney’s heritage in a way that still allows renewal, diversity, and new housing supply.

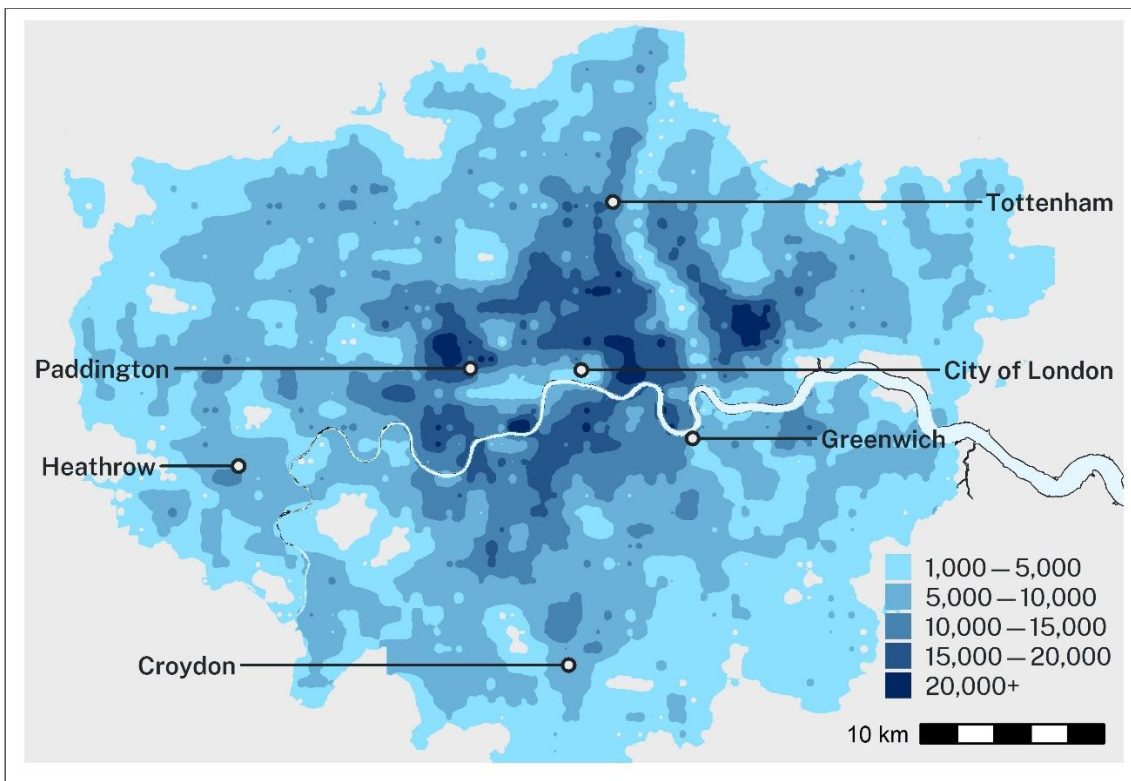
Figure 14: Sydney has abundant opportunities to house more people

Population density in Greater Sydney, 2022, per square kilometre



Source: ABS; NSW Productivity Commission.

Population density in Greater London, 2022, per square kilometre



Source: National Aeronautics and Space Administration; NSW Productivity Commission.

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## 3.1 Community consultation needs to be broader and more balanced

Despite support for increased housing supply citywide, local opposition often impedes or delays rezoning or development. Indeed, proposals for new housing — especially at higher densities — frequently face resistance from members of the community. Common objections include increased road congestion, crowding of schools and public transport services, harm to neighbourhood character (such as from tall buildings), and lack of green space (Newton et al., 2022).

### 3.1.1 Recognise the full range of benefits, not just the costs

One reason for the opposition to development is that the benefits of new housing are realised over a longer period and are quite diffuse, while the costs — such as noise and disruptions to views — are felt immediately and are locally concentrated (Duranton & Puga, 2020; Demsas, 2022).

This is consistent with a recent study of zoning restrictiveness in the US that highlighted the possible conflict between local and broader social interests. It finds that metro areas with more localised planning decision-making tend to have more restrictive planning regulations (Favilukis & Song, 2023).

There is increasing recognition of the need to improve housing affordability. But opponents and planning authorities may not see the additional supply provided by one local development as making any impact (Box 3). Costs and concerns, on the other hand, are given significant weight. For example:

- The number of dwellings in the planned St Leonards South precinct was scaled down by 17 per cent when it was approved in 2020. After community opposition, the Independent Planning Commission found the original St Leonards South planning proposal represented an ‘overdevelopment’, due to concerns the scale would be out of character, did not add enough green space, and would impact street parking and traffic movement (Independent Planning Commission NSW, 2019).
- Planning reforms in 2009 permitted low- and medium-height infill development if developers set aside a proportion of dwellings for affordable rental housing. However, high-profile community opposition in Parramatta led developments to be blocked on the basis of neighbourhood character (Davison et al., 2013).

So in both of these circumstances, fewer people were able to live in these locations, partly because of fear of impacts on existing communities.

