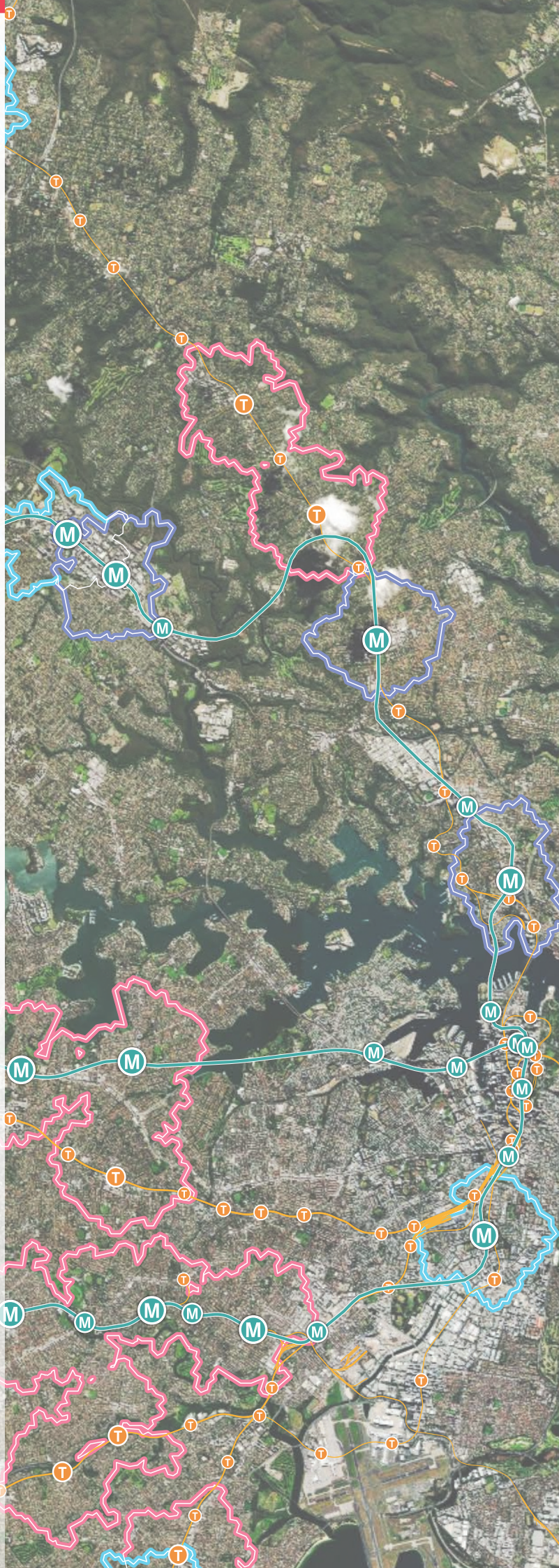
Rethinking Station Precincts

How to create great precincts around rail stations, and why this matters for Sydney

April 2022



Committee for Sydney

Acknowledgements

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AECOM

ARCADIS

Frecklington Advisory

GRIMSHAW

HASSELL

mecone

SGS Economics & Planning

Co-authors

Gabriel Metcalf & Julian Frecklington

Project team

AECOM	James Rosenwax
AECOM	James Grant
AECOM	Giulia Vignaroli
Arcadis	Stephen Taylor
Arcadis	Kevin Brake
Arcadis	Michael Kurtz
Committee for Sydney	Matt Levinson
Grimshaw	Andrew Cortese
Grimshaw	Mark Gilder
Hassell	Ken Maher
Hassell	Chris Kelly
Hassell	Thomas Hale
Hassell	David Tickle
Mecone	Ben Hendriks
Mecone	Joseph Bell
SGS Economics & Planning	Pat Fensham
SGS Economics & Planning	Alison Holloway
SGS Economics & Planning	Ben Taylor

Cover image: Capacity analysis of Sydney's station areas. Source: AECOM.
This page: Parramatta interchange. Source: Hassell / Max Creasy.

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Executive summary

The network of Sydney Metro and Sydney Trains is one of Sydney's most important urban assets—growing to 338 stations when the current round of funded projects is complete.

This extraordinary investment, built up over almost two centuries, could hold the key to Sydney's future in terms of delivering a productive, liveable and sustainable city.

Simply put, the immediate environs of rail stations are the best place to put Sydney's growth over the coming years for a high-functioning global city.

Why rethink station precincts?

Development of rail station precincts is complex and difficult. They are typically located in existing CBDs and town centres, with fragmented landholdings, where development must senstively balance the needs of existing residents and future communities.

Sydney is in the middle of a rail infrastructure boom, with the potential to transform the way we live and move around. Making the most of this investment will require a sophisticated approach to land use around stations, involving issues of governance, planning, land economics, urban design and placemaking.

Done right, we can create a powerful network of great station precints that support a 'polycentric' growth model for Sydney. However, if we fail to support the next wave of station development with appropriate measures, Sydney's development will continue to sprawl because that is the easiest option.

What is our approach to rethinking station precincts?

We have brought together some of Sydney's leading town planners, architects, economists, development professionals and transport experts to map out a strategy to achieve two objectives:

1. Allow more of Sydney's growth in walking distance of rail and Metro stations
2. Ensure growth is high quality, supports community life and helps make areas more liveable.

If we can achieve both, station area development can make Sydney more convenient, more affordable and more resilient.

What can we achieve by rethinking station precincts?

We should be clear at the outset, we accept Sydney will continue to have greenfield development. What this report argues is, with the right settings in place, station precinct development could be more ambitious and deliver up to 45% of the total projected dwellings required in metropolitan Sydney over the next two decades, including (see appendix for sources):

- Up to 327,000 dwellings in highly accessible locations with great amenity
- Up to $9.3 billion of economic benefits for NSW, by putting housing in locations that enhance productivity and leverage existing infrastructure
- Up to $16.3 billion in financial value created through land appreciation and rezoning to support affordable housing and investment in state and local infrastructure.

These are complemented by a broad array of social and environmental benefits associated with creating a more compact, walkable, sustainable and equitable city.

How can we do it?

It will not be easy – we make 10 key recommendations to achieve this goal:

1. **Integrate station location and land use planning –** make high-level decisions on precinct development in the same process that selects route alignments and station locations
2. **Establish clear growth targets around stations –** set a goal to accommodate at least 40-45% of Sydney's population growth in walking distance of train and Metro stations
3. **Adopt state-led rezonings for Major Station Precincts –** these are generally places with material government landholdings and rapid change
4. **For other locations, support councils to successfully manage station development over time –** here, change is likely to be more gradual
5. **Establish effective governance for station precincts –** set up a delivery authority for each Major Station Precinct with significant government landholdings, and establish collaborative governance structures to work with councils on other locations
6. **Build capacity of Transport for NSW agencies to oversee a rolling program of discrete station developments –** for stations with less developable land, agencies need to be able to create consistent, repeatable and scalable procurement programs
7. **Selectively retain strategic sites in public ownership around stations –** where government owns land around strategic station precincts, government should retain a long term leasehold interest (99 years) to enable the land to revert to government for re-leasing, value capture and precinct redevelopment
8. **Ensure infrastructure contributions are communicated in advance and effectively applied –** to help fund local improvements and transport operations, as well as generalised public services
9. **Be smart about parking and encourage sustainable transit –** put parking in the right locations so it does not disrupt the walkability and amenity of station precincts
10. **Require more affordable rental housing in station precincts –** make it a condition of rezoning that a minimum commitment of 5% affordable housing is delivered on private sites, and 10% on government sites.

What do we want this report to achieve?

This report is intended to start a broader conversation about how we can optimise the next wave of rail investment, and channel Sydney's growth where it makes sense rather than where it is easy.

The objective is to make the case for more intensive and better quality station precincts, and to put forward recommendations to support policy makers.

We welcome the opportunity for constructive debate on this important topic, and hope it can feed into future reforms.

Castle Hill Metro station. Source: Hassell / Brett Boardman.

The case for doing more to focus growth around stations

1.1 Train stations are nodes of community amenity

Stations serve as anchors for neighbourhoods. Many town centres and high streets originally grew up next to them, because it was so convenient for customers to stop by the shops on the way to or from the station.

Still today, stations are good places to put things that people in the surrounding community need – from grocery stores to schools to health clinics to local parks.

1.2 The rail network is the best way to move longer distances around Sydney

Planners sometimes speak about the '15-minute city' as an ideal, meaning a way of building neighbourhoods so they have all the necessities of daily life within a 15 minute walk. Certainly the forced experiment of Covid-19 has highlighted the beauty of this kind of complete neighbourhood, for those lucky enough to live in one.

But not all life can be lived close to home. The great benefit of living in a major world city instead of a small town is to have access to the whole place – to the people and jobs and institutions and public spaces across all of Sydney. This remains as true today as ever.

When it comes to leaving the local neighbourhood and travelling a longer distance, we would argue the best way to get around is by train. All public transport users enjoy the benefits of being able to work or read or simply space out – the freedom of not having to drive. And public transport users contribute far less pollution than those who drive – a fact that will remain true even when cars are 100% electric.

We support all public transport modes. But there are special benefits to a rail network for a city like Sydney. Sydney Trains and Sydney Metro – which we suggest are best thought of as a single, interconnected rail network – are grade separated, meaning they do not cross any streets, so they go much faster than buses can. They have no conflicts with cars, bicycles or pedestrians because they are in the air or underground. For large passenger volumes and for fast trip times, rail is simply superior.

Over time, as the network is extended and more lines are built, Sydney will end up with a comprehensive network. Instead of having to start and finish on one line, it will be easy to transfer between lines – as is done in all the world's great public transport cities. With investment in turn-up-and-go services associated with Sydney Metro and the More Trains More Services Program, the ease of connecting via rail will continue to improve.

1.3 Train stations are also the most logical places to channel growth

Not everyone is lucky enough to live within a walking distance of a rail station – and that is exactly our point. Changing Sydney's development patterns so more people have the convenience of being able to access the high speed, high capacity network is the best way to improve Sydney's transport network.

When people live somewhere without good public transport access, their only option is to drive essentially all trips. If we want it to be easy for Sydneysiders to access the necessities of life without always having to drive, the single most important thing we can do is put more development near stations. Buses can supplement this, but the highest rates of public transport use occur when people are near rail stations. Trains can carry the largest number of people in the most efficient, timely way possible.

While we believe people will not go in to work as often in the post-Covid world, most trips are not work trips. If our goal is to enable people to rely on public transport as the default longer-distance mode for most trips, for all kinds of purposes, then we need to put people where they can walk to a rail station.

Sydney is projected to add 1.85 million people between now and 2041. If that growth occurs in places where most people have to drive, then traffic will become worse. However, if growth is clustered around train stations, reliance on car journeys will be reduced, making Sydney more liveable.

1.4 But station area development is highly challenging

Because of the inherent advantages of being near a train station, demand is high for many uses.

Infill development around existing stations has the big advantage of being able to call on the existing assets in the area – shops, parks, streets and services.

However, there are challenges to make large-scale development like this happen:

- Land fragmentation makes it difficult and time consuming to assemble sites of sufficient size to enable significant development, and also adds a risk that failure to acquire key sites will compromise the overall project
- Land often costs more, which reduces the feasibility of new development
- Social and recreational infrastructure needs are often not properly catered for in station precinct planning, and are difficult to retrofit into centres if not planned up front
- Residents in long-established neighbourhoods may be reluctant to accept change and oppose new development.

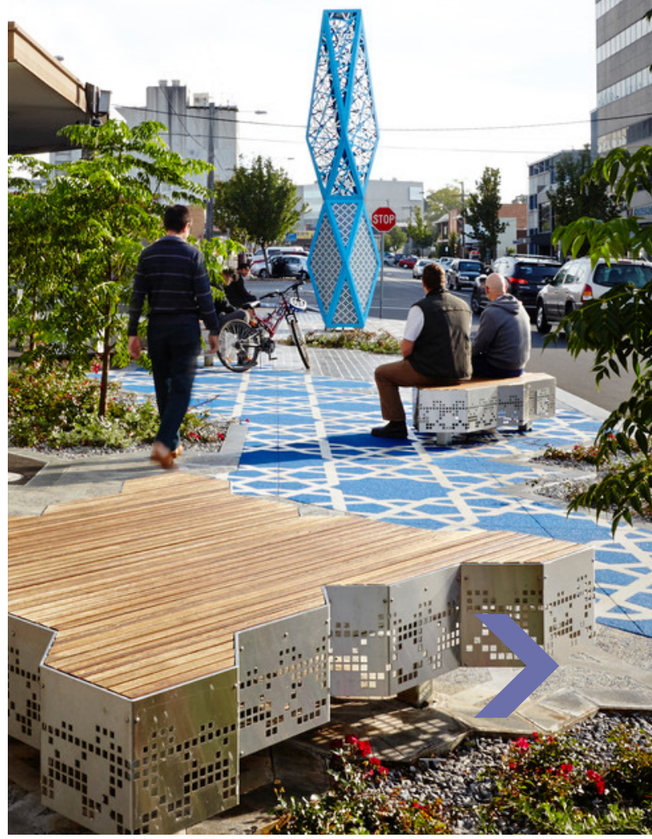
The paradox of infill development is that the only way to assemble sites is to pay a premium above the current market prices, which means developers can only make projects work if they achieve fairly significant increases in height and/or density – precisely the things that local residents may oppose.

Greenfield sites are easier to develop in the sense they start out with larger parcel sizes and generally have fewer local residents to oppose the development. However, there are other challenges:

- Everything has to be built from scratch – roads, shops, public space – which adds costs
- Rents or sales prices are lower than for sites closer in to the city, so it's harder to generate the revenue to provide the necessary amenities
- Higher density development around train stations may not be economically viable until prices rise. This means development may need to be staged, and 'meanwhile uses' may be required.

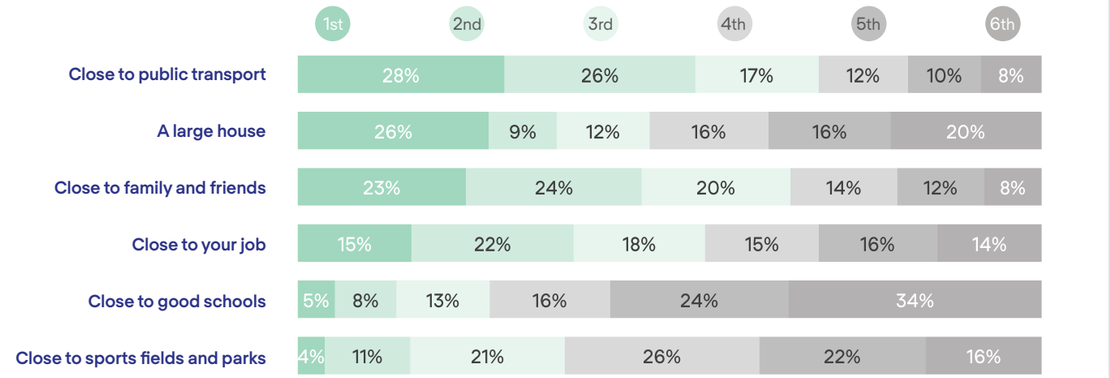
The paradox for greenfield sites is it's hard to support amenities without a large customer base, but it's hard to attract people without the amenities. There is, therefore, an important time dimension for greenfield station area development: what is possible to build at the beginning may be different from what is possible to build later on, once more people are in the area. Therefore, our planning strategies need to be able to accommodate change over time.

> "The great benefit of living in a major world city instead of a small town is to have access to the whole place – to the people and jobs and institutions and public spaces across all of Sydney."



Afghan bazaar in Dandenong, an outer suburb of Melbourne. Source: Hassell / Andrew Lloyd.

Figure 1: Public transport ranks as the most important aspect when moving house



Source: Committee for Sydney's Life in Sydney survey 2021. Q38. Please rank in order of personal preference the following six aspects when considering moving to a new place? Base: Sydney 2022 n=1034. Statements showed in descending order based on 'Ranked 1st'.

1.5 We can achieve multiple goals if we do this right

More Sydneysiders can have the opportunity to live or work near a train station. Neighbourhoods can get more amenities. Growth can be realised through more sustainable, resilient solutions. Traffic impacts can be mitigated through public transport improvements, which give people the option not to drive. And we can create amazing places, which will stand the test of time and become much-loved Sydney neighbourhoods.

All these goals can be achieved, but, at times, the goals will be in tension, and judgement calls will have to be made.

1.6 We are doing things right, but there are opportunities for improvement

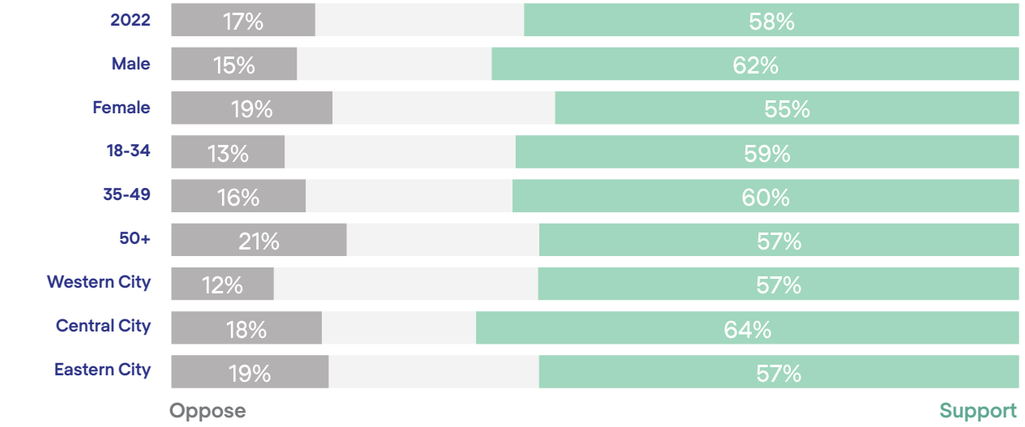
Over the last decade, we have seen the Sydney Metro North West line open, and work is underway on the Sydney Metro link through the Sydney CBD, where there are a number of developments above station sites. Potential exemplar outcomes include Victoria Cross and Martin Place stations, with both supporting high-quality integrated station development.

Most Metro station development to date has involved discrete sites rather than 'precinct scale' transformation. Some of these provide scope for the NSW Government to renew large tracts of land at precinct scale. These precincts could benefit from lessons learned to date, including that:

1. It is usually a mistake to decouple the station site from the broader precinct because this can result in a lack of coordination, and limit the ability of the station to act as catalyst for effective and contemporaneous renewal of a much broader precinct. This was an issue for the Waterloo precinct, and could be an issue at Sydney Olympic Park and The Bays Precinct.
2. Planning disagreements between state and local government about the appropriate level of density need to be resolved quickly, or precinct renewal planning can drag on for years and years. This has been an issue for major precints such as Waterloo and could be an issue at The Bays Precinct.
3. Station sites should not have substantially lower density than surrounding private sites (unless dictated by market forces), as this reduces the direct value capture opportunity for the public. This is an issue at Crows Nest, where the potential of the station site was reduced due to political sensitivity.
4. Planning of station sites needs to take into account market viability to avoid integrating product types that are mismatched with consumer demand (e.g. oversized and unviable apartments). This is an issue at stations along the North West Rail Line.

The next section of this report investigates some of the issues relating to great design results.

Figure 2: How much do you support or oppose more density nearby and above train stations, if it means government can preserve green and open spaces in the suburb?



One solution to the housing supply shortage problem is to build more homes and apartments above or within walking distance to train stations. This would build the homes we need while preserving the green and open spaces within our suburbs.

Source: Committee for Sydney's Life in Sydney survey 2021. Q65. How much do you support or oppose more density nearby and above train stations, if it means government can preserve green and open spaces in the suburb? Base: 2022 (n=1034), male n=465, female n=569, 18-34 n=289, 35-49 n=284, 50+ n=461, Western City n=226, Central City n=255, Eastern City n=548. Note: 'don't know' and 'neutral' excluded for analysis purposes.

Concentrating growth near stations has many benefits

Benefits for residents

- Higher quality of life, better places to live, stronger communities.
- Faster, more reliable access to Greater Sydney
- Increase in affordable, accessible and diverse housing for residents.

Benefits for workers

- Less time commuting
- Better access to jobs for more people
- Improved mental health, with more personal time.

Benefits for Sydney's resilience

- More sustainable — less car dependency, with lower emissions
- Greener — concentrating density preserves nature at the edge of the city.

Benefits for government

- Increased economic return on public infrastructure investment
- Improved labour productivity drives higher GDP
- Improved social and public outcomes in precincts
- More efficient public service provision.

