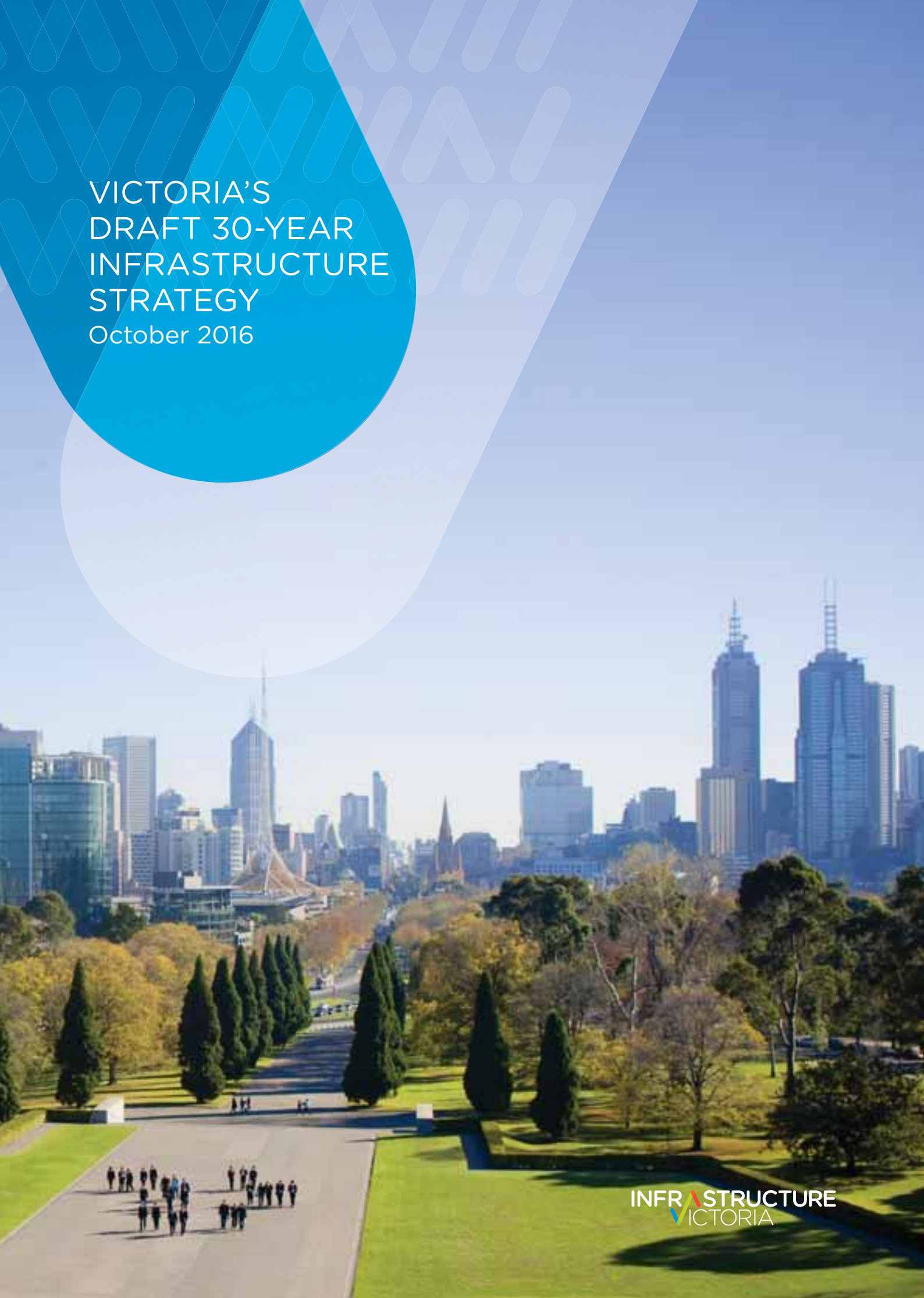
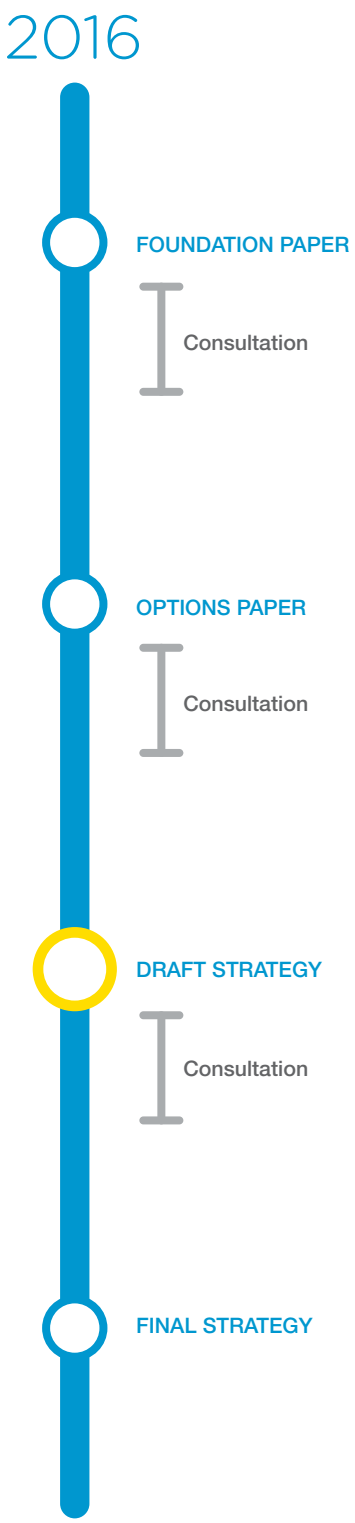
VICTORIA'S DRAFT 30-YEAR INFRASTRUCTURE STRATEGY

October 2016



INFRASTRUCTURE VICTORIA

Infrastructure Victoria acknowledges the traditional owners of country in Victoria and pays respect to their elders past and present, as well as elders of other Aboriginal communities. We recognise that the state's infrastructure is built on land that has been managed by Aboriginal people for millennia.



This is not the final strategy

This draft 30-year infrastructure strategy for Victoria presents draft recommendations. These should not be confused with the final recommendations, which will be presented to Parliament in December 2016.

The draft strategy is an opportunity to test Infrastructure Victoria's advice. This includes testing our assumptions, evidence and arguments about the state's infrastructure needs and priorities over the next 30 years.

But it is your final chance to have a say

To get to this point Infrastructure Victoria has already consulted extensively, so we don't expect there to be too many surprises, but we are still keen to hear what you think.

The draft strategy represents the final chance for stakeholders and community members to have a say. To find out more about getting involved, see page 204 or visit yoursay.infrastructurevictoria.com.au.

Executive Summary

Is there a better place in the world to live than Victoria? With a strong economy, booming industries and world-class education, transport and health care, Victoria is the envy of other states of Australia and other parts of the world.

Melbourne has just been named the most liveable city in the world for the sixth consecutive year, and regional areas such as Geelong, Ballarat and Bendigo continue to thrive.

The success of our state – which is enjoyed by many, but not all, Victorians – is no accident. Careful planning, bold decisions and significant investment over several decades have shaped the Victoria we know today. This success is not perpetual and it cannot be taken for granted. Without continual planning for a better future, the state we all appreciate and expect will become a very different place.

No one wants a Victoria choked by congestion. No one wants a Victoria where the most vulnerable people don't have access to housing. No one wants a Victoria where basic but essential services are out of reach to entire parts of the state. Yet that's what we could have 30 years from today if there isn't action now.

Infrastructure is all about facilitating good outcomes for people. It connects people to jobs, to education, to services, to each other. It supports Victoria's businesses, industries and communities. It creates opportunities and success. Good infrastructure is at the heart of a great state, and good infrastructure doesn't happen without good planning.

That's what this strategy is all about, providing a path to the future that Victorians want.

It outlines a pipeline of initiatives to be delivered over the next three decades to create the best possible future for the state. Some of these initiatives are new build solutions – state-shaping projects that could transform how Victorians live and move. Many other initiatives involve no construction, but could be even more impactful. These include policy and regulatory reforms that could profoundly change how people behave. Transport pricing, for example, could deliver more significant reductions in congestion than any new road project, cutting daily commute times and improving freight efficiency. Of all the recommendations made in the draft strategy, transport pricing is one of the most needed and the most beneficial.

The draft strategy identifies two other areas where decisive action is required – these are housing for low-income Victorians and densification. Major investment in dedicated affordable housing over the next 30 years, and particularly the next ten, is essential to ensure the most vulnerable Victorians have access to one of our most fundamental needs – shelter. Without bold action to address a lack of supply for at-risk Victorians, the number of Victorians living in insecure accommodation will increase to levels never seen before. While the cost of improving the provision of housing for vulnerable Victorians will be significant, not acting will come at even greater costs to society and the economy, which will be felt by generations to come. This is not a future we can accept.

Increased densification in urban areas is the other key recommendation of the draft strategy. Victorian cities are expanding and government must continue to plan for new communities. But the more Victorian cities sprawl, the harder it is for people to get around, and the more onerous the task of providing high quality infrastructure. Immediate and ongoing action is required to redirect growth to areas better equipped to

cope. It makes sense to direct growth to areas in Melbourne and regional cities that are already well serviced by infrastructure, rather than creating suburbs where new infrastructure has to be provided and maintained. Suburbs in Melbourne's east and south are particularly well placed to cope with extra demands on existing infrastructure, reducing pressure on the city's west, which continues to grow at the fastest rate of any region in Australia. This rebalancing is unlikely to occur without intervention.

In total, 134 recommendations are made in the draft strategy to be delivered over the short, medium and long term. Of these, around 35 per cent are new projects and 45 per cent are behaviour change/supply management initiatives. The remaining recommendations are about better planning and prioritisation and further investigation. A mix of solutions is critical. Of course major new projects will be needed over the next 30 years, but with finite funding initiatives that seek to manage demand and better use existing infrastructure are just as important. And in some instances, the full benefits of new infrastructure cannot be realised without policy or regulatory reform.

Funding has been an important consideration of the strategy development. Infrastructure is expensive and recommendations must be made responsibly. Investment in infrastructure is essential and there is no doubt that in some areas more investment is required. In other areas the amount of money spent on infrastructure does not need to increase, it just needs to be spent more wisely. The funding of infrastructure initiatives must also consider ongoing costs. There is no point providing new infrastructure if asset management and ongoing maintenance are not done properly. When looking at how to fund infrastructure, government should consider a mix of different mechanisms, including general government revenue, user charges and beneficiary charges.

The initiatives recommended in this draft strategy are based on assessments of the best available evidence, as well as feedback gained through extensive consultation. The inputs of community and stakeholder feedback, including the reports of two citizen juries, have all been considered. This does not mean all of the recommendations will be popular and, in some instances, what is not in the draft strategy will generate the most debate. Some initiatives with strong community support are not recommended because the impact they would make simply cannot justify their substantial cost. Other recommendations that impose additional costs or change delivery models may also be unpopular. But infrastructure planning must be bold and responsible rather than populist. We know our strategy will generate debate, and we welcome that. But we hope it is based on reason and evidence because the community deserves quality debate about infrastructure.

The opportunities that technological innovations could create have been top of mind in the development of the draft strategy and many of the recommendations relate to improving service delivery and optimising assets through technology. The need for improved Information and Communication Technology (ICT) connectivity was the message heard most often throughout consultation. It was heard across Victoria, but was loudest in regional areas. There is no doubt improving ICT connectivity would deliver enormous benefits to the entire state; it is the common link running through this strategy. State government alone cannot fix this problem. Rather, all levels of government need to work in partnership with the private sector to improve ICT coverage and we encourage all agencies and organisations that can make a difference to contribute to the solution.

Of the recommendations made in the draft strategy, 70 per cent are statewide, reflecting the importance of integrated and holistic planning for the whole state. The strategy recognises the significance of Melbourne as the economic engine room of Victoria, and the important contribution regional and rural areas make to the success of the state. It is a strategy for all Victorians.

This draft strategy is complex, ambitious and achievable. We think it can create a thriving, connected and sustainable future where everyone can access good jobs, education and services. We believe it can maintain the state Victorians love and create the future we all want.

Contents

Overview

VICTORIA WILL NEED TO ADDRESS MANY INFRASTRUCTURE CHALLENGES OVER THE NEXT 30 YEARS.

Addressing these challenges will help achieve better social, economic and environmental outcomes for the state.

THE DRAFT STRATEGY PROPOSES A NUMBER OF SOLUTIONS FOR MEETING THESE CHALLENGES.

The draft recommendations outline priority projects, policies and reforms, with an emphasis on what government can do differently.

WE WANT TO HEAR WHAT YOU THINK.

Infrastructure Victoria will be engaging with stakeholders and the community on the draft strategy in October and November.

The purpose of the draft strategy is to publicly test Infrastructure Victoria's advice on the state's infrastructure needs and priorities over the next 30 years, before we deliver the final strategy to the Victorian Parliament by the end of 2016.

This document describes the overall strategic framework, confirmed through earlier consultations, including what the strategy is aiming to achieve, what problems the strategy is seeking to address and the principles that have guided the development of the strategy. It outlines the methodology we used to shape the draft recommendations and, most importantly, the draft recommendations themselves.

We are seeking your feedback on the draft recommendations, in particular whether the recommendations, as a whole, will address the infrastructure challenges and achieve the goals we have identified as being important to Victoria over the coming decades.

Next steps

The immediate next step, following the close of consultation, is for Infrastructure Victoria to transmit the final strategy to the Victorian Parliament in December 2016.

After this, the Victorian Government will have up to 12 months to respond to the final recommendations and develop its own 5-year plan.

Infrastructure Victoria will then, on an annual basis, report on government's progress in meeting the infrastructure needs and priorities identified in the 5-year plan.

Within three to five years, Infrastructure Victoria will review and update the 30-year strategy and the cycle will begin again.

HOW TO NAVIGATE THIS PAPER

The most important section of this paper is the one that presents Infrastructure Victoria's draft recommendations (pages 39 to 201). This is the advice to Parliament we want to test with stakeholders and the community.

To find out how to contribute your views on the draft recommendations, go to the section on getting involved (page 204).

If you'd like to understand what the strategy is trying to achieve, see the section on the strategic framework (pages 11 to 19), and if you're interested in how we came up with the draft recommendations, see the methodology section (pages 21 to 37).

WANT TO FIND OUT MORE?

This document is complemented by a number of Infrastructure Victoria publications, including a consultation report on the options phase, entitled *Your considered opinion*, and the second version of the *Draft options book*.

Underpinning these publications is a range of technical reports, in particular updated assessments by AECOM/PwC of a number of options considered during the development of the draft strategy, and a report by KPMG/Arup/Jacobs on transport economic appraisal and demand modelling.

All these documents are available at yoursay.infrastructurevictoria.com.au.

STRATEGIC FRAMEWORK

The strategic framework

VISION

By 2046, we see a thriving, connected and sustainable Victoria where everyone can access good jobs, education and services.

Guiding principles

Consult and collaborate

Drive improved outcomes

Integrate land use and infrastructure planning

Draw on compelling evidence

Consider non-build solutions first

Promote responsible funding and financing

Be open to change

Objectives

1. Prepare for population change
2. Foster healthy, safe and inclusive communities
3. Reduce disadvantage
4. Enable workforce participation
5. Lift productivity
6. Drive Victoria's changing, globally integrated economy
7. Promote sustainable production and consumption
8. Protect and enhance natural environments
9. Advance climate change mitigation and adaptation
10. Build resilience to shocks

Needs

1. Address infrastructure demands in areas with high population growth
2. Address infrastructure challenges in areas with low or negative population growth
3. Respond to increasing pressures on health infrastructure, particularly due to ageing
4. Enable physical activity and participation
5. Provide spaces where communities can come together
6. Improve accessibility for people with mobility challenges
7. Provide better access to housing for the most vulnerable Victorians
8. Address increasing demand on the justice system
9. Provide access to high-quality education infrastructure to support lifelong learning
10. Meet growing demand for access to economic activity in central Melbourne
11. Improve access to middle and outer metropolitan major employment centres
12. Improve access to jobs and services for people in regional and rural areas
13. Improve the efficiency of freight supply chains
14. Manage threats to water security, particularly in regional and rural areas
15. Manage pressures on landfill and waste recovery facilities
16. Help preserve natural environments and minimise biodiversity loss
17. Improve the health of waterways and coastal areas
18. Transition to lower carbon energy supply and use
19. Improve the resilience of critical infrastructure

The strategic framework explained

THE STRATEGIC FRAMEWORK SETS OUT A VISION FOR VICTORIA IN 2046, AS WELL AS A NUMBER OF OBJECTIVES AND NEEDS.

It describes what the strategy is trying to achieve and the challenges that need to be addressed.

IT ALSO OUTLINES INFRASTRUCTURE VICTORIA'S GUIDING PRINCIPLES.

We've been true to these principles in developing the draft strategy.

THE DRAFT RECOMMENDATIONS IN THIS PAPER RESPOND TO THIS STRATEGIC FRAMEWORK.

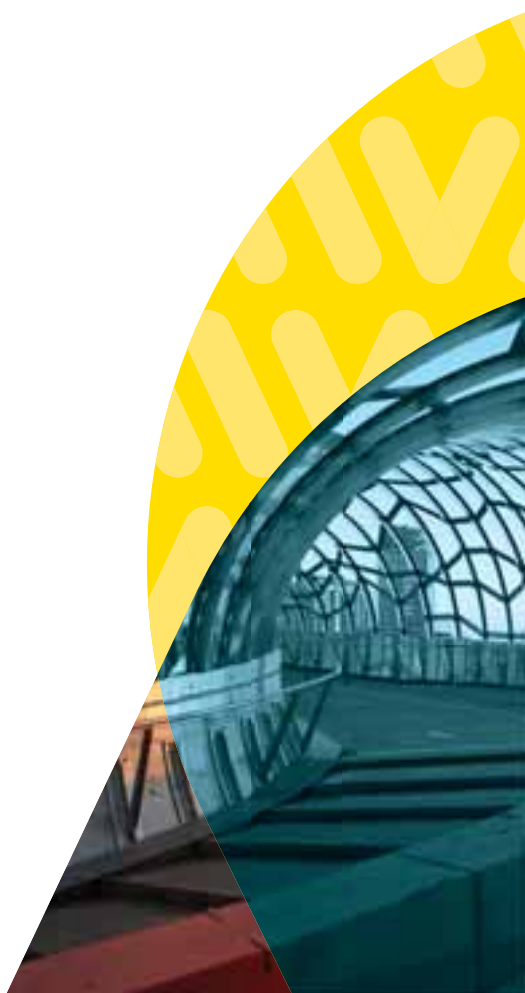
We think they are the best projects, policies and reforms for achieving the strategy's objectives and meeting Victoria's infrastructure needs.