Managing concerns around neighbourhood character is particularly challenging for a dynamic city like Sydney. For a city to grow and progress, it needs to be able to change and adapt. Our planning system, however, gives great weight to those who would prefer to keep things the way they are.<sup>31</sup> Character is an intangible concept, but the existing ‘feel’ or ‘ambience’ of a place is affected by its tangible characteristics. In practice, concerns tend to focus on building size relative to existing buildings, or the transition in heights to neighbouring buildings (Randwick City Council, 2020). Character does not need to be formally recognised or defined to influence planning decisions, although it can be via Heritage Conservation Areas (see Section 3.3).

The evidence that we do have on the impacts of development on neighbourhood character suggest it does not harm local welfare. By analysing a set of densifying precincts in Sydney, Tulip & Lanigan (2021) find that local house prices do not fall relative to nearby suburbs that do not undergo intensification.

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<sup>31</sup> Dovey et al (2013) highlights the paradox between the two commonplace views of the benefits of a compact city and the focus on neighbourhood character in a Melbourne study.

One important lesson from these examples (among many others) is that policymakers and planning authorities should place weight on the benefits of a proposal. In the St Leonards South Independent Planning Commission (IPC) decision cited above, policymakers appear to have only recognised housing supply as a formality rather than a true social benefit. Because Lane Cove Council was deemed to be on track to meet its short-term targets, and there was no explicit guidance on the targets for the next period, the supply benefits were discounted. There was otherwise no reference to affordability. Other benefits discussed in Sections 1 and 2 were noted in the council's vision statement, but were discounted.

Having an evidence-based discussion on impacts on the existing community, and how they should be weighed against the benefits, is also important. This can both help clarify and resolve genuine community concerns, and also 'weed out' less genuine objections.

'It doesn't matter whether you're using traffic or parking ... or density ... people will use any argument they possibly can to stop something. So people are really quite dishonest in their opposition.'

Interviewee quote from Davison (2013)

### Box 3: Housing works like other markets

A large body of evidence shows that building more homes lowers rents and home prices (NSW Productivity Commission, 2023a). Despite this, many people, whether homeowners or renters, are sceptical about supply-driven housing solutions: they doubt that building more homes can bring down rents and house prices.

Recent Australian survey research shows how prevalent this scepticism is (Susan McKinnon Foundation, 2023). Asked what impact building more homes would have on housing prices, more respondents thought prices would *increase* (33 per cent) than decrease (27 per cent). This echoes results from similar analysis in the US market, where only 30 to 40 per cent of respondents believed that having more homes would cause rents and home prices to fall (Nall, Elmendorf & Oklobdzija, 2022).

Supply scepticism seems to be specific to housing. For other goods and services, people generally understand that increasing the supply lowers the price, all else equal. Indeed, respondents to the US survey mentioned above agreed that this is what happens to agricultural commodities, labour, and cars (Nall, Elmendorf & Oklobdzija, 2022).

People overlook the affordability impacts of new housing supply for understandable reasons:

- For decades now, housing construction has been too slow to offset rising demand from population growth and rising incomes. Every new home *slows* the growth of house prices and rents, and recent analysis has found that postcodes with the highest supply growth saw the slowest price growth over the decade to 2022 (Garvin, 2023). But to *stop* price growth entirely, we would need to build much faster.
- New homes lower house prices and rents indirectly. They reduce competition for older homes and make them more affordable.<sup>32</sup> But new homes themselves often appear relatively expensive, because developers build in areas where prices are rising fastest. It is easy to miss how expensive new homes make older housing more affordable.

Some believe local development entices new higher-income residents to an area, pushing up rents and home prices (Li, 2020; Hankinson, 2018). While this is likely true to an extent, research shows that extra supply is powerful enough to overcome this effect, and still makes housing cheaper overall (Li, 2020).

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<sup>32</sup> This process is called 'filtering'. See the NSW Productivity Commission paper *Building more homes where people want to live* (2023) for a more in-depth discussion.

### 3.1.2 Recognise the interests of all demographics, including future residents

Although objections are frequent, it is less clear that they are representative. International evidence suggests that young people, women, and renters tend to be underrepresented in community planning forums.