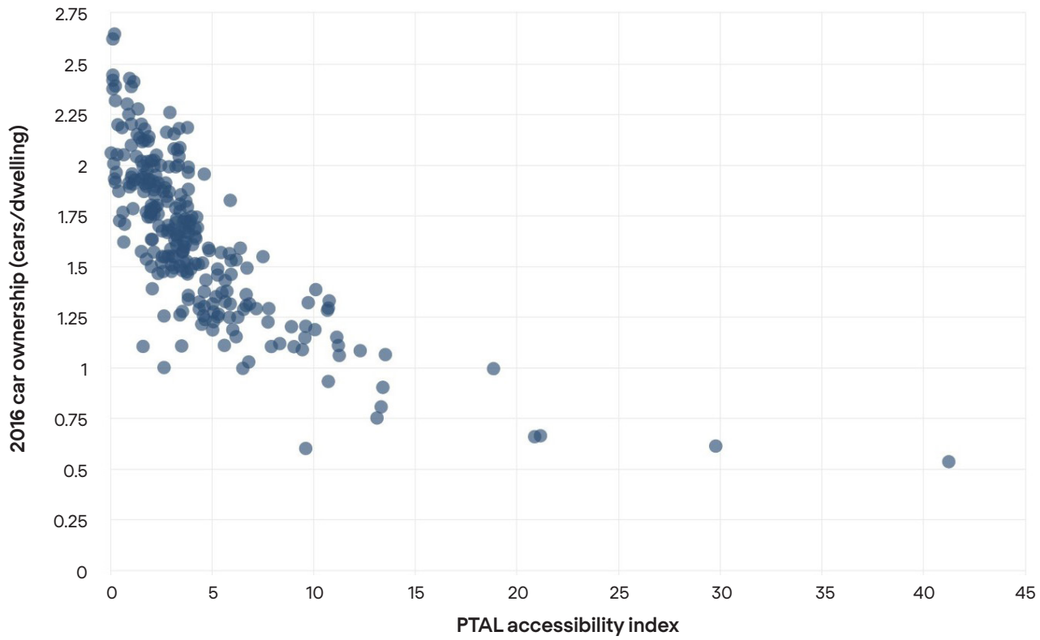
Benefits for Sydney Metro and Transport for NSW

- Increased ridership and fare box revenue
- Higher asset values due to increased patronage.

Benefits for industry

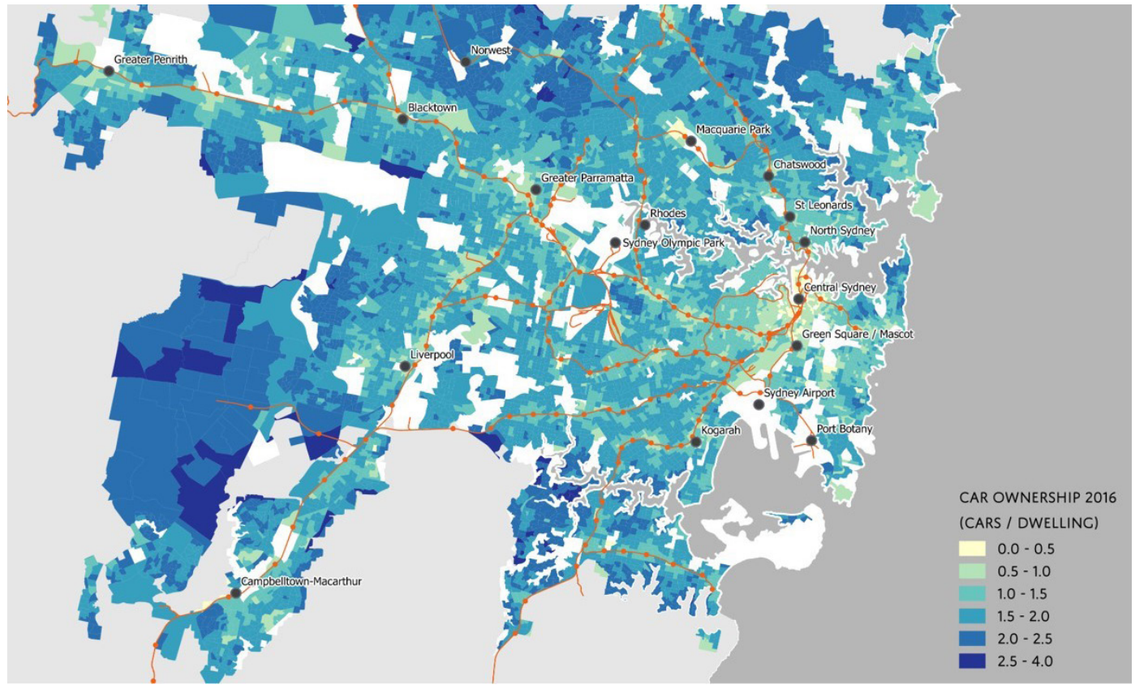
- Improved access to talent (for employers)
- More reliable customers (for retailers)
- More investment opportunities (for investors /developers)
- Agglomeration benefits of intensification (for industries).

Figure 3: Relationship between car ownership and public transport accessibility levels



The better the public transport, the less car ownership. Source: Kinesis analysis using data from ABS and Transport for NSW.

Figure 4: Map of car ownership overlaid with rail lines



Car ownership significantly lower around rail lines. Source: Kinesis analysis using data from ABS and Transport for NSW.

Design principles

2.1 Insist on high-quality urban design and amenity

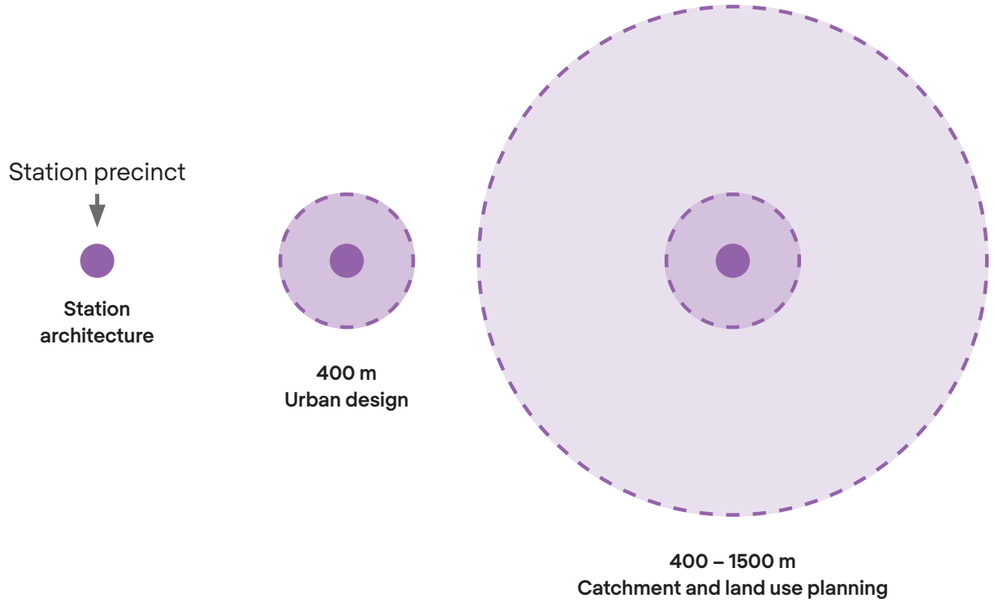
Concentrating growth around station precincts requires higher density and more compact living. The best way to ensure widespread acceptance of this type of arrangement is to build places that deliver high quality design and are rich with local amenities, in order to make the trade-off 'worth it' to people deciding where to live.

Apartment living without having a mix of shops, parks and services nearby is missing out on the point of urbanism.

But similarly, badly-designed apartments will not be attractive to people, even if they are located in a fully mixed-use and walkable neighbourhood.

The great success of apartment living all over Sydney demonstrates that the 'Australian dream' can exist in many different housing formats. The key is to insist on high quality urban design and amenity, with appropriate social infrastructure.

Figure 5: Integrating scales



2.2 Focus on the entire precinct, not just the station node

The station should be a genuine catalyst for development, not just of the station node, but of the surrounding precinct in walking distance.

Cycling and future personal mobility innovations may gradually expand the effective catchment area surrounding rail stations.

2.3 Put density close to the train station and optimise transition zones

Generally it will make sense to put higher densities closest to stations, with a gradual transition to lower-density areas. However, there are exceptions to this rule – like working around historic buildings or open spaces – that might push the densities elsewhere.

Including the surrounding precinct will support a spread of densities, and give more people the chance to live or work within easy walking distance of a station.

2.4 Make stations into multi-modal mobility hubs

Stations are great places to connect transport passengers to other modes.

We recommend thinking of them as 'mobility hubs', supported by a second tier of connecting local transport infrastructure, including buses, light rail, car-sharing pods, plentiful bike parking, and anything else that makes people's lives more convenient.

2.5 Plan for social infrastructure upfront and bring civic uses into the centre of the precinct

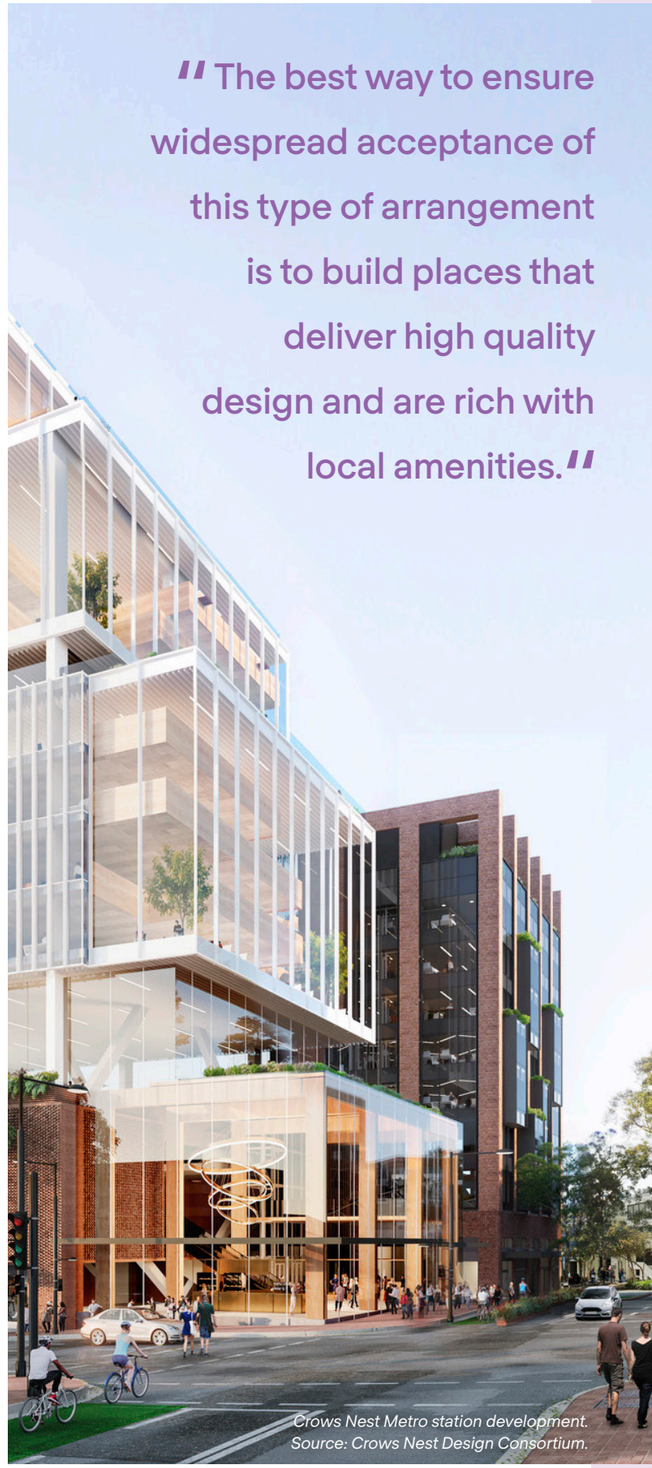
Community acceptance of station precinct development has been hampered, in part, by the lack of social and recreational infrastructure for the current and future population.

As the nucleus of town centres, train stations make excellent locations for civic and social infrastructure such as health services, schools, childcare, community centres and libraries. In some cases, the right solution will be to locate public uses right on top of the station; in other cases, they can be cleverly integrated within surrounding development.

Similarly, precinct developments should include public open spaces – ranging from small pocket-parks to large urban plazas – to create an enduring public offering for everyone in the area.

While civic uses may not be the 'highest and best use' of the land from a purely financial perspective, planners need to recognise the importance of encouraging land uses that deliver enduring social and economic benefits and raise the overall amenity of the precinct.

"The best way to ensure widespread acceptance of this type of arrangement is to build places that deliver high quality design and are rich with local amenities."



Crows Nest Metro station development. Source: Crows Nest Design Consortium.

Case study: Festival Plaza redevelopment: integrating social infrastructure into a rail precinct

Location	Adelaide
Lead agencies	SA Government including Department of Infrastructure and Transport (DIT) and Renewal SA, and Walker Group
Construction began	2016
Opening year	2023-2026

Project summary:

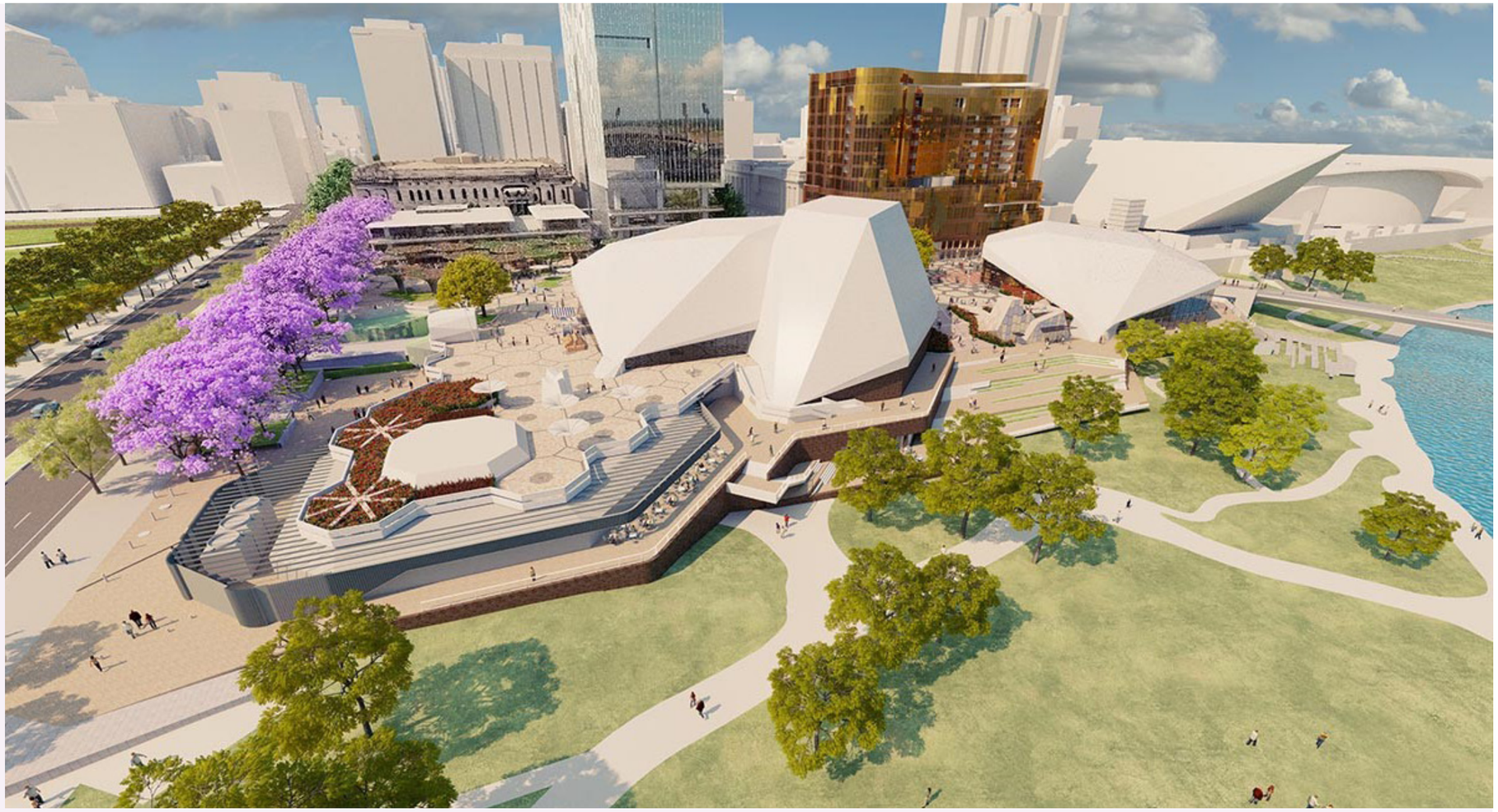
- Festival Plaza is a complex, mixed-use development adjacent to the Adelaide Railway Station
- The precinct includes a mix of social infrastructure including an upgraded Adelaide Festival Centre plus a new city-campus for Flinders University.
- The Adelaide Festival Centre and public realm has recently been redeveloped by DIT.
- Through a development agreement between Renewal SA and Walker Group, the precinct will also accommodate a new 27-storey commercial building (40,000sqm) which includes the 8-Storey vertical campus for Flinders University plus an active retail precinct.

The site:

- The site sits on the northern edge of the CBD and is surrounded by the Adelaide Festival Centre, the Adelaide Convention Centre, Parliament House, SkyCity casino, the State Library, South Australia Museum, and the Art Gallery of South Australia.

Flinders University campus:

- In 2021, it was announced that Flinders University would become the anchor tenant of the project, occupying 8 storeys of the tower from 2024.
- The university is expected to make a material contribution to precinct activation, and to introduce a diverse cohort of users to complement traditional commercial tenants.



Adelaide Plaza redevelopment render. Source: SA Government.

Why it matters:

- Festival Plaza is an example of a university as an anchor tenant playing an important role in the economic regeneration of a station precinct.
- The project illustrates the potential to locate social infrastructure like schools, universities, theatres, hospitals, or libraries at rail stations to anchor urban renewal projects.

2.6 Promote walkability and fine-grain block structures

Station precincts should be designed for walking and for human-scale interaction, specifically:

- A grid of streets with small block sizes
- Streets that are not too wide, and which prioritise pedestrian movement over vehicular movement
- Buildings that are built up to the property line, with good design on the ground level
- Streets that provide shelter from the climate, and are well lit and safe at all times of the day and night.

It is difficult to retrofit existing street grids that are too large, but in some suburban locations this needs to be done. It will require land amalgamation and boundary re-alignment, which is a complex activity when it involves private land. This is discussed later in this report (page 32).

In some cases, there are major barriers to station access – roads or even the train tracks themselves. To maximise the usefulness of the public transport investment, precinct plans need to overcome these barriers to maximise the pedestrian catchment area for station users.

2.7 Use rules-based and performance-based approaches where appropriate

Place strategies should be created for station precincts undergoing significant change. These strategies have two sets of objectives that can be in tension:

- To maximise yields to deliver revenue to the state
- To ensure they deliver maximum community benefit.

The point of the planning exercise is to resolve this tension and manage trade-offs in the most sophisticated way possible. Station Precinct Design Guidelines should be produced to guide built form outcomes within the station area.

We note an important debate over the merits of 'rules-based' versus 'performance-based' approaches to urban design. There are advantages and disadvantages to each.

Generally, it will make sense to use:

1. A 'rules based' approach for the broader station precinct, where there will be more smaller projects
2. A 'performance based' approach for the most prominent sites in the area immediately surrounding the station, as well as other key catalytic sites, especially if they are government land holdings.

Table 1: Comparison of 'rules based' and 'performance based' approaches to urban design

	Rules based	Performance based
Approach	• Overarching development controls, aligned to delivering high-quality design outcomes across a broad area	• Specific site requirements for 'design excellence processes involving design experts' or 'design competitions' for CBD sites
Advantages	• More clarity, greater certainty • Stronger ability to achieve consistent planning form controls • Faster and cheaper assessment	• Potential for more design flexibility • Potential for more innovation • More energy and effort spent on design
Disadvantages	• Increased rigidity • Less scope for innovation • More restrictions on design	• More subjective, less objective • More opaque, less certainty • Slow and expensive assessment
Implication	• Use for broader station precinct	• Use for prominent sites

2.8 Integrate nature and Country

Where existing natural environments are not evident or they are scarce, we need to plan carefully to enable open spaces and natural environments.

Design responses should reflect the ecology of place, its context, history, nature, landscape and streetscape, and allow for public art, interpretative content and cultural identity.

Design responses should also draw on First Nations knowledge by adopting regenerative design approaches to focus on passive design and strong connections to landscape.

This recognition of Country is important, and it can be integrated into design while simultaneously improving place-making.

2.9 Plan for change

Infrastructure lasts hundreds of years, whereas buildings typically need to be redeveloped within 50 years.

As such, we need to be careful when we allow high-density, strata subdivision within station precincts because this can inadvertently result in highly fragmented ownership patterns that sterilise future renewal opportunities.