One of Infrastructure Victoria's earliest commitments after being established in October 2015 was that we would work from the ground up, defining goals and assessing challenges before coming up with solutions.

The strategic framework is essentially the foundation stone of the 30-year strategy. It is an expression of what the strategy is aiming to achieve (the vision and objectives), what infrastructure challenges need to be addressed (the needs), and the principles by which the strategy will be developed (the guiding principles).

Each of the draft recommendations in this document aim to help meet one or more of the 19 infrastructure needs, which in turn contribute to the achievement of the strategy's objectives and, ultimately, the vision for Victoria in 2046.

The remainder of this section provides more detail on the vision, guiding principles and objectives. The needs are explained more fully and embedded within the section on draft recommendations. Under each need links are drawn to the objectives they help achieve. We aimed to capture the primary relationships between needs and objectives, but we note that these links may not be exhaustive.



Vision

THE STRATEGY IS GUIDED BY AN OVERARCHING, POSITIVE VISION FOR VICTORIA IN 2046. IT IS A FUTURE THAT GOOD INFRASTRUCTURE PLANNING CAN HELP DELIVER.

By 2046, we see a thriving, connected and sustainable Victoria where everyone can access good jobs, education and services.

Infrastructure profoundly affects our lives – where we live, what services, education and jobs we can access, and the strength of our communities. It influences the ease with which we buy and sell products and how we impact on, and adapt to, our natural environment.

In 30 years' time, the state will look very different. We can't tell what the future holds, but we know that the performance of infrastructure across all sectors will shape Victoria's society, economy and environment. In turn, Victoria's society, economy and environment will influence the state's infrastructure needs.

Infrastructure Victoria's first 30-year strategy sees a future where infrastructure will better enable Victorians to access opportunities, connect with each other and the world, and live sustainably.

Victoria is already a great place to live, work and do business. With strong infrastructure planning, we see an even brighter future.

INFRASTRUCTURE VICTORIA HAS DEVELOPED A SET OF PRINCIPLES TO GUIDE WORK ON THE STRATEGY AND BEYOND. THE PRINCIPLES REFLECT MANY OF THE REQUIREMENTS IN THE *INFRASTRUCTURE VICTORIA ACT 2015*.

Guiding principles

Consult and collaborate

Infrastructure Victoria will engage with the community and stakeholders in an open and meaningful way. Given the constrained fiscal environment, difficult choices will need to be made about the future of Victoria's infrastructure. The 30-year strategy, in particular, provides an opportunity to listen to different viewpoints and build consensus.

Infrastructure Victoria will also collaborate closely with government and private and community sector organisations that have a role in planning, funding and delivering infrastructure. The relationship with Victorian Government departments and agencies, as well as Victoria's 79 local governments, is particularly important as we all work towards the same goal of improving social, economic and environmental outcomes for the state.

Drive improved outcomes

Infrastructure Victoria will aim to achieve improved social, economic and environmental outcomes across the whole state.

Infrastructure has the capacity to both respond to and influence Victoria's society, economy and the environment, so we will consider all three when providing advice. Getting the right balance between social, economic and environmental considerations will not always be easy, but the best advice will seek to achieve positive outcomes across all three domains.

Integrate land use and infrastructure planning

Infrastructure Victoria recognises the importance of aligning land use planning with infrastructure planning. Land use planning informs infrastructure requirements and infrastructure provision enables the achievement of land use objectives.

Infrastructure Victoria will initially draw on existing land use plans to inform better infrastructure planning. Over time, the 30-year infrastructure strategy will become an important input to future land use plans and new land use plans will inform future updates to the 30-year strategy. This integration will help to ensure that we achieve improved social, economic and environmental outcomes from both infrastructure and land use planning.

Draw on compelling evidence

Infrastructure Victoria will draw on detailed, objective evidence to support better, more informed decision-making. This will require careful research, modelling and scenario planning, as well as access to information and expertise from across government, academia, industry and non-profit organisations.

The evidence we use will be shared with the community. Transparency will ensure scrutiny of our assumptions and methodologies and enhance public debate. Infrastructure Victoria recognises that, in some cases, the evidence required for decision-making may not exist or be fit-for-purpose. In others, even the best available evidence will not mitigate uncertainty entirely. In this context, we will seek to preserve options to provide more flexibility in future and identify solutions that meet a range of possible needs.

Consider non-build solutions first

Infrastructure Victoria recognises that building new things often isn't the best way to meet infrastructure needs. Taking steps to manage the demands placed on infrastructure and using the assets we already have more efficiently can be cheaper and better options.

Major projects will continue to be an important part of the infrastructure planning landscape, but, wherever possible, Infrastructure Victoria will look at non-build solutions first.

Promote responsible funding and financing

Infrastructure Victoria's advice, if taken, could have major budgetary implications. Victoria's fiscal position is sound. However, over the long term, revenue growth may struggle to keep pace with growth in spending, particularly on health and, as such, ongoing sustainable fiscal management will be important.

Funding infrastructure responsibly means making hard choices about what to fund and what not to fund. This includes looking at non-build solutions and taking into account life cycle costs. Financing infrastructure responsibly also means making hard decisions about how and when the community pays for infrastructure. This includes looking at when the costs and benefits of infrastructure are incurred, getting value for money and considering all the funding and financing options available.

Be open to change

Infrastructure Victoria recognises that improving outcomes rests, in part, on our willingness to embrace change so it can be used to the state's advantage.

For infrastructure, this could mean adapting existing assets, building flexibility into planning processes and responding to or adopting new technologies. Disruptive technologies have perhaps the greatest potential to change the way Victoria's society, economy and environment function. They are also the greatest unknown from an infrastructure planning perspective.

To stay relevant, Infrastructure Victoria's 30-year strategy will be updated every three to five years. As circumstances change, so will our advice.

THESE OBJECTIVES SET OUT WHAT THE STRATEGY IS AIMING TO ACHIEVE. THEY RECOGNISE THAT GOOD INFRASTRUCTURE IS NOT AN END IN ITSELF, BUT AN ENABLER OF BETTER SOCIAL, ECONOMIC AND ENVIRONMENTAL OUTCOMES.

Objectives

1. Prepare for population change

Victoria's population is expected to grow from approximately 6.0 million in 2016 to approximately 9.5 million in 2046. There will be proportionally more elderly Victorians, households will get smaller and the majority of growth will be centred in cities, particularly Melbourne. Having the right infrastructure in place will be critical for accommodating this growth and meeting increased and differing demands for services and housing across Victoria.

2. Foster healthy, safe and inclusive communities

Making our state a great place to live is about more than just accommodating growth. It is also about Victorians being and feeling healthy, safe and part of the community. All of these factors can be influenced by the quality, design and accessibility of infrastructure and services.

3. Reduce disadvantage

People who face socio-economic and other forms of disadvantage may have less ability to participate in society and access resources. In Victoria, disadvantage is concentrated in certain areas and experienced most acutely by certain cohorts. Infrastructure can help provide better access to employment and educational opportunities and social services and activities for disadvantaged Victorians.

4. Enable workforce participation

Participation in the workforce benefits both individuals and the wider economy. Over the coming decades, Victoria's workforce participation rate is expected to decline, largely due to the ageing of the population. It is unlikely this decline can be reversed entirely, but infrastructure can play a role in connecting people to jobs and supporting a healthy, educated workforce.

5. Lift productivity

Productivity growth is critical to improving living standards in the long term, particularly in the context of declining workforce participation. Productivity growth in Victoria has been relatively subdued since the turn of the century. Infrastructure can make a major contribution to lifting Victoria's productivity by enabling more efficient business activity, supporting innovation and skills development, and promoting workforce health and wellbeing.

6. Drive Victoria's changing, globally integrated economy

Victoria's economy is undergoing structural changes with the shift from manufacturing to service and knowledge-based industries. Victoria is also increasingly integrated into the global economy and is well positioned to take advantage of strong growth in Asia. Infrastructure will play a critical role in making the most of opportunities in the region by supporting future changes to the structure of the economy.

7. Promote sustainable production and consumption

Two centuries of economic growth have put pressure on the state's natural resources – resources that are critical for the success of Victoria's society and economy. Today, however, policy choices and new technologies enable states to pursue economic growth in a more environmentally sustainable manner. Infrastructure is central to this transition, both in terms of reducing the negative impacts of its use and encouraging more efficient and sustainable production and consumption.

8. Protect and enhance natural environments

Victoria has a wealth of diverse natural environments, encompassing desert, alpine, coastal and forest areas, which have intrinsic value. Population and economic growth, as well as climate change and urbanisation, will place increasing pressure on the environment. Infrastructure has the potential to not only minimise harm to the environment, but also protect and enhance ecological systems.

9. Advance climate change mitigation and adaptation

The changing climate, and actions to slow the rate of change, will have significant impacts on Victoria. Infrastructure plays a key role in helping the state adapt to climate change and facilitate the transition to a low-carbon economy. Climate change considerations must be incorporated into infrastructure decision-making to ensure that Victoria is prepared, flexible and resilient.

10. Build resilience to shocks

Unexpected events are likely to disrupt Victoria's society, economy and environment over the coming decades. These shocks could be anything from natural disasters, pandemics, ICT disruptions, global economic crises and terrorism, to more minor but more frequent disruptions to transport networks. The state's vulnerability to these shocks will be partly determined by the resilience and adaptability of its infrastructure.

RECOMMENDATIONS METHODOLOGY

Advice to whom?

THE 30-YEAR STRATEGY PROVIDES ADVICE TO THE VICTORIAN PARLIAMENT.

The Victorian Government will respond to the recommendations.

BUT MANY OTHER ORGANISATIONS ARE ALSO INVOLVED IN INFRASTRUCTURE PLANNING AND DELIVERY.

Local and federal government and the private and community sectors play a significant role as well.

IT'S IMPORTANT THAT THE STRATEGY IS NOT CONSTRAINED BY ARTIFICIAL BOUNDARIES.

Some recommendations will have implications beyond the state government sphere.

At the end of the year, Infrastructure Victoria will transmit the final 30-year strategy to the Victorian Parliament and publish it for all Victorians at the same time. The Victorian Government will then have up to 12 months to respond to the recommendations and develop its own 5-year plan. This means that the advice in this paper is primarily directed at representatives of the State of Victoria.

We know, however, that state government is just one of many players in the business of infrastructure planning and delivery in Victoria (albeit a very important one). When people step out of their front doors, much of the infrastructure they see is provided and maintained by local government, from pavements and plantings to municipal libraries. The private and community sectors also contribute to Victoria's infrastructure landscape, as does the Commonwealth Government.

The distributed nature of infrastructure planning and delivery in Victoria is reflected in the draft recommendations presented in this strategy. In many cases, we have noted that while the Victorian Government has a leadership role to play, it will need to partner with other levels of government and the private and community sectors to secure the best outcomes.

At times we have made recommendations that have cost implications beyond the state government sphere, for example, for local government. In doing so, we are not suggesting that local government alone should have to pay for programs, but neither are we suggesting by putting the recommendations to state government that it should cover all costs. The problems are shared and so too must be the solutions.

Ultimately, people aren't interested in artificial boundaries drawn between different organisations. They just care about how infrastructure can help improve their day-to-day lives and Victoria's society, economy and environment overall. The recommendations in the draft strategy reflect this thinking.

THE DRAFT RECOMMENDATIONS ARE OUR PROPOSED SOLUTIONS TO MEETING VICTORIA'S INFRASTRUCTURE NEEDS.

Collectively, the recommendations will help achieve the strategy's vision and objectives.

THE RECOMMENDATIONS HAVE BEEN SEQUENCED OVER THE 30-YEAR PERIOD.

All the recommended projects, reforms and policies are important, but we recognise that not everything can, or needs to, happen all at once.

WE'VE AIMED TO CREATE A BALANCED STRATEGY THAT IS AMBITIOUS, BUT NOT 'GOLD PLATED'.

This has involved balancing recommendations across needs, sectors, geographic areas and types, and considering broad cost implications.

Shaping the recommendations

All of the draft recommendations on pages 39 to 201 started their life as options for consideration. These options were developed and assessed over 2016 by Infrastructure Victoria, with technical advice provided by external consultants. The discussion that follows describes how these options, among the many that were considered, rose to become priorities and how they were shaped into recommendations.

Assessing options

Assessing the 280-plus options we identified in developing this strategy involved consideration of a number of different factors, including:

- The **cost** of the option, both in terms of what it would cost to implement or build and what it would cost to operate over the 30-year period.
- The expected **contribution** of the option to meeting one or more needs over time.
- The likely **economic, social and environmental impacts** of the option.
- The **relationships** between options, including how they might enable, complement or inhibit one another.
- The level of **community support** for the option, drawing on ongoing public consultation and the reports of two citizen juries.
- The resilience of the options under alternate **future scenarios**.
- Any relevant interactions with current **state planning strategies**.

For a limited number of major transport projects, we commissioned additional demand modelling and preliminary benefit cost analysis (see pages 136 to 137 for further discussion of the outcomes of this work). We are currently undertaking research on how benefit cost analysis can be applied more broadly to other sectors and how to better value social and environmental, as well as economic, benefits.

Weighing up all of these factors involved the exercise of considerable judgement. There were no simple formulas that could be applied to derive the perfect answer. For example, some options that were assessed as having a low contribution to meeting a need still performed well because they had the capacity to meet multiple needs or because they were important enablers for other options.

Forming recommendations

Forming strong-performing options into recommendations was even more complex. It involved answering the following questions:

- Given the role of state government, what advice could we reasonably give to Parliament?
- What were we telling government to do differently? To change policy or regulatory settings, to introduce a systemic reform, to spend more on infrastructure, including specific major projects, or to spend more wisely on infrastructure?
- What was the optimal timing and the logical next steps for implementing a recommendation (noting that all major projects should be subject to business case)?
- Had anything changed in the policy environment since an option was developed that would make it redundant?
- Did any of the options seem just too far out of scope for an infrastructure strategy?
- How certain were we of the evidence and what could we say with confidence?

At times, in answering these questions, the recommendations shifted away from the underlying options that had been assessed. For example, an underlying option may have been scoped and costed to include both a new investment decision-making framework and money for new programs or facilities. In determining what government needed to do differently, however, this option may have only been recommended in part to focus on the decision-making framework. In other words, the recommendation focused on spending money more wisely, not on spending more.

Balancing recommendations

Once the recommendations for each need had been formulated, we looked at how they could be balanced across needs. This involved analysing the breakdown of sectors, geographic areas and types and considering broad cost implications.

For the most part, this analysis revealed that the recommendations were reasonably balanced. Geographically, around 70 per cent applied to the state as a whole. Around 20 per cent were specific to metropolitan Melbourne and around 10 per cent were specific to regional and rural Victoria.

In terms of type, around 45 per cent were behaviour change/better use solutions and around 35 per cent were new or expanded asset solutions (explained further on the next page). The remainder were recommendations for better planning/prioritisation of capital works and further investigation of some reforms and projects. Under each need, recommendations related to changing behaviour/better use and new or expanded assets are presented together. This recognises that non-build and build solutions are both important in planning for Victoria's infrastructure future. It also recognises that they are deeply interrelated.

However, the balancing exercise also showed that some sectors, such as transport and health and human services (mainly housing), were overrepresented, particularly in terms of the potential capital cost of recommendations to government. On this basis, some recommended programs of work were scaled down or refocused. This was a not a process of sorting the 'bad' from the 'good'; it was a process of sorting the 'good' from the 'better'. In the end, transport and health and human services still feature strongly in the draft strategy, which is appropriate given the scale of the need in these sectors.

We note that just because a particular infrastructure solution does not appear in the draft strategy does not mean government should never pursue it. The recommendations focus on priorities. We haven't tried to produce a strategy for everything. In many cases, government should just keep doing what it's doing.

A note on the timing of recommendations

To determine timings for the draft recommendations, we considered a range of factors, including the timing of the need they were addressing, how the recommendations worked together, and anticipated budget capacity for capital spending, particularly in the shorter term. We also considered industry's capacity to deliver and the importance of a steady flow of construction projects, avoiding major peaks and troughs. However, we know that circumstances can change and in preparing the final strategy we will develop advice about any recommendations that could be completed in alternative time periods, particularly recommendations that could potentially be brought forward.

1 CHANGING BEHAVIOUR, MANAGING DEMAND

For example, using pricing to spread demand for electricity over peak and non-peak periods.

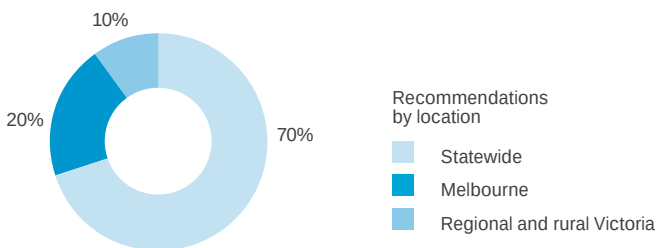
2 GETTING BETTER USE FROM EXISTING ASSETS

For example, using school facilities for community activities to make the most of what the state already has.

3 EXPANDING ASSETS OR BUILDING NEW ONES

For example, building new roads and rail lines to increase the capacity of the transport network.

A strategy for the whole state



Feedback received through consultation to date has emphasised the need to focus attention on infrastructure issues in regional and rural areas. Many of the iconic infrastructure plans from Victoria's past have centred on metropolitan Melbourne, and this document is the first of its kind to cover the whole state.

We don't think this should be an either/or equation. Melbourne is integral to the functioning of regional and rural Victoria, just as regional and rural Victoria is integral to the functioning of Melbourne. The majority of the recommendations in this strategy have broad applicability across the state.

Scale is a factor for consideration. Melbourne's population today is around 4.6 million, while the population of Victoria's next largest city, Geelong, is around 280,000 people. The sheer size of population growth in Melbourne means that government will have a huge task in providing and maintaining Melbourne's infrastructure over the next 30 years. But this does not mean the needs of regional and rural Victoria should be overlooked.

Funding considerations

We estimate that the recommendations in this draft strategy would total around $100 billion dollars in capital spending over 30 years. However, this is a very rough figure and it would include at least some expected business-as-usual spending.

It is important to emphasise that when we considered the broad cost implications of recommendations, we did not attempt to fill a certain funding envelope. The strategy is not a budgeting exercise and, ultimately, government is responsible for prioritising spending on infrastructure.

We did, however, do a sense check of our recommendations against the capacity for capital spending on infrastructure over the next ten years should net debt be maintained at around 6 per cent of gross state product, as outlined in the *2016-17 Victorian State Budget (Budget paper 2: Strategy and outlook)*. This exercise resulted in the timings of some high cost recommendations being pushed back, particularly from the 0-5 year period covering the forward estimates when a large proportion of spending has already been committed. We also looked at ways that government could source funding for major projects, policies and reforms, such as beneficiary and user charges (see page 37 for more information).

WANT TO FIND OUT MORE?