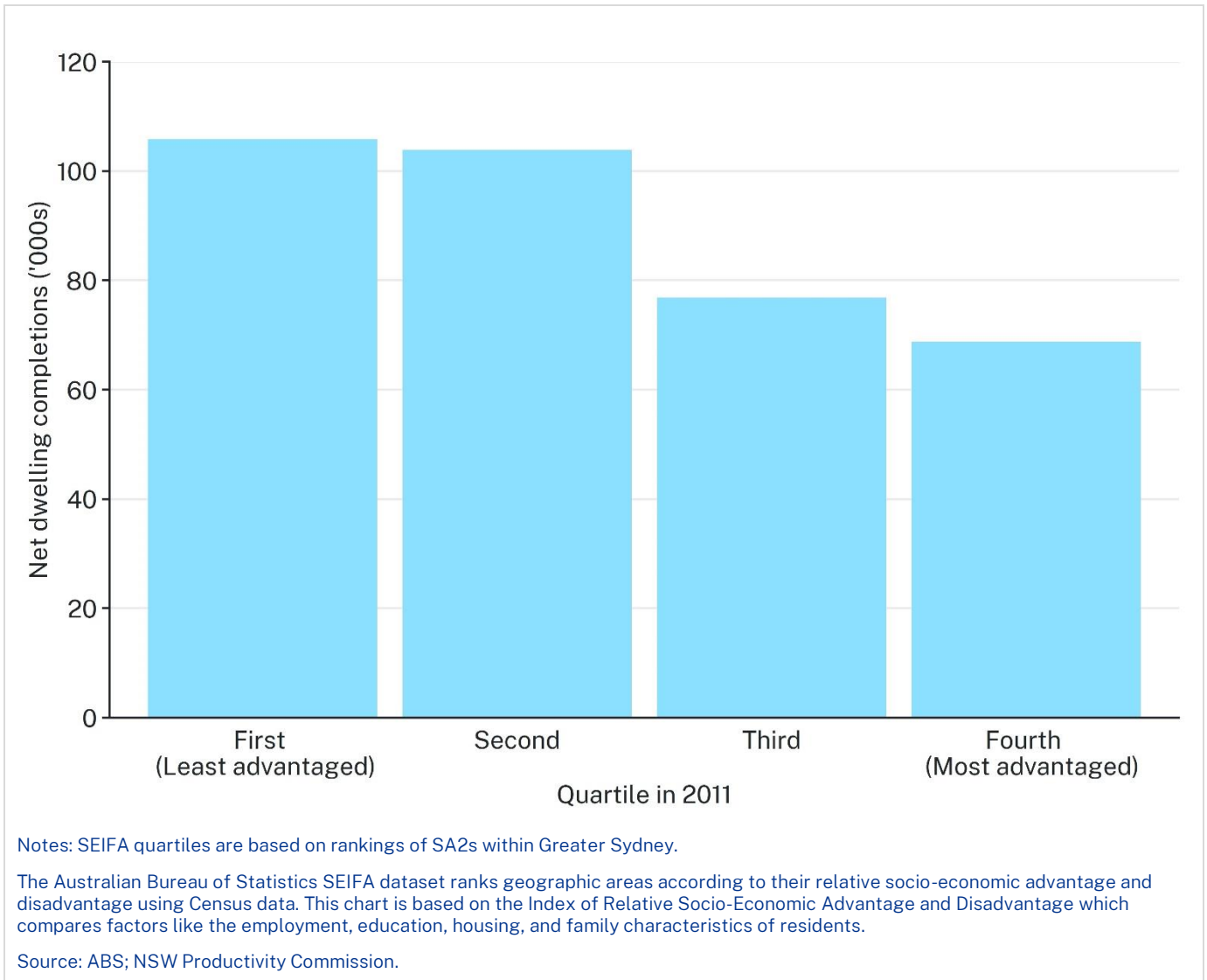
Analysis of voting data from the US state of Massachusetts finds that vocal residents do not reflect the local population and are instead more likely to be older, male, long-time residents, voters in local elections, and homeowners (Einstein, Palmer & Glick, 2019). It concludes that 'individuals use their privileged status as current members of a community to prevent new housing, and thus close its doors to prospective new members' (Einstein, Palmer & Glick, 2019, p. 4).

Closer to home, a Melbourne study of unit-level permit and household data found that the permits were more likely to receive objections in areas with more public notice, higher election turnout, higher income, education, and age (Ryan, Rambaldi & Tan, 2021). These developments were then more likely to be rejected.

Similarly, Davison et al. (2013) found the level of opposition to the Parramatta affordable housing developments, described above, was most strongly correlated with household income. New dwelling supply across the city demonstrates much the same trend, with less socio-economically advantaged areas taking more of the growth over the past decade (Figure 15).

Figure 15: Less advantaged areas of Sydney have seen larger increases in housing supply

Net dwelling completions by SEIFA quartile of each Greater Sydney SA2, 2011 to 2021



Importantly, the direct beneficiaries of development, future residents, are unknown ahead of time, so they are unable to make their voice heard.