This does not rule out strata residential, it simply means we should identify the key sites that may be better kept in consolidated ownership to preserve the opportunity for future renewal. These sites should still be capable of accommodating commercial or mixed-use projects.

If residential accommodation is required, this can be alternatively delivered via a Build-to-Rent offering, which maintains ownership in a single title. The current zonings do not adequately allow for this distinction.

Designing with Country was a priority for the advanced manufacturing research facility at Bradfield aerotropolis. Source: Hassell.

Delivery principles

3.1 Establish appropriate governance and planning pathways for precinct developments

The very heart of an integrated station precinct is the presence of strong institutional arrangements that facilitate cross sector collaboration.

Complex, city-shaping projects must be developed in conjunction with partners. As well as the key transport agency disciplines (rail, road, bus, freight, active transport), they also require collaboration between agencies and between different layers of government. This is why an inclusive and integrated governance structure becomes increasingly vital as the project increases in complexity.

The governance models operate on a spectrum between state government leading and local government leading:

- Councils will take the lead in most rail station areas. This is because councils are better placed to lead where precincts have a larger share of private ownership, and where local issues can be properly considered.
- For large, precinct-scale renewal projects with significant NSW Government land holdings, the State will more likely take the lead.
- Discrete Metro station development falls somewhere between these models, as it involves the development of discrete station sites that are effectively 'stand alone' buildings.

"The reality is different precincts will require collaboration with local and state government, together with public and private partners."

Green Square, Sydney. Source: Hassell / Simon Wood Photography.

Table 2: Comparison of station precincts at different scales

	Major renewal precinct	Discrete Metro station	All other stations
Precinct lead:	**Renewal authority**	**Sydney Metro**	**Council and state agencies**
Examples	 **The Bays West (above)** • Sydney Olympic Park • Waterloo Estate	 **Martin Place Station (above)** • Pyrmont Station • Crows Nest Station • Parramatta Station	 **Lindfield Station (above)** • Gordon Station • Kogarah Station • Five Dock • Marrickville
Description	Major urban renewal precints where there are significant state landholdings. Includes a limited number of mega-precincts with state landholdings that extend well beyond the station site. (i.e. > 2ha of state land)	A program of discrete stations where development is limited to the area immediately surrounding the station box. Includes a large number of 'stand-alone' development sites. (i.e. < 2ha of state land).	At all other stations that are not a Major Renewal Precinct or a Discrete Metro Station opportunity, there is an opportunity for councils to collaborate with state agencies to explore and develop an outcome. This includes existing stations where there is development potential, although transformation is likely to be more gradual.
Governance model	A renewal authority is required because the station is part of a much broader precinct involving multiple agencies – with Metro acting as one of many service providers to the authority.	Sydney Metro can lead this discrete development because the station site is limited and any development has an interface with rail infrastructure.	Collaborative governance is required for this type of development. This includes council leadership, with state government input through surplus land and establishment of clear growth targets.
Rezoning pathway	The renewal authority and Department of Planning and Environment should lead a joint rezoning and development control framework.	Sydney Metro and Department of Planning and Environment would lead a joint rezoning and development application in line with stated objectives.	Local council can be delegated the role to manage the rezoning process. The rezoning would be guided by the state through a S9.1 Ministerial Direction – with timeframes and 'call in' powers. State funding should be provided to councils to help with resourcing and processing.
Development pathway	Larger individual development applications could be classified as state-significant based on cost, splitting development assessment between the state government and local councils. Outcomes would need to accord to Place Strategies and Masterplans.	Integrated and over-station developments led by Sydney Metro and classified as State Significant Development.	Development applications would be market-led, given the majority of land in these precincts would be in private ownership. Assessment of these applications could be left to the local council, though state funding should be provided to help with resourcing where large volumes of applications are experienced.
Requirements for success	State land should be transferred to the authority, which must have the resources, capabilities and mandate to coordinate precinct delivery in order to avoid a piecemeal approach	Metro should retain land ownership and deliver a high number of stand alone station developments via a program of works with repeatable processes and economies of scale.	The state should genuinely collaborate with councils, and 'enable' local development by providing appropriate resourcing, agency input and state infrastructure.

3.2 Review the agencies involved in station development within the NSW Government

Improving station area development will require a review of current NSW Government agencies involved in this space. As it stands, too many agencies appear to be involved in various aspects of station development, with many having overlapping mandates. This is illustrated in Figure 6, below.

When viewed on a page, it is clear there are multiple and competing agencies. This raises issues relating to coordination and duplication of processes for planning, procurement and delivery of station precincts. It also creates confusion in the market, particularly when there are additional planning entities, central agencies and infrastructure agencies involved.

Referencing other global cities, such as Toronto, we believe the most appropriate fix for this situation would involve creating 'place-based' urban renewal authorities for large-scale, priority station precincts. It is important that these authorities are led, resourced and governed by urban development professionals who can successfully take a precinct from inception to delivery.

3.3 Coordinate infrastructure and land development

Far too often, a land rezoning is announced without two key elements:

1. Sufficient infrastructure to support land intensification
2. Certainty relating to future development contributions and affordable housing targets that impact land-values and development feasibilities.

The goal is to create coherent, complete neighbourhoods, which means releasing land for development is only part of the puzzle. Small infill sites in previously developed neighbourhoods are easier, but for larger sites, especially in greenfield locations, the precinct needs government, in partnership with local authorities, to simultaneously have a plan for:

- Transport infrastructure – streets, cycleways, buses and other transport options
- Social infrastructure – schools, hospitals, public services and so on
- Community facilities – childcare, libraries, local roads, parks and so on
- Enabling infrastructure – power, water, sewer, data
- Development contributions – what the costs will be and when they must be paid
- Green infrastructure – biodiversity corridors, deep soil areas for vegetation cover, water recycling, energy generation.

> "Referencing other global cities, such as Toronto, we believe the most appropriate fix for this situation would involve creating 'place-based' urban renewal authorities for large-scale, priority station precincts."

Figure 6: NSW Government entities involved in Metro station and precinct development (not including planning entities and social infrastructure agencies).

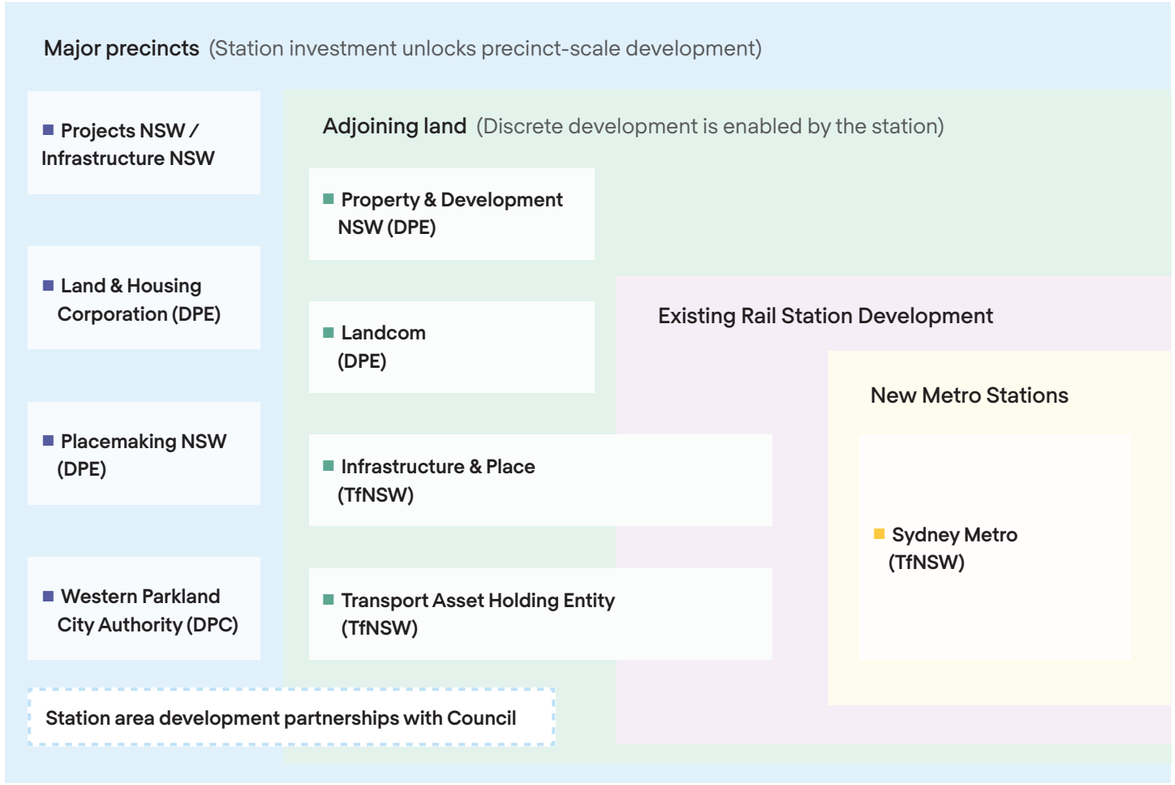


Table 3: Relevant government clusters.

Transport

Sydney Metro
Oversees development of the new Metro and associated station sites. Sydney Metro has the authority to operate reasonably independently of other agencies, but still relies on the Department of Planning and the Environment for independent planning assessment.

Transport Asset Holding Entity (TAHE)
A state owned corporation responsible for surplus land development around rail stations. TAHE is more likely to own land in council-led precints where there is an opportunity for the state to work in partnership with council.

Infrastructure and Place
A division of Transport for NSW responsible for delivering specific TAHE-owned integrated rail station developments.

Planning

Property and Development NSW
The former Property NSW division is responsible for broader surplus land sales and government tenancies, and developing and transacting land across a large portfolio of sites. It can help facilitate government leasing deals, which may be important employment anchors for station precincts.

Landcom
State-owned corporation responsible for housing development in mostly outer-ring locations, where it has a track record of working in partnership with councils.

Land and Housing Corporation
The State's social housing developer, owns a vast portfolio of land, some close to station precincts.

Placemaking NSW
A masterplanning and place management entity, and custodian of Sydney Olympic Park (excluding the town centre), Hunter Park and Darling Harbour.

Premier

Western Parkland City Authority
This newly created agency is responsible for delivery of the Aerotropolis and land surrounding new greenfield stations.

Infrastructure NSW
Lead on several large urban renewal projects including Barangaroo, Sydney Fishmarkets and Blackwattle Bay.

3.4 Deliver affordable housing

There is a widespread community expectation that major developments around train stations will include affordable housing. Generally, there are three ways to deliver affordable housing within a broader precinct:

1. **Government delivers social housing**. In this model, government is the developer of subsidised housing using its own balance sheet. Typically, this model is used when government already owns land adjacent to a station, but in theory LAHC can act entrepreneurially to develop land anywhere it chooses, especially with injections of new capital. State-owned corporations such as Landcom and TAHE can deliver affordable housing, either through joint venture partnerships with community housing providers or selling sites to CHPs.
2. **Inclusionary zoning** is a requirement that developers (on both government and private land) include affordable housing dwellings within their projects. Typically, these would be rental units. The affordable units could either be 'salt and peppered' throughout the project, or delivered as separate stratums within larger projects to improve operational efficiency for community housing providers.
3. **Development contributions** involve governments collecting funding from new developments to invest in social or affordable housing.

All three strategies involve a cost. But so long as the cost or contribution is known and the proportion of affordable housing is appropriate to balance development viability with social outcomes, it can be factored into the project, which generally means it shows up as a reduced land price when developers buy a site on which to build. The exception is for outlying areas, where the land around a station precinct has insufficient value to support development with inclusionary zoning. In such situations, it may be the case that 'meanwhile uses' are required until such development becomes viable or other strategies are required.

What is essential in all cases – government land as well as private land – is that the rules are known in advance so developers know if the project is financially viable for them and, if so, how much they can afford to pay for land.

3.5 Use government land to demonstrate exemplar outcomes

Government has a leadership role to play where it has significant landholdings in a station precinct, which create the opportunity for government to establish an exemplar project.

The most exceptional opportunities exist where government owns vast precincts (e.g. Sydney Olympic Park, Waterloo Housing Estate, the Bays Precinct). These are locations where it makes sense to 'go big' to achieve a scale that allows for multiple benefits:

- Create a fine-grained, walkable street network and block structure, which can acommodate land use changes over succeeding decades
- Provide value to fund exemplar public outcomes
- Attract institutional grade developers and world class design teams
- Allow the market to innovate when responding to reference schemes and evaluation criteria
- Deliver 'best practice' outcomes on affordable housing, sustainability, community and open space, design excellence, heritage integration, nature and Country.

A common mistake is for government to create its own 'reference scheme designs' that are too detailed (e.g. Waterloo Metro Quarter). We think a better approach would be to articulate functional outcomes and then ask developers to come up with ways to deliver them.

In some situations, when there are fragmented landholdings or market failure, the NSW Government may have a role to play in acquiring strategic sites (at market valuation) to support better local results. In these situations, it is encumbent on government to demonstrate a clear 'public purpose' before using any compulsory acquisition powers under the various Acts (e.g. Sydney Metro, TAHE or Growth Centres Act). These mechanisms should be used sparingly to avoid unwarranted interference in the market. However, they are an important mechanism to ensure significant state investment in station infrastructure is able to catalyse the effective renewal of surrounding sites. The use of these powers is obviously highly political, and requires robust probity and transparent application.

When it comes to strategic sites around major station precincts (e.g. Central Station or the Bays Precinct), we think some key sites should be retained in long-term public ownership, where government retains the reversionary interest in the land. The market is generally accepting of long-term leasehold tenure on strategic sites and foreshore land, and there is limited impact in terms of diminishing the market value of the land today (e.g. Darling Harbour). If structured well, such approaches can also enable government to benefit from value increases as leases change hands through future development cycles, and thereby receive a fair return on its investment in infrastructure and pubic domain improvements over time.

> "There is a widespread community expectation that major developments around train stations will include affordable housing."

Seven per cent of new homes at Waterloo South will be set aside for affordable housing. Source: NSW Government.

Case study: Docklands and the Southern Cross Station: the effective redevelopment of government land by urban renewal authorities

Location	Melbourne
Lead agencies	Development Victoria (Docklands); Southern Cross Station Authority and Civic Nexus Pty Ltd (Southern Cross Station)
Construction began	1997 (Docklands) and 2002 (Southern Cross Station)
Opening year	2000 (Docklands) 2006 (Southern Cross Station)
Operator	Civic Nexus Pty Ltd (Southern Cross Station)

Project summaries:

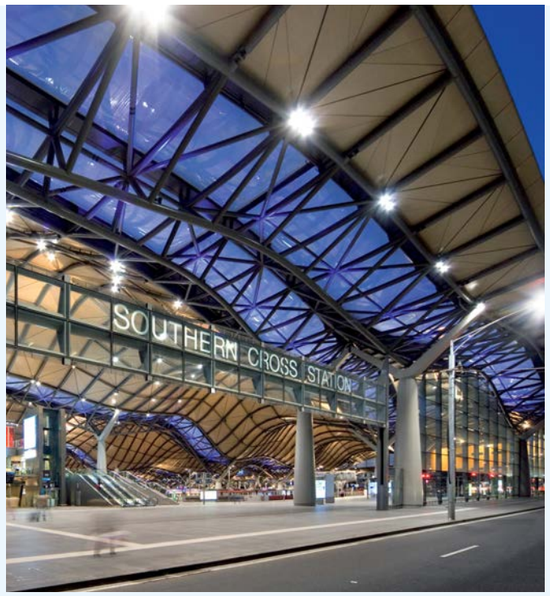
- The $14.6 billion redevelopment of Docklands began in 1997 and is ongoing today.
- Urban renewal in Docklands was designed to reconnect the CBD with the Yarra River.
- The $700 million redevelopment of Southern Cross Station was part of the Victorian Government's Linking Victoria program, launched in 1999.
- The project included the development of a station precinct linking Docklands with the Melbourne CBD, refurbishment of the terminal, the provision of new rail lines and a 30-bay bus station.

The sites:

- Docklands is located on the western edge of Melbourne CBD, wrapping around the Yarra River. The redevelopment site is 1.9 square kms, including a 7km waterfront stretch.
- Once considered derelict, and home to less than 600 residents, Docklands now accommodates 13,000 residents and 73,000 workers. It is expected that Docklands will be home to 20,000 residents by 2025.
- Docklands includes a public art trail with 68 installations, Melbourne Star Observation Ferris Wheel, and Marvel Stadium – a waterfront sporting arena.

The rail station:

- Southern Cross Station is comprised of 16 platforms and 22 tracks. It serves as the departure point for all regional and metropolitan trains, trams, and buses – servicing more than 1 million people every week.



Redevelopment through public private partnerships:

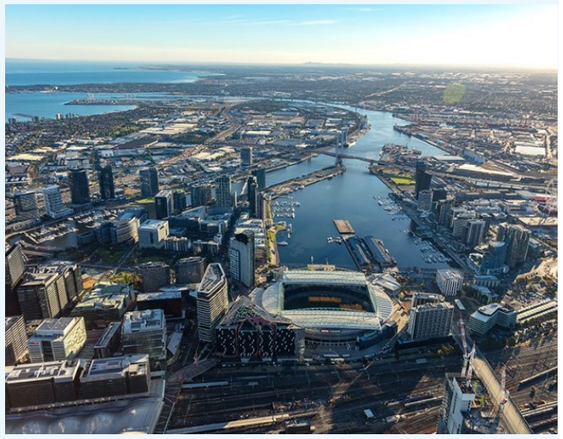
- The Docklands Authority (now Development Victoria) was established in 1991 to oversee the urban renewal of Docklands
- The Victorian Government undertook development of the surrounding public land to transform Docklands and to optimise outcomes from the redevelopment of Southern Cross Station.
- This was undertaken using a series of partnerships between Government and the private sector, with the overarching curation of the precinct being undertaken by Government.

Why it matters:

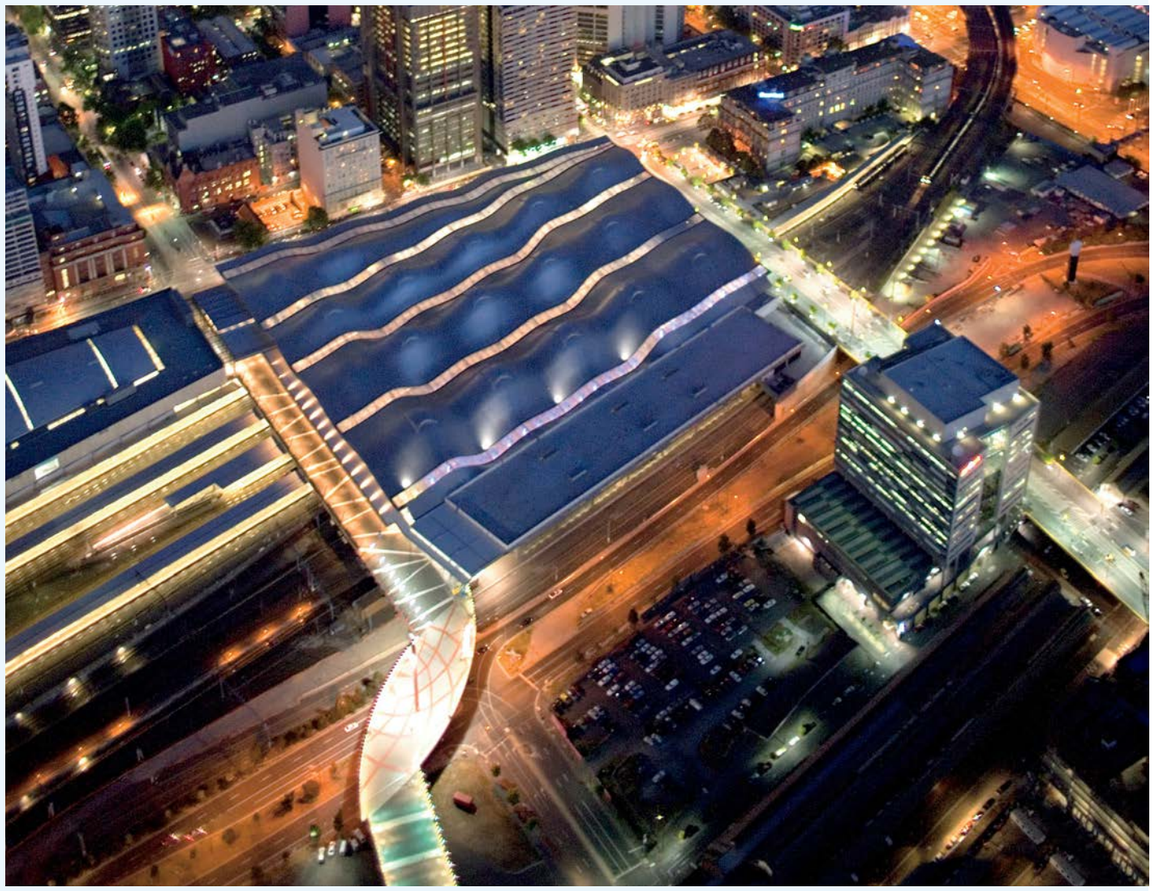
- The two major projects demonstrate the effectiveness of delivering critical infrastructure and redeveloped government land at the same time.
- As the urban renewal of Docklands and redevelopment of Southern Cross Station occurred concurrently, new residents and workers were attracted to Docklands by the immediate connection to various transport options and the CBD.
- Furthermore, connecting Docklands to a station precinct – and therefore the rest of Melbourne – helped to attract more private investment from developers, boosting the ongoing urban renewal.