For more information on how we developed and assessed options for meeting Victoria's infrastructure needs, which are essentially the ingredients of the draft recommendations, see the *Draft options book version two* at yoursay.infrastructurevictoria.com.au.

Why are some recommendations more specific than others?

One of the challenges we faced when writing the draft strategy was that the level of existing evidence about what specific pieces of infrastructure will be needed over the coming decades varied by sector and by region.

Information about what big transport projects (road and rail) may be needed in Melbourne over the next 30 years was easy to find. The same could not be said for all sectors and all parts of Victoria.

The fact that some recommendations are more specific than others highlights gaps in forward planning, most notably for regional and rural Victoria. This has been called out in a number of recommendations, where we identify critical next steps as being the transparent identification of priorities.

Why are some recommendations different to what's in the *Draft options book version two*?

In a number of cases, what we are recommending in the draft strategy is a little different to the underlying option as described in the *Draft options book version two*. For example, the option on metropolitan level crossing removals was about completing the removal of all level crossings, whereas the draft recommendation is about more transparent prioritisation of such removals. Similarly, the option on recycled water for drinking was on introducing the scheme, whereas we have recommended more work be done to assess trigger points for major water supply augmentation and to consider a number of different technological solutions, including recycled water.

As discussed on pages 24 to 28, forming the recommendations included the consideration of many factors, including things like our level of certainty and overall cost implications. The recommendations sometimes diverge from what is in the *Draft options book version two* because we have honed in on what government should do differently.

In the *Draft options book version two* we've included a section for every option considered during the development of the draft strategy that outlines what we think of the option and why, including those that have not been recommended. These sections explain why some recommendations are slightly different to their related options.

The 'architecture' of the recommendations and underlying analysis of related options is outlined on page 43 and all supporting documents are available at yoursay.infrastructurevictoria.com.au.

THROUGHOUT 2016, WE HAVE LISTENED TO YOU.

We have received feedback on objectives, needs and options through a range of channels, including formal submissions, workshops, surveys and roundtables.

TWO CITIZEN JURIES DELIBERATED ON OPTIONS FOR MEETING VICTORIA'S INFRASTRUCTURE NEEDS.

One jury was held in metropolitan Melbourne and the other in Shepparton in regional Victoria.

INPUT FROM CONSULTATION HAS HELPED US UNPACK THE ISSUES AND INFORMED THE DRAFT STRATEGY.

Community and stakeholder views are one of many factors we have considered in shaping the recommendations.

Listening to you

The consultation program

Throughout 2016, we have consulted extensively with stakeholders and the community. In February and March, we asked for your feedback on the objectives and infrastructure needs that would frame the 30-year strategy. In May and June, we sought your views on options to meet the infrastructure needs.

To date, we have received 390 formal submissions and almost 1,000 online survey responses and interactions. We have also held roundtables, workshops and meetings with stakeholders and community groups across Victoria and conducted community research.

In addition to this broad public consultation, Infrastructure Victoria convened two citizen juries to respond to the question: 'What should we do to meet Victoria's infrastructure needs?' Each jury met for six full-day sessions from April to July to build its understanding of the subject. Both juries provided reports with recommendations, to which Infrastructure Victoria has now responded.

We made the decision to engage with stakeholders and the community at multiple key points throughout the development of the 30-year strategy. The intention of this regular 'check in' approach has been to build a common understanding about goals, problems and possible solutions. By this point, our hope is that there aren't too many surprises in the draft strategy, as we have sought to engage with you throughout the process.

Our response to consultation

Community and stakeholder input has been used in multiple ways throughout the strategy's development – to set the foundations, assess the options and shape the recommendations. In lots of cases, people have provided strong evidence in support of their views and caused us to change ours.

In developing an enduring strategy for all Victorians, we recognise the critical importance of community and stakeholder input. However, we note that it is but one of many factors we have considered in shaping the draft strategy.

Where we agree

Community and stakeholder input has been valuable in adding depth to the strategy and helping us test potentially contentious options. For example, going into the consultation on options, we held a strong view that transport network pricing could make a significant and beneficial impact to meeting the state's transport challenges. Though community and stakeholder views were mixed on this issue, both citizen juries recommended transport network pricing after careful consideration of the costs and benefits.

Where we disagree

In some cases, the draft strategy diverges from prevailing views expressed during consultation. For example, Doncaster heavy rail and Rowville heavy rail received a lot of community support during the consultation on options. Initial assessments of these projects indicated they should not proceed. A number of submitters contested these assessments and provided alternative studies to support their views, so we looked at these and undertook further analysis. Ultimately, despite this high level of support, we don't think these projects make sufficient contributions to the objectives and needs considering their substantial cost, so they are not recommended in the draft strategy.

Where we changed our mind

Finally, consultation with the community and the public has provided us with ideas and evidence that changed our minds. This was particularly evident in relation to how we had developed and assessed the option for urban forests, which we had filtered out in *All things considered*. Stakeholders argued that the option had been too narrowly focused and assessed as a means to transition to lower carbon emissions under Need 18. They provided us with evidence of how greening of the urban environment can support a number of needs. We have reconsidered this option, changed its focus to be about green infrastructure more broadly and assessed it against multiple needs. It now features quite prominently across the strategy.

WANT TO FIND OUT MORE?

To read Infrastructure Victoria's analysis of, and responses to, consultation to date, as well as the original citizen juries' recommendations and independent reporting from our consultation facilitators, visit yoursay.infrastructurevictoria.com.au.

OUR CONCLUSIONS ARE BASED ON THE BEST INFORMATION AVAILABLE.

We've made the recommendations as concrete as possible, drawing on the evidence at hand and considering different future scenarios.

HOWEVER, WE UNDERSTAND THAT MORE WORK WILL BE REQUIRED IN SOME AREAS.

Big decisions require serious consideration and in many cases our advice is qualified.

WE ALSO KNOW THAT THINGS CAN CHANGE.

A lot can happen in the space of one year, let alone 30, which is one of the reasons the strategy will be updated periodically.

Dealing with uncertainty

To develop the 30-year strategy, we have assembled evidence from many different sources. This has involved liaising closely with other Victorian Government departments and agencies and with key stakeholders, including those in local government and the private and community sectors. We have also sought technical advice from consultants, all of which is available for scrutiny at yoursay.infrastructurevictoria.com.au.

In shaping the draft recommendations, we have drawn on the best information available right now. We have also considered different future scenarios, such as alternative population growth and distribution profiles and potential technological disruptions. However, we know that there are gaps in our knowledge, which can only be filled with further investigation.

Where the evidence is strong and our level of certainty is high, recommendations are sharper in focus. This includes recommendations for projects that are ready to proceed to business case, where adequate scoping and feasibility studies have already been undertaken. It also includes recommendations to extend or accelerate existing programs or to adopt policies or reforms that have been successful in other jurisdictions.

Where more work is clearly required and there is greater uncertainty overall, recommendations are more qualified. This includes recommendations for reviews and feasibility studies with a view to implementing the specific project, policy or reform down the track, as well as recommendations that are conditional on particular things happening, such as demand triggers.

Ultimately, even with the best possible evidence, we know that the future can unfold in unexpected ways. Technological disruptions, shifting global economic forces and climate change are just some of the factors that may impact the shape of Victoria over the coming decades. Recognising that it is impossible to predict the future with any certainty, the 30-year strategy will be updated every three to five years. As the circumstances change, so too will our advice.

OUR ASSUMPTIONS

To develop the draft strategy, we have made some assumptions about the future. This goes beyond the base case, which covers committed projects and policies, and appeals to reason about what is likely to occur over the 30-year horizon. Some of these assumptions include:

- Overall population growth will continue at projected levels.
- Cities will continue to experience higher levels of population growth than other parts of the state.
- Climate change will result in higher temperatures overall and more severe weather patterns.
- Driverless vehicles, and other advanced technologies, will impact on infrastructure use.

Further information about our assumptions can be found in the *Draft options book version two* at yoursay.infrastructurevictoria.com.au. These will be continuously monitored in anticipation of the strategy refresh in three to five years.

Driverless vehicles

One of the greatest uncertainties for the transport system is the how and when of driverless vehicles. Though we expect fully automated vehicles are someway in the future, new technology is already being used to improve the transport network's function. VicRoads Managed Motorways program has shown the ability to improve traffic flows on the state's most important roads. Transport users across the network already benefit from better access to information, for example, smartphone apps for public transport users and in-vehicle systems for road users. Many places, including Singapore, Pittsburgh and Western Australia, already have trials of driverless vehicles underway or planned.

Automotive vehicles will progressively become more automated and connected. The challenge for government is to work out how to best support the deployment of these new technologies as they become available, minimising barriers and ensuring their value to the community is maximised. There is a role for both federal and state and territory governments to set appropriate standards, establish transport strategies and mediate between different transport types.

It's not all about driverless vehicles, but we think this technology is likely to have the most profound effect on the way Victorians travel. We have commissioned modelling that suggests driverless vehicles and/or transport pricing could dwarf the effect of any single major transport project.

The modelling also raises questions about the performance of the transport network overall. If the number of vehicles using motorways significantly increases, what are the flow-on effects for arterial and local roads? How will vehicle ownership patterns and new business models evolve? How can government ensure the public interest is not compromised by the potential step change increase in traffic levels and congestion?

In developing the strategy, we have considered the best available evidence about the likely pathways to a driverless future. This indicates that by the halfway mark – about 15 years out of our 30-year strategy – reasonable uptake of driverless vehicles that may begin to affect transport patterns is possible. We've used this as a guide to frame our recommendations, including identifying transport pricing reform as an essential step ahead of this occurring to get the most efficient use out of these new technologies.

It is easy to overstate the pace of technology change over the short run and there are many hurdles to overcome before driverless vehicles could become commonplace. But history shows that even the greatest minds can underestimate the extent of transformation over longer timeframes. One of the most important reasons for updating the 30-year strategy every three to five years is to adjust it for the unknown, and change our view as new evidence arrives.

INFRASTRUCTURE PLANNING ON THIS SCALE IS INHERENTLY COMPLEX.

The 30-year strategy has a lot of ground to cover, crossing sectoral, geographic and institutional lines.

BUT LOOKING AT THE BIG PICTURE CAN HELP TO IDENTIFY CONNECTIONS ACROSS THE SYSTEM.

For example, action in one sector or area can help reduce demand in another.

THE STRATEGY AIMS TO DRAW OUT THE RELATIONSHIPS BETWEEN OBJECTIVES, NEEDS AND RECOMMENDATIONS.

In many, if not most, cases, these relationships are not strictly linear.

Dealing with complexity

The 30-year strategy has a lot to consider. It isn't a strategy for everything, but it is a strategy for all types and sectors of infrastructure in Victoria (an area roughly the same size as New Zealand and housing a larger population), covering a period of three decades. Making sense of infrastructure planning at this scale means dealing with complexity.

We have taken the view that good infrastructure is not an end in itself, but an enabler of better social, economic and environmental outcomes. Using this big picture framework, we have been able to identify common challenges and interdependencies across the system.

This has resulted in a strategy that is not strictly linear. Just as meeting one need can help achieve multiple objectives, so too can action under one need help address others. In some cases, we have simply noted the relationships. For example, achieving better health, housing and education outcomes for people (Needs 3, 7 and 9) can help reduce pressure on the justice system (Need 8). In other cases, specific recommendations appear under multiple needs. For example, creating a network of green infrastructure in Victorian cities and towns is recommend under Needs 4 and 16. This is based on the recognition that the same solution can help meet multiple needs in different ways.

This may sound complex, and it is. Rather than shying away from this complexity, the strategy has tried to draw out the relationships between objectives, needs and recommendations. The summary of recommendations on pages 40 to 41 will give you some insight into how it all fits together.

What are some limitations of the strategy?

One of the things considered we when developing the draft strategy was whether to focus on the needs of specific groups or cohorts of people, for example, as defined by age, gender or cultural background. In the end, we took a broader, often spatial view of how infrastructure could address disadvantage, for example, through housing responses for low-income Victorians and improving access to jobs and services. We recognise that infrastructure challenges can be viewed through many different lenses, however, and this may be something we revisit in future iterations of the strategy.

THE DRAFT STRATEGY HAS NOT BEEN WRITTEN IN A VOID.

We have drawn extensively on good work done by other government, private and community sector organisations in Victoria, Australia and overseas.

OUR LEGISLATION REQUIRES US TO HAVE REGARD FOR RELEVANT PLANS AND POLICIES IN VICTORIA.

It is particularly important that infrastructure planning supports good land use outcomes.

ULTIMATELY, HOWEVER, INFRASTRUCTURE VICTORIA IS PROVIDING INDEPENDENT ADVICE.

In many cases our advice will align with, or build on, directions set out in related strategies; in others, it will diverge.

Relationship with other strategies

The broad scope of the 30-year strategy means that it will inevitably cover well-travelled ground. To identify options and make recommendations for meeting Victoria's infrastructure needs, we have drawn upon existing local, regional and state plans, as well as examples from across Australia and internationally.

For example, when identifying transport projects to recommend, we have, of course, considered relevant strategies produced over time by the Victorian Government or its agencies (such as the 2012 *Network development plan*, the 2013 *Freight and logistics plan* and the 2016 *Regional network development plan*), local government (such as the 2014 *50 year infrastructure strategy for Melbourne's north*) and the Commonwealth Government (such as the 2015 *Infrastructure Australia Plan*). We have also looked further afield at strategies from other countries (such as the US Department of Transport's 2015 *Beyond traffic draft framework*).

We have also considered a variety of Victorian Government plans that are currently under development, such as *Water for Victoria* and the Health *Statewide system design, service and infrastructure plan*.

Given the importance of integrating land use and infrastructure planning, we have been particularly mindful of the directions and priorities outlined in *Plan Melbourne 2014* and the *Plan Melbourne refresh discussion paper*, as well as the eight *Regional growth plans*. The final strategy will be updated to reflect any significant changes to these important strategic land use plans, subject to timing.

Not only is it good practice for Infrastructure Victoria to scan and understand the policy environment in which the strategy is being written, it's also a requirement of our legislation. We are literally obliged by law to have regard for relevant Victorian plans.

This does not mean, however, that we have to adhere to, or fully align with, these plans. Ultimately, we are providing independent advice to Parliament on Victoria's infrastructure needs and priorities over the next 30 years.

A workable plan

WE'VE TRIED TO MAKE OUR ADVICE CLEAR, PRACTICAL AND ACTION ORIENTATED.

Recommendations include guidance on next steps for implementation.

FOR SPECIFIED MAJOR PROJECTS, POLICIES AND REFORMS, WE HAVE PROVIDED RECOMMENDATIONS ON FUNDING OPTIONS.

We know that infrastructure is expensive and have looked at a range of potential funding mechanisms.

IN SEQUENCING RECOMMENDATIONS, WE HAVE CONSIDERED INDUSTRY'S DELIVERY CAPACITY.

Having an orderly pipeline of major capital projects allows for a steady continuation of activity.

The draft strategy takes a big-picture, high-level view of infrastructure, but we've aimed to make the recommendations as specific and workable as possible, outlining key next steps for action. We have aimed to develop a strategy that government can respond to and implement.

For the same reason, we've also looked at how major projects, policies and reforms could be funded. General government revenue, which primarily comes from taxes, will continue to be a major source of funding for infrastructure. But continuing to increase general government revenue by all levels of government has consequences for Victoria's economy and community. Given the high cost of delivering infrastructure, the varying degrees to which different people benefit from the same piece of infrastructure and high public expectations of what will be delivered, government also needs to consider alternative funding sources (more information about funding is on the next page).

The final consideration in making the strategy a workable plan has been how to sequence build solutions, in other words, construction projects. We haven't sought to fine-tune specific timings, particularly in the out years, but we have allowed for a steady continuation of activity in terms of major projects after current projects are complete, while supporting a step-up of smaller scale construction and, in particular, maintenance.

One of the main drivers of this exercise has been to smooth capital expenditure for government, but we have also considered the capacity of industry to deliver, in terms of construction activity and extraction and disposal of materials. We see the steady continuation of major construction activity and growth of smaller scale construction activity as manageable, although it will continue to put pressure on waste disposal, including landfill.

Funding infrastructure

There is no silver bullet for raising all the revenue needed for the infrastructure Victorians want. While government can increase general revenue by increasing taxes or reducing expenditure, this affects individuals, businesses and the economy. General government revenue will always be a major funding source, but government should use a mix of funding mechanisms.

In our previous publications we identified seven funding mechanisms and seven financing mechanisms. Funding and financing are separate concepts. Funding is all the revenue needed to pay for infrastructure, while financing affects when we pay for infrastructure. Government needs to consider funding and financing for projects on a case-by-case basis as proposals are developed to ensure value for money. We focus on funding mechanisms in the draft strategy. This is because decisions on financing are typically determined when government procures infrastructure once it decides to fund a project.

When looking at different ways to fund infrastructure, government needs to strike a balance between raising revenue, using infrastructure efficiently and encouraging a productive economy and inclusive communities. Continuing to increase or levying multiple taxes and charges on selected groups in the community can create disproportionate or unfair financial burdens. In assessing ways to fund infrastructure, we refined our principles following consultation. We clarified that equity, fairness, efficiency and effectiveness play a role in applying funding mechanisms. Our refined principles are:

- distribute the funding burden equitably and fairly
- implement easy and cost-effective funding mechanisms
- ensure that the funding approach considers people's overall tax burden
- promote the highest and best use of infrastructure
- optimise the effectiveness and efficiency of infrastructure (including its maintenance) and services
- change behaviour and manage demand
- align the cost of infrastructure with users and those who privately benefit from it.

Our funding recommendations focus on major projects with significant costs that commence in the short to medium term, as well as major policies and reforms with large implementation costs for government. Additionally, some of our recommendations are, or incorporate, funding mechanisms. We also provide funding advice for projects or policies where there is likely significant opportunity for government to leverage alternative funding mechanisms.

Following consultation, we have considered equity objectives in recommendations about user charges. When infrastructure has a significant and measurable increase in property values or business productivity, we have considered whether beneficiary charges are appropriate. We have also considered applying beneficiary charges where government decisions enable development that then leads to future demand for government infrastructure investment. We are mindful of the challenge for some local governments to contribute to infrastructure funding with a rates cap in place. However, local government can seek a cap increase when demonstrating sound financial management and community support. At this stage, there is insufficient evidence to demonstrate that the policy significantly constrains local government infrastructure investment. We therefore support ongoing monitoring of the policy.

Further details about our position on these important issues and our approach to funding can be found in the *Draft options book version two* at yoursay.infrastructurevictoria.com.au.

DRAFT RECOMMENDATIONS

Recommendations summary

Infrastructure, at its core, is about connectivity. The transport system enables people and goods to get to and from places. ICT networks collapse the distances between places. Education infrastructure enables the transfer of knowledge between people. Health infrastructure allows people to access the expertise of others. Shared community spaces, like libraries and parks, enable people to commune with each other and with nature. Essential services, like water and electricity, connect homes and businesses through grids that are often hidden from view.