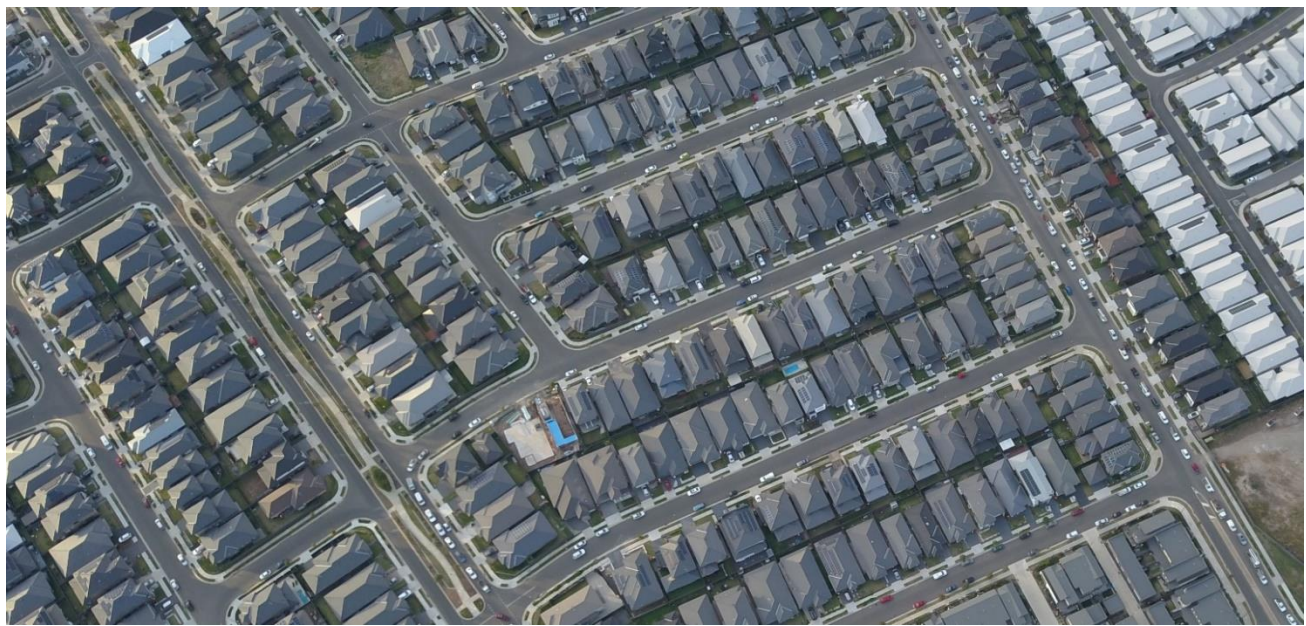
While existing residents may have strong views about the dwelling types that are appropriate for people to live in, prospective residents do not necessarily share those views. Many people are happy to sacrifice space to live in a place that suits them. This is clear from the higher rents that buyers and renters are willing to pay to live in townhouses and apartments in good locations. But survey data also point in the same direction: the public *wants* more townhouses and apartments. These dwellings made up about 45 per cent of Sydney’s housing stock in 2021, lower than the residents’ stated preference for around 60 per cent (ABS, 2021; Daley, Coates & Wilshire, 2018). Of course, there will always be those that want to live in a detached house, but it is not for everyone (Figure 16).

According to Coates (2022):

*‘It is a myth that all new first-home buyers want a quarter-acre block. Many would prefer a townhouse, semi-detached dwelling, or apartment in an inner or middle suburb, rather than a house on the city fringe.’*

**Figure 16: Detached homes in Western Sydney do not meet everyone's needs**

Aerial photograph of a new housing estate in Western Sydney



Source: © Billy7/Wirestock Creators/Adobe Stock.

Another group of indirect beneficiaries — everyone who benefits from lower housing costs — is dispersed across the state, with little incentive to participate in a decision over any single development.

There is clearly a need for policymakers to carefully trade off local concerns about growth against the more diffuse affordability benefits to unidentifiable future residents and the broader community.

#### **Box 4: Use density to enhance amenity and character**

Residents of apartment buildings accept these buildings' smaller living spaces in exchange for increased convenience and walkable access to nearby shops, cafes, and public space.

How we plan for new housing, however, has a big effect on whether residents can realise these benefits in practice. In this spirit, we have outlined below some aspirations for new medium- and high-density dwellings. By meeting these aspirations, we can ensure both that residents have high-quality housing and that the city evolves with urban spaces that we can all enjoy.

- High-density development should occur in locations with good public transport accessibility, to allow mobility with a lower dependence on cars. *Building more homes where infrastructure costs less* highlighted significant capacity on existing and planned train lines in high-demand inner suburban locations. Trams and buses may also benefit from scale economies and become more used in denser environments.
- Higher density should be permitted on quieter 'second streets', as well as near commercial centres. Too often, infill development is restricted to busy arterial roads (such as Canterbury Road and the Pacific Highway) where multi-storey buildings attract less community opposition. But both vehicle noise and pollution are correlated with a variety of negative health outcomes (Huang et al., 2023, NSW Health, 2014) and poorer convenience.

- Mixed-use zoning and better planning of commercial and residential areas can both allow for more walkable neighbourhoods. Even small things like a busy road, an unlit path, or a lack of shade to protect against the sun or rain between the areas can all push residents to drive instead, increasing congestion.
- Infill development should have ready access to high-value public space. Most established Sydney suburbs have reasonable open space access, but there may need to be adaptation.

High-quality buildings can also improve perceptions of density. We should keep in mind, however, that design standards are better suited to addressing market failures such as a lack of privacy (an externality) or hidden building faults (asymmetric information). Avoiding overly prescriptive standards can avoid excess compliance costs and allow for more varied and abundant housing options, with people able to make the choices that are right for their circumstances.

Regulators should also be mindful that perceptions of dis-amenities may vary. For example, planning instruments often discourage building that overshadows parks or other buildings. However, the shade provided by high-rise buildings can actually benefit residents and visitors by creating a cooler, shadier environment, and reducing the risk of melanoma (Arbel et al., 2022).

### 3.1.3 Make our existing system fairer

How might a fairer system work in practice? The current approach is to set state-determined housing targets for local councils. This does have the benefit, in principle, of representing a broader range of views. These targets are important. However, to date Sydney's targets have not reflected where housing is most needed. There is also little explicit accountability for meeting supply targets.