Before

After



Melbourne's Docklands is one of Australia's largest urban renewal precincts. Source: Development Victoria.



Southern Cross Station connects Docklands to the Melbourne CBD across an established rail corridor. Source: Grimshaw / John Gollings Photography.

3.6 Engage with stakeholders, community and critics in a genuine way

There is a lot to dislike about the current community engagement process:

- Local residents are rarely happy about taller buildings going up near them
- Future residents don't get a voice in the process
- Local Aboriginal communities are not engaged meaningfully
- Those who choose to participate are often unrepresentative of broader views in the community
- Often the community feels consultation consists of the project being 'sold', rather than authentic engagement.

These are issues faced all over the world as part of the process of urban change, and we need to be realistic there is no way to make everyone happy.

Early and genuine engagement, regarding the wider precinct surrounding existing and new rail stations, can provide positive feedback and inform scope decisions. When precinct planning decision-makers are willing and able to understand stakeholder feedback and make an informed choice, it can result in vastly improved public outcomes. More importantly, engagement and scope decisions that reflect what is heard build trust and buy-in from the community and stakeholders. Stakeholders can become partners or even advocates.

It is critical to obtain this kind of far-reaching acceptance and advocacy for city-shaping public transport projects.

Project teams should not be afraid of open conversations with stakeholders, the community, supporters and even critics. In fact, a healthy debate with critics has the potential to reveal optimism bias, previously unknown constraints, and new opportunities. Even when an agreed position cannot be mutually agreed, engagement with critics can often establish a level of empathy and understanding for both parties.

Being upfront about the nature of change and utilising processes that draw on local knowledge can help achieve better outcomes. It often works best by:

- Presenting two to three scenarios rather than a blank canvas, and evaluating these with appropriate data to show how they can deliver against stated objectives
- Establishing that no change, or even limited change, is not an option, and that the process is about maximising quality, liveability and sustainability given the need to accommodate an identified amount of residential or employment floorspace
- Clarifying design processes, including any design guidelines to ensure high-quality built form
- Explaining the commercials, benefits and trade-offs
- Specifically addressing development in 'transition zones' between the high-density station core and lower-density surrounding neighbourhoods
- Being clear about the things that are 'on the table' and 'off the table' in the engagement process to manage expectations and direct the community's limited time and resources
- Starting with engagement so community views, needs and aspirations are an early informer to the project
- Planning enough time and resources for the community to participate meaningfully
- Connecting with local Aboriginal communities early, meaningfully and respectfully, as well as providing appropriate resources and time to enable engagement
- Highlighting the benefits of renewal, such as public domain, civic uses, local infrastructure and social outcomes, rather than just the proposed development.

3.7 Establish infrastructure contributions before rezoning

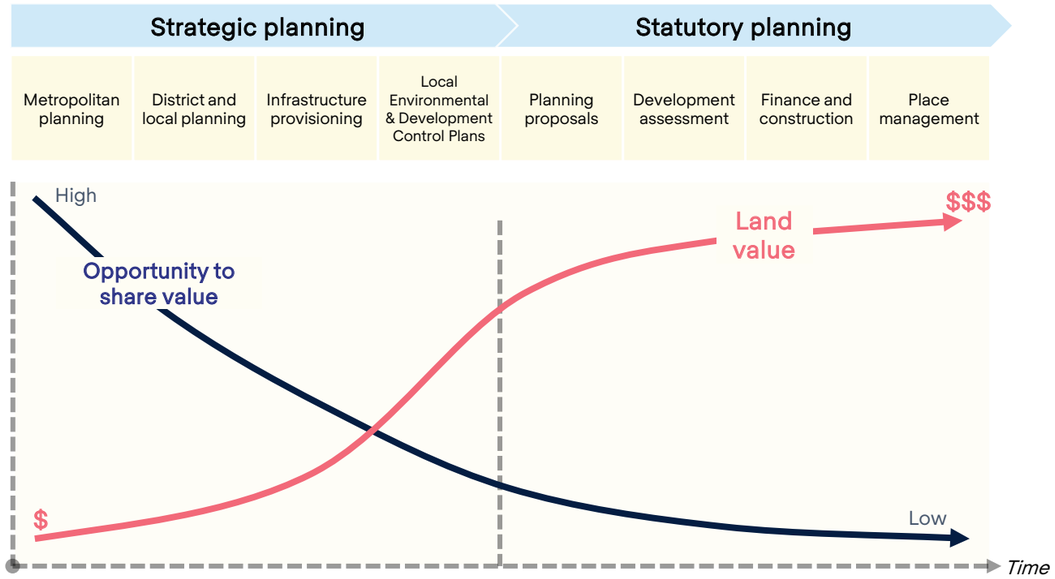
The NSW Productivity Commission's Review of Infrastructure Contributions recommended important changes to infrastructure contributions levied in areas benefitting from investment in new rail infrastructure and upzoning.

This is a significant step forward. It recognises that large public investments in public transport capacity, public space and other infrastructure create value for private land owners. If government can recoup some of that value, it will be able to recycle it back into further community improvements.

Value sharing in this context means reappropriating some of the financial gains from rezoning and development, and using those for public purposes – whether that be affordable housing, state infrastructure funding or public amenities for the local community. For this to work in practice, infrastructure contributions need to be signalled upfront, before the actual value is created – that is, before rezoning around station precincts..

Recent history shows some contribution mechanisms have been released too late because the original land owners have already captured the value for themselves by selling to developers. The developers have already undertaken residual land value analysis without the knowledge of infrastructure contribution requirements, and therefore additional costs either make development less viable or lead to big asset write-downs, something any business would obviously fight to prevent.

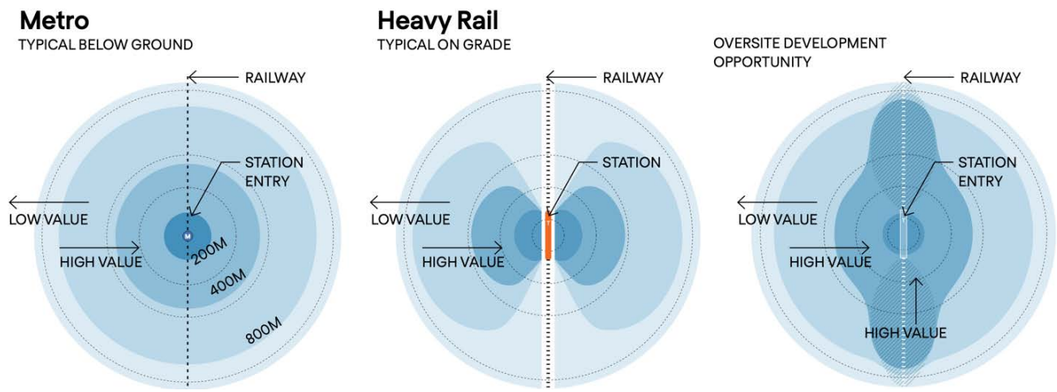
Figure 7: Establish infrastructure contributions at the start of the strategic planning process.



Source: Frecklington Advisory.

We need to develop a clever approach to infrastructure contributions around station precincts that balances development viability with appropriate funding for social and community outcomes. For infrastructure contributions to work, they must be reasonable, viable and established before rezoning so they can be factored into land value calculations for development feasibility. Spatial distribution of value created around Metro versus heavy rail precincts is shown in figure 8 below. This gives an indication of the areas applicable for rezoning and infrastructure funding.

Figure 8: Spatial distribution of the value created around Metro vs heavy rail precincts.



Source: Grimshaw.

Case study: Crossrail UK: using value capture to pay for transport infrastructure

Location	London
Lead agency	Transport for London
Approved	2007
Construction began	2009
Opening year	2022
Operator	MTR

Project summary:

- Crossrail 1 (the Elizabeth Line) is a new high capacity east-west train line running underneath London.
- When completed, it will serve 41 stations including Paddington Station, Heathrow Airport, and Canary Wharf.
- It is designed to have the capacity to run up to 24 trains per hour and will bring an additional 1.5 million people within a 45-minute commute of London's CBD.

New station design for Crossrail UK. Source: Grimshaw.

Table 4: Funding sources for the Crossrail UK redevelopment.

Source	£	%	
Department for Transport funding	5.1bn	27.2%	
Network Rail funding (for access to tracks)	3.0bn	15.9%	
Transport for London Funding	2.1bn	10.9%	
Department for Transport loan to Transport for London (from future Crossrail Revenue)	0.8bn	4.0%	
City of London Corporation committed funding	0.3bn	1.3%	
Greater London Authority funding	0.1bn	0.5%	
Voluntary funding from London Businesses	0.1bn	0.5%	
Heathrow Airport Limited funding	0.1bn	0.4%	
Compulsory land acquisition and resale	**0.6bn**	**2.9%**	
Broad levy on all development in London (Mayoral Community Infrastructure Levy)	**0.3bn**	**1.6%**	
Targeted levy on large, non-residential development near Crossrail stations (S.106 charge)	**0.3bn**	**1.6%**	**Total funding from Value Capture = £ 7.4bn Which is equal to 39.3% of the total funding package.**
Business Rate Supplement	**4.1bn**	**21.8%**	
Loan to Greater London Authority funded by the Business Rate Supplement and Mayoral Community Infrastructure Levy	**2.1bn**	**11.3%**	
Total Funding	**18.8bn**	**100%**	

Four types of value capture used on Crossrail UK:

1. Compulsory land acquisition and resale

- The Crossrail Act 2008 enabled compulsory land acquisition of station sites prior to construction. The land was then sold back to developers after the value had increased.
- At twelve of the stations, the Secretary of State gave the original landowner the right of first refusal to purchase back the sites at the higher value. For the remaining 7 sites, there was no single landowner, so Crossrail Ltd set the terms of sale based on the market.

2. Broad levy on all development in London

- The Mayoral Community Infrastructure Levy (MCIL) is a £/sqm charge for all almost new development in London - with exemptions for medical, educational, or social housing uses.
- The UK Government's Community Infrastructure Levy Regulations 2010 enabled local authorities to obtain finance from developers for infrastructure. Authorities can set their own levy at a rate per square metre.
- The MCIL was established by the Mayor of London in 2012. It was superseded by MCIL2 in 2019, which had slightly higher rates. Rates varied by Borough, ranging from £25-£80 per sqm.

3. Targeted levy on large, non-residential development near Crossrail stations

- The Mayor of London also implemented an S.106 charge – a planning obligation £/sqm charge under the UK's National Planning Policy Framework.
- Contributions were sought from retail, hotel and office developments with a net increase of 500sqm or more floorspace in central London, the Isle of Dogs, and within a 1km radius of any Crossrail station.
- Developers who were liable for both the MCIL and the S.106 charge had the MCIL payment treated as a credit towards the S.106 charge.
- The MCIL2 superseded the S.106 charge for new office, retail and hotel developments in central London. Rates varied based on use type and location, ranging from £0-£140 per sqm for a hotel, £16-£165 per sqm for retail, and £31-£185 per sqm for office buildings.

4. Business Rate Supplement

- The Crossrail Business Rate Supplement (BRS) is a levy on non-residential ratepayers in London.
- The BRS was enabled by the UK's Business Rates Supplements Act 2009, which allows local authorities to obtain financing for economic development projects from non-residential ratepayers.
- The Crossrail BRS has a basic multiplier of 2% per year, so a property with a rateable value of £100,000 would pay a £2,000 contribution annually.
- The BRS was initially applicable to premises with a rateable value of £55,000 or more in the 32 boroughs of London. In 2017, the Mayor of London increased the qualifying rateable value to £70,000 or more. The BRS has been in place since 2010. It was extended in 2018 and as of 2021 it was expected that it may be extended again until the mid to late 2030s.

Why it matters:

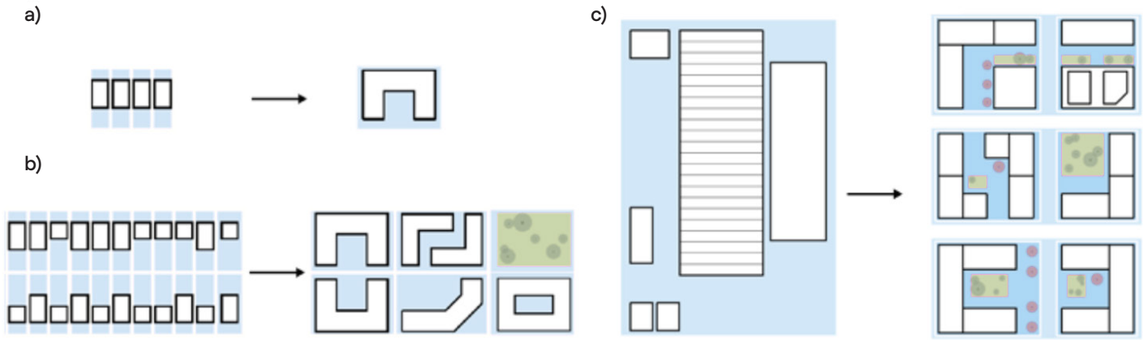
- Major public investments in public transport create a lot of value for private landowners by making sites accessible.
- Crossrail demonstrates the possibility of using Value Capture mechanisms to help pay for some of the costs of that infrastructure.
- Crossrail was able to cover 39% of the project construction costs through these mechanisms. This highlights a huge opportunity for Sydney to continue to fund major public transport infrastructure.

3.8 Enable land amalgamation

Being able to amalgamate land is critical to station development – specifically, to create parcel sizes capable of supporting timely and high quality development, rather than delayed or piecemeal development. There are a number of ways to facilitate land amalgamation, including:

- Incentivising land amalgamation through mechanisms such as bonus FSR (floor space ratio, or how much building is allowed on a site)
- Facilitating land pooling through owner-partnerships, which may be assisted by brokers
- Where appropriate, enabling government to adopt a more hands on approach, including Development Rights Auctions, where government works with landowners to assemble and masterplan developable land, and subsequently sells development rights for assembled lots via auctions, with returns shared between government and participating landowners
- Appropriate use of the NSW Government's Unsolicited Proposals process (noting that transparent and competitive market processes should always be government's preference).

Figure 9: Various models for amalgamating land around will be crucial for station area development.



a) Small single blocks can be amalgamated to a larger block where additional density can be achieved. b) Consolidation of more small plots allows greater amalgamations, with potential for more public amenity with greater yields and density. c) Large plot lands such as those for industrial uses often become surplus as logistics drive big box warehousing to the outskirts of towns, close to arterial roads, or manufacturing becomes more technology focused. These are prime for redevelopment into generous precincts with significant uplift. Source: Hassell.

3.9 Allow private land to be developed with speed and certainty

Where land is in private ownership, government is the enabler of development, rather than the primary actor.

It is important to have the right planning and zoning in place, and a well-functioning process for reviewing and permitting development, but ultimately it is up to private landowners to initiate and undertake the development.

To achieve the best outcomes on private land, government should:

1. Provide clarity about planning controls and about infrastructure charges/developer contributions – which enables developers to forecast revenues and costs so they know what to bid for land
2. Use a planning review and approval process that is as streamlined and clear as possible – if a developer proposes something that fits within the plans, they know it will be approved
3. Create incentives for land owners to sell or amalgamate.

The overall point is to have clear rules in place so the market generates good place outcomes while being able to move quickly.

> " Being able to amalgamate land is critical to station development – specifically, to create parcel sizes capable of supporting timely and high quality development, rather than delayed or piecemeal development. "

An artist's impression of the Parramatta Metro station. Source: Sydney Metro.

Models for precinct design and station construction

We are putting forward four station models that capture the challenges and opportunities across Greater Sydney when delivering new or upgraded transport infrastructure.

Aerial shot of planned Waterloo South development. Source: NSW Government.

Model 1: For inner city station precincts

This CBD Centre model concentrates development around the station precinct, featuring a vertical high school over the Metro (we have specifically included this to challenge our thinking), and creating a new town centre.

It creates a new commercial hub with significant building height and density, and a rejuvenated shopping centre and vibrant high street. Also within the transport hub is a medical campus provided for the existing and broader community. Large plots, formerly used for industrial purposes, are redeveloped into residential precincts.

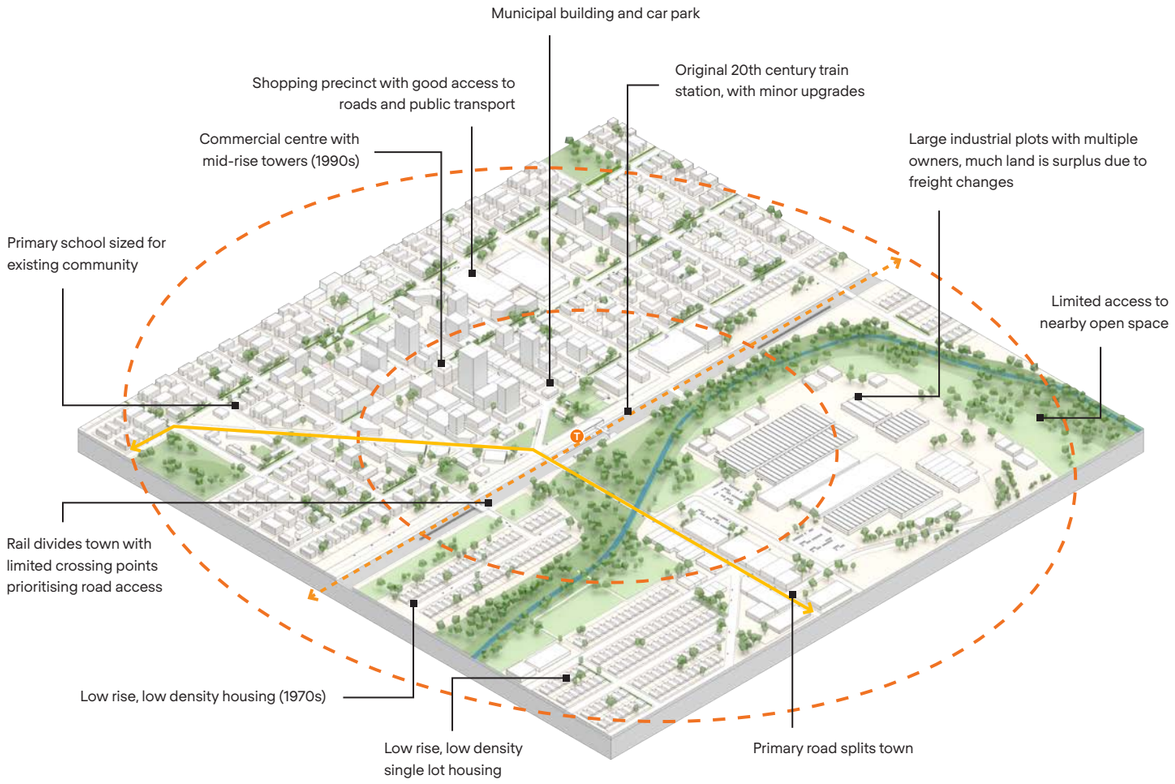
New links across the rail infrastructure connect new communities into the station precinct. Smaller plot landowners are incentivised to develop around the rail corridor with good walkability to the station. Natural environments are enhanced.

Before

Three big challenges

1. Multiple land owners with different interests
2. Inconsistent development quality
3. Poor access across the rail corridor impedes growth

Existing dwellings: 5,700



Established examples:

- Martin Place
- Pitt Street
- Barangaroo
- North Sydney – Victoria Cross
- Parramatta

Emerging examples:

- Liverpool
- Chatswood
- Pyrmont

Key opportunities for intensification:

- Bays Precinct
- Eveleigh
- Central Station

Key characteristics:

- High densities
- High employment concentrations
- High land values
- High level of metropolitan connectivity

Key

- Existing heavy rail station
- Existing heavy rail line
- Existing arterial road
- New Metro Station
- New Metro Line (below Ground)

After

Three big responses

1. Incentivise amalgamation of landholdings
2. Design review process to drive high quality development and public realm
3. Another rail crossing for pedestrians and bike riders

Total dwellings: 15,900

Model and images developed by Grimshaw

Model 2: For major town centres

The reconfigured Activity Centre model is unlocked through the construction of new Metro infrastructure. It provides the impetus and development focus to create the civic and public spaces that will anchor the future precinct. It also enables key connections to the surrounding precinct.

The proposed model allows transitional growth along key new linkages, creating a variety of development types that are able to cater for a much more diverse social base.