Infrastructure, and the connections it enables, is critical to the functioning and success of Victoria's society, economy and environment. The draft recommendations set out in this section aim to improve how the State of Victoria provides, uses and maintains infrastructure to get better outcomes for the people of Victoria. Government already does a lot of things well. The recommendations focus on what it can do differently.

Key messages

Looking across the draft recommendations, the key messages being conveyed are as follows:

- **Changing the way existing infrastructure is operated can have a much greater impact than building new things.** For example, the introduction of a pricing scheme to influence how the transport system is used and the widespread use of driverless cars could dwarf the impact of building any new major road or rail line.
- **Land use planning decisions should factor in the capacity of existing infrastructure.** For example, greater densification of housing in established areas that are already well serviced with infrastructure is more efficient than providing new infrastructure in new areas.
- **Often, the amount of money typically spent on infrastructure does not need to increase, it just needs to be spent more wisely.** For example, it's unlikely government will stop building and upgrading schools over the next 30 years, but there is an opportunity to introduce more transparency and certainty into the prioritisation process by which investments are made.
- **Sometimes more investment in infrastructure is required.** For example, there is a strong case for substantially increasing the amount of money spent on social housing, given the scale of the unmet need and the potential social and economic benefits from making such an investment.
- **There is no point providing new infrastructure if asset management and maintenance are not done properly.** For example, providing extra support to refurbish or rationalise community facilities that are poorly maintained or no longer fit-for-purpose will have a much greater impact overall than cutting ribbons on new buildings.

Our top three

All of the draft recommendations flagged above and the many that appear in the pages that follow have been identified as priorities by Infrastructure Victoria. But if we had to nominate the top three most important actions for government to take in the short to medium term, we would choose:

1. Increasing densities in established areas to make better use of existing infrastructure.
2. Introducing a comprehensive transport pricing regime to manage demands on the network.
3. Investing in social and affordable housing for vulnerable Victorians to significantly increase supply.

These recommendations have the potential to transform the economic and social fabric of the state over the coming decades, making Victoria a fairer, more productive and more sustainable place to live, work and do business. More information on these recommendations is available under Needs 1, 7 and 10.

The common link

ICT connectivity will be critical to Victoria's success over the coming decades. It is the common link running through this strategy. We know that gaps in fixed and mobile coverage are a significant issue, particularly in parts of regional and rural Victoria. State government can't address this issue on its own, but it can do more. The recommendation for improving ICT infrastructure (discussed further under Need 12) isn't a simple fix and doesn't have a guaranteed outcome. But it does encourage state government to take a more proactive, coordinated approach to addressing this pressing infrastructure challenge.

HOW TO NAVIGATE THE DRAFT RECOMMENDATIONS

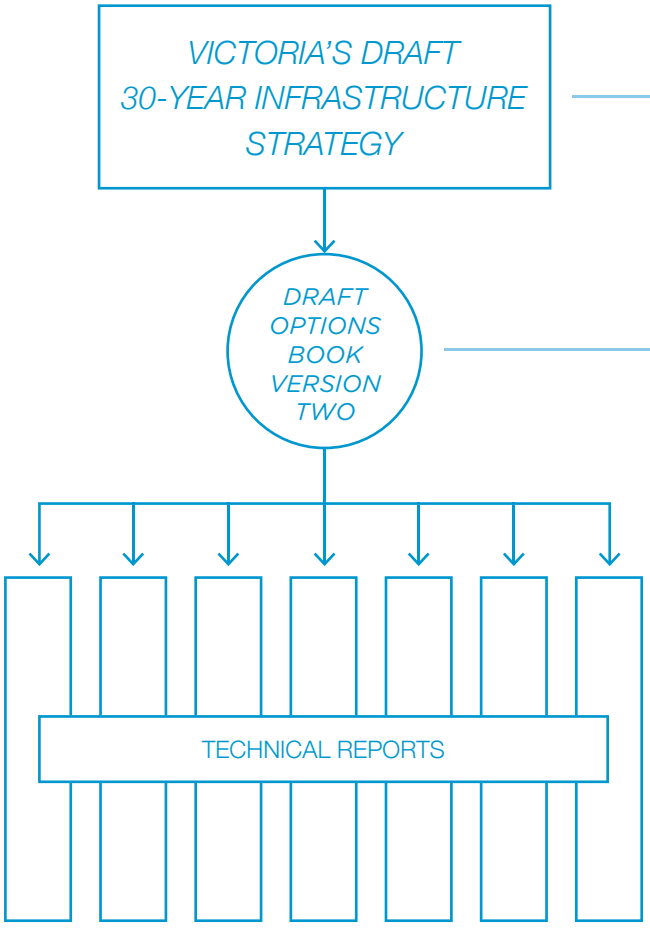
Following the strategic framework set out on pages 11 to 19, the draft recommendations have been organised according to the needs, or challenges, they address.

Some recommendations address multiple needs. In these cases, the recommendations are repeated, so that each need is self-contained and presents a full picture of the problem being addressed and the solutions being proposed. The draft strategy includes 134 discrete recommendations, of which 51 appear under multiple needs.

The recommendations under each need include the following elements:

- A short summary of the recommendations at the top of the first page, which conveys key messages and themes.
- The recommendations themselves, which have been grouped under themes, structured to provide the reader with a clear sense of the 'what, when, how and why' and ordered according to the timings proposed.
- Funding advice, where relevant, for major projects, policies and reforms.
- A section on things we considered when shaping the recommendations, including discussion of some of the options we didn't recommend.
- Additional content, such as Q&As, case studies, maps and figures that illustrate aspects of the recommendations.

The 'architecture' of the recommendations and underlying analysis of related options is shown in the diagram on the next page. The reference codes (for example, ref. XYZ) embedded throughout provide a link back to our analysis of related options in the *Draft options book version two*, which is available at yoursay.infrastructurevictoria.com.au, along with all supporting technical documents.



Maybe you've read Recommendation 10.2.2/13.1.2 on the introduction of a transport network price regime and want to know more.

The recommendation included reference to an underlying option that we assessed, coded 'TNP'. You can find our assessment of this alongside every other option we considered in the *Draft options book version two*, which is ordered alphabetically by option code.

And if you want to dive into the detail, the *Draft options book version two* will point you to a range of technical reports available on our website. In this case, you might want to look at the assessments by AECOM and PwC and modelling prepared by KPMG, Arup and Jacobs.

Recommendations quick reference guide

Recommendation	Recommendation number(s)	Related option code(s)	Location, sector(s)
10-car metropolitan trains	10.5.2	HCT2	
Active lifestyle facilities	4.2.2	ALP	
Acute/sub-acute health facilities	3.2.2	HIM	
Affordable housing fast-track approvals	7.3.1	SHS1	
Affordable housing plan	7.4.1	SCP	
Affordable housing planning mechanisms	7.3.2	SAH, AHR	
Affordable rental housing provision	7.4.3	ARH, SHE	
Aged care facility approvals	3.4.1	UPA	
Brown coal transition	18.2.1	BCA, BCL	
City Loop reconfiguration	10.10.1	CLR	
Clyde rail extension	1.3.8, 10.8.5	CRE	
Coastal protection infrastructure	19.1.4	CPI	
Community cultural facilities	5.1.2	CCF	
Community space refurb/rationalisation	1.4.4, 2.3.2, 5.4.2	CSR	
Community space shared use agreements	1.4.2, 2.3.1, 5.2.2	CSS1	
Community sport/recreation facilities	4.3.2	SRF	
Community use of TAFE assets	9.4.2	TAF	
Courts in high growth areas	8.1.3	JDG	
Courts in Melbourne's CBD	8.3.2	JLP	
Courts maintenance	8.3.1	CMD	
Crisis and transitional accommodation	7.4.2	CHP, TSA	
Critical infrastructure contingency planning	19.2.1	CSB	
Critical infrastructure control systems	19.1.1	ECS	
Cycling corridors/walking improvements	4.1.3, 10.3.2	BWP2, BWP3, BHT	
Cycling end-of-trip facilities	4.1.1	ALR	
Cycling/walking data	4.1.2, 10.3.1	BWP1	
Cycling/walking in established areas	4.2.1	AEA	
Development in established areas	1.1.1, 10.1.1	UDC	
Development in/around employment centres	1.1.2, 10.1.2 ,11.1.1	STO	
Dispute resolution technology	8.2.2, 12.1.2	JSD	
Doncaster bus system	10.6.4	DBI	

Location

- Statewide
- Melbourne
- Regional and rural Victoria

Sector

- All sectors
- Transport
- Cultural, civic, sporting, recreation and tourism
- Education and training
- Water and waste
- Energy
- Justice and emergency services
- Health and human services
- ICT
- Science, agriculture and environment

Recommendation	Recommendation number(s)	Related option code(s)	Location, sector(s)
Driver assistance applications	10.7.2, 13.2.3	ADA	
Driverless freight vehicles	13.2.2	DFV	
Driverless vehicles	6.2.2, 10.7.3	ACT	
Eastern Freeway-CityLink-Western Ring Road	11.4.8, 13.5.3	EWW, EWE	
Education delivery through technology	2.2.2, 9.2.1, 12.1.4	SRS	
Electricity network capability	18.2.2	ENI	
Employment centre arterial roads	11.4.1	ARN	
Employment centre mass transit	11.4.4	MTN	
Energy efficiency of existing public buildings	18.1.2	EDM1	
Energy efficiency of new buildings	18.1.3	EED	
Energy pricing	18.1.1	EDM2	
Environmental water delivery	16.3.3, 17.2.2	EWD	
Fishermans Bend tram link	1.2.1, 10.8.1	CCT	
Forensic mental health facilities	3.3.1	NEF	
Freight precincts	13.3.1	FPL	
Geelong/Werribee/Wyndham rail	1.3.4, 10.8.2, 12.3.1	WWW, GWR, GRE	
Government service/infrastructure planning	1.5.1, 2.4.1, 11.1.2	SIP	
Green infrastructure	4.2.3, 16.3.1	UFF	
Growth area local buses	1.3.2, 11.4.2	LBS	
Habitat corridors	16.3.2	HCL	
Health care delivery through technology	2.2.3, 3.1.2, 12.1.6	TEH	
Health care ICT systems	3.1.1, 12.1.5	EEA	
Health care partnerships	3.2.1	HAP	
High-capacity signalling	10.4.7	RSF	
High Productivity Freight Vehicles	13.4.3	HPF	
Housing rental assistance	7.1.1	HRA	
ICT infrastructure	12.1.3, 19.1.2	ETP	
Innovative transport services	1.3.1, 10.7.1, 12.2.2	MAS	
Integrated community health hubs	3.2.3, 12.1.7	ICP	
Irrigation water delivery	14.1.3	WDE	
Justice case management ICT system	8.2.3	CSC	

Recommendation	Recommendation number(s)	Related option code(s)	Location, sector(s)
Justice/human services integrated planning	8.1.1	JCS	
Landfill buffers	15.2.1	FLS	
Level crossing removals	11.2.4	MLC	
Long-distance rail services	12.2.9	RTL	
Major cultural/sporting infrastructure	4.3.1, 5.1.1	CSM	
Major hospitals	3.2.4	THR	
Major water supply augmentation	14.3.1	RWW,WDP, WSA1	
Melbourne Airport bus	10.9.1, 11.3.1	MAB	
Melbourne Airport rail link	10.9.2, 11.3.2	MAH	
Melbourne Metro - future stages	10.10.2	MMS	
Melton rail electrification	1.3.6, 10.8.3	MRE1	
Mental health/AOD facilities	3.3.2	MHA	
Metropolitan bus network	10.4.3, 11.2.1	MBN	
Metropolitan rail stations	10.4.6	MRI	
Metropolitan rail upgrades	10.4.5	MRC	
Metropolitan rolling stock	10.5.1	HCT3, HCT4	
North East Link	11.4.6, 13.5.1	NEL	
On-demand transport services	2.1.3, 6.2.1, 12.2.6	PTA	
Organic waste	15.1.2	OWM	
Outer metropolitan arterial roads	1.3.5, 11.4.5	OMA	
Outer Metropolitan Ring Road	11.4.7, 13.5.2	OMR	
Parks governance	16.2.1	NPP3	
Parks partnerships	16.2.2	NPP2	
Parks pricing/funding/expenditure	16.1.1	NPP1	
Police communications channels	2.2.1, 8.2.1, 12.1.1	MPW	
Police station supersites	8.1.2	PSS	
Port of Melbourne rail access	13.3.2	PMM, WDF	
Public housing refurb/rationalisation	7.2.1	SHA, SHS3	
Public libraries	1.4.5, 5.4.3, 9.4.3	LLH	
Public space utilisation	1.4.1, 5.2.1	CSU	
Public transport accessibility	6.1.3	PTV	
Public transport real-time information	10.4.1	TNI	
Public transport resilience	19.1.3	PTN	
Recycled materials in construction	15.1.1	RMU	
Recycled water (non-potable use)	14.2.1	RTH	
Regional city local buses	12.2.7	RBU	
Regional coaches	2.1.2, 12.2.8	RCU	
Regional highways	2.1.1, 12.2.5, 13.4.1	RHU	
Regional local road maintenance	2.1.4, 12.2.10, 13.4.4	RRU	

Location

- Statewide
- Melbourne
- Regional and rural Victoria

Sector

- All sectors
- Transport
- Cultural, civic, sporting, recreation and tourism
- Education and training
- Water and waste
- Energy
- Justice and emergency services
- Health and human services
- ICT
- Science, agriculture and environment

Recommendation	Recommendation number(s)	Related option code(s)	Location, sector(s)
Regional rail eastern corridor	12.3.3, 13.5.4	RRE1	
Regional rail gauge standardisation	13.4.2	RRG	
Regional rail upgrades	12.2.4	RRC	
Regional rolling stock	12.2.3	RRS	
Relocatable community infrastructure	1.4.3, 5.4.1, 19.2.3	RCI	
Riparian fencing	17.1.2	RFI	
Road asset management	10.6.1, 11.2.2, 12.2.1	RMF	
Road space allocation	10.6.3, 11.2.5	RSA	
School investment pipeline	9.3.1	SIF	
School maintenance	9.3.2	SRM1	
School network planning	9.1.1	SOO	
Schools as community facilities	1.4.6, 2.3.3, 5.3.1, 9.3.3	SCF	
Small-scale solar	18.2.3	SSE	
SmartBus network	1.3.3, 11.4.3	SNE	
Stormwater harvesting	14.2.2, 17.2.1	SRH	
Stormwater quality	17.1.1	SRQ	
Tertiary education/VET in schools	9.4.1	STE	
Torquay transport links	12.3.2	TRE	
Traffic management systems	10.6.2, 13.2.1	ATM	
Train timetabling	10.4.2	PTT	
Transport contingency planning	19.2.2	CRR1	
Transport control centres	19.2.4	ITC, CRR2	
Transport interchanges	6.1.2, 10.4.4, 11.2.3	MII	
Transport modelling	10.2.1, 13.1.1	ABM	
Transport network pricing	10.2.2, 13.1.2	TNP	
Universal design	6.1.1	CIM	
Wallan rail electrification	1.3.7, 10.8.4	WRE1	
Waste management sites	15.2.2	FWL	
Waste pricing	15.1.3	HWD	
Water governance	14.1.1	WIO2	
Water trading	14.1.2	WME	
Western Intermodal Freight Terminal	13.3.3	WIF	
Wollert transport links	1.3.9, 10.8.6	WRE2	

Need 1.

Address infrastructure demands in areas with high population growth

Meeting this need will help achieve objectives:

1. ● Prepare for population change
2. ● Foster healthy, safe and inclusive communities
3. ● Reduce disadvantage
4. ● Enable workforce participation
5. ● Lift productivity
6. ○
7. ○
8. ○
9. ○
10. ○

Strong population growth in some parts of Victoria, particularly the inner and outer/peri-urban areas of Melbourne and some regional cities, is expected to continue. Infrastructure across a range of sectors, from health and education to transport, is struggling to keep pace with demand. This need seeks to address the deficits that already exist in these areas and better prepare for future growth.

Victoria is experiencing strong population growth driven by natural increase (births minus deaths) and high rates of interstate and international migration. The state is growing by over 100,000 people each year and the Australian Bureau of Statistics (ABS) estimates that Victoria now makes up 25 per cent of Australia's population, the first time since 1995 that this proportion has been reached. By 2046, the state's population is expected to reach almost 9.5 million.

This growth is not, however, distributed evenly across the state. While strong growth is occurring in and around regional cities like Ballarat, Bendigo and Geelong, as well as some regional towns, more than 80 per cent of population growth is expected to be in Melbourne over the next 30 years (see figure 4 under Need 2 for a breakdown of this growth by Local Government Area). In the capital, 'greenfield' outer suburbs and peri-urban areas are continuing to expand. 'Infill' inner suburbs are transforming to become higher density areas with an increasing supply of apartments. 'Brownfield' sites in the central city have the potential to accommodate new populations.

Different areas experience different challenges. Growth area and peri-urban suburbs are growing off a very small base and, in recent years, both a Parliamentary Inquiry and the Victorian Auditor-General found that there is already a significant infrastructure backlog in these areas. Established areas often have more existing infrastructure, but some of this infrastructure is ageing and not fit-for-purpose. Central city urban renewal areas require new infrastructure for their potential to be unlocked.

Recommendations

The recommendations below address how the Victorian Government can better manage the spatial and infrastructure implications of high population growth.

Providing more infrastructure in areas where it is needed is clearly a big part of this story. This is particularly relevant in Melbourne's outer suburbs and peri-urban areas to improve access to jobs and services for the people who live there now, and in the future, and to ensure Melbourne's famed 'liveability' is shared by all. Many of the recommendations to improve access to middle and outer employment centres under Need 11 would also help support these communities.

However, there is potentially much greater opportunity for land use planning controls to direct future housing to areas that already have good access to infrastructure, particularly in Melbourne's eastern and southern suburbs, and to unlock urban renewal sites in the central city with catalyst transport infrastructure. Increasing densities closer to the city, train stations, transport corridors and major employment centres can be challenging, but we believe it is the most sustainable and equitable solution to managing high growth. It's also likely to save infrastructure costs.

Whether providing for growth in new areas or encouraging growth in established areas, it will be critically important to use transport, community and other infrastructure in the most efficient way possible and to improve planning across local, state and federal government.

Some of Victoria's regional cities are also experiencing relatively high growth. Continuing to support these cities to accommodate growth can assist in taking some of the pressure off Melbourne. Improving access to jobs and services in regional areas is addressed later in the draft strategy under Need 12.