Our 2021 White Paper recommended improvements to address these problems (NSW Productivity Commission, 2021). These issues will be discussed further in future NSW Productivity Commission work.

Pending that discussion, a modest but still important change would be to reduce the current wholesale reliance on 'opt-in' convenience sampling approaches to community engagement, and to recognise its substantial flaws.

Many councils currently post notices allowing people to engage through mechanisms such as community meetings or invitations to submit opinions. As sampling methods, such mechanisms usually fall far short of being representative in the way that voting would be. They disproportionately attract those with strong political views and/or the time to engage in such processes. These mechanisms are therefore liable to produce skewed and misleading pictures of community views.

There are genuine issues to be worked through as to how far community engagement should go. The City of Sydney, for example, has undertaken extensive consultation as part of its 'Planning for Sydney 2050'. This sought the voices not just of those who live in the local government area (LGA), but businesses and visitors from across Greater Sydney (City of Sydney, 2023). While it might not be feasible for all councils to consult on that scale, broader consultation would give us a better picture of existing residents views, and potentially even those of prospective residents.



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## 3.2 Focus on accessible, quality open space, not ratios

A common objection to new housing is that communities do not have sufficient capacity to absorb the associated increase in local population (Hanrahan, 2022). These objections frequently centre on concerns that infrastructure will prove inadequate to service the larger population, leading to congestion on roads and in green space.

Increased congestion and crowding are legitimate concerns. But these concerns exist for all new housing, regardless of where it is located. And it is a fortunate coincidence that many of the locations that households would most like to live in possess, in general, the greatest existing infrastructure capacity to accommodate new residents (NSW Productivity Commission, 2023a and 2023b).

The issue of open space is one that many councils frequently cite as preventing new housing. In principle, density should unlock open space (as noted above).

In practice, Sydney has a great deal of open space per person by international standards – around 155 square metres per person. That is much more than the World Health Organization’s recommended amount of 50 square metres per person and far greater than the suggested minimum of nine square metres (Keogh, 2023; Russo and Cirella, 2018).

Recent research suggests that greater emphasis should be given to accessibility and functionality than to pure quantity. For example, rules could require that suitably sized and functional open space should be available to residents within 400 metres or a five-minute walk (GHD, 2016; JBA Urban Planning Consultants Pty Ltd, 2015).

Indeed, the NSW Government’s 2021 draft *Urban Design Guide* indicated that residents should live within 200 metres of a small park, 400 metres of a local park, and 1,600 metres of a district park.<sup>33</sup> This approach is also consistent with international standards. According to the World Health Organization (2017, p. 11):

*As a rule of thumb, urban residents should be able to access public green spaces of at least 0.5–1 hectare within 300 metres’ linear distance (around five minutes’ walk) of their homes.*

The quality of open space matters as much as the quantity. Even in locations with adequate space, it may be necessary or worthwhile to invest in upgrading open spaces to better meet the needs of a growing and changing population – for example, with playing fields, playgrounds, or walking tracks. A report by the Northern Sydney Regional Organisation of Councils Sydney has, for example, identified a major shortage of sports facilities, particularly playing fields, across its eight councils (NSROC, 2023). It proposed that public golf course facilities might be repurposed or shared with other activities, so that more people benefit from them. This follows a NSW Government decision to repurpose half of the Moore Park Golf Course as parkland.

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## 3.3 Balance heritage with renewal, diversity, and vibrancy

A city’s heritage is part of its identity, and a big part of what makes it an attractive place to live. Iconic buildings and structures make Sydney who we are today (e.g. the Sydney Opera House, Sydney Harbour Bridge) and historical ones keep us connected with our past (e.g. Old Government House in Parramatta, and the historic laneways and terraces in The Rocks).

Today an extensive system of heritage protection ensures sites of cultural and architectural significance, right across Sydney, are maintained for current and future residents and visitors.<sup>34</sup>

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<sup>33</sup> A ‘small’ park was defined as being 0.15 hectares or more in size, a ‘local’ park as being 0.5 hectares or more in size, and a ‘district’ park as being 5 hectares or more in size

<sup>34</sup> Heritage protections can be divided into national and world (under the *Commonwealth Environmental Protection and Biodiversity Conservation Act 1999*, State level listings (under the *Heritage Act 1977*) and local level listings and conservation areas (under the *Environmental Planning and Assessment Act 1979*).

When managed well, a system of heritage protection provides important social and economic benefits. A Commonwealth Productivity Commission (2006) inquiry identified potential benefits of heritage ranging from tourism spillovers to cultural and educational value.

But preserving the city's heritage should not prevent our cities from meeting the needs of their current and future residents. We need a balanced approach that protects what is important, while allowing more people to live near and enjoy the city's heritage and valued locations. Density can achieve both goals.

Heritage conservation took off in the 1970s, when government responded to the threat of rapid redevelopment of many historic neighbourhoods and parklands. During the 1950s and 1960s, historic inner-city suburbs had become run-down working-class refuges (Iveson, 2014). In the 1970s, these well-located areas became prime targets for developers – some with links to organised crime and government corruption – who looked to demolish large tracts of historic housing and create high-rise developments (Hickie, 1985).