Key characteristics:

- Intensive, middle-ring station nodes
- Economically productive but less important than CBD Centres
- Need to deal with transition zones from a high-density station core to lower-density surrounding area.

Key

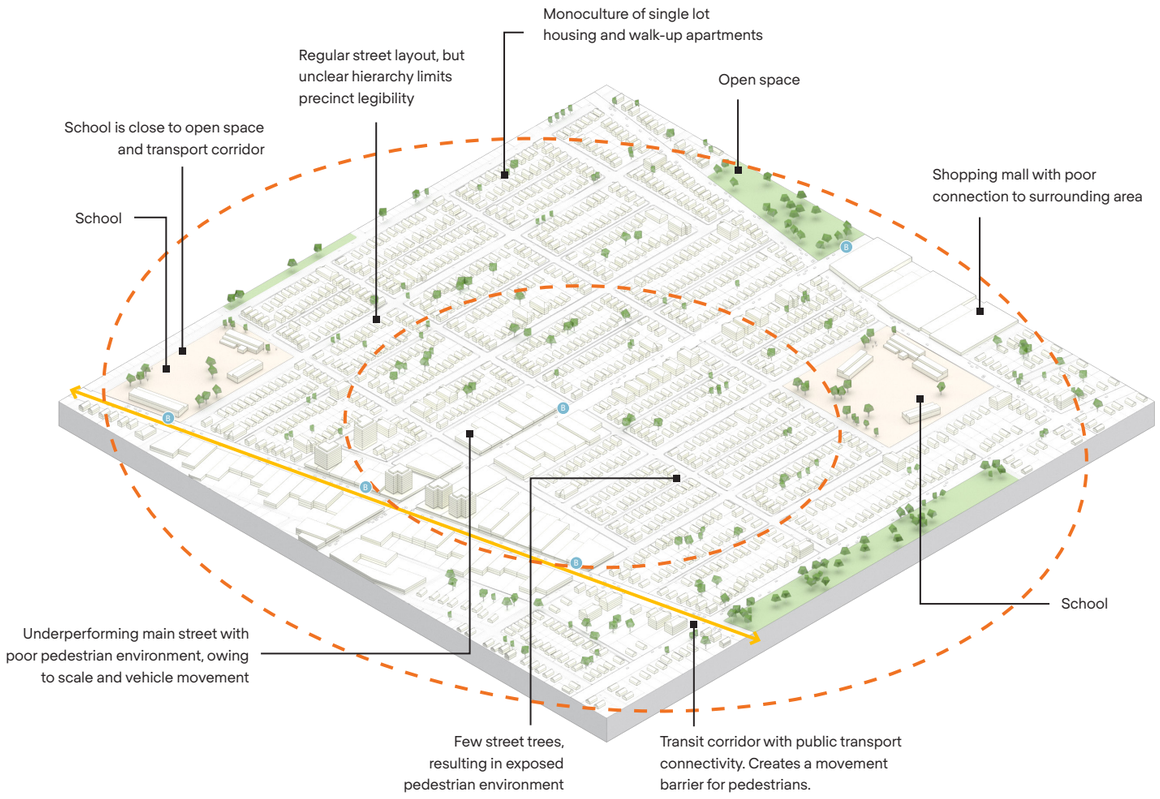
- Existing bus stop
- Existing arterial road
- New Metro station
- New Metro line (below ground)

Before

Three big challenges

Existing dwellings: 2,995

1. Multiple land owners with different interests
2. Homogeneous built form, results in monocultures
3. Poorly structured precinct, with wayfinding issues



After

Three big responses

Total dwellings: 8,599

1. Strategic locations identified for renewal and uplift, based on nearby amenity, contribution to centre structure, and walkability to Metro
2. Increase amenity through reprogrammed larger open spaces, more local parks and community centres
3. Improve walkability and wayfinding by providing greater movement hierarchy including green and slow movement priority streets

Established examples:

- Bondi Junction
- Hornsby
- Castle Hill

Emerging examples:

- Rouse Hill Town Centre
- Rhodes
- Green Square
- Campsie

Key opportunities for intensification:

- East Gardens / Maroubra Junction
- Crows Nest
- St Marys

Model and images developed by Hassell

Model 3: For existing suburban centres

This hypothetical suburban upgrade contemplates more incremental and gradual change, unlike other centres that may be created in much shorter time frames. The overall framework for development is therefore flexible in nature, and while landowner development will be incentivised, markets may be slower to capitalise on the improvements.

A new enterprise zone is created in walking distance from the station, with a new residential and light industrial / technology precinct adjacent, occupying land previously used for industry. Traffic is diverted from the existing high street allowing an improved public realm with retail, cafes and restaurants.

Key characteristics:

- Historically sited in the centre of suburbs that evolved over time
- Existing amenities like restaurants, cafes and shops
- Generally lower relative land values
- Change likely to be more incremental over time.

Key

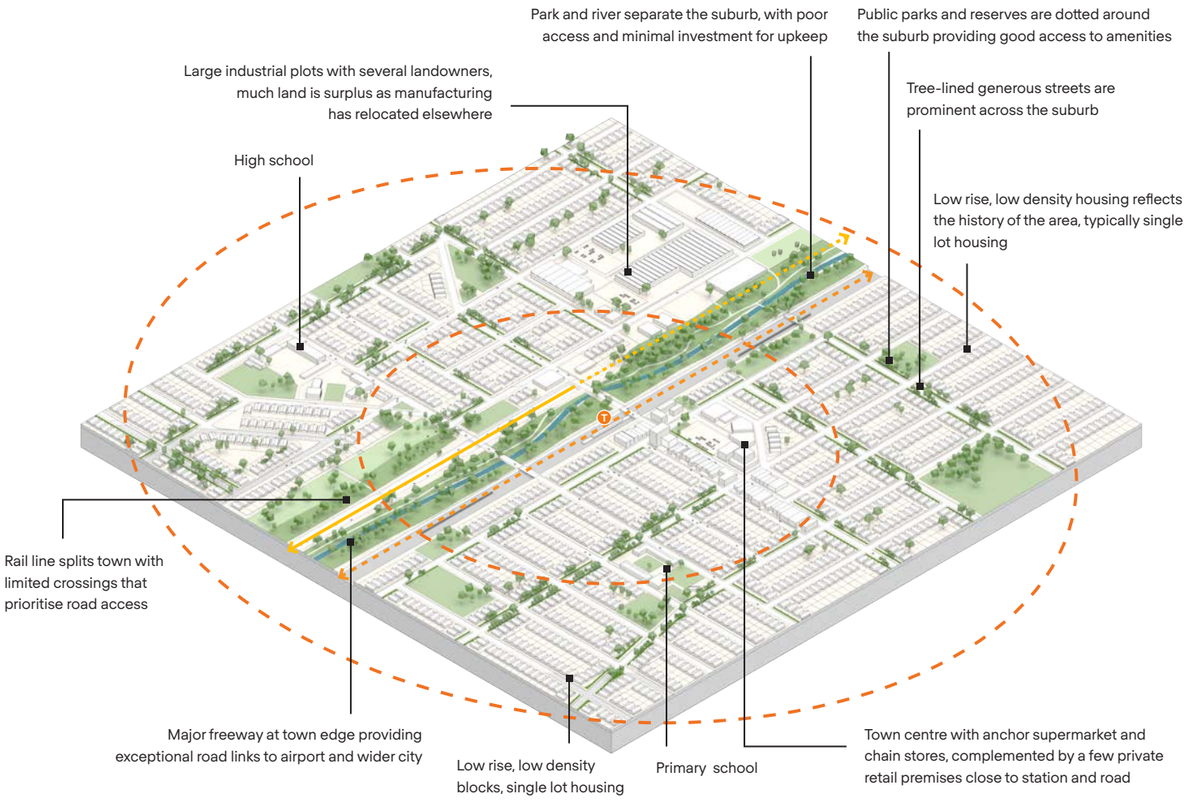
- Existing heavy rail station
- Existing heavy rail line
- Existing arterial road

Before

Three big challenges

1. Multiple land owners with different interests
2. Insufficient market demand to drive development and investment
3. Poor design and amenity

Existing dwellings: 1,700

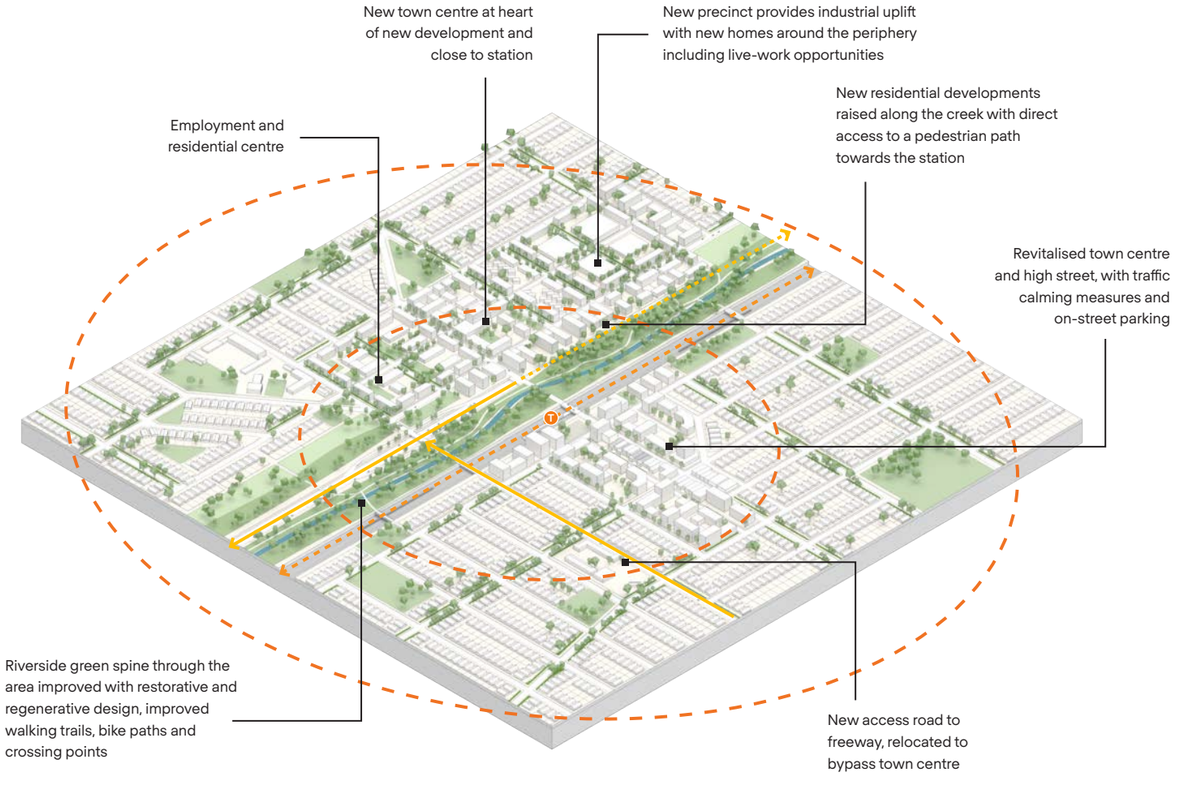


After

Three big responses

1. Stimulate residential and employment growth
2. Incentivise retail activity
3. Provide improved community assets, buildings and facilities for a growing centre

Total dwellings: 3,400



Established examples:

- Summer Hill
- Newtown

Emerging examples:

- Five Dock
- North Strathfield

Key opportunities for intensification:

- Pennant Hills
- Bexley North

Model and images developed by Grimshaw

Model 4: For new greenfield suburban centres

The reconfigured New Suburban Centre draws on the surrounding natural landscape to help define its future character. As such, the proposed development relies on compact development models to minimise its urban footprint. The station itself is likely to be elevated to keep costs lower while allowing at-grade permeability and movement on either side.

This model leverages the productive landscape that is typical of these locations to help create a specialised centre form providing knowledge and education infrastructure.

Key characteristics:

- New town centres within a greenfield
- Community setting that require the establishment of a strong commercial/retail core
- Low existing population density
- Greater dependence on private motor vehicle
- Need to plan for waves of future renewal.

Key

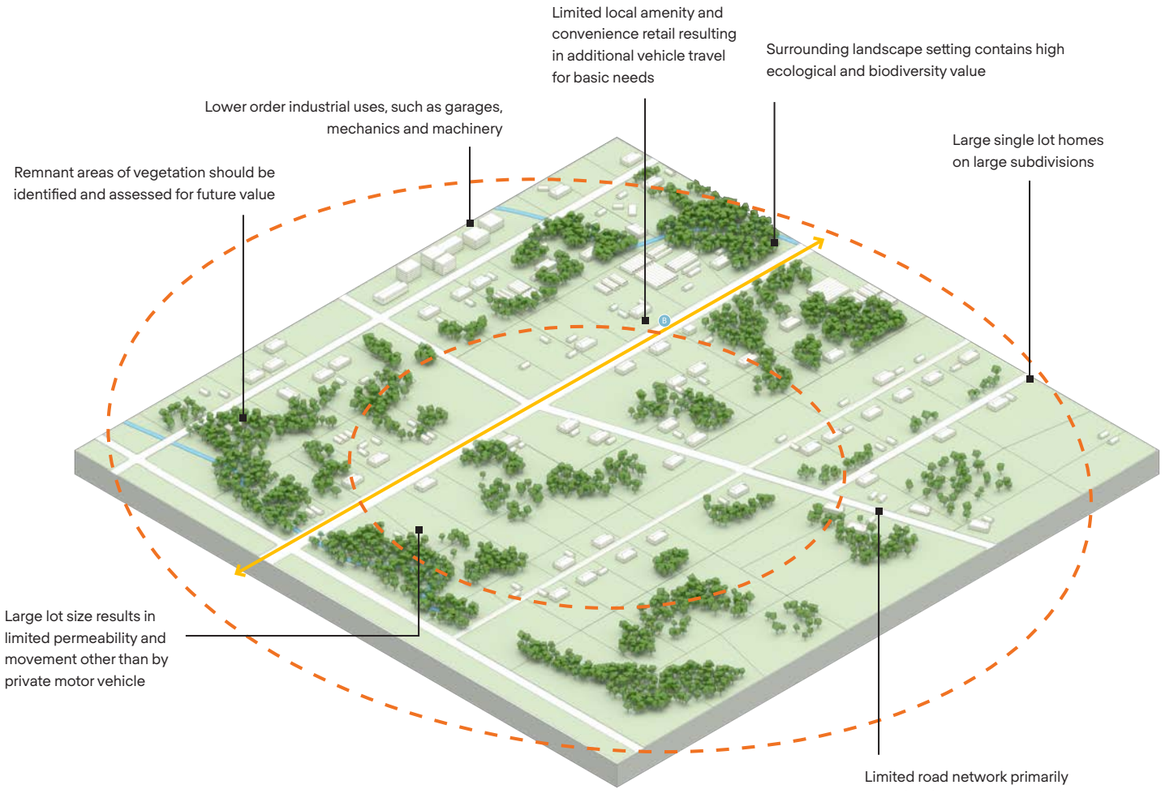
- Existing and proposed bus stops
- Existing arterial road
- New Metro station
- New Metro line (above ground)

Before

Three big challenges

1. Lack of surrounding amenity and functions to support locals
2. Preserving landscape setting and ecological value
3. Enabling walkability and sustainable movement

Existing dwellings: 128

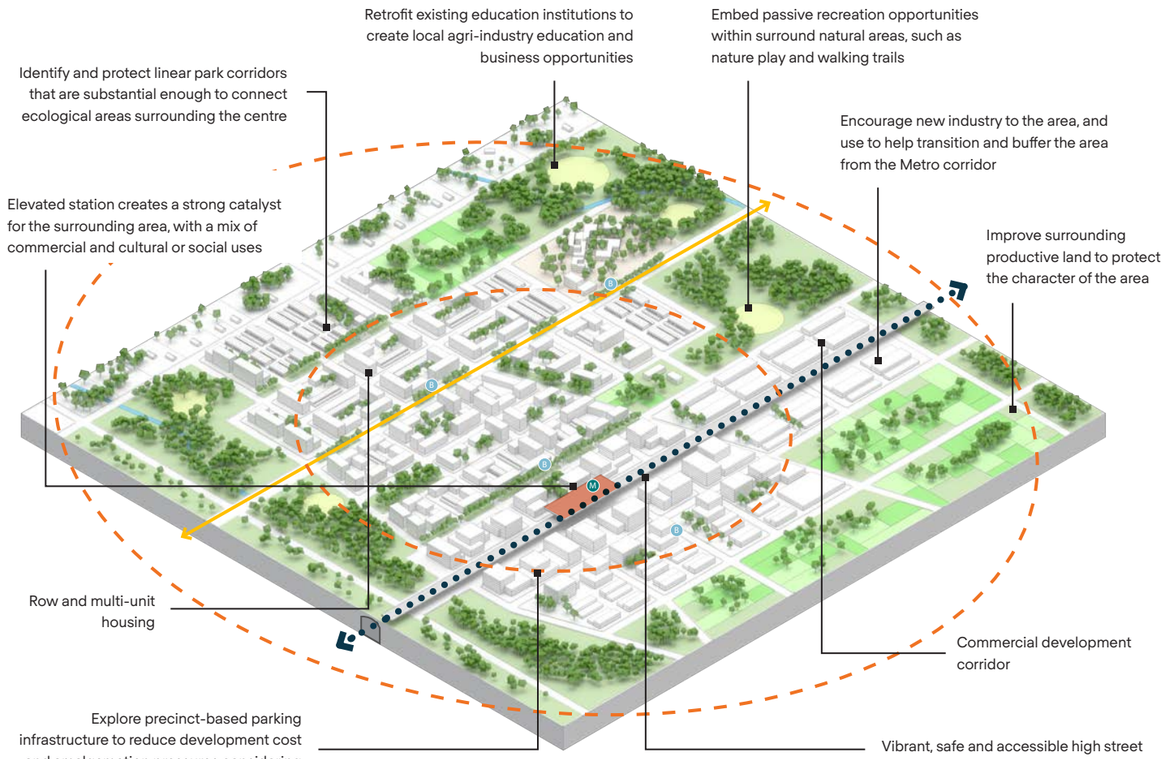


After

Three big responses

1. Establish a future destination and identity for the area to attract a variety of people and local business
2. Celebrate the surrounding landscape and integrate into the centre structure and community amenity
3. Capture and promote rural economy elements to differentiate centre functions and contributions

Total dwellings: 5,881



Established examples:

- Edmondson Park
- Leppington
- Luddenham
- Marsden Park

Model and images developed by Hassell

4.2 Station construction models

When it comes to construction, there are three construction models for building over and around new station precincts. These models can be applied to different station models depending on the land value and density.

Integrated station development (ISD)
The station is integrated with the over-station development, and the entire station is built in a single stage.

These projects need to be delivered by a party with integrated real estate and infrastructure capabilities, and are typically procured on a station by station basis, with separate counterparties for each station node. While the interface risk at each node (i.e. the risk of integrating the belowground infrastructure with the aboveground building) may have been partially mitigated, the risk profile has changed because successful delivery of the network of new rail stations no longer relies on a single infrastructure contractor but instead on a series of separate counterparties for each station node.

There are clear benefits to ISD – better integration between the station and the development. But ISD makes sense only in high land-value and high density places (e.g. Martin Place) because it is complex and expensive to put density directly on top of station boxes. When it comes to implementing ISD, there is a significant complexity involved in integrating real estate and infrastructure workstreams.

Current ISD strategy requires contractors be accredited as Authorised Engineering Organisations (AEO), which creates a dependency on a 'handful' of qualified counterparties which may not have the balance sheets to satisfy the future scope of Metro station procurement. This limits the number of potential counterparties for government, and creates network risk for Metro by having separate counterparties responsible for the delivery of each station node in the network (i.e. if one developer goes bankrupt and can't finish a station on time, the entire network is delayed). ISDs should therefore be selectively used, and rarely outside CBDs.

Integrated station development case study	Euston Station, UK

- Development of sites within footprint of railway infrastructure /station
- Requires early engagement with developer and/or ultimate building user
- Achieves optimised value through innovative design and engineering
- Integrated masterplan of station and over-site development
- Station upgrades funded by high speed rail project
- Over-station development funded by commercial developer
- Urban regeneration in collaboration with local government
- Provides public benefit
- Diversification in commercial tenants

Over station development (OSD)
The station box is designed to accommodate a future development, enabling a single infrastructure contractor to deliver the station box and decking structure for all station nodes, but may result in more 'vanilla' over-station development.

OSD is applicable in locations where land values are lower and where 'repeatable / scalable' reference schemes can be applied to enable a program of Metro stations (i.e. to create unlock economies of scale). To enable OSD, Sydney Metro needs to develop a 'repeatable / scalable' reference design in consultation with industry, and provide the opportunity to engage a broader cross-section of potential builders.