1.1 Increase the proportion of housing in areas that are well serviced with infrastructure.

1.1.1 ALL **Development in established areas.** Intensify housing development in established areas of Melbourne, Geelong, Ballarat and Bendigo that are already well serviced with infrastructure by amending planning schemes within 0-5 years. This should focus initially on Melbourne's eastern and southern suburbs, in particular around train stations on the Lilydale, Belgrave, Glen Waverley, Alamein, Frankston, Sandringham, Pakenham and Cranbourne lines, as these are expected to experience fewer capacity constraints over the next 30 years. Investigations to better understand the capacity of the tram network should also commence, with a view to intensifying housing along tram corridors. To achieve this reform and ensure local needs are considered, state government will have to work closely with affected local councils (ref. UDC).

1.1.2 ALL **Development in/around employment centres.** Target intensification and development of businesses, services and housing around activity centres, particularly major employment centres and the transport corridors that feed them, by amending planning schemes within 0-5 years. This will enable more people to live closer to jobs. To achieve this reform and ensure local needs are considered, state government will have to work closely with affected local councils (ref. STO).

1.2 Provide catalyst transport infrastructure to unlock large-scale brownfield sites close to inner city areas.

1.2.1 **Fishermans Bend tram link.** Extend the tram network to Fishermans Bend to stimulate high-density major urban redevelopment within 5-10 years. This tram extension would have a city-shaping and catalytic impact of opening up Australia's largest urban renewal precinct and enable housing for 80,000 people and 60,000 jobs to be located adjacent to central Melbourne (ref. CCT).

1.3 Provide transport infrastructure to support high growth greenfield areas.

1.3.1 **Innovative transport services.** Remove barriers to the entry of new market players offering innovative transport services within 0-5 years to increase travel options and encourage higher vehicle occupancy. Particular areas of opportunity include ride hailing, car pooling and private minibuses and coaches providing either on-demand or fixed schedule services through third-party applications. In regional areas, the ability to earn a supplementary income and provide much needed local on-demand transport has the potential for widespread community benefit. This should be undertaken with a review of metropolitan bus contracts to ensure that these new players are not contractually precluded or otherwise disadvantaged from entering the market (ref. MAS).

1.3.2 **Growth area local buses.** Expand the local bus network coverage in growth areas and provide service enhancements over 0-15 years to support local trips and connection with other trunk services, such as SmartBus routes and local train stations, subject to transparent assessment to determine priorities. This would include new buses, better timetables and more services and help to ensure quality access to jobs and services including to major employment centres from growth areas (ref. LBS).

1.3.3 **SmartBus network.** Expand the SmartBus network and provide service enhancements over 0-15 years to support cross-town travel, subject to transparent assessment to determine priorities. This should include consideration of how the SmartBus network could complement or form part of the mass transit networks for major employment centres (see Recommendation 11.4.4) to provide a trunk access network supported by local bus networks. Key areas of priority are in the western suburbs and around the inner city (ref. SNE).

1.3.4 **Geelong/Werribee/Wyndham rail.** Deliver new stations with rail capacity expansion on the existing Regional Rail Link corridor in western Melbourne to support these high growth areas while maintaining travel times and relieving overcrowding on the Geelong line within 5-15 years. Further work is required to determine the scope and sequence of this rail upgrade (ref. WVW, GWR and GRE).

1.3.5 **Outer metropolitan arterial roads.** Roll out a program of upgrades to the arterial road network, focusing on congested roads in outer metropolitan areas, over 5-15 years. The first step is to identify priority locations and works, which could include widening and duplication of existing roads, grade separations, connections to motorways and provision of bus lanes to improve safety and local access for people and goods (ref. OMA).

1.3.6 **Melton rail electrification.** Extend the electrified rail network to Melton within 10-15 years to support the western growth corridor and improve services on the Ballarat line. This electrification is critical to meeting the significant projected patronage growth on the Melton line for access to the central city and requires the support of 10-car high-capacity metro trains (see Recommendation 10.5.2) to operate on this line (ref. MRE1).

1.3.7 **Wallan rail electrification.** Extend the electrified rail network to Wallan within the early part of 15-30 years to support the northern growth corridor and improve services on the Seymour line. This electrification is critical to meeting the significant projected patronage growth on this line for access to the central city and requires the support of the City Loop reconfiguration (see Recommendation 10.10.1) to provide capacity for the additional services (WRE1).

1.3.8 **Clyde rail extension.** Construct an extension of the Cranbourne rail line from Cranbourne to Clyde within 15-30 years to connect this designated growth precinct with the central city, including assessment of options to use alternative modes. This will provide better access to high growth areas in the southeast of Melbourne (ref. CRE).

1.3.9 **Wollert transport links.** Complete a feasibility study within 0-5 years for creating a high capacity transport link (rail or bus) connecting growth areas around Wollert to the rail network and on to central Melbourne. This link is likely to be required within 15-30 years and would provide a viable alternative to private vehicles for local trips and commuting to the central city from these high growth areas (ref. WRE2).

1.4 Make better use of local infrastructure in areas experiencing growth.

1.4.1 **Public space utilisation.** Activate and open up state government land and facilities for wider community use by undertaking an audit to identify underutilised assets, initially in areas of high growth, and reviewing and removing regulatory barriers to their use within 0-5 years. The findings of the audit should be published to show where opportunities for better use of government assets exist currently and where they are likely to be in future (ref. CSU).

1.4.2 **Community space shared use agreements.** Better support the sharing of facilities by standardising shared use agreements, and providing supporting tools and resources, for use in state facilities and by local government, service providers and community organisations within 0-5 years. As a first step, there should be a review of the effectiveness of existing agreements and barriers to their use (ref. CSS1).

1.4.3 **Relocatable community infrastructure.** Increase the provision of temporary or ‘pop up’ community infrastructure, such as relocatable buildings, over 0-10 years to respond to rapidly changing community needs. Temporary infrastructure is of particular use in areas of high population growth where permanent infrastructure cannot be provided in a timely way and after emergencies, such as bushfires, where existing infrastructure is destroyed (ref. RCI).

1.4.4 **Community space refurb/rationalisation.** Create an incentive fund with clear criteria to assist local government, service providers and community organisations to refurbish or rationalise community assets (such as kindergartens, sports facilities and parks) over 0-30 years to better meet the needs of the community, while ensuring financial sustainability. We expect a reasonable level of funding would be required as an incentive, with local governments and other organisations placing bids to government on the basis of demonstrating a significant gap, refurbishment requirements, resource constraints and efforts to divest surplus or ineffective assets (ref. CSR).

1.4.5 **Public libraries.** Provide additional support to local government for the delivery of 21st century municipal libraries (new or upgraded) over 0-30 years. Even a limited increase in state government funding would better recognise the cost of these facilities, which perform a crucial role in supporting lifelong learning and meeting multiple community needs. Opportunities for integrating municipal libraries on school sites should be considered where schools are well located (see Recommendation 1.4.6/2.3.3/5.3.1/9.3.3) (ref. LLH).

1.4.6 **Schools as community facilities.** Transform state schools into community facilities (for example, integrating kindergartens and long day care and sharing of sports facilities, community arts facilities and libraries) over 5-30 years. This would involve designing all new schools as community facilities and progressively transitioning existing schools during major scheduled upgrades. Consideration would need to be given to reforming funding, governance and planning arrangements for these facilities. Areas experiencing rapid growth and regional and rural communities that face challenges in providing and maintaining community assets would particularly benefit from integrating community facilities with schools (ref. SCF).

1.5 Improve the planning for high growth areas to ensure infrastructure is coordinated and delivered in a timely way.

1.5.1 **Government service/infrastructure planning.** Formalise an area-based, whole-of-government, integrated service and infrastructure planning and investment prioritisation process within 0-5 years to improve coordination and minimise siloed decision-making. Initially this would focus on mechanisms to make state government departments plan services and infrastructure better together. Once state government has become more integrated, it will be critical to include local and federal government in this process to enable more effective integrated land use and infrastructure planning (ref. SIP).

Funding recommendations

The delivery of the following major projects and policies is expected to involve significant costs or present opportunities to capture some of the value of urban planning decisions. If government chooses to adopt these recommendations, a range of funding mechanisms should be considered.

Recommendation	General government revenue	User charges	Beneficiary charges	Property development	Asset sales
1.1.1 Development in established areas			✓	✓	
1.1.2 Development in/around employment centres			✓	✓	
1.2.1 Fishermans Bend tram link	✓	✓	✓		
1.3.4 Geelong/Werribee/ Wyndham rail	✓	✓	✓	✓	
1.3.5 Outer metropolitan arterial roads	✓	✓	✓		
1.3.7 Wallan rail electrification	✓	✓	✓	✓	
1.4.4 Community space refurb/ rationalisation	✓	✓		✓	✓

✓ Potential funding mechanism

Funding recommendations – additional comments

Development in established areas and development in/around employment centres require planning scheme changes that are likely to increase the value of land in certain areas. To capture part of this value, government could levy beneficiary charges such as developer contributions.

Beneficiary charges should be considered for Fishermans Bend Tram link, Wallan rail electrification, and Geelong/Werribee/Wyndham rail if there is a substantial uplift in land values and business activity in the vicinity of the new projects. New beneficiary charges could include land betterment levies on commercial and/or residential property and developer contributions. Developer contributions could also be considered for outer metropolitan arterial roads.

Property development opportunities could be pursued for development in established areas, development in/around employment centres, Wallan rail electrification, Geelong/Werribee/Wyndham rail and community space refurb/rationalisation, for example, selling or leasing land or air rights surrounding new projects for commercial development. For development in established areas and development in/around employment centres, funding raised could be reinvested in those areas to meet infrastructure needs arising from intensification.

For community space refurb/rationalisation, some of the cost of providing refurbished or new community facilities could be reduced by local government, service providers and community organisations selling low-performing, costly or not fit-for-purpose community infrastructure. User charges could be used to recover from users some of the cost of the infrastructure, maintenance or operations for these facilities. User charges for using refurbished community facilities could be considered to help fund future development.

Things we considered

This draft strategy has been prepared prior to the release of the refreshed *Plan Melbourne* and recommendations of the Managing Residential Development Taskforce. In the final strategy, we will revisit all draft recommendations related to land use planning to see if any amendments need to be made in light of these publications, subject to timing. We anticipate that there will be even greater opportunities to align land use and infrastructure planning in future.

It is unlikely, however, that our basic position will change, that is that population growth should be directed to areas that are most able to support it with existing infrastructure or where there are clear benefits in terms of improving access to jobs and services. We believe that shaping Melbourne's growth to achieve improved social, economic and environmental outcomes is just as important as providing for it.

An option to manage the sequencing of greenfield development (ref. GFS) was considered, but there was limited evidence about what the potential impact would be on the cost of housing in greenfield growth areas should sequencing be more tightly managed. We therefore decided not recommend this option at this stage.

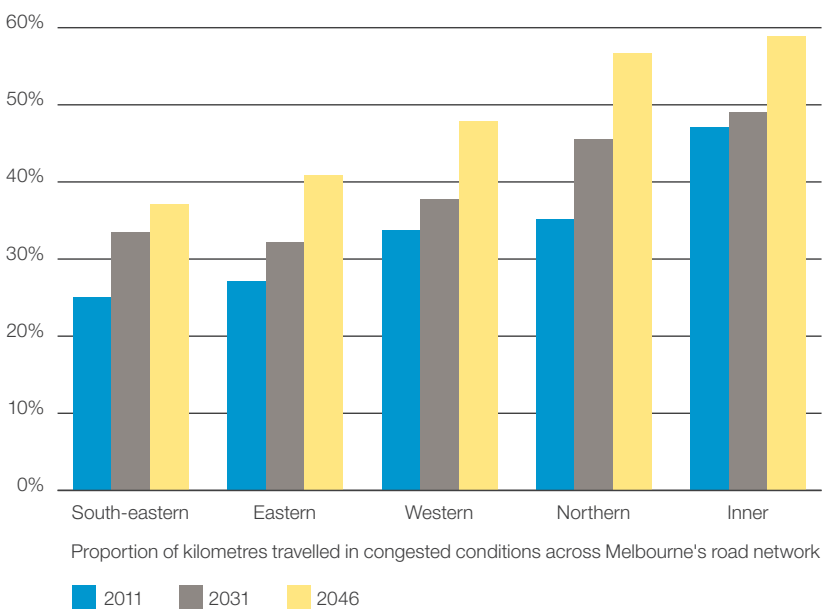
INSIGHT: Densification in established areas?

Victoria is growing rapidly, particularly in the inner suburbs and outer and peri-urban growth areas of Melbourne and in large regional cities, and it is essential that we prepare for that growth. But government also has choices about the shape of this growth and there is great opportunity to rebalance it. In particular, the established areas of Melbourne to the east and the south are well served by infrastructure and offer the opportunity to further intensify housing. Accommodating residential growth through this kind of infill development also has the potential to save infrastructure costs, with greenfield urban expansion estimated to cost between two to four times more than infill, depending on the capacity of existing infrastructure to support additional people.

Train lines to the south and east are not projected to reach capacity by 2046, with only a minimum level of further investment beyond current commitments (including the completion of Melbourne metro), whereas lines in the north and west will be under substantial pressure. There is a similar story on the road network, with modelling suggesting congestion levels in the south and east will take until 2046 to exceed levels northern Melbourne was already experiencing in 2011. Melbourne's social infrastructure, too, is more concentrated in the south and the east, with these areas offering substantially greater access to health services (see figures 1, 2 and 3).

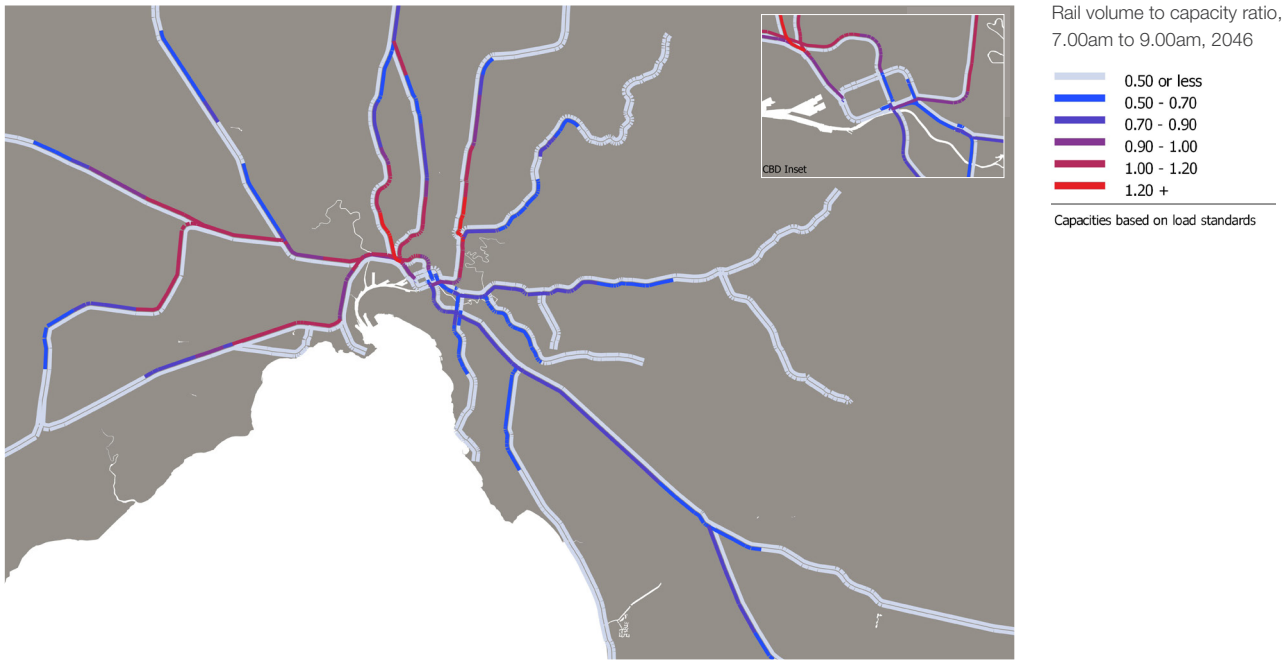
While it is not the role of an infrastructure strategy to determine the optimum planning settings across the state, the evidence on the advantages of urban consolidation from an infrastructure perspective are clear, and we strongly support efforts to achieve this through *Plan Melbourne*, including future refreshes over coming years.

Figure 1: By 2046, roads in Melbourne's south and east are projected to be less congested than other parts of the city. Roads in the north and west are projected to be more congested than inner Melbourne was in 2011.



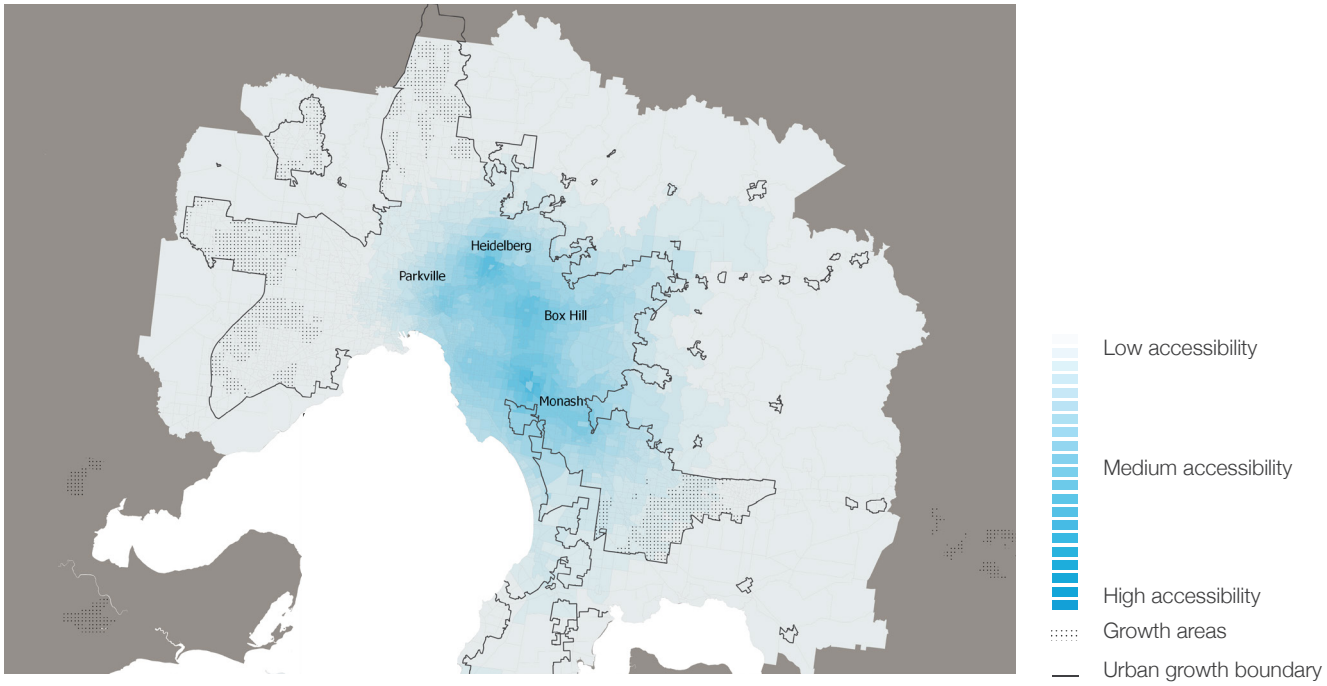
Source: KPMG/Arup/Jacobs, *Economic appraisal and demand modelling*, 2016

Figure 2: Even as far into the future as 2046, train lines in Melbourne's south and east are projected to have capacity during the morning peak period with only modest upgrades beyond current commitments (including Melbourne Metro).