Conservationists allied themselves with construction unions like the Builders Labourers Federation. The unions blocked many redevelopments by refusing to work on them, in a campaign known as the “Green Bans”. These interventions prevented the loss of some of Sydney's most popular historic places, such as The Rocks and the Royal Botanic Gardens (Burgmann & Burgmann, 1998).

Around the same time, the international conservation movement began to recognise the heritage value of whole areas rather than just buildings (Spennemann, 2023). New South Wales formalised this with the recognition of local ‘heritage precincts’ in the *Heritage Act (1977)*. The *Environmental Planning and Assessment Act (1979)* then empowered local governments to create Heritage Conservation Areas (HCAs).

Unlike the high-profile buildings and places on the state and national heritage registers, councils' HCAs are typically made up of private dwellings in low-density residential areas. HCAs are not subject to the same assessment requirements as listings, but still restrict owners from redeveloping their land or undertaking significant extensions or renovations (City of Sydney, 2006).

HCAs account for most of the growth in heritage protections since the 1970s. Today, around a quarter of residential-zoned land within 10 kilometres of the city is subject to some form of heritage protection.<sup>35</sup> Most of this (20 per cent of residential land) is conserved by HCAs, and an additional six per cent as specific council heritage items or, to a lesser extent, State listings (Figure 17).<sup>36</sup>

Some HCAs are vast. Entire suburbs in the Inner West (such as Haberfield and Balmain), Eastern Suburbs (Elizabeth Bay and Paddington), and North Shore (Cremorne Point) are conserved. Elsewhere, high-demand inner suburbs, often with train stations, have HCAs that put swathes of land off-limits for new homes. North Sydney, Newtown, Edgecliff, and Redfern range from 50 per cent to 85 per cent heritage protected. In total, heritage protections cover at least half of the residential land in 50 suburbs across Sydney. The vast majority of these are inner suburbs, with only six being more than 10 kilometres from the CBD.<sup>37</sup>

This proliferation of HCAs in Sydney has greatly reduced the amount of land available for new housing in Sydney's most desirable areas. This drives up prices and rents across the city, while at the same time suppressing land values for the owners of these properties, imposing extra compliance costs on them, and restricting their ability to adapt their homes to their needs.

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<sup>35</sup> Developable land for this purpose is a very broad measure that mostly excludes national parks and waterways, roads, and social infrastructure such as schools and hospitals, and heavy industrial.

<sup>36</sup> Council heritage items account for the vast majority of heritage listings. Residential-zoned land includes the mixed-use zone MU1 (formerly B4).

<sup>37</sup> Suburbs falling outside the 10km radius are older Northern suburbs (Beecroft and Cheltenham), Blue Mountains (Mt Victoria and Blackheath), and rural locations (Richmond Lowlands and Menangle).

We need to maintain Sydney's identity and recognise its history by managing heritage well. While council HCAs are preserving architectural history, they may also harm the unique cultures and identities that have developed in these areas. For example, former working-class areas like Paddington, Surry Hills, and parts of the Inner West, that at times have been hives of creativity, are increasingly only accessible to the most wealthy.

Broad-brush heritage conservation may also be inconsistent with what the community wants from heritage policy. The Productivity Commission inquiry saw evidence that the community was 'willing to pay' for conservation, but particularly where buildings were in good condition and accessible to the public (CHCANZ, 2005).

The State Government provides well-defined criteria for local governments to assess the heritage value of potential HCAs. But there is no clear strategic vision for heritage across the state, including how to balance heritage objectives with housing, business, and other objectives, how to prioritise what should be preserved and where, and how to evaluate heritage needs over time in a changing society. We need a state-wide strategic vision for heritage protection, as well as a mechanism for achieving it. The NSW Government's Heritage Strategy, under development at the time of writing, is an opportunity to define what is most significant and to explore options to ensure we meet both heritage and housing supply objectives. A more strategic approach to heritage protection would:

- coordinate protections across state and local government to achieve clearly defined cultural heritage objectives
- indicate what should be prioritised, and how much should be protected overall
- align with other planning controls, so that housing supply can increase in high-demand areas
- take into account the impact of heritage protection on housing supply and affordability, and the social costs it creates, alongside the benefits
- ensure heritage protection is not misused to prevent growth or change in an area
- balance the value of architectural heritage with the value of culture, renewal, diversity, and vibrancy
- recognise that heritage value is enhanced by enabling more people to live near and enjoy it.