Over station development case study	Hudson Rail Yards

- Creates a development 'deck' over the railway
- Once deck is constructed, limited impact on rail operations
- Cost is high and dependent on specific site constraints
- Relies on early planning / master planning of sites
- Integrated masterplan of station and over-site development
- Commercial deck built over existing railway infrastructure
- Over-station development funded by commercial developer
- Provides public space, events building and public structures
- Optimises land use in the city

Adjacent site development (ASD)
This involves developing the land contiguous to the station box and this is less complicated.

ASD makes sense for precincts where land values are relatively low (e.g. greenfield areas) or precincts where there are large adjacent landholdings that can be developed first with a lower cost-base (e.g. Sydney Olympic Park). In the case of precincts like Sydney Olympic Park, the cost of 'manufacturing' land over the top of a station (i.e. OSD) is likely to be more expensive that the cost of land on the surrounding sites (which have ample capacity for development in the short to medium term). In this situation, it may be better for government to wait until the adjacent development sites are delivered before returning to do OSD, and in the meantime the station precinct can provide a great public plaza or civic outcome.

Adjacent site development case study	Kings Cross, UK

- Development of sites adjacent to railway infrastructure / station
- Often regenerates former buildings associated with the railway infrastructure that are now obsolete
- Can be urban, precinct or station scale
- Costs vary, benefits exist, but need to be understood and applied
- Masterplan of former rail associated industrial buildings
- Catalysed by HSR and transport upgrade funding
- Rejuvenated public realm
- Urban regeneration in collaboration with local government
- Diverse anchor tenants

4.3 Bringing precinct design and station construction together

Applying the right construction model for each station precinct is the key to bringing design and delivery together. The table below illustrates the circumstances where ISD, OSD and ASD are applicable, and how this relates to our four station models.

Table 5: Applying the right construction model for each station precinct is the key to bringing design and delivery together. The table below illustrates the circumstances where ISD, OSD and ASD are applicable, and how this relates to our four station models.

	Infrastructure delivery models		
Precinct model (High to low density)	ISD (For complex CBD sites with high land values)	OSD (Where the benefits of generic station design outweigh the dis-benefits)	ASD (For precincts with large adjacent landholdings or low land values)
CBD Centre	Standard approach	By exception	N/A
Activity Centre	By exception	Standard approach	By exception
Suburban Centre	N/A	By exception	Standard approach
New Suburban Centre	N/A	By exception	Standard approach

Clarifying this approach will be important to help government design appropriate procurement processes for future station development partners.

A much broader cross-section of builders and developers can get involved in OSD and ASD opportunities, because they are less complex than ISD. This will be important to enable government to address the risk that ISD opportunities are contested by a limited number of organisations. It will also be important to ensure that station development strategies are appropriate for local markets, taking into account land economics and market participants.

UK's Newcastle Helix used a university as anchor institution with the aim of catalysing economic renewal in a city that has suffered from deindustrialisation. Source: Newcastle Helix.

Metropolitan outcomes and development potential

5.1 Development capacity near the rail network

The criteria for centres with additional development potential are:

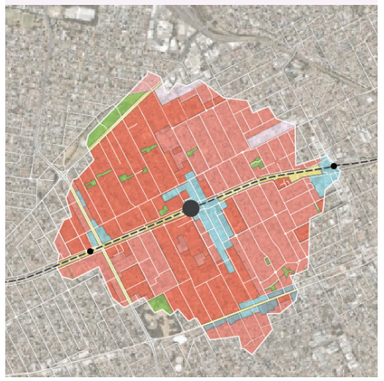
1. Centres on a heavy rail line or the north-west, city and southwest, or west Metro lines (as these lines are the focus for this report)
2. Centres identified as metropolitan centres, health and education precincts, and strategic centres in the Greater Sydney Region Plan and District Plans (priority locations for services and additional development)
3. Centres that are not overly constrained or ruled out from further development by environmental, physical or heritage factors, or not already the subject of recent planning processes to enable significant additional development
4. Other local centres accessible to a significant share of metropolitan jobs and services by public transport, as this will support sustainable transport outcomes and higher productivity and labour matching (using effective job density as a metric).

Table 6: The development capacity analysis considers population, dwellings and development potential.

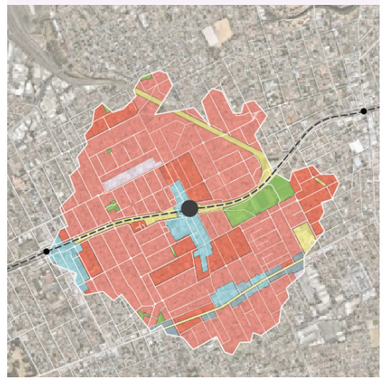
Station	Lakemba	Belmore	Burwood	Westmead	Epping	Five Dock	Chatswood
15 minute catchment	315.9Ha	313.3 Ha	338.5 Ha	326.8 Ha	338.2 Ha	345.6 Ha	325.2 Ha
Residential and mixed use developable area	258.5Ha	252.4 Ha	245.9 Ha	184.3 Ha	269.4 Ha	270.2 Ha	243.9 Ha
Other developable area	31.1Ha	30.9 Ha	32.8 Ha	2.4 Ha	15.4 Ha	25.2 Ha	37.5 Ha
Total developable area percentage over total catchment	289.6Ha 91.7%	283.3 Ha 90.4%	278.7 Ha 82.3%	186.7 Ha 57.2%	284.8 Ha 84.2%	295.4 Ha 85.5%	281.4 Ha 86.5%
Population – density over total catchment	28,334 pp 89.7 people/Ha	19,406 pp 61.9 pp/Ha	20,987 pp 62.0 pp/Ha	18,299 pp 56.0 pp/Ha	15,125 pp 44.7 pp / Ha	15,759 pp 45.6 pp/Ha	25,347 pp 77.9 pp / Ha
Residential dwellings – density over total catchment	9,394 dw 29.7 dw/Ha	7,138 dw 22.8 dw/Ha	7,928 dw 23.4 dw/Ha	6,662 dw 20.4 dw/Ha	5,553 dw 16.4 dw / Ha	6,342 dw 18.4 dw/Ha	10,743 dw 33.0 dw / Ha

Source: AECOM.

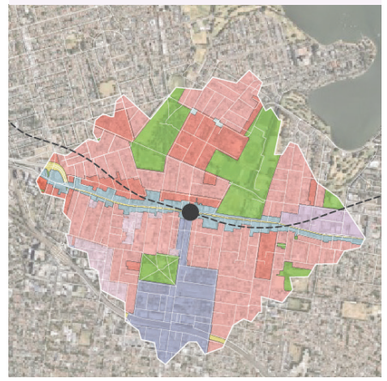
Lakemba



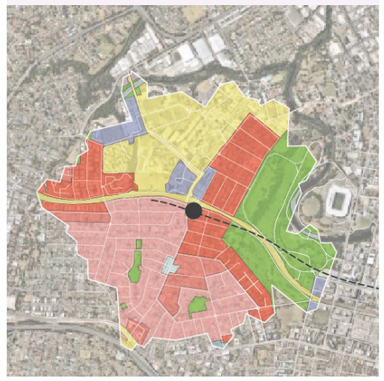
Belmore



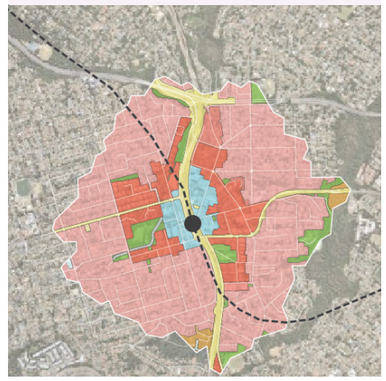
Burwood



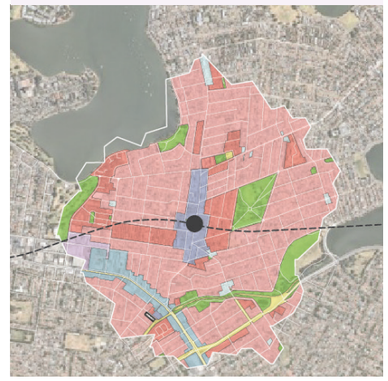
Westmead



Epping



Five Dock



Chatswood

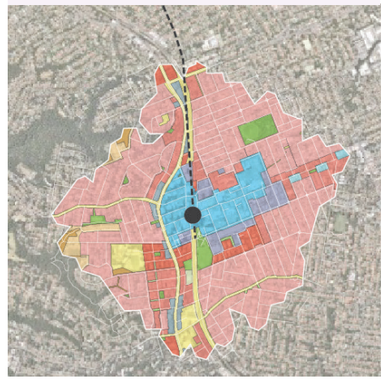


FIGURE 10: Sydney's station areas identified for capacity analysis

CBD Centre

Activity Centre

Suburban Upgrade Centre

New Suburban Centre

Existing heavy rail station

New Metro station

5 km

Model and map developed by AECOM.

"Given Sydney's temperate climate, we considered the 1500 metre catchment to be well suited to walking as well as emerging modes of electric scooters and bicycles, to access shops, services and public transport."

5.2 Potential yield from station development

A capacity analysis was undertaken on 82 centres along existing heavy rail lines of the new Metro lines (see Figure 10 above). The selected station precints included strategic sites in the Greater Sydney Region Plan and District Plans, and/or sites that are accessible to a significant share of metropolitan jobs and services by public transport.

To undertake the capacity analysis, the team adopted a 1500 metre radius around the rail station. The 1500 metre radius represents a larger catchment than the typical focus (of 400 to 800 metres) for urban design and structure planning. Given Sydney's temperate climate, we considered the 1500 metre catchment to be well suited to walking as well as emerging modes of electric scooters and bicycles, to access shops, services and public transport. It also provides a wider area to plan for a variety of housing types, including 'missing middle' medium-density housing, rather than just apartments in and around the core.

To estimate potential capacity, scenarios for dwelling uplift have been identified based on how much of the gross developable area in the 1500 metre radius catchment can be redeveloped, and by assuming different increments in density. The scenarios yielded a range, from a lower estimate of 40% through to a higher estimate of 45% of total projected dwellings in metropolitan Sydney over the next 20 years. The results of this analysis are in Table 7 below.

This translates to 262,000 to 327,000 dwellings in highly accessible locations with great amenity.

5.3 Economic benefits

The cost savings and benefits, per dwelling, of replacing a greenfield dwelling with an infill dwelling are in the order of $120,000 per dwelling, or $100,000 per dwelling with discounting of future cost savings at 5% per annum (see Table 6 in Appendix). In both cases, the future cost savings are assumed for a 20 year period only, notwithstanding the fact they are likely to accrue in perpetuity.

The benefits of this change in the composition and distribution of dwellings supplied in Sydney are detailed in section 3.

Measuring these impacts is consistent with standard economic appraisal (or cost benefit analysis) techniques used to evaluate government investment decisions or any other resource allocation decisions. This is illustrated in Table 7, right.

In terms of economic outcomes, 'rethinking station precincts' is expected to deliver economic benefits that range between $5.1 and $9.3 billion (lower target and stretch target respectively) by putting housing in locations that enhance productivity and leverage existing infrastructure.

5.4 Financial benefits

We estimate the potential pool of financial value created through land appreciation and rezoning is in the order of $13.1 to $16.4 billion (see table XXX, above). This assumes an increase in net residual land value of $50,000 on average per dwelling. To avoid doubt, this value is directly created through the state's investment in major rail infrastructure, which enables land rezoning and intensification. It represents a significant pool of capital to put towards infrastructure contributions.

It should be noted that commercial property rents will also increase as a result of the state's investment in station precincts. As discussed in the Crossrail case study, there are global precedents for commercial asset owners to also contribute to precinct infrastructure. These mechanisms could be further explored in NSW over time.

Ultimately, it is the responsibility of the property industry to price development sites sensibly. This means taking into account all known infrastructure funding costs at the time of land acquisition.

For existing landowners who achieve 'super-returns' through a rezoning that is enabled by a major state investment, it is perfectly reasonable to expect these landowners to contribute to new local and state infrastructure, providing contributions are appropriate and financially viable.

Table 7: Potential yield and economic and financial benefits over 20 years (Source: SGS)

Potential station development outcomes for Sydney	Lower target	Stretch target
Potential yield		
Target share of new dwellings (2021 – 2041) in centres	40%	45%
Total new dwellings	261,573	326,966
Economic and financial benefits to NSW		
Economic benefits ($103,817 per additional dwelling)	$5.08 billion*	$9.31 billion*
Financial uplift (total additional dwellings)	$13.08 billion	$16.35 billion

* Future economic benefits are discounted at 5% per annum in our analysis. The NSW guidelines call for discount rates of 3% or 7% depending on the nature of the project. Major projects that have long lives, large impacts and a strategic focus may place more emphasis on the project's value to society in the future, as reflected in the lower 3% discount rate values and BCR. In picking 5%, we've effectively judged the initiative as having a long life, large impact and value to society in the value, but taken a slightly more conservative approach by bumping the rate up to 5%.

Putting it all together

Recommendations for policy makers

The Bays West precinct is set for significant renewal. Source: NSW Government.

Key recommendations

6.1 Integrate station location and land use planning – make high-level decisions on precinct development in the same process that selects route alignments and station locations

One of the fundamental problems of the current approach to new rail line and station planning is we decide everything twice. First, the decision about where stations go. Later, an entirely separate process to decide what to build around them. These decisions need to be combined, the decision about where to locate stations, along with the analysis of costs and benefits, is both a transport and a land use decision.

Not every new station will undergo major land use change. In some cases, stations are located because they are serving significant trip generators that are already in place. But in many cases, especially with new lines, part of the purpose of the transport investment is to shape the city by encouraging land use change and creating places for growth. New station decisions should very explicitly consider the potential for land use change.

This will be important for future planning of 'fast rail' and/or 'high speed rail', which will transform regional centres.

Every component of that system – infrastructure design, station design, land use planning, public realm planning and so on – will undergo significant refinement through the process. But the high-level land use commitment should be made as part of the initial decision.

Giving greater weight to land use outcomes in planning for new alignments will also help address limitations with network planning that arise from the use of outdated transport models. The Strategic Transport Model (STM), used to forecast the origin, destination and mode of trips across the city, tends to reinforce existing movement patterns and overlook the opportunity to provide improved land use outcomes and new travel options in areas not serviced by stations. It is critical that we move from the traditional 'predict and provide' paradigm to a 'vision and validate' approach, where transport becomes an enabler of building a better city rather than a blockage.

Investment decisions at the Expenditure Review Committee and Cabinet should (and often do) include decisions about which stations will be developed and what the high-level land use vision should be. But often transport business case decisions and approvals are not carried through the land use process – it is too often a case of starting over, years later, to begin the station area development program.

Note that if the land use strategy is done with a sufficient thoughtfulness, the initial station location decision is the best moment to put in place the development contributions, affordable housing requirements and other costs, so these are known in advance and developers don't overpay for land. Or, even better, there can be pre-existing, uniform charges for these measures that apply to all new rail stations.

6.2 Establish clear growth targets around stations – set a goal to accommodate at least 40-45% of Sydney's population growth in walking distance of train and Metro stations

The current bottom-up process takes a station by station, precinct by precinct approach, to come up with good land use plans. The problem with this approach is it has no way of knowing 'how much is enough' at each station node.

We need a more consistent and equitable approach to station development, which requires a clear macro strategy for putting more of Sydney's growth around station precincts. We can do this while still achieving high quality places that will stand the test of time.

The actors here are the Greater Cities Commission, Transport for NSW, and the Department of Planning and Environment through Place Strategies. Local councils have an obligation and opportunity to direct growth toward areas with high transit amenity. All these parties must be held to account for achieving growth targets at each station.

6.3 Adopt state-led rezonings for Major Station Precincts. These are generally places with material government landholdings and rapid change

Large precincts of state significance benefit the citizens of the entire city and need a consistent and clear planning process in which visionary outcomes can be realised. These Major Station Precincts typically have material state government landholdings, and are subject to rapid and intensive change.

> "It is critical that we move from the traditional 'predict and provide' paradigm to a 'vision and validate' approach, where transport becomes an enabler of building a better city rather than a blockage."

Far too often we see the planning for 'city shaping' precincts overtaken by local interests, with little regard given to future generations or the broader opportunities and benefits that renewal would provide at a city scale. We have also seen different state agencies undertaking ad hoc engagement and development activities across controversial precincts without clear accountability. In some cases, the state has stepped away from a difficult precinct, handing responsibility back to local government.

One of the benefits of the state taking control of the rezoning process in key locations is the underlying inference that local issues are balanced against the state significance of the precinct. While the community still has clear and genuine involvement, the ultimate vision can be set at a state level and be in line with agreed priorities and objectives.

For large state-owned or state significant precincts, state-led rezoning processes should apply. This will ensure state land is both a catalyst for precinct development as well as an exemplar for demonstrating station outcomes and also ensure that that NSW Government's investment in infrastructure is optimised. The criteria for state-led rezoning would include:

1. Precincts with large state land holdings to be identified within a State Environmental Planning Policy (for example, the Major Precincts SEPP)

2. Integrated station developments (i.e. station site locations where there is the opportunity for higher densities to be delivered directly in line with the station).

Rezonings at other precincts can be led by councils, with guidance provided by the state. See recommendation 6.4.

Urban renewal on Nicholson Street Mall, Melbourne. Source: Hassell / Dianna Snape.

" Far too often we see the planning for 'city shaping' precincts overtaken by local interests, with little regard given to future generations or the broader opportunities and benefits that renewal would provide at a city scale."

6.4 For other locations, support councils to successfully manage station development over time – here, change is likely to be more gradual

Many stations will have development potential, although transformation is likely to be more gradual where there is no 'step change' in infrastructure investment to justify accelerated rezoning. Here, there is an opportunity for local councils to collaborate with state agencies to develop these station sites on an incremental basis, as local councils tend to know the issues and local characteristics that will help shape these precincts as great places.

These types of precinct renewals could also include local station upgrades, which can be coordinated with council and state agencies in a truly collaborative process. Local council can be delegated the role of managing the rezoning and development approval processes, which will ensure ownership and proper consideration of local issues.

When it comes to greenfield station precincts, these should typically be led by council. State leadership would only be required in the exceptional circumstance that precincts have:

a. material state landholdings

b. major state infrastructure investment

c. the need for rapid rezoning to accommodate relatively fast and intensive change to optimise public benefits.

Where required, the council-led rezoning process could be guided by the state through an S9.1 Ministerial Direction — with timeframes, functional, land use and form based outcomes, and 'call in' powers where these are not being adhered to. This could potentially include a requirement to undertake planning in line with the Place Strategies and Station Precinct Development Design Guidelines. State funding should be provided to councils to help with resourcing and processing.

To achieve growth targets, it will sometimes be important to enable sites to be assembled and block structures to be optimised. One mechanism to achieve this is bonus FSR for consolidated sites, which would incentivise landowners to collaborate. Bonus FSR opportunities should be limited to specific station catchments and appropriate zones, as determined by councils. This bonus FSR provisioning would need to be discussed and adopted by councils on a case-by-case basis.

6.5 Establish effective governance for station precincts – set up a delivery authority for each Major Station Precinct with significant state government landholdings, and establish collaborative governance structures to work with councils on other locations

The governance models operate on a spectrum between state government leading and local government leading:

- Councils will take the lead in most rail station areas. This is because councils are better placed to lead where precincts have a larger share of private ownership, and where local issues can be properly considered.
- For large, precinct-scale renewal projects with significant NSW Government landholdings, the state will more likely take the lead.

For a limited number of station nodes with large state landholdings, we recommend creating 'place-based' delivery authorities to optimise the use of government landholdings and oversee long-dated renewal programs. This would apply to a limited number of 'mega precincts' like the Bays West, Waterloo and Sydney Olympic Park. While Transport for NSW and Sydney Metro will be deeply involved, for the truly large-scale opportunities with government land, we believe a single purpose delivery authority is the best approach.

There are a number of success factors for a delivery authority, which include (but are not limited to):

- Having a clear vision and mandate to create exemplar outcomes
- Being empowered to act as a 'master developer' across the precinct
- Being led by practitioners with a track record in real estate delivery
- Having adequate budget, resourcing and the ability to capture value
- Having the power to coordinate land assembly and the development process to facilitate desirable urban outcomes in appropriate circumstances
- Having control over all public land within the precinct.

A useful precedent is the Barangaroo Delivery Authority. While it was not perfect, it had the focus, mandate, legislative authority and capability of a single place delivery authority.

6.6 Build capacity of Transport for NSW agencies to oversee a rolling program of discrete station developments – for stations with less developable land, agencies need to be able to create consistent, repeatable and scalable procurement programs

For the vast majority of new and existing stations, the amount of land in state government ownership will be limited to the land required to develop the station box and surrounding area – typically limited to an area of less than one hectare. With these discrete station developments, a delivery authority is not required, and it is more appropriate for Sydney Metro or Sydney Trains to oversee procurement of both infrastructure and real estate.