Source: KPMG/Arup/Jacobs, *Economic appraisal and demand modelling*, 2016

Figure 3: In 2046, Melbourne's south and east are projected to have relatively good access to health services by car and public transport, particularly in contrast to the north and west.



Source: KPMG/Arup/Jacobs, *Economic appraisal and demand modelling*, 2016

Timeline

Target for completion of recommendation or implementation period of program

- Changing behaviour/better use
- New or expanded asset(s)
- Planning/prioritisation or further investigation of new or expanded asset(s)

Anticipated construction/operation period

Location

- Statewide
- Melbourne

Sector

- All sectors
- Transport
- Education and training
- Cultural, civic, sporting, recreation and tourism

Recommendation	0-5 years	5-10 years	10-15 years	15-30 years	Location, sector(s)
1.1 Increase the proportion of housing in areas that are well serviced with infrastructure.					
1.1.1 Development in established areas					
1.1.2 Development in/around employment centres					
1.2 Provide catalyst transport infrastructure to unlock large-scale brownfield sites close to inner city areas.					
1.2.1 Fishermans Bend tram link					
1.3 Provide transport infrastructure to support high growth greenfield areas.					
1.3.1 Innovative transport services					
1.3.2 Growth area local buses					
1.3.3 SmartBus network					
1.3.4 Geelong/Werribee/ Wyndham rail					
1.3.5 Outer metropolitan arterial roads					
1.3.6 Melton rail electrification					
1.3.7 Wallan rail electrification					
1.3.8 Clyde rail extension					
1.3.9 Wollert transport links					
1.4 Make better use of local infrastructure in areas experiencing growth.					
1.4.1 Public space utilisation					
1.4.2 Community space shared use agreements					
1.4.3 Relocatable community infrastructure					
1.4.4 Community space refurb/rationalisation					
1.4.5 Public libraries					
1.4.6 Schools as community facilities					
1.5 Improve the planning for high growth areas to ensure infrastructure is coordinated and delivered in a timely way.					
1.5.1 Government service/ infrastructure planning					

Need 2.

Address infrastructure challenges in areas with low or negative population growth

Meeting this need will help achieve objectives:

1. ● Prepare for population change
2. ● Foster healthy, safe and inclusive communities
3. ● Reduce disadvantage
4. ○
5. ○
6. ○
7. ○
8. ○
9. ○
10. ○

While there is much discussion about the pressures of population growth, less attention is given to parts of Victoria that are experiencing low growth or even decline. The distribution of population is a complex story. There is a need to think about the most efficient and equitable means of using infrastructure to support these communities.

Victoria's uneven distribution of population growth means that while some areas of Victoria are growing rapidly, others are in decline. The increasing concentration of population in regional centres and Melbourne and the concurrent decline of some small towns is not a new phenomenon, but it nonetheless brings its own challenges for local communities and for policy makers.

According to projections for the next 30 years, around a sixth of Victoria's Local Government Areas (LGAs), mostly situated in rural parts of western Victoria, are expected to experience negative growth (see figure 4). The sub-LGA story is again more complex, with some small towns in higher growth municipalities also experiencing decline.

Rural areas often experience a range of barriers that makes adequate infrastructure and service provision challenging. These include small ratepayer bases for councils, dispersed populations and large distances, relatively higher proportions of older people and people experiencing socio-economic disadvantage, poor internet and mobile coverage, and lack of competition. In some cases, low growth areas have underutilised assets that create a maintenance burden on state and local governments, yet these same assets can be central to community wellbeing.

In this context, there is a need to consider how the state can sustainably and equitably support communities that are experiencing low or negative population growth through infrastructure.

Recommendations

The recommendations to meet this need primarily focus on how to keep people in rural areas experiencing low growth connected to each other and to services, and how to make community infrastructure adaptable and resilient in the face of continued population decline and industry change.

These include actions where state government has a role in maintaining transport and community infrastructure, providing health, education and justice services, assisting local governments to consolidate and better use assets (which are often difficult to maintain in the context of declining revenues), and better matching demand with service provision.

A number of recommendations relate to the use of ICT for service delivery. However, the success of these initiatives relies on bridging the gap in the provision of telecommunications infrastructure across the state. The ability to access the internet will be important for meeting this critical need in rural communities and for enabling many of the service delivery recommendations in the draft strategy. This issue is discussed further under Need 12.

2.1 Maintain adequate transport connectivity in low growth areas.

2.1.1 **Regional highways.** Transparently identify and prioritise upgrades to regional highways that will increase productivity and safety for road users within 0-5 years. High-priority projects that will improve the level of service for commercial vehicles and improve safety and capacity for all road users could include highway duplications (for example on the Western Highway from Ararat to Stawell), road widenings with centre safety barriers (for example on the Goulburn Valley Highway), town bypasses (for example Shepparton and Traralgon), upgraded river crossings (for example at Swan Hill and Echuca), and upgrades to improve traffic flow such as overtaking lanes (ref. RHU).

2.1.2 **Regional coaches.** Provide new and expanded coach services between regional towns and cities over 0-10 years to provide greater opportunity for communities to access jobs and services in their regions. This requires the transparent identification of priority locations to improve connections with neighbouring centres and rail stations, which could include St Arnaud, Heathcote and Orbost. It would likely involve the provision of new coaches, routes and services (ref. RCU).

2.1.3 **On-demand transport services.** Redeploy local community transport and taxis (or similar) to provide on-demand services in regional and rural areas, including for people who experience mobility challenges, within 0-10 years. This initiative may require ongoing subsides and regulation changes and should build on the recent trials of such services in Yarrawonga and Warrnambool. The first steps will be to refine the proposed service changes based on the evaluation of these trials and to identify high-priority locations for implementation (ref. PTA).

2.1.4 **Regional local road maintenance.** Provide additional support for road maintenance and upgrades in regional Victoria over 5-30 years, following further scoping of works and monitoring of outcomes of currently committed investment programs. This program will provide extra support to assist local government to maintain and upgrade local regional roads to improve access to jobs and services and meet the needs of first and last-mile freight in regional areas. A transparent framework to distribute funds should be developed, which relies on local government knowledge of priorities given its role as asset owners and managers. The Commonwealth Roads to Recovery program has allocated approximately $370 million to Victorian local government roads from 2015-16 to 2017-18, in addition to funds already committed by state and local government. The longer-term planning should identify and prioritise the need for regional road investment across the state (ref. RRU).

2.2 Support access to services through technology in low growth areas.

2.2.1 **Police communications channels.** Create new communications channels between the public and the police and broader justice workforce by delivering a non-emergency call centre (using the Police Assistance Line 131 444 available in other states) and supportive technology platforms within 0-5 years. When planning and delivering this system, consider whether it could support an integrated service model with human services and health (ref. MPW).

2.2.2 **Education delivery through technology.** Expand and accelerate the provision of ICT infrastructure in schools (such as Wi-Fi and video conferencing), with a particular focus on regional and rural schools and schools in disadvantaged areas, over 0-10 years, to support new ways of learning and enable the sharing of resources and teachers across school sites. This includes ensuring students in smaller schools have access to a wide range of curriculum such as Science, Technology, Engineering and Maths (STEM) subjects and languages other than English (ref. SRS).

2.2.3 **Health care delivery through technology.** Expand the roll-out of video conferencing and remote monitoring for health care and enable technologies to 'plug in' and share information over 5-10 years to deliver real-time, cost-effective and convenient health services (ref. TEH).

2.3 Enable the better use and rationalisation of ageing, underutilised assets in low growth areas.

2.3.1 **Community space shared use agreements.** Better support the sharing of state facilities by local government, service providers and community organisations by standardising shared use agreements and providing supporting tools and resources within 0-5 years. As a first step, there should be a review of the effectiveness of existing agreements and barriers to their use (ref. CSS1).

2.3.2 **Community space refurb/rationalisation.** Create an incentive fund with clear criteria to assist local government, service providers and community organisations to refurbish or rationalise community assets (such as kindergartens, sports facilities and parks) over 0-30 years to better meet the needs of the community, while ensuring financial sustainability. We expect a reasonable level of funding would be required as an incentive, with local governments and other organisations placing bids to government on the basis of demonstrating a significant gap, refurbishment requirements, resource constraints and efforts to divest surplus or ineffective assets (ref. CSR).

2.3.3 **Schools as community facilities.** Transform state schools into community facilities (for example, integrating kindergartens and long day care and sharing of sports facilities, community arts facilities and libraries) over 5-30 years. This would involve designing all new schools as community facilities and progressively transitioning existing schools during major scheduled upgrades. Consideration would need to be given to reforming funding, governance and planning arrangements for these facilities. Areas experiencing rapid growth and regional and rural communities that face challenges in providing and maintaining community assets would particularly benefit from integrating community facilities with schools (ref. SCF).

2.4 Improve planning in low growth areas to respond to changing demands on services and infrastructure.

2.4.1 **Government service/infrastructure planning.** Formalise an area-based, whole-of-government, integrated service and infrastructure planning and investment prioritisation process within 0-5 years to improve coordination and minimise siloed decision-making. Initially this would focus on mechanisms to make state government departments plan services and infrastructure better together. Once state government has become more integrated, it will be critical to include local and federal government in this process to enable more effective integrated land use and infrastructure planning (ref. SIP).

Funding recommendations

The delivery of the following major projects is expected to involve significant costs. If government chooses to adopt these recommendations, a range of funding mechanisms should be considered.

Recommendation	General government revenue	User charges	Beneficiary charges	Property development	Asset sales
2.1.1 Regional highways	✓	✓			
2.3.2 Community space refurb/ rationalisation	✓	✓		✓	✓

✓ Potential funding mechanism

Funding recommendations – additional comments

User charges could contribute to funding for regional highway upgrades that have been identified and prioritised. Reforms to road user charges, particularly heavy vehicles, are needed so that charges are commensurate with the impact by those users. We recognise that this is underway through national reform processes. Also, Infrastructure Victoria is examining transport network pricing as part of our research program. We are considering how pricing regimes across all modes, including roads and public transport, could be used to change behaviour, manage demand and/or recover costs, and address equity concerns.

For community space refurb/rationalisation, we recommend establishing an incentive fund to assist local government, service providers and community organisations to refurbish or rationalise community assets. Some of the cost of providing refurbished or new community facilities could be reduced by local government, service providers and community organisations selling low-performing, costly or not fit-for-purpose community infrastructure. Property development opportunities could also be pursued by partnering with the private sector, such as selling or leasing facilities or floor space for commercial retail development (such as cafés, shops, etc.). User charges could be used to recover from users some of the cost of the infrastructure, maintenance or operations for these facilities. User charges for using refurbished community facilities could be considered to help fund future development.

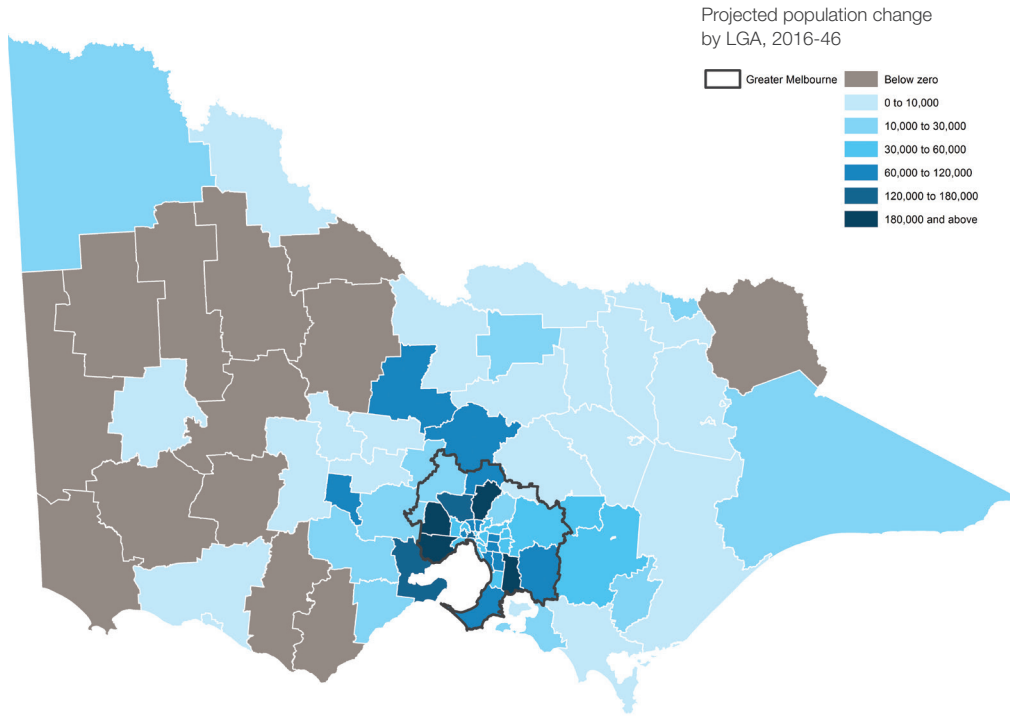
Things we considered

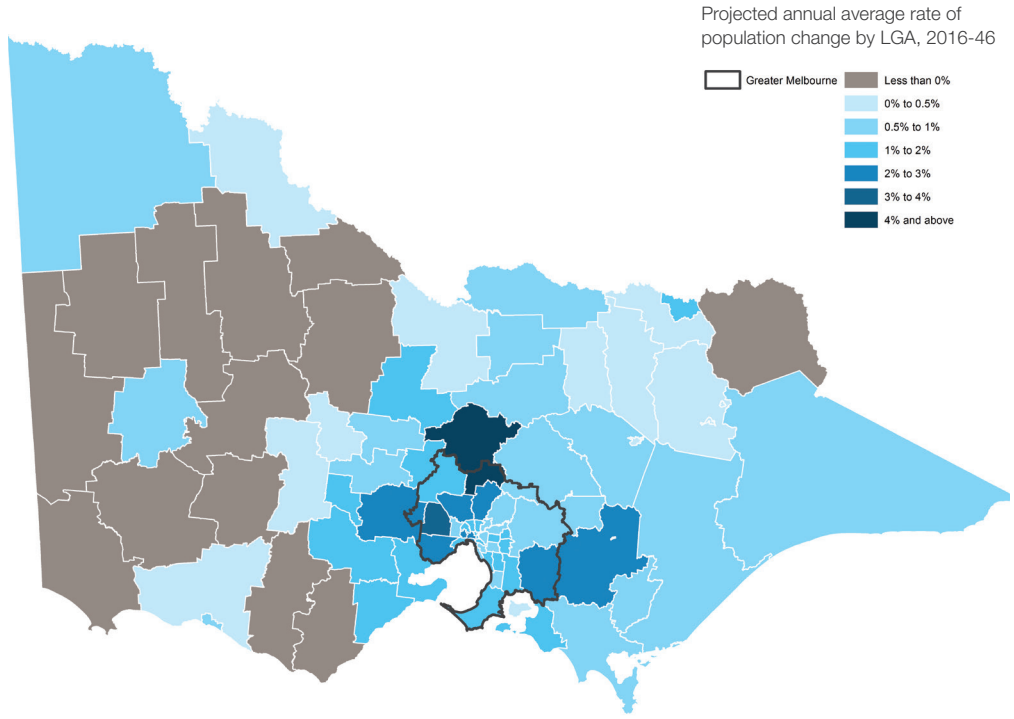
One of the main issues we considered in responding to this need was whether to recommend using infrastructure to grow local economies and create jobs and help reverse the trend of population decline in the process, for example, by expanding the reach of the rail network. In the end we concluded that infrastructure could make only a limited contribution to promoting growth in areas where fundamental economic change is underway, such as the effect of new technologies on the labour intensity of farming.

Instead, we focused on developing alternative delivery models and ongoing management and maintenance of existing infrastructure, with the aim of sustainably providing basic services.

At this stage, we have recommended that state government provides additional support for upgrades to local roads over the medium to long term, even though the Commonwealth Government recently announced extension of the Roads to Recovery program, as problems in these areas are unlikely to go away. We recognise the rural and regional councils often have vast areas of land and assets to manage, including thousands of kilometres of roads that are critical to local residents and to the movement of freight.

Figure 4: Population growth in Victoria over the next 30 years is not projected to be evenly distributed across the state.





Source: Victorian Department of Environment, Land, Water and Planning, *Victoria in future 2016,* and unpublished Victorian Government population projections, adapted by AECOM/PwC

Timeline

Target for completion of recommendation or implementation period of program

- Changing behaviour/better use
- New or expanded asset(s)
- Planning/prioritisation or further investigation of new or expanded asset(s)

Location

- Statewide
- Regional and rural Victoria

Sector

- All sectors
- Transport
- ICT
- Cultural, civic, sporting, recreation and tourism
- Education and training
- Health and human services
- Justice and emergency services

Recommendation	0-5 years	5-10 years	10-15 years	15-30 years	Location, sector(s)
2.1 Maintain adequate transport connectivity in low growth areas.					
2.1.1 Regional highways					
2.1.2 Regional coaches					
2.1.3 On-demand transport services					
2.1.4 Regional local road maintenance					
2.2 Support access to services through technology in low growth areas.					
2.2.1 Police communications channels					
2.2.2 Education delivery through technology					
2.2.3 Health care delivery through technology					
2.3 Enable the better use and rationalisation of ageing, underutilised assets in low growth areas.					
2.3.1 Community space shared use agreements					
2.3.2 Community space refurb/rationalisation					
2.3.3 Schools as community facilities					
2.4 Improve planning in low growth areas to respond to changing demands on services and infrastructure.					
2.4.1 Government service/ infrastructure planning					

Need 3.

Respond to increasing pressures on health infrastructure, particularly due to ageing

Meeting this need will help achieve objectives:

1. ● Prepare for population change
2. ● Foster healthy, safe and inclusive communities
3. ● Reduce disadvantage
4. ● Enable workforce participation
5. ● Lift productivity
6. ○
7. ○
8. ○
9. ○
10. ○

Over the coming decades, government expenditure on health is expected to increase significantly due to population growth and ageing, as well as the rise of chronic diseases. Innovative approaches, including leveraging technology, will be needed to respond to increasing pressures on hospitals and community health and aged care infrastructure, but technological advances could also bring new challenges.