Some policy options that could help achieve these things include:

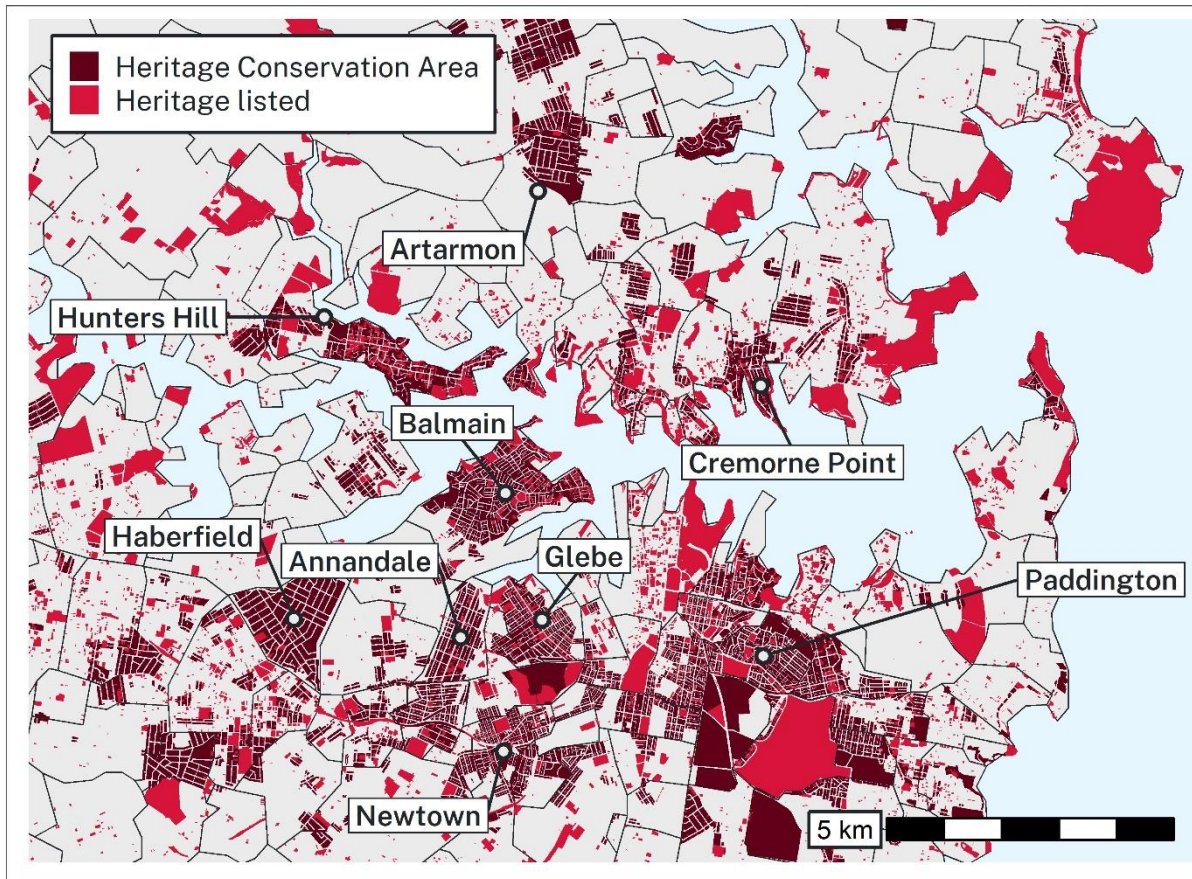
- setting housing targets that allocate more housing to places where people want to live, and where infrastructure costs are lowest
- allowing local councils to use their discretion to prioritise and maximise the value of local heritage while achieving their housing targets
- transferable development rights (TDRs) – a mechanism that allows zoning uplift to be distributed flexibly within a local area; TDRs can also provide the owners of heritage buildings with a valuable asset to offset the development opportunities they forgo
- State planning interventions (such as State Environmental Planning Policies or State-led precincts) that are specifically designed to optimise heritage, housing, and economic outcomes for specific locations (for example, around existing or planned rail stations).

As a global city, Sydney has not thrived merely by expanding onto previously unbuilt land. It has always rebuilt.

In August 1958, demolition began on the historic Fort Macquarie Tram Depot. The grand old structure made way for a new building that some thought inappropriate – the Sydney Opera House. The people who allowed that to happen believed that given the chance to do so, Sydney could create new structures that improved its built environment. Today, few would argue that they were wrong. Keeping heritage Sydney will always be important to the city. Building innovation should also rank high in our values. The shape of Sydney has long been a balance between preserving the old and creating the new.

**Figure 17: Blanket historic zoning stops more people living in Sydney's most valued locations**

Heritage-protected areas of inner Sydney, 2021



Note: If a place is both heritage listed and in an HCA, it is marked as heritage listed. HCAs are created in councils' local environment plans. Heritage listed places receive specific protection by inclusion on either State or Commonwealth heritage registers or in local environment plans.

Source: DPHI.