There are dozens of stations today with viable development opportunities that are not being pursued because the transport agencies are not deeply focused on the goal of enabling development around their stations. It needs to be a clear purpose and priority for both Sydney Metro and Sydney Trains to do what is necessary to enable development as a core part of their work.

Elements of this 'program approach' to station development would include the following changes:

1. Joint leadership of rezoning and development applications, or response to unsolicited proposals, by transport agencies and Department of Planning and the Environment
2. State Significant Development pathway used for the land above and immediately adjacent to the station node, which may include a combination of public land and private sites
3. Development of standard approaches to ISD/OSD/ASD, and employing these models, where appropriate, taking into account the attributes of the station site (per table 5 in section 4.3)).

6.7 Selectively retain strategic sites in public ownership around stations – where government owns land around strategic station precincts, government should retain a long term leasehold interest (99 years) to enable the land to revert to government

This recommendation is primarily about 'future proofing' rail stations.

Key public sites should be retained in long-term public ownership so the land eventually reverts to government to enable it to participate in and benefit from future renewal.

If this is done through long-term leasehold arrangements, the market is generally accepting of this tenure, and there is limited impact in terms of diminishing the market value of the land today.

This approach would apply selectively to a limited number of strategic sites where the land around the station should revert to public ownership – examples include (but are not limited to):

- **Strategic foreshore land** – such as Darling Harbour, where all developments within the SEPP Major Precinct are subject to 99-year leases and the market is already conditioned to this tenure. This approach should apply to the Bays West precinct and potentially Pyrmont Station
- **Strategic town centre sites** – such as Parramatta and Sydney Olympic Park Metro Stations, both of which should be retained in long-term public ownership. In fact, the market is already conditioned at Sydney Olympic Park to accept long-term leasehold tenure.

If Metro or the relevant place-based authority keeps the land, it will have a stronger incentive to plan for long term value rather than short term gain. This structure could also be applied to government landholdings around the Bays West Metro station, where long-term leasehold deals could be used to enable development, fund upfront infrastructure and also create an annual ground lease payment. The uplift in value when ground leases are renewed would also accrue to government.

6.8 Unlock value for reinvestment in community Infrastructure – set up a mix of value sharing mechanisms to help fund local improvements and transport operations, as well as generalised public services

Taxpayer funded infrastructure can often generate windfall gains to existing landowners. Value is created by a combination of land intensification, an investment in transport, and enhanced amenity offerings that drive up prices and rents.

The 'step change' in land value is especially pronounced in precincts with substantial upzoning, where the opportunity for windfall gains to landowners is high, and where government has a poor track record of receiving a 'fair share' of value to fund infrastructure for new communities.

To unlock value for reinvestment in new precincts, we recommend two mechanisms:

1. **Infrastructure contributions** — In keeping with the NSW Productivity Commission's Review of Infrastructure Contributions, and recommendation 5.3 of the proposed EP&A Act Contribution Bill, regional infrastructure contributions should be levied in areas benefitting from investment in new rail infrastructure, and in areas with existing rail infrastructure that benefit from upzoning. This is justifiable on the basis that development of existing station precints is typically enabled by the state creating additional rail 'network capacity', which requires substantial public investment in rail infrastructure and services. For rezoned properties in station service catchments, this means an additional transport contribution – which should be reasonable, transparent and economically viable.
2. **Annual land tax** — A broad-based land tax is perhaps the best, most flexible form of value sharing[1]. As property values increase over time, government automatically collects more revenue from them. So long as the land tax is set at a sufficient rate (on a precinct by precinct basis), it can be a primary source of funds to retire construction debt and/or fund expansion of the transport system. An annual land tax picks up properties that develop, as well as those that do not, and over time it will generate far more money than one-time payments like developer contributions. For properties that are rezoned, the annual land tax should be:

   (a) adjusted to reflect the new rezoned value

   (b) phased-in over time (for example, three years) to provide sufficient notice for existing landowners to adjust to the new land tax regime and/or trade their sites to enable the rezoning outcomes envisaged by the new strategic plans for the precinct.

1 'Main Residence' and other land tax exemptions currently apply. The treatment of these exemptions is a matter for further discussion.

In terms of what the money is spent on, we recognise the need for local investments that benefit the immediate community, as well as system-wide investments in the maintenance and expansion of the transport network:

- Value created by station development should be reinvested in local infrastructure so the community can receive timely and meaningful benefits (e.g. new schools, childcare, libraries and so on). This means spending a significant proportion of the additional transport contribution within the local area.

6.9 Be smart about parking and encourage sustainable transit – put parking in the right locations so it does not disrupt the walkability and amenity of station precincts

If parking is mismanaged, higher densities around train stations can result in localised gridlock or destroy the pedestrian environment. At the same time, we need to be realistic that some households who live near train stations will still want to own a car; and in addition, there is a need to provide commuter car-parks at some rail stations to allow part-drive/part-transport trips. So a balance must be struck. We recommend:

- Establish parking maximums, rather than minimums, for new developments in station precincts
- Separate car parking from strata titles to create a separate market for parking – residents will therefore be able to choose if they want to spend the extra money to have a parking space or not
- Ensure access to car-share vehicles so people can easily get a car when they need one without having to own it full time if they don't want to – this is a primary way to reduce the overall number of parking spaces that have to be built
- Where surface parking lots still exist next to rail stations, consolidate the spaces into structured parking to create room for development
- Design for the adaptive re-use of parking garages so that if future fleets of on-demand autonomous vehicles end up replacing private ownership, the buildings can be converted to new uses
- Charge for parking, even if only a nominal amount to cover operating costs of garages
- Design rail stations to have convenient pick-up and drop-off areas for taxis and ride-share
- Ensure convenient and sufficient storage space for bikes and prams within new developments
- Over time, work to upgrade bus routes and flexible transport options to bring people to and from rail stations.

6.10 Require more affordable rental housing in station precincts – make it a condition of rezoning that a minimum commitment of 5% affordable housing is delivered on private sites, and 10% on government sites.

Large private development sites that are rezoned around rail stations should include a minimum commitment of 5% affordable housing or an equivalent local infrastructure contribution to council.

Government has a leadership role to play where it has significant landholdings, and this means demonstrating a commitment to 'best practice' targets for affordable housing. As a minimum, this should include a commitment to 10% affordable housing on government projects.

To deliver these, we recommend:

1. **Applying the policy consistently and broadly** – across station precincts where land is rezoned for development
2. **Announcing targets early** – establish affordable housing targets before land is rezoned, so developers know the maximum amount they can pay for land
3. **Awarding bonus FSR for more affordable housing** – as an incentive to the market, allow developers to access bonus FSR for exceeding the targets (this may be greater than the bonus FSR currently allowed under the Affordable Rental Housing SEPP)
4. **Giving developers choice between delivering affordable housing within a development or paying equivalent fees** – this provides flexibility to make projects work based on site and market conditions; with fee amounts contained in a schedule, updated annually
5. **Ensure affordable housing contributions are well managed** – with capital collected from developers effectively reinvested to deliver affordable housing by community housing providers.

An artist's impression of the Waterloo over station development, showing the Cope Street plaza and community meeting place. Source: Sydney Metro.

Appendix

Methodology for calculating development potential and economic benefits

Summary

There are 82 centres on an existing heavy rail line or the North West or West Metro, which are:

- Significant or strategic in the Greater Sydney Region Plan and District Plans;
- Accessible to a significant share of metropolitan jobs and services by public transport (above the 40th percentile as measured by effective job density, which is a measure of the relative concentration of employment, derived from the density and accessibility of all jobs across a region).

Of these centres, 52 are considered 'priorities' for planned intensification, while 30 are 'non-priorities' as they are considered somewhat constrained from significant further development or are already the subject of recent structure planning and LEP changes.

The focus for planning and possible intensification is defined by a 1500 metre radius of residential or mixed use zoned land around the 52 'priority' station node centres and station precincts. The 1500 metre radius represents a larger catchment than the typical focus (400 to 800 metres). This extended catchment is still suited to walking, as well as emerging modes of electric scooters and bicycles, to access shops, services and public transport in centres. It also provides a wider area to plan for a variety of housing types, including 'missing middle' medium-density housing, not just the apartments that will be focussed in and around the core of centres. There are about 308,000 dwellings currently in these catchment areas.

There are around 200,000 dwellings in the remaining 30 'non-priority' (constrained or recently planned) centres with catchments associated with the 'travel zones' produced by TfNSW's Transport Performance and Analytics (TPA) unit, typically smaller than a 1500 metre radius (about 700 metres on average for these centres).

Scenarios for dwelling uplift in the priority centres have been identified based on how much of the gross developable area in the 1500 metre radius catchment is able to be redeveloped (30%, 50%, 70%), and by assuming different increments in density (plus 10, 20 and 30 dwellings per hectare). The scenarios range from a low, conservative uplift of 36,000 to a high of 266,100 dwellings. With the addition of the 66,200 dwellings projected by the TPA forecasts in the 'non-priority' centres, the upper end of the uplift potential in all 82 centres is 332,300, or 44% of Greater Sydney's projected dwelling growth (of approximately 735,000) from 2021-41.

A target of planning for 35%, or about 256,000 of Greater Sydney's dwellings to be accommodated in all 82 of these job-accessible and strategic centres between 2021 and 2041 is aspirational, though at the lower end of possible outcomes. Adding 40% of all new dwellings to the centres would mean adding 294,300 new dwellings. A stretch target would be to add 45%, or about 332,000 dwellings in these centres.

To achieve the mid-range of 40% for all the centres, the gross density (all area within the planning catchments) would need to increase on average from about 22 to about 35 dwellings per hectare, an increase of just over one-third. This is achievable in a growing city in the most accessible and best served station centres, but will only be acceptable and accepted if done on a planned basis where design, amenity, liveability and sustainability considerations are at the fore.

We have sought to quantify the benefits associated with major urban consolidation around selected rail station precincts in the metropolitan area.

If planning and design efforts can successfully increase demand for this form of development, dwelling supply would increase in the target precincts relative to business-as-usual, resulting in fewer dwellings being required at the urban fringe or in dispersed, less well-served locations. The 'base case' assumes 24% of Greater Sydney's total dwellings will be in the 82 centres in 2041, up from 23% in 2021. The lower (35% of new dwellings), mid (40%) and stretch (44%) targets assume 26%, 28% and 29% of Greater Sydney's total dwellings will be in the 82 centres in 2041.

The impacts of the incremental change from the 'base case' in the composition and distribution of dwellings supplied in Greater Sydney are detailed in Section 3.

The improved dwelling amenity, as a result of more dwellings being supplied in well-serviced locations (measured by the marginal increase in residual land value), has a direct financial value where landowners would be beneficiaries – which is also considered in the economic appraisal.

The tables below show the total benefits of achieving additional station development, over a 20 year growth period:

- Marginal benefits of $5.08 billion to NSW from achieving the lower target (35%) outcome, $7.19 billion from the mid target (40%), and $9.31 billion from the stretch target (44%) compared to the base case – noting total additional dwellings are spread over 20 years and the per dwelling economic benefits are discounted at 5% per year
- Up to $16.3 billion of value uplift.

Table 8: Economic benefits of greater station precinct development (discounted)

	Lower target	Mid target	Stretch target
Share of new dwellings (2021 – 2041) in centres	35%	40%	44%
Net additional dwellings in target centres (above base case)	78,464	111,160	143,857
Economic benefits ($103,817 per additional dwelling)	$5,076,000,000*	$7,191,000,000*	$9,306,000,000*

**Future economic benefits discounted at 5% pa.*

Table 9: Gross value potential from greater station precinct development

	Lower target	Mid target	Stretch target
Total new dwellings	261,573	294,269	326,966
Financial uplift (total additional dwellings)	$13,079,000,000	$14,713,000,000	$16,348,000,000

1. Priority centres for station-based renewal and intensification

Not all locations or even all rail-based centres should necessarily be a focus for short to medium term residential intensification. The planning and supporting infrastructure effort should be focussed to maximise the strategic, sustainability and economic 'pay-off.'

The criteria for identifying potential priority centres for additional development are:

- Must be a on a heavy rail line or the north-west or west metro (assuming current Metro projects and rail-based centres in general provide a strong focus for more sustainable development – and to realise the latent development capacity across the metropolitan area)
- Centres identified as significant or strategic in the Greater Sydney Region Plan and District Plans that is Metropolitan Centres, Health and Education Precincts and Strategic Centres (e.g. these are priority locations for services and additional development, are typically well serviced by public transport, and support a polycentric metropolitan form)
- All other local centres that are accessible to a significant share of metropolitan jobs and services by public transport, as this will support sustainable transport outcomes and higher productivity and labour matching
- Centres in the above two categories have been excluded where they are considered constrained or ruled out from further development by environmental, physical or heritage factors, and not already the subject of recent structure planning and LEP changes, which have enabled significant additional development).

Priority centres

Must be on a heavy rail line or committed metro rail project

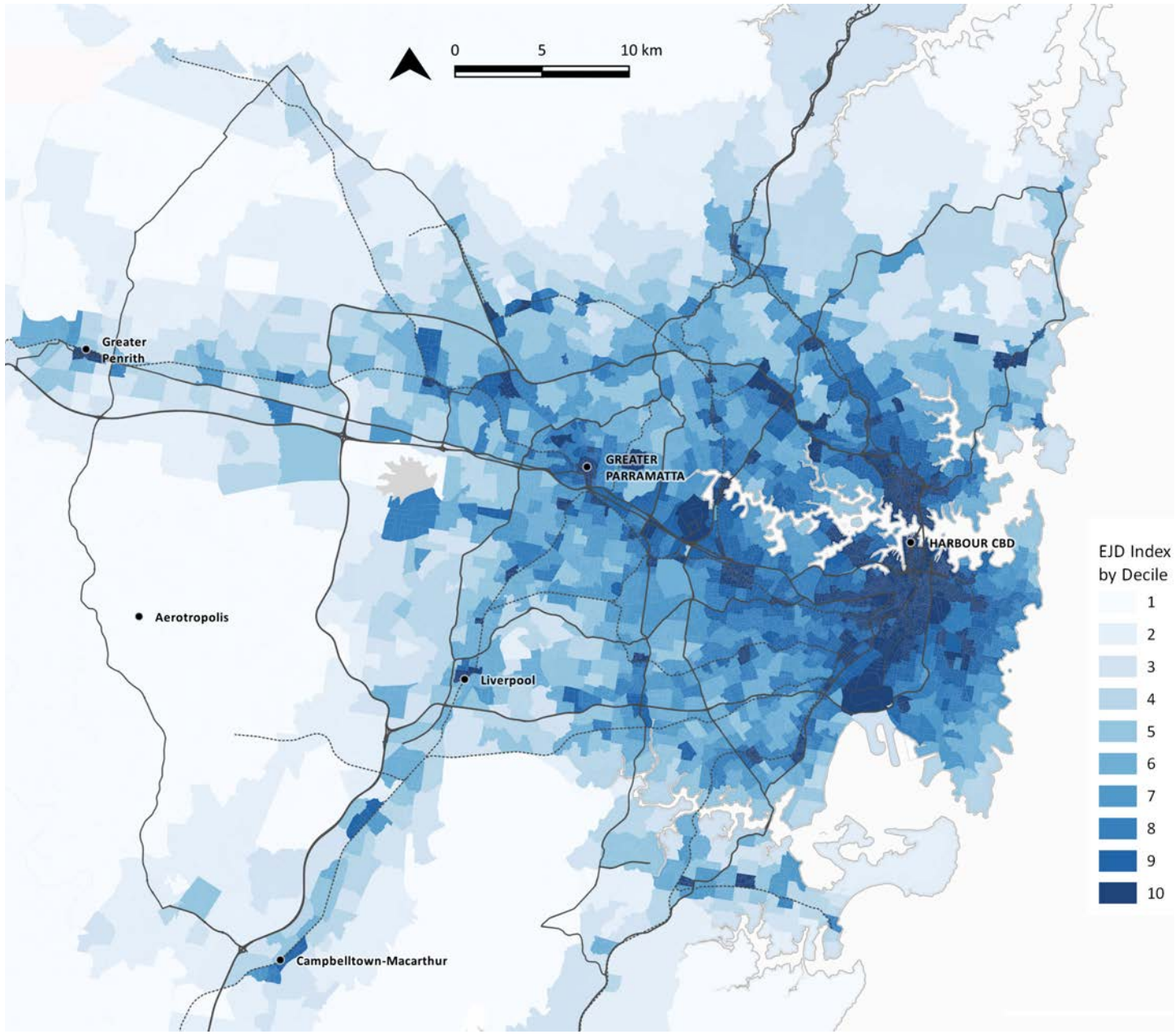
Metropolitan Centres, Health and Education Precincts and Strategic Centres in the Greater Sydney Region Plan and District Plans – except if subject to recent strategic planning or constrained by environmental, physical or heritage factors.	All other local centres which are accessible to a significant share of metropolitan jobs (measured by EJD) – except if subject to recent strategic planning or constrained by environmental, physical or heritage factors.

The best proxy for the third criteria is 'effective job density' (EJD) of the centres. This is a measure of the relative concentration of employment, derived from the density and accessibility of all jobs across a region. For this assessment, the focus is on the effective density of jobs accessible by public transport, as shown in Figure 1 for metropolitan Sydney. The station locations with the most jobs accessible by public transport (and by proxy the most services, activities and shops) should be the focus for intensification (along with strategic priority centres as indicated by GSRP/ District Plans as per the second criteria above).

By implication, these job-accessible locations are preferred for residential intensification, over those within 30 minutes by public transport of metropolitan/strategic centres, which is the GSRP/District Plan potential indicator. Some of these metropolitan/strategic centres have a limited array of jobs and services (though the plan seeks to further develop these). Development within 30 minutes travel of these places will not necessarily increase accessibility to significant employment or opportunities.

Productivity is enhanced by access to a deep labour and jobs pool, so the higher the EJD the better its location for new housing. To contribute towards a program of about 50 centres for future redevelopment, station locations above the 40th percentile of EJD by public transport are included.

Figure 11: Effective job density in metropolitan Sydney (via public transport)



Source: SGS Economics and Planning.

While EJD reflects the current distribution of employment, the 'three cities' vision of current metropolitan strategic planning reflects an important aspiration to rebalance this distribution to less employment-rich areas. The inclusion of centres on major existing or proposed rail and Metro lines, and significant or strategic centres as identified in strategic plans (criterion 1 and 2), regardless of their EJD, reflects this aspiration.

Calculating EJD by public transport

EJD is not based on any particular travel-time threshold (e.g. 30 minutes), and how many jobs can be accessed in that travel-time. It's a value based on all possible travel-times, and the number of jobs you can access at each location, and how that compares to other locations. EJD is therefore calculated using two variables:

- travel time from location (a) to location (b) using the public transport network
- number of jobs at location (b), sourced from 2016 Census.

The relevant formula is as follows:

$$EJD_{\text{at a}} = \sum_{a}^{n} \frac{Jobs_{\text{at b}}}{Travel\ time_{\text{a to b}}}$$

As an example, from point (a) let's say:

- Point (b) has 100 jobs and takes 10 minutes travel time
- Point (c) has 200 jobs and take 20 minutes travel time
- Point (d) has 700 jobs and take 40 minutes travel time.

Relative job accessibility would say 300 jobs can be accessed from point (a) within 20 minutes (b+c) and if there are 1,000 jobs in the system that's 30% of all jobs within 20 minutes.

Say travel times are doubled from another origin point (e), relative job accessibility would be say 100 jobs within 20 minutes, or 10%.

Effective job density, however, provides a relative measure for all origins, for example:

- EJD at point (a) = 100/10 +200/20 +700/40= 37.5
- EJD at point (e) = 100/20 +200/40 +700/80 = 18.75

So point (a) has an EJD double that of point (e).

Ranking or allocating centres by the decile EJD score

Ranking centres by EJD and allocating them to deciles, for the purposes of this centres prioritisation exercise, involves:

Data inputs:

- 2016 TTM @ TZ11 Geographies (source: TPA)
- Job distribution 2016 Jobs @ 2011 geographies (source: SGS, using TPA)
- TZ2011 to TZ2016 concordance file – using area concordance (source: TPA)
- Centres list defined by TZ16 (source: SGS).

Method:

- Centres defined by TZ16 geographies
- EJD calculated for each TZ11 using formula below (essentially, sum of jobs discounted by travel time to get to the jobs, from any location)
- EJD value (at TZ11 level) assigned to each TZ16 (using area concordance from TZ11 as EJD is at the TZ11 geography)
- Average centre EJD calculated by averaging EJD values for time zones that make up each centre
- Maximum EJD observed calculated by taking maximum EJD value for time zones that make up each centre
- Minimum EJD observed calculated by taking minimum EJD value for time zones that make up each centre.