Between 2016 and 2046, Victoria's overall population is projected to grow by 55 per cent and the number of over 85 year olds will grow by 220 per cent. Half of all Victorian adults already report having at least one chronic disease and one in five report having two or more. The burden of chronic diseases, including diabetes, heart disease, cancer, stroke, arthritis, osteoporosis and depression, is only expected to grow.

This demand will place increasing pressure on government health expenditure and infrastructure provision. The Productivity Commission estimates that state and territory spending on health will rise from 2.4 to 3.8 per cent of gross domestic product between 2011-12 and 2059-60 (or about $5 billion for Victoria in today's prices). Over the coming decades, Victoria will most likely require thousands of additional points of care and residential support packages spanning the health and aged care sectors. Moreover, existing health infrastructure is not always fit-for-purpose or in the right place, with limited accessibility to services in parts of Melbourne, particularly the north and west (see figure 3 in Need 1), and some regional and rural locations.

Looking into the future, technology will be a fundamental disruptor and enabler, transforming health service delivery and infrastructure provision. It has the potential to remove barriers of time and distance, increasing access to health care services and ultimately improving health outcomes and experiences. However, the emergence of new health technologies could also significantly increase the cost of services.

Recommendations

Delivering health services is likely to be one of the key budget pressure points for state governments over the medium to long term. While infrastructure represents only a small proportion of spending in this sector, it can enable more sustainable health service delivery models. The Commonwealth Government also plays a significant role in service delivery in this sector.

Technology will play a large part in meeting the challenges of rising health costs, but could also be a source of cost pressure. The recommendations below target investment in ICT infrastructure that both underpins improvements in quality and safety of existing health services and captures and shares health data for research and diagnosis to support health care delivery in the future.

The role of hospitals will change over time, based on disease prevalence and evolving clinical practice. The recommendations recognise, however, that investment will need to continue in health facilities, targeting areas that are not well serviced currently and providing generational upgrades to major facilities within the 30-year period.

3.1 Deliver better health care outcomes through ICT.

3.1.1 **Health care ICT systems.** Improve the capability of digital health systems over 0-10 years. This will involve implementing digital clinical systems across public hospitals and health services, establishing clinical and research information exchanges and connecting all elements with a secure communications network. This will enable patient information to be shared within and between health service providers and the research community, improving quality and safety, coordinating services and enabling developments in medical research and technology (ref. EEA).

3.1.2 **Health care delivery through technology.** Expand the roll-out of video conferencing and remote monitoring for health care and enable technologies to ‘plug in’ and share information over 5-10 years to deliver real-time, cost-effective and convenient health services (ref. TEH).

3.2 Take an integrated, system-based approach to health infrastructure provision.

3.2.1 **Health care partnerships.** Develop additional partnerships with community and private sector health care providers over 0-30 years to complement the public health system and promote the sharing of resources and facilities. The completion of the Victorian *Statewide system design, service and infrastructure plan* will provide greater visibility of where there are the opportunities for government and other parties to form partnerships in a more structured, longer-term manner (ref. HAP).

3.2.2 **Acute/sub-acute health facilities.** Target investment in public acute and sub-acute health facilities to areas experiencing high growth in the outer northern, western and southeastern metropolitan zones of Melbourne and central Victoria over 5-15 years. This will help address existing and forecast service gaps in these areas (ref. HIM).

3.2.3 **Integrated community health hubs.** Expand the provision of integrated, community-based health hubs over 5-30 years, in partnership with a mix of health providers and other human services and justice service providers. This will allow for a greater focus on primary and preventative health, reducing pressure on hospitals (ref. ICP).

3.2.4 **Major hospitals.** Respond to the aged condition of the Alfred, Royal Melbourne and Footscray hospitals, with a view to completing a major refurbishment or new facility construction of one or more of these hospitals within 10-15 years. This will be required to efficiently support the delivery of specialist and complex statewide health services and meet the needs of rapidly growing inner city populations (ref. THR).

3.3 Provide infrastructure to support mental health and alcohol and other drugs services.

3.3.1 **Forensic mental health facilities.** Provide new or expanded forensic mental health facilities (currently provided by the Thomas Embling Hospital) within 5-10 years. Detailed planning will be required to meet growing demand for these services (ref. NEF).

3.3.2 **Mental health/AOD facilities.** Expand the provision of infrastructure to support mental health and alcohol and other drug (AOD) rehabilitation services across emergency, acute, sub-acute, community and long-term care over 5-30 years. The first step is to define the strategic approach to service delivery and align infrastructure planning accordingly. Opportunities to co-locate with justice and human services should be also pursued (ref. MHA).

3.4 Enable the provision of aged care support facilities.

3.4.1 **Aged care facility approvals.** Enable more aged care facilities to be provided in established areas by reviewing and removing planning and regulatory barriers for private and community sector aged care developments within 0-5 years. This will allow more people to age in their current neighbourhoods (ref. UPA).

Funding recommendations

The delivery of the following major projects is expected to involve significant costs. If government chooses to adopt these recommendations, a range of funding mechanisms should be considered.

Recommendation	General government revenue	User charges	Beneficiary charges	Property development	Asset sales	Donations and bequests
3.1.1 Health care ICT systems	✓	✓				
3.2.2 Acute/sub-acute health facilities	✓			✓	✓	✓
3.2.3 Integrated community health hubs	✓			✓		✓
3.2.4 Major hospitals	✓			✓	✓	✓
3.3.2 Mental health/AOD facilities	✓					

✓ Potential funding mechanism

Funding recommendations – additional comments

General government revenue will continue to be a major source of funding for these major projects, but there are potential additional funding mechanisms.

Property development could be considered to help fund major new health facilities and refurbishments (through acute/sub-acute health facilities, major hospitals and integrated community health hubs). This could include commercially leasing parts of the premises within or around the health facilities. Opportunities could range from retail (such as cafés and shops) to providing space for private providers. Donations and bequests should also continue to be pursued; however, they will only ever make a small contribution to a project.

Additionally, any hospital sites that are no longer fit-for-purpose and surplus to government requirements should be sold, which can provide a one-off funding boost.

Opportunities for user charging could be examined for health care ICT systems, such as charging for access by private sector researchers.

Things we considered

We are aware that the Department of Health and Human Services is preparing a *Statewide system design, service and infrastructure plan*, which is due to be published in mid-2017. Rather than pre-empting this plan and going into fine detail about particular facilities, we focused on big picture issues. The recommendations do, however, call out specific geographic areas and types of facilities where there are known existing or future infrastructure gaps requiring attention.

In framing the recommendations, we were very cognisant of the fact that Victoria will not be able to afford to provide hospital beds or points of care at the same ratio per head of population than it has in the past. In addition to rolling out system efficiencies and new models of health care delivery, including providing services outside of the hospital environment when it is safe to do so, we see a place for clearer definition of the roles of different facilities and better targeting of resources.

We considered a number of preventative health options to reduce demands on the system (ref. HEP and PHC), but concluded that these were beyond the scope of a strategy about infrastructure.

INSIGHT: Technology and health?

Advances in health technologies have already had a transformative effect on the delivery of health care and the patient experience. The time spent in hospital following operations has dramatically reduced over recent decades and many services that used to be provided in hospitals are now delivered in alternative care settings, including homes. New devices are also allowing people to monitor their own health and wellbeing, with the potential for a much greater focus on preventative health.

Looking to the future, having the right ICT systems in place to support health care delivery and better information exchange will be critical for improving safety, adopting developments in medical practice, providing more equitable access to health care (particularly in areas not as well served with 'bricks and mortar' infrastructure), enhancing research and, ultimately, improving health outcomes.

Technological advances in health can, however, be a double-edged sword for governments. As more and more innovations hit the market, citizens' expectations can rise, sometimes beyond the capacity of governments to pay. This issue needs to be carefully managed, with investments targeted to maximise return.

Timeline

Target for completion of recommendation or implementation period of program

- Changing behaviour/better use
- New or expanded asset(s)
- Planning/prioritisation or further investigation of new or expanded asset(s)

Location

- Statewide
- Melbourne

Sector

- ICT
- Health and human services

Recommendation	0-5 years	5-10 years	10-15 years	15-30 years	Location, sector(s)
3.1 Deliver better health care outcomes through ICT.					
3.1.1 Health care ICT systems					
3.1.2 Health care delivery through technology					
3.2 Take an integrated, system-based approach to health infrastructure provision.					
3.2.1 Health care partnerships					
3.2.2 Acute/sub-acute health facilities					
3.2.3 Integrated community health hubs					
3.2.4 Major hospitals					
3.3 Provide infrastructure to support mental health and alcohol and other drugs services.					
3.3.1 Forensic mental health facilities					
3.3.2 Mental health/ AOD facilities					
3.4 Enable the provision of aged care support facilities.					
3.4.1 Aged care facility approvals					

Need 4.

Enable physical activity and participation

Meeting this need will help achieve objectives:

1. ○
2. ● Foster healthy, safe and inclusive communities
3. ○
4. ○
5. ● Lift productivity
6. ○
7. ● Promote sustainable production and consumption
8. ○
9. ○
10. ○

In addition to responding to pressures on the health system, infrastructure can help prevent them. Encouraging physical activity and participation in sport and recreation can play an important role in preventing chronic disease and promoting physical and mental wellbeing, as well as contributing to a more connected society.

Victoria prides itself on being the sporting capital of the world, yet it has seen a growth in physical inactivity and associated health problems. According to the Victorian Population Health Survey, only around 64 per cent of Victorian adults met the guidelines for sufficient physical activity in 2011-12, with the lowest rates in a number of middle and outer Melbourne LGAs, particularly in the west, northwest and southeast, as well as some regional and rural LGAs.

A particular challenge is the health and wellbeing of Victorian children. Some key Victorian Government indicators show that children are walking to school less and being driven more. In 2013, approximately half of all Victorian children aged 5 to 12 were always driven to school, and in 2014 only one in four children in school years 5, 8 and 11 met the recommended amount of physical activity on all days of the week, with children in rural areas more likely to meet guidelines than children in metropolitan areas.

Obesity and physical inactivity play a major role in the incidence of chronic disease in Victoria. Unaddressed, these risk factors will pose a significant drain on Victoria's health system over the next 30 years, along with the other costs associated with poorer productivity and wellbeing. In 2008, the total economic cost to Australia of physical inactivity was estimated to be $13.8 billion.

Infrastructure can enable both incidental and planned physical activity through the provision of walking and cycling networks and community sporting and recreational facilities. The built environment and community design can also play an important role, in part through proximity of housing to jobs and services and walking to public transport hubs.

Recommendations

Without adequate enabling infrastructure, low rates of physical activity and participation can become intractable. Other societal factors play a significant role as well.

The recommendations below focus on delivering cycling and walking networks for both recreation and transport, shaping the urban form of Victorian communities to encourage incidental exercise, and developing a more strategic investment approach for sport and recreational facilities.

In particular, we see great opportunity for Victoria to increase investment in walking and cycling infrastructure to better reflect its share as a transport mode (see figure 5). In addition to expected health benefits, including mental health benefits, such an investment would help reduce congestion and the negative environmental impacts of transport. For many years, successive governments have released maps of proposed cycling networks without any clear commitment to delivering these networks. It's time for a concerted effort.

While state government has a leadership role to play in meeting the challenges of physical inactivity, it will often need to partner with local government to achieve the best outcomes.

4.1 Increase walking and cycling for transport.

4.1.1 **Cycling end-of-trip facilities.** Increase the provision of end-of-trip bicycling facilities by reviewing and updating prescribed rates in the planning system (clause 52.34) within 0-5 years to better reflect current and projected demand across the state and particularly in high-demand areas such central Melbourne (ref. ALR).

4.1.2 **Cycling/walking data.** Improve walking and cycling data capture and analysis, including expanding the network of bike counters, within 0-5 years to support improved investment proposals and target opportunities for growth (ref. BWP1).

4.1.3 **Cycling corridors/walking improvements.** Finalise and roll out Victoria's Strategic Cycling Corridors and identified walking network improvements within 0-15 years, focusing on state government roads and land or other significant locations. An accelerated roll-out should include:

- expanding walking and cycling networks, including to address missing links (ref. BWP2)
- improving standards for existing walking and cycling networks, in particular the separation of walking and cycling paths and also from other road users (ref. BWP3)
- identifying and prioritising locations where grade-separated bicycle highways in the central city could facilitate safer and more direct access into and across central Melbourne (ref. BHT).

4.2 Promote more incidental and recreational physical activity in local communities.

4.2.1 **Cycling/walking in established areas.** Run three pilots to retrofit walking and cycling facilities in established suburbs in Melbourne with high levels of car dependence (such as Sunbury) within 0-5 years. Evaluation of these pilots would inform whether the initiative should be rolled out more broadly over the coming decades. A more extensive program could support the delivery of the '20-minute city' concept championed through *Plan Melbourne* and similar concepts in the Commonwealth Government's *Smart cities plan* (ref. AEA).

4.2.2 **Active lifestyle facilities.** Identify priority locations for, and roll out a program of, small-scale improvements to state government facilities to promote physical activity over 0-10 years, including bicycle and equipment lockers in train stations (ref. ALP).

4.2.3 **Green infrastructure.** Increase the amount and quality of green infrastructure in urban settings over 0-15 years to support a range of outcomes, including creating new spaces for planned and incidental exercise, improving biodiversity by increasing forested areas in urban settings and supporting water-sensitive design to mitigate flooding events. The first step is to produce a green infrastructure plan in partnership with local government (ref. UFF).

4.3 Develop a network of multi-purpose, well-maintained and fit-for-purpose sporting and recreation facilities.

4.3.1 **Major cultural/sporting infrastructure.** Develop a transparent decision-making framework to guide any future state government investment in major cultural and sporting infrastructure within 0-5 years. The criteria applied, and the supporting resources, should ensure that any future infrastructure investment will have a wider community benefit through the provision of new spaces for community sport and recreation use and not just for the benefit one or two main groups (ref. CSM).

4.3.2 **Community sport/recreation facilities.** Develop a stronger evidence base and more transparent decision-making processes for any future state government investment in community sport and recreation infrastructure within 0-5 years. This should include consideration of the condition and use of existing facilities, gaps in provision and demand forecasts, changing trends in participation and more integrated delivery models. The focus should be on enabling the development of facilities that meet the needs of communities across multiple LGAs. Opportunities for integrating community sports facilities on school sites should be considered where schools are well located (see Recommendation 1.4.6/2.3.3/5.3.1/9.3.3) (ref. SRF).

Funding recommendations

The delivery of the following major project is expected to involve significant costs. If government chooses to adopt this recommendation, a range of funding mechanisms should be considered.

Recommendation	General government revenue	User charges	Beneficiary charges	Property development	Asset sales
4.1.3 Cycling corridors/ walking improvements	✓		✓		

✓ Potential funding mechanism

Funding recommendations – additional comments

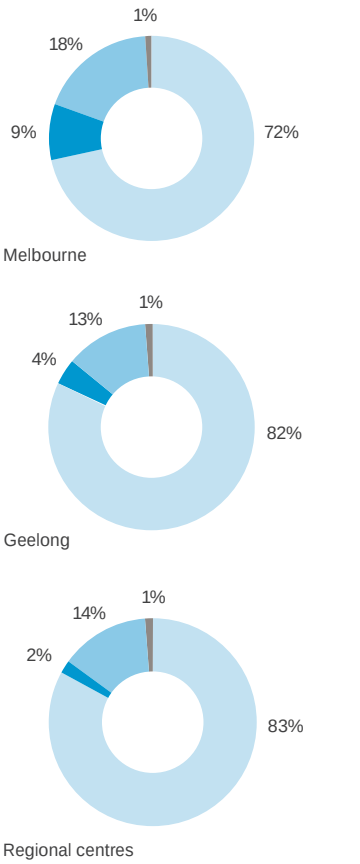
Beneficiary charges, such as developer contributions, could be considered for cycling corridors/walking improvements. This could be sourced from existing developer contributions such as the Growth Areas Infrastructure Contribution, developer contribution plans and open space contributions.

Things we considered

One of the biggest issues we considered in developing recommendations related to cycling and walking was whether to adopt government's work to identify Strategic Cycling Corridors and walking network improvements across Victoria or to separately identify areas or projects as priorities. Rather than opening up the case for further high-level network planning, we have put the focus on getting on with delivery.

We also considered whether funding through the Transport Accident Commissions' (TAC) Safer Cyclists and Pedestrians Fund was sufficient to cover necessary improvements to Victoria's cycling and walking infrastructure. Given international evidence showing excellent cost-benefit ratios for such projects, there was a clear case for recommending government accelerates the roll-out of Strategic Cycling Corridors and identified network improvements beyond priorities funded through the TAC.

Figure 5: In 2012-13, active transport had a higher share of weekday trips for all purposes than public transport in Victoria.



Source: Victorian Department of Economic Development, Jobs, Transport and Resources, *Victorian integrated survey of travel and activity (VISTA),* 2013

INSIGHT: Investment framework for major cultural and sporting infrastructure?

Government makes significant investments in major sports and cultural/arts facilities, including where these are not owned by the state. These facilities are usually very costly to build and maintain. They are highly valued, not just as places for elite sports and arts, but also as important attractors for tourists (such as the Winter Masterpieces series at the NGV), which can contribute significantly to the local, regional and even national economy.

During our consultation phase, stakeholders brought forward a range of proposals for new investments in major sports and cultural infrastructure, including expansions to Kardinia Park, the Melbourne Cricket Ground and the House of World Cultures. As all of these proposals came forward, it became clear to us that there will be a bigger challenge in determining where investment should occur and who should benefit.

We believe that a robust and transparent decision-making framework for these types of investments must be developed, adopted and monitored for compliance to ensure the benefits of these large investments are spread across the community, and not just for one group. Some principles that could be applied (drawing from the 2015 VAGO report on the Regional Growth Fund outcomes and learnings) include having:

- clear goals and outcomes that are to be achieved
- robust business cases, including options assessment
- documented evidence to support the investment
- evidence of partnerships and joint funder contributions, with details on expectations on returns from their investment
- clear processes to assess the business case, with high levels of integrity
- evaluation frameworks including measurable outcomes that are expected to be achieved from the investment.

With current and likely increased demands on government for community-level sports and cultural infrastructure, there is an opportunity to leverage these major investments for additional benefits. Investment decisions should demonstrate how the infrastructure will meet wider community needs, for example, supporting inner-city schools with limited access to sports grounds or community arts groups requiring performance spaces. This would involve new governance models in the early planning and design stages to ensure community groups are not designed out, and that the needs of elite groups can be managed alongside those of the wider community.