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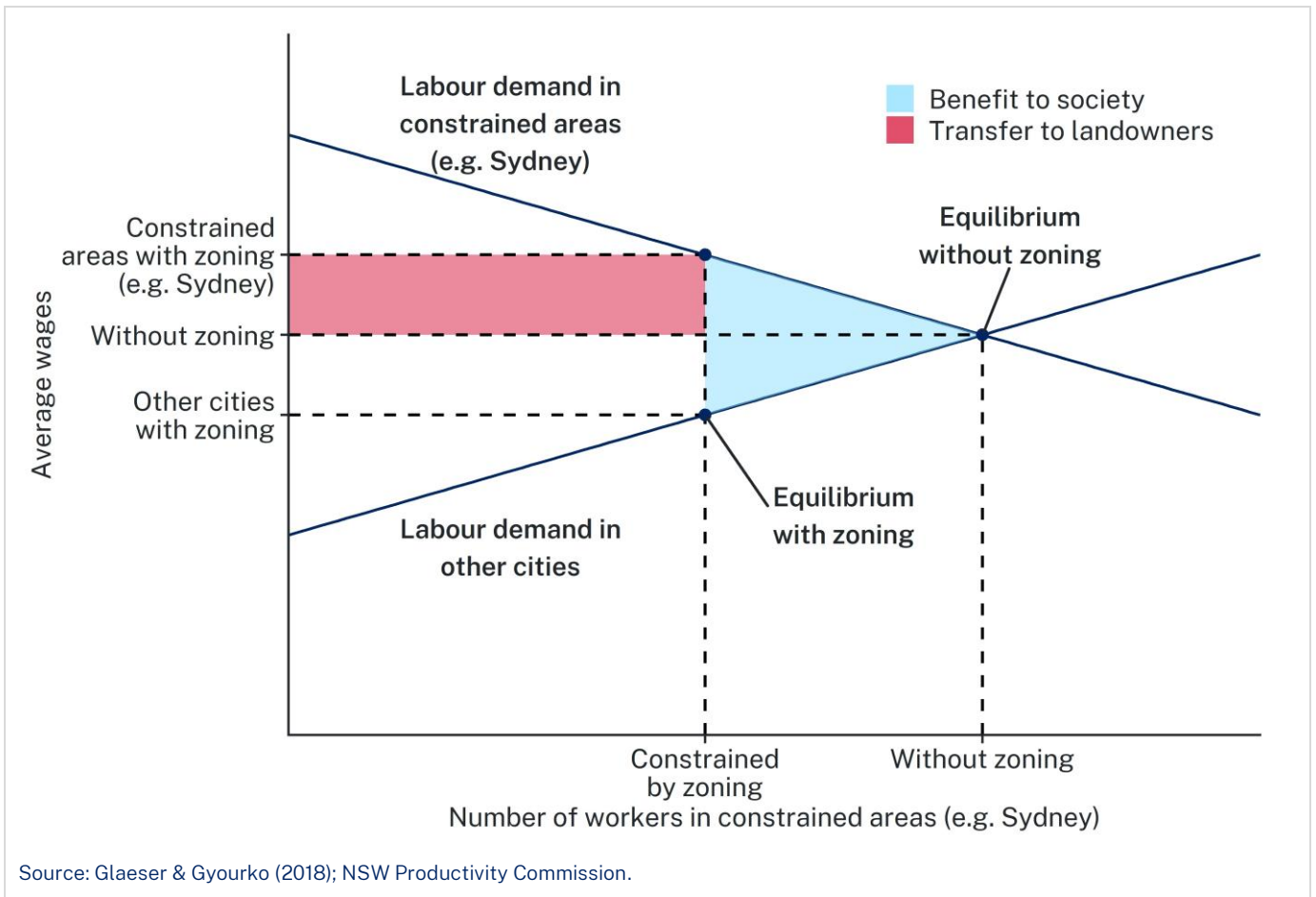
# Appendix A: Estimating the cost of spatial misallocation

In Section 1.5 we estimate that relaxing restrictions on housing supply could boost GDP by 1.5 per cent. To do this, we follow Glaeser & Gyourko's (2018) simplified model of spatial misallocation. They impose some restrictive assumptions which flow on into our analysis, namely that:

1. housing construction costs are the same across cities
2. amenities are equal across cities.

Given these assumptions, wages should equalise across cities in the absence of housing supply constraints. The graph below depicts the intuition of their model. The yellow triangle represents the gain to society from allowing more people to work in the most productive locations. The blue rectangle shows the size of the transfer from landowners to business-owners and workers from relaxing restrictions on new homebuilding.

Figure 18: A cost of restricting development



To be precise, the area of represented by the yellow triangle can be expressed mathematically as:

$$\text{Gains from reducing misallocation} = \frac{1}{2} \times \frac{1}{\alpha} \times \sum_i L_i (F_L^i(L_i) - \hat{w})$$

where:

- $\alpha$  is the inverse elasticity of labour demand; that is, how much population responds to a change in wages. We follow Glaeser & Gyourko (2018) and set this at -0.3
- $L_i$  is the initial population in city  $i$
- $F_L^i(L_i)$  is the initial wage level in city  $i$

- $\hat{w}$  is the equalising wage; that is, the wage that would prevail across cities should housing costs be equalised. For Australia in 2019-20, this was around \$67,000 per year.

The size of the gain in GDP depends, therefore, on how sensitive city-level wages are to changes in the size of city-level labour supply. If wages are relatively unresponsive to new arrivals, then a large number of workers will need to move into a city to bid down its wage premium. This suggests the benefits of re-allocation are potentially large, since it implies a larger group of workers are currently not living where they would be most productive.

A reasonable estimate is that for every one per cent increase in its workforce, a city's wages will decline by 0.3 per cent (Beaudry, Green & Sand, 2018). Given that average incomes in Sydney are about 14 per cent higher than in Australia as a whole, this implies that its workforce could increase by up to 45 per cent if expensive housing did not inhibit people from moving here.<sup>38</sup>

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<sup>38</sup> Calculated as 14 per cent / 0.3 ~ 45 per cent.

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