Line chart:

- Shows the centres ordered by average EJD (PT) (i.e. average of the time zones that define the centre)
- Blue line shows the distribution of average EJD for time zones that make up each centre
- Orange line shows the maximum EJD observed for time zones that make up each centre
- Grey line shows the minimum EJD observed for time zones that make up each centre.

Figure 12: Ranking of centres by average EJD

52 centres met the priority centre criteria, including eight centres that are below the 40th EJD percentile but are either metropolitan clusters or strategic centres in the GSRP/District Plans. The centres included as priorities for further potential development, their EJD rank and quintile, and their categorisation to model typology are shown below.

Table 10: Rail station centres prioritised for potential intensification ('priority centres')

EJD Rank	EJD Decile	Precinct	Model
3	0.9	Victoria Cross	CBD Centre
6	0.9	Burwood	Activity Centre
8	0.9	Chatswood	CBD Centre
15	0.8	Macquarie Park	CBD Centre
21	0.8	Auburn	Suburban Upgrade
25	0.8	Norwest	Activity Centre
26	0.8	Hurtsville	Suburban Upgrade
27	0.8	Strathfield	Suburban Upgrade
29	0.7	Olympic Park	Activity Centre
30	0.7	Macquarie University	Activity Centre
31	0.7	North Strathfield	Suburban Upgrade
32	0.7	Waterloo	Activity Centre
33	0.7	Bankstown	CBD Centre
35	0.7	Ashfield	Suburban Upgrade
36	0.7	Hornsby	Activity Centre
37	0.7	Miranda	Activity Centre
38	0.7	Merrylands	Activity Centre
39	0.7	Kogarah	Activity Centre
40	0.7	Blacktown	CBD Centre
42	0.7	Burwood North	Suburban Upgrade
43	0.6	Eastwood	Suburban Upgrade
48	0.6	Bays Precinct	CBD Centre
52	0.6	Granville	Activity Centre
53	0.6	Epping	Suburban Upgrade
54	0.6	Campsie	Activity Centre
56	0.6	Marrickville Station	Suburban Upgrade
57	0.6	Rockdale	Suburban Upgrade
58	0.5	Five Dock	Suburban Upgrade
60	0.5	Westmead	Activity Centre
61	0.5	Caringbah	Suburban Upgrade
63	0.5	Liverpool	CBD Centre
64	0.5	Lindfield	Suburban Upgrade
65	0.5	Gordon	Suburban Upgrade
66	0.5	Cabramatta	Suburban Upgrade
67	0.5	Fairfield	Activity Centre
68	0.5	Hurlstone Park	Suburban Upgrade
70	0.4	Cronulla	Suburban Upgrade
72	0.4	Belmore	Suburban Upgrade
73	0.4	Penrith Core	Metropolitan Centre
74	0.4	Sutherland	Suburban Upgrade
75	0.4	Canterbury	Suburban Upgrade
76	0.4	Bexley North	Suburban Upgrade
77	0.4	Seven Hills	Suburban Upgrade
78	0.4	Bardwell Park/Earlwood	Suburban Upgrade
82	0.3	Mt Druitt	Activity Centre
83	0.3	Castle Hill	Activity Centre
87	0.3	Showground	Suburban Upgrade
91	0.2	Punchbowl	Suburban Upgrade
97	0.2	Campbelltown-Macarthur	CBD Centre
110	0.1	St Marys	Activity Centre
114	0.1	Rouse Hill	Activity Centre
125	0	Leppington	New Suburban Centre

Centres that otherwise ranked in the top 60th percentile by EJD were ruled out from inclusion here by the fourth criterion. Development constraints include environmental, physical or heritage factors, or existing strata development, which makes them difficult to redevelop. Alternatively, centres have already been the subject of recent structure planning and LEP changes, which have enabled significant additional development beyond capacity allowed by controls. These 30 centres and the reasons for their non-priority status are identified in the table below.

Table 11: Rail station centres with EJD at 40th percentile or above but already planned or constrained ('non-priority centres')

EJD Rank	EJD Decile	Precinct	Reason for non-priority status
1	0.9	Martin Place	Captured in CBD planning proposal
2	0.9	Pitt Street	Captured in CBD planning proposal
4	0.9	Barangaroo	Recent high density masterplanned development
5	0.9	Pyrmont-Ultimo	High density, high constrained, remaining uplift captured in Pyrmont place strategy
7	0.9	Crows Nest	Captured under St Leonards – Crows Nest Plan
9	0.9	Central	Captured in CBD planning proposal
10	0.9	Bondi Junction	Modest potential given high existing densities + planning controls, heritage outside of immediate catchment
11	0.9	Parramatta CBD	Controls maxed out under PCBD PP
12	0.9	Milsons Point	Strata and heritage
13	0.8	Redfern	Captured in current planning
14	0.8	North Sydney	Captured in current planning
16	0.9	St Leonards	Captured under St Leonards - Crows Nest Plan
18	0.8	Edgecliff	Limited potential – heritage, topography constraints
19	0.8	Green Square-Mascot	Significant density already and planned - traffic and capacity issues on the rail line
20	0.8	North Ryde	Poorly located station with surrounding landholdings being inaccessible or incapable of development (e.g. cemeteries, National Park)
17	0.8	Kings Cross	Captured in planning proposal
18	0.9	Newtown	Highly constrained by heritage and small lot terrace housing
20	0.8	Rhodes	Already has substantial density, at or nearing capacity
28	0.7	Waverton	Heritage
34	0.7	Wollstonecraft	Heritage
39	0.8	Sydenham	ANEF issues with noise; industrial retention policy
41	0.6	Lewisham	Strata and heritage
44	0.6	Stanmore	Strata and heritage
46	0.8	Wolli Creek	Developed/developing to maximum controls
47	0.6	Artarmon	Strata and heritage
49	0.6	Petersham	Strata and heritage
55	0.8	Summer Hill	Strata and heritage
60	0.4	Homebush	Strata
62	0.5	Croydon	Strata and heritage
71	0.4	Dulwich Hill	Strata and heritage

2. Development potential

The centres listed in Table 1 are categorised by centre type and shown on the map in Figure 3 (see page #), along with the notional surrounding areas for possible densification, defined by a 1500 metre radius of residential or mixed use zoned land around the station node. These 'developable' areas have been defined to avoid overlap.

The 1500 metre radius represents a larger catchment than the typical focus (400 to 800 metres) for centres based urban design and structure planning. We consider this extended catchment still suited to walking as well as emerging modes of electric scooters and bicycles, to access shops, services and public transport in centres. It also provides a wider area to plan for a variety of housing types, including 'missing middle' medium density housing, not just apartments focussed in and around the core of centres.

Rendering of Parramatta Square. Source: BG&E.

Table 3 shows the total area and area zoned for residential or mixed use development in the priority centre catchments based on a 1500m radius (with overlapping areas only counted once), the dwellings in these areas and the existing densities aggregated by centre type. The table also shows that dwellings in these centres, defined in this way, account for approximately 14% of Greater Sydney's total dwellings. There is in the order of 200,000 dwellings in 'non-priority' (constrained or recently planned) centres with catchments defined by associated travel zones, typically smaller than a 1500 metre radius (about 700m on average for these centres). This amounts to about 9% of Greater Sydney's total dwellings. In aggregate then, and though the catchments are defined somewhat differently between the 'priority and non-priority' centres, only about 23% of Sydney's dwellings are currently in these job-accessible or strategically significant rail station centres.

To calculate the potential yields that could be achieved using the best practice design and planning approaches identified for this study, a range of low, medium and high yield scenarios have been produced based on how much of the gross developable area of each centre is able to be redeveloped, and by assuming different increments in density across the centres.

Table 12: Areas, dwellings and densities in priority centres aggregated by centre category

Centre Category	1500m radius catchment (Ha)	RESI +MIX DEV (Ha)	Existing dwellings	Existing dwg/ha over total catchment	Existing dwg/ha over RESI +MIX DEV
CBD Centre	3,125.14	1877.28	57,030	18.25	30.38
Activity Centre	5,278.41	3714	93,305	17.68	25.12
Suburban Upgrade	9,205.94	7022.75	157,277	17.08	22.40
New Suburban Centre	185.06	57.83	98	0.53	1.70
Total in priority centres	**17,794.55**	**12,671.86**	**307,710**	**17.29**	**24.28**
Metro Sydney Dwellings 2021 (TPA)	-	-	2,188,390	-	-
Approximate % of Greater Sydney	-	-	14%	-	-
Non- priority centres (TPA)	-	-	205,573		
Approximate % of Greater Sydney			9%		

Source: AECOM and TPA Travel Zone Projections 2019 (Released September 2020).

Table 13: Range of potential yields from priority centre development and share of growth

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
	Resi + MU Area in CBD centres (Ha)	Resi + MU Area in Activity centres (Ha)	Resi + MU Area in Suburban upgrade centres (Ha)	Resi + MU Area in New Suburban centres (Ha)	Total Resi and Mixed Use Area (Ha)	New Dwelling Uplift Conservative	New Dwelling Uplift Moderate	New Dwelling Uplift High	Projected dwelling uplift 21-41 for non-priority centres (TPA)	Total Uplift Conservative	Total Uplift Moderate	Total Uplift High	Conservative Total Uplift Share of Total Metro Sydney Growth 21- 41 (735,000	Moderate Total Uplift Share of Total Metro Sydney Growth 21-41 (735,000)	Hight Total Uplift share of Total Metro Sydney Growth 21-41 (735,000)
Total Area	1,877.3	3,714.0	7,022.8	57.8	12,671.9										
Increase in dwellings per gross ha						10	20	30							
Scenario 1 - Low (30% redeveloped)	563.2	1,114.2	2,106.8	17.3	3,801.6	38,016	76,031	114,047	66,217	104,232	142,248	180,263	14%	19%	24%
Scenario 2 - Medium (50% redeveloped)	938.6	1,857.0	3,511.4	28.9	6,335.9	63,359	126,719	190,078	66,217	129,576	192,935	256,294	18%	26%	35%
Scenario 3 - High (70% redeveloped)	1,314.1	2,599.8	4,915.9	40.5	8,870.3	88,703	177,406	266,109	66,217	154,920	243,623	332,326	21%	33%	45%

Source: AECOM and SGS Economics and Planning – including using TPA Travel Zone Projections 2019 (Released September 2020).

These calculations are shown in full in Table 4. Columns A to E show the 'developable areas' within the different types of priority centres and in total, and the assumed amount developed through low (30%), medium (50%) and high (70%) scenarios. Columns F to H show the dwelling uplift that would be achieved in each of these scenarios if densities increased by 10, 20 and 30 dwellings per hectare.

Column I shows the projected dwelling change of 66,217 from 2021 to 2041 for the non-priority centres from the TPA Travel Zone Projections 2019 (released September 2020). While these are not included for further intensification in this analysis, because they either subject to recent planning or somewhat constrained for development, they will contribute to dwelling growth in well-located centres in metropolitan Sydney.

Columns J to L adds the dwelling uplift for the priority centres to that projected for the non-priority centres to generate a range of potential uplift outcomes for all the accessible or strategic transport focussed centres. Columns M to O show these different dwelling figures as a share of total anticipated Greater Sydney dwelling growth for 2021 to 2041 (approximately 735,000 according to TPA – as forecast prior to Covid-19 impacts on growth). The additional dwellings in the centres ranges from 104,000 to 332,000 or from 14% to 45% of Greater Sydney's anticipated total dwelling growth.

A target of planning for 35% of Greater Sydney's dwellings to be accommodated in all 82 of these job accessible and strategic centres between 2021 and 2041 (about 256,000 dwellings) is aspirational though at the lower end of possible outcomes. A stretch target of 45% (or about 332,000 dwellings) in these centres is desirable.

Table 4 shows that to achieve the mid-range of these targets of 40% for all the centres, the gross density (all area within the planning catchments) would need to increase on average from about 22 to about 35 dwellings per hectare, an increase of just over one-third. This is achievable in a growing city in the most accessible and best served station centres, but will only be acceptable and accepted if done on a planned basis where design, amenity, liveability and sustainability considerations are at the fore.

Table 14: Implied change in gross density with 40% of all new dwellings in planned (priority and non-priority) centres

Priority centres gross area (Ha)	17,794.6
Non-priority centres gross area (Ha)	5,070.8
Total gross area (Ha)	22,865.4
Approximate dwellings 2021	513,283
Approximate gross density 2021 (dwg/Ha)	22.4
40% of new dwellings 2021-41	294,269
Approximate dwellings in all centres 2041 – existing plus 40% of new dwellings	807,552
Approximate gross density 2041 (dwg/Ha)	35.3
Change in density (dwg/Ha)	12.9

An additional 213,500 dwellings are projected for these centres by TPA for the period 2021-41. While the assumed planning areas are somewhat different, this figure is at the higher end of the range of potential uplifts shown in Table 3. In our view, it will be necessary to implement the identified design and planning recommendations to support the achievement of even the TPA projections, and to push beyond this to delivering 35-45% of total future dwellings in these centres. Without these design and planning changes it will not be possible to develop the platform of amenity and build on the potential of the station location precincts to support the higher densities and growth implied by these desired outcomes.

Around 23% of Sydney's total housing is in the identified priority and non-priority centres in 2021. Without a planning focus and dedicated interventions this share might increase to say 24% of the 2,924,598 TPA Greater Sydney dwelling estimate in 2041, implying a further 143,865 dwellings in these target centres. Adding 40% of all new dwellings to the centres – the halfway point between the lower and stretch targets – would mean adding 294,300 new dwellings, taking the share of all of Sydney's dwellings in these centres by 2041 to 28%. The difference of four percentage points or 111,160 additional dwellings in the target centres could be said to be the result of the quality planning and design focus.

3. Evaluation of financial and economic benefits

Introduction

There are measurable financial and economic returns of achieving additional density in station precincts, based on best practice development, and in accordance with the design principles and approach proposed for this study.

SGS has sought to quantify the benefits associated with major urban consolidation around selected rail station precincts in the metropolitan area. If planning and design efforts can successfully increase demand for this form of development, dwelling supply would increase in the target precincts relative to business-as-usual, resulting in fewer dwellings being required at the urban fringe or in dispersed, less well-served locations.

The impacts of this change in the composition and distribution of dwellings supplied in Sydney are detailed in section 3. Measuring these impacts is consistent with economic appraisal (or cost benefit analysis) techniques used to evaluate government investment decisions or any other resource allocation decisions.

There may also be a shift in the resources used to construct new dwellings (material and labour) depending on the construction methods used in each location.

Other potential benefits that have not been quantified include retained agricultural production, increased reserve capacity for urban growth, and improved labour market functioning and business productivity.

Economic appraisal and financial appraisal have similarities but they are addressing or answering different questions:

- a cost benefit analysis or economic appraisal is a social welfare analysis that seeks to capture all resource costs and benefits of an initiative in this case on a NSW-wide basis
- a financial appraisal is a cash flow analysis that seeks to capture all financial costs and revenues to an organisation, which could be a private landowner or firm, a government agency, or a government as a whole.

In this case the, improved dwelling amenity (fourth impact above) has a direct financial value where landowners would be beneficiaries (which is also considered in the economic appraisal).

Cherrybrook Central Station Precinct. Source: Grimshaw / Toplace.

Approach

The impacts of a shift in the composition of housing supplied in Sydney have been quantified on a per dwelling basis using the assumptions in Table 5.

Table 15: Assumptions used to quantify impacts of greater station precinct development

Assumption	Value	Source (see detailed at end)
Per dwelling infrastructure cost saving for infill versus greenfield housing	$26,925	SGSEP (2016)
Additional walking per week per adult in infill versus greenfield locations	60 minutes	Zapata-Diomedi et al. (2019)
Reduced driving per week per adult in infill versus greenfield locations	50 kms	SGS estimate
Vehicle operating cost per kilometre	$0.29	T&IC (2016)
Emissions and other externality costs per kilometre	$0.03	T&IC (2016)
Health cost savings per kilometre of additional activity	$0.97	T&IC (2016)
Health cost saving per hour of additional activity (based on 5km per hour)	$4.85	T&IC (2016)
Average residual land values per infill dwelling	$150,000	SGSEP (2020)
Average residual land values per greenfield dwelling	$100,000	Savills (2021)
Adults per household	2.00	SGS estimate
Evaluation period for future benefit streams	20 years	

Results

Based on these assumptions, the total of the cost savings and benefits, per dwelling, of replacing a greenfield dwelling with an infill dwelling are in the order of $100,000 per dwelling with discounting of future savings/benefits at 5% pa (as shown in Table 6). The future savings/benefits are assumed for a 20 year period only, nothwithstanding that they are likely to accrue in perpetuity.

Table 16: Per dwelling quantification of benefits of greater station precinct development

Item	Description	Units	Infill	Greenfield	Difference	Rate	Cost savings/ benefits*
Infrastructure cost savings	Capital costs per dwelling	$	$26,655	$53,580	($26,925)	na	$26,925
Health care costs savings	Additional physical activity per HH, 20 yrs	Hours	2,080		2,080	$4.85	$6,286
Reduced VKT - direct costs	Reduced VKT - per household, 20 yrs	Kilometres		104,000	-104,000	-$0.29	$18,662 $1,944 $50,000
Reduced VKT - externalities	Reduced VKT per household, 20 yrs	Kilometres		104,000	-104,000		$103,817
Improved dwelling utility	WTP for location (captured in RLV)	$	$150,000	$100,000	$50,000	na	$50,000
		$					
Total saving/benefits per infill dwelling supplied in place of a greenfield dwelling							$103,817

*Future savings/benefits discounted at 5% pa.

No costs associated with achieving additional infill versus greenfield development have been included as these are trivial in scale, and mostly relate to greater planning and design sophistication and effort. They would be easily covered by benefits also not included.

It is assumed new transport infrastructure is required to manage the growth of the metropolitan area however it develops, but that it is better utilised and achieves better returns under the potential outcomes identified.

Economic and financial appraisal

Conventional cost benefit analysis identifies a base case and a project case and the evaluation is based on quantifying and comparing the marginal costs and benefits of moving from the base to the project case.

A possible 'base case' would be that assumed by the NSW Government's projections of dwellings, prepared by the TPA. However, these projections already assume significant future intensification and housing development in the 82 centres, and it would be our study team's strong belief that achieving the intensification assumed by the TPA would require the adoption of the type of design, planning and implementation approaches outlined and recommended. Consequently, the base case we have identified assumes that by 2041, 24% of the total Greater Sydney dwellings will be located in all 82 centres (up from 23% in 2021),

The potential range of scenarios was identified in Table 3 and drawing on these we have identified outcomes for 'project cases' based on the achievement of 35%, 40% and 45% target shares of all new dwellings between 2021 and 2041 in the 82 centres. These are equivalent to 26%, 28% and 29% of the share of total Greater Sydney dwellings in 2041 being in these centres. These numbers are summarised in Table 7.

Table 17: 'Base' and project cases for economic and financial appraisal inputs

Additional dwellings 2021-41		2041 Total Greater Sydney dwellings		Difference from base case
Total for Greater Sydney	736,208	100%	2,924,598	
In centres – 'base case'		**24%**	**696,392**	
Lower target 35%	261,572	26%	774,856	78,464
Mid target 40%	294,269	28%	807,552	111,160
Stretch target 45%	326,966	29%	840,249	143,857

We have applied the per dwelling economic benefits value to the marginal differences between a base case that assumes that by 2041, 24% of the total metro Sydney dwellings will be located in all 82 centres (up from 20% in 2021), and the achievement of 30, 40 and 44% of all new dwellings in Greater Sydney between 2021-41 in the priority and non-priority centres.

For the financial analysis we have reasonably applied the value to the total (rather than the marginal) range of yields as this contributes to the potential income that could be available to the NSW Government to reinvest in infrastructure and adds to the rationale to plan for and achieve these yields (to the base case and beyond).

Tables 8 and 9 shows total benefits of achieving additional station development, over a 20 year growth period, of:

- Marginal benefits of $5.08 billion to NSW from achieving the lower target outcome; $7.19 billion from the mid target; and $9.31 billion from the stretch target (compared to the base case) – noting that the total additional dwellings are spread over 20 years and the per dwelling economic benefits are discounted at 5% per year
- Up to $16.3 billion of value uplift.

Table 18: Economic benefits of greater station precinct development (discounted)

	Lower target	Mid target	Stretch target
Share of new dwellings (2021 – 2041) in centres	35%	40%	44%
Net additional dwellings in target centres (above base case)	78,464	111,160	143,857
Economic benefits ($103,817 per additional dwelling)	$5,076,000,000*	$7,191,000,000*	$9,306,000,000*

**Future economic benefits are discounted at 5% pa.*

Table 19: Gross value from greater station precinct development

	Lower target	Mid target	Stretch target
Total new dwellings	261,573	294,269	326,966
Financial uplift (total additional dwellings)	$13,079,000,000	$14,713,000,000	$16,348,000,000

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Waterloo South development. Source: NSW Government.

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Committee for Sydney

sydney.org.au

@Committee4Syd

committee@sydney.org.au

+61 2 8320 6750