Timeline

Target for completion of recommendation or implementation period of program

- Changing behaviour/better use
- New or expanded asset(s)
- Planning/prioritisation or further investigation of new or expanded asset(s)

Location

- Statewide

Sector

- Transport
- Cultural, civic, sporting, recreation and tourism
- Science, agriculture and environment

Recommendation	0-5 years	5-10 years	10-15 years	15-30 years	Location, sector(s)
4.1 Increase walking and cycling for transport.					
4.1.1 Cycling end-of-trip facilities					
4.1.2 Cycling/walking data					
4.1.3 Cycling corridors/walking improvements					
4.2 Promote more incidental and recreational physical activity in local communities.					
4.2.1 Cycling/walking in established areas					
4.2.2 Active lifestyle facilities					
4.2.3 Green infrastructure					
4.3 Develop a network of multi-purpose, well-maintained and fit-for-purpose sporting and recreation facilities.					
4.3.1 Major cultural/sporting infrastructure					
4.3.2 Community sport/ recreation facilities					

Need 5.

Provide spaces where communities can come together

Meeting this need will help achieve objectives:

1. ● Prepare for population change
2. ● Foster healthy, safe and inclusive communities
3. ● Reduce disadvantage
4. ○
5. ○
6. ○
7. ○
8. ○
9. ○
10. ● Build resilience to shocks

Public spaces, and the community connections they enable, have been recognised as central to social cohesion. These spaces can include libraries, community centres, arts and culture venues, sport and recreation facilities, and parks. As Victoria's population grows and densification increases, access to public spaces is likely to come under pressure.

Public spaces, such as libraries, community centres, arts and culture venues, sport and recreation facilities, and parks, are shared resources that play a vital role in the social life of communities. They can promote social interaction and inclusion, as well as civic engagement and community empowerment. They can help create vibrant places, foster creativeness and support tourism. Open public spaces, particularly green spaces, provide opportunities for physical activity, while delivering environmental benefits such as supporting biodiversity and reducing the urban heat island effect. Successful public spaces are accessible to all.

The 2011-12 Victorian Population Health Survey showed that the majority of Victorians were able to access community services or resources, such as libraries, maternal and child health centres and neighbourhood centres, when needed (84.9 per cent), thought their local area as was a pleasant environment, taking into consideration features such as nice streets and open spaces (80.5 per cent), and considered they were part of an active community where people do things and get involved in local issues and activities (58.5 per cent). On all of these measures, regional and rural Victorians performed better than their metropolitan counterparts, though there was some variation at LGA level.

As Victoria's population grows and densification increases over the coming decades, access to existing public spaces will come under pressure and new infrastructure will be required in some areas. In others, reduced demand or financial challenges may make some facilities unsustainable, with many local councils already noting a backlog of maintenance for civic assets in their annual reporting.

Recommendations

People have told us about the importance of infrastructure in supporting social connections. There is a strongly held view that the provision, management and maintenance of these spaces could be improved. The recommendations below cover a range of interventions, including encouraging government to make more strategic and evidence-based investment decisions in facilities, getting the most out of existing and new assets, and rationalising old assets that are not going to meet future community needs.

At their core, the recommendations recognise that, with increasingly high costs of land, construction and maintenance and changing population profiles, more shared and less single use spaces will be required in the future. Sometimes, the complexity of joint planning and managing spaces makes it seem easier for all parties to just go it alone. However, investing in community spaces that meet the needs of just one group is unlikely to be viable in future.

The recommendations below are directed at state government, but local government and private and community sector organisations also play a crucial role in providing, maintaining and programming many of the spaces where communities come together. Ultimately, partnerships are required to deliver the shared spaces Victoria needs.

5.1 Make more strategic investments in cultural and sporting facilities.

5.1.1 **Major cultural/sporting infrastructure.** Develop a transparent decision-making framework to guide any future state government investment in major cultural and sporting infrastructure within 0-5 years. The criteria applied, and the supporting resources, should ensure that any future infrastructure investment will have a wider community benefit through the provision of new spaces for community sport and recreation use and not just for the benefit one or two main groups (ref. CSM).

5.1.2 **Community cultural facilities.** Develop a stronger evidence base and more transparent decision-making processes for any future state government investment in community cultural infrastructure within 0-5 years. This should include consideration of the condition and use of existing facilities, gaps in provision and demand forecasts, changing trends in participation and more integrated delivery models. Opportunities for integrating community cultural facilities on school sites should be considered where schools are well located (see Recommendation 1.4.6/2.3.3/5.3.1/9.3.3) (ref. CCF).

5.2 Better use existing public spaces.

5.2.1 **Public space utilisation.** Activate and open up state government land and facilities for wider community use by undertaking an audit to identify underutilised assets, initially in areas of high growth, and reviewing and removing regulatory barriers to their use within 0-5 years. The findings of the audit should be published to show where opportunities for better use of government assets exist currently and where they are likely to be in the future (ref. CSU).

5.2.2 **Community space shared use agreements.** Better support the sharing of state facilities by local government, service providers and community organisations by standardising shared use agreements and providing supporting tools and resources within 0-5 years. As a first step, there should be a review of the effectiveness of existing agreements and barriers to their use (ref. CSS1).

5.3 Turn schools into places for the whole community.

5.3.1 **Schools as community facilities.** Transform state schools into community facilities (for example, integrating kindergartens and long day care and sharing of sports facilities, community arts facilities and libraries) over 5-30 years. This would involve designing all new schools as community facilities and progressively transitioning existing schools during major scheduled upgrades. Consideration would need to be given to reforming funding, governance and planning arrangements for these facilities. Areas experiencing rapid growth and regional and rural communities that face challenges in providing and maintaining community assets would particularly benefit from integrating community facilities with schools (ref. SCF).

5.4 Upgrade existing facilities and build new ones that meet the needs of more than just one group, and respond to the changing needs of the community.

5.4.1 **Relocatable community infrastructure.** Increase the provision of temporary or 'pop up' community infrastructure, such as relocatable buildings, over 0-10 years, to respond to rapidly changing community needs. Temporary infrastructure is of particular use in areas of high population growth where permanent infrastructure cannot be provided in a timely way and after emergencies, such as bushfires, where existing infrastructure is destroyed (ref. RCI).

5.4.2 **Community space refurb/rationalisation.** Create an incentive fund with clear criteria to assist local government, service providers and community organisations to refurbish or rationalise community assets (such as kindergartens, sports facilities and parks) over 0-30 years to better meet the needs of the community, while ensuring financial sustainability. We expect a reasonable level of funding would be required as an incentive, with local governments and other organisations placing bids to government on the basis of demonstrating a significant gap, refurbishment requirements, resource constraints and efforts to divest surplus or ineffective assets (ref. CSR).

5.4.3 **Public libraries.** Provide additional support to local government for the delivery of 21st century municipal libraries (new or upgraded) over 0-30 years. Even a limited increase in state government funding would better recognise the cost of these facilities, which perform a crucial role in supporting lifelong learning and meeting multiple community needs. Opportunities for integrating municipal libraries on school sites should be considered where schools are well located (see Recommendation 1.4.6/2.3.3/5.3.1/9.3.3) (ref. LLH).

Funding recommendations

The delivery of the following major projects is expected to involve significant costs. If government chooses to adopt this recommendation, a range of funding mechanisms should be considered.

Recommendation	General government revenue	User charges	Beneficiary charges	Property development	Asset sales
5.4.2 Community space refurb/ rationalisation	✓	✓		✓	✓

✓ Potential funding mechanism

Funding recommendations – additional comments

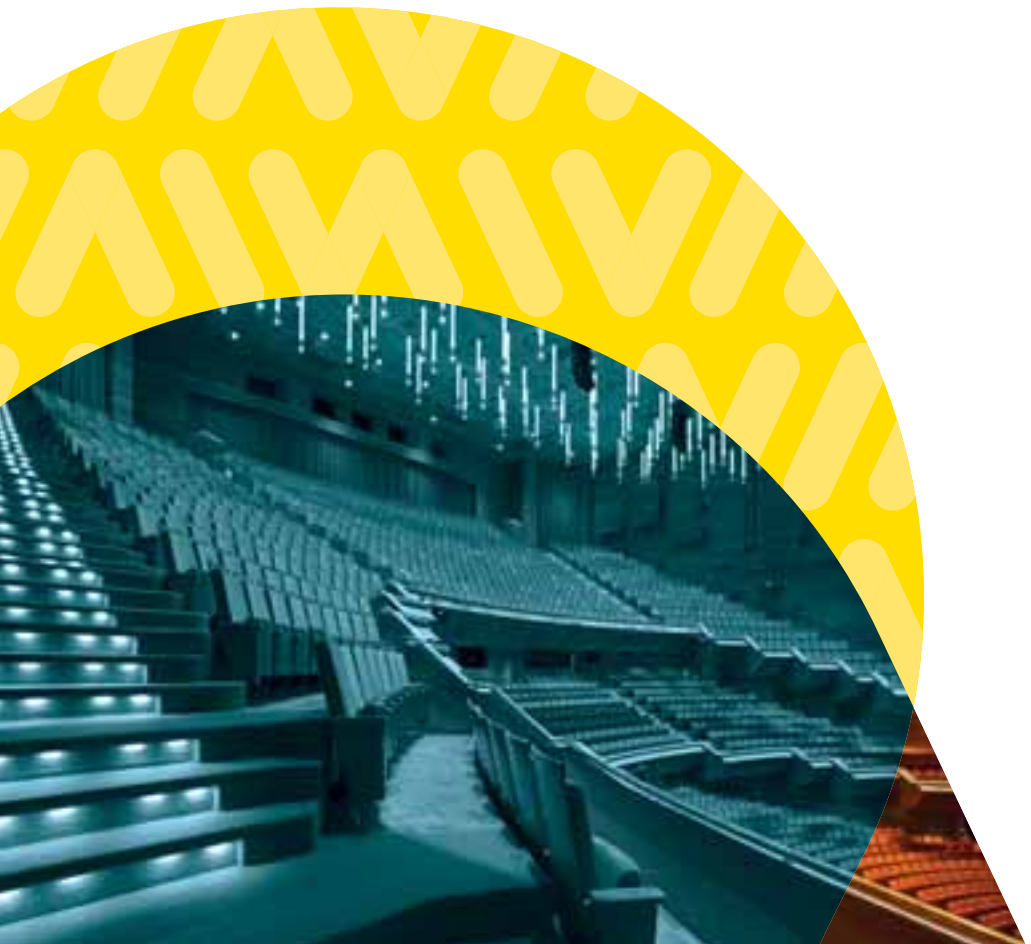
For community space refurb/rationalisation, we recommend establishing an incentive fund to assist local government, service providers and community organisations to refurbish or rationalise community assets. Some of the cost of providing refurbished or new community facilities could be reduced by local government, service providers and community organisations selling low-performing, costly or not fit-for-purpose community infrastructure. Property development opportunities could also be pursued by partnering with the private sector, such as selling or leasing facilities or floor space for commercial retail development (such as cafés, shops, etc.). User charges could be used to recover from users some of the cost of the infrastructure, maintenance or operations for these facilities. User charges for using refurbished community facilities could be considered to help fund future development.

Things we considered

Public spaces are often highly valued by communities and sometimes highly contested. When weighing up recommendations for this need, we considered whether the challenges associated with changing the way community spaces are designed and used or, in some cases, encouraging divestment of underutilised or unsustainable facilities, were too great to be overcome. Ultimately, however, the benefits of creating great spaces across the state where people can come together outweighed these concerns.

We also considered the role of technology and how it will impact on the way people come together. While we are already witnessing thriving virtual communities and connections, people will always need face-to-face human interaction. However, the spaces where people meet will change through the use of technology. For example, spaces will be increasingly networked and infrastructure such as Wi-Fi will enable their activation and better use. Over time, we will need to monitor how technology changes the way community spaces are used.

Through consultation we received proposals for a range of new facilities across the state. We also consulted on the option to improve arts precinct connectivity (ref. CPC). We ultimately decided not to call out one specific facility as a priority. Instead, there is a need for a robust and transparent investment criteria that considers how these investments can be leveraged for Victorian communities as a whole, rather than specific associations or groups.



INSIGHT: Refurbishing and rationalising community facilities?

Community facilities are an integral part of our lives. At some point today you are likely to have used a community facility. Perhaps you dropped your child off at childcare, went to the swimming pool before work or walked through a park at lunchtime. These assets are highly valued by communities and it is important that they remain usable and relevant for all Victorians.

Many of the state's community facilities are funded, operated and managed by Victorian local governments. A 2015 report by the local government sector found that 40 per cent of community infrastructure is currently not considered to be fit-for-purpose and requires significant investment in maintenance or renewal to bring it up to standard. In some cases the money spent on maintaining these assets could be better used, for example, to support a new facility. However, communities have strong ties to these spaces and are often resistant to them changing. It can be particularly difficult for councils to consolidate or modify these older assets. Ultimately, over the next 30 years many of these assets will continue to require ongoing maintenance and will not be able to meet changing community needs.

The recommendation for community space refurbishment and rationalisation proposes that the Victorian Government assists local government to transition these assets to become fit-for-purpose over the coming years through a fund tied to criteria. This would incentivise councils to ensure facilities are upgraded over time to meet current and future needs. This might involve older single-room kindergartens or stand-alone maternal and child health centres being consolidated into early years children services hubs, possibly even located on school sites. For sport and recreational assets, it could support upgrading an existing grass sports field to a synthetic turf field that would increase its use from 25 hours a week to 60 hours a week.

Given that this recommendation is about meeting demand and better use of assets, it could be targeted to areas experiencing strong population growth or rural areas with constrained resources in the first instance.

Timeline

Target for completion of recommendation or implementation period of program

- Changing behaviour/better use
- New or expanded asset(s)
- Planning/prioritisation or further investigation of new or expanded asset(s)

Location

- Statewide

Sector

- Cultural, civic, sporting, recreation and tourism
- Education and training

Recommendation	0-5 years	5-10 years	10-15 years	15-30 years	Location, sector(s)
5.1 Make more strategic investments in cultural and sporting facilities.					
5.1.1 Major cultural/sporting infrastructure					
5.1.2 Community cultural facilities					
5.2 Better use existing public spaces.					
5.2.1 Public space utilisation					
5.2.2 Community space shared use agreements					
5.3 Turn schools into places for the whole community.					
5.3.1 Schools as community facilities					
5.4 Upgrade existing facilities and build new ones that meet the needs of more than just one group, and respond to the changing needs of the community.					
5.4.1 Relocatable community infrastructure					
5.4.2 Community space refurb/rationalisation					
5.4.3 Public libraries					

Need 6.

Improve accessibility for people with mobility challenges

Meeting this need will help achieve objectives:

1. ● Prepare for population change
2. ● Foster healthy, safe and inclusive communities
3. ● Reduce disadvantage
4. ● Enable workforce participation
5. ● Lift productivity
6. ○
7. ○
8. ○
9. ○
10. ○

For people with mobility challenges due to age, disability or other causes, infrastructure can act as a powerful barrier to, or enabler for, accessing jobs and services and participating in community life. This need seeks to address legacy issues with existing infrastructure and explore new ways to improve accessibility.

Many Victorians experience mobility restrictions of varying degrees, which can inhibit social and economic participation. For some, this can be due to permanent or temporary disability, while for others it may be associated with a life stage, for example, older people or families with young children. Barriers to access to can also be experienced by associates of people with mobility restrictions, such as carers.

All new infrastructure should comply with the requirements of the *Commonwealth Disability Discrimination Act 1992*, but there is a long trail of expensive retrofitting associated with legacy infrastructure, including transport, buildings and places. In particular, much of the Victorian public transport network does not yet meet requirements, though improvements are being made. According to the ABS, a third of Victorians with a disability report having difficulty using public transport.

Evolving technology that brings services into people's homes has the potential to break down physical barriers. However, as cautioned in a recent Victorian Parliamentary inquiry, there are risks to becoming overly reliant on ICT solutions. Many people who are mobility challenged often already experience social isolation and while remote access may meet some people's service needs, it may also have the unintended consequence of negatively affecting wellbeing and participation.

Recommendations

The recommendations under this need primarily focus on making built infrastructure more accessible for people with mobility challenges. Infrastructure can be an enabler for inclusive communities, but in many cases it is currently a barrier.

In particular, the recommendations recognise that retrofitting infrastructure, particularly transport infrastructure, to meet requirements under the *Disability Discrimination Act 1992* (DDA) is critical. While government largely met its targets in 2012, it is unlikely that 2017 targets will be met.

There is also a need to get things right at the design stage. The objective of Universal Design is to create spaces and facilities that can cater for all abilities, especially for those with mobility challenges, such as disabled and older Victorians, without the need for adaption or special design. Designing for people of all abilities will not only increase the proportion of state government infrastructure that is accessible, but also demonstrate best-practice leadership to show how the built form can be improved across the board.

There is also clearly a role for alternative delivery models that complement these changes, such as point-to-point transport, which may become even more viable with the introduction of driverless vehicles.

6.1 Retrofit existing infrastructure and better design new infrastructure to improve accessibility.

6.1.1 **Universal Design.** Design all new and upgraded infrastructure with a view to ensuring access for people of all abilities through the adoption of Universal Design principles across the Victorian Government within 0-5 years. If they haven't already done so, departments and agencies should use these principles to prepare Universal Design guidelines appropriate to their function (ref. CIM).

6.1.2 **Transport interchanges.** Develop a transparent prioritisation process within 0-5 years for upgrading transport interchanges beyond current commitments. This framework should focus on identifying upgrades that facilitate faster and easier passenger transfers, including for people with mobility challenges, and support a multi-modal network. Priority interchanges for upgrade are expected to include those that serve the Monash, Dandenong and Latrobe National Employment Clusters (NECs) and the Box Hill and Broadmeadows Metropolitan Activity Centres (MACs) (ref. MII).

6.1.3 **Public transport accessibility.** Accelerate the program of retrofitting public transport assets to achieve DDA compliance within 0-5 years. The first steps will be to review the status of the transport network to prioritise low cost and high-benefit upgrades. Any revised action plan should consider prioritising access and integrating transport modes around key destinations and precincts, for example, the hospitals in Parkville (ref. PTV).

6.2 Increase transport choice to reduce barriers to mobility.

6.2.1 **On-demand transport services.** Redeploy local community transport and taxis (or similar) to provide on-demand services in regional and rural areas, including for people who experience mobility challenges, within 0-10 years. This initiative may require ongoing subsides and regulation changes and should build on the recent trials of such services in Yarrawonga and Warrnambool. The first steps will be to refine the proposed service changes based on the evaluation of these trials and to identify high-priority locations for implementation (ref. PTA).

6.2.2 **Driverless vehicles.** Introduce regulatory changes to enable the testing and deployment of driverless vehicles within 0-15 years to improve traffic flow, expand the range of available transport options and potentially improve the carrying capacity of roadways by allowing vehicles to safely travel closely together at the same speed. Further research and consultation will be required to develop a national approach to maximising the benefits of driverless vehicles (ref. ACT).

Funding recommendations

Funding advice is not provided for this need because our funding recommendations focus on major projects, policies or reforms with a significant cost to government.

Things we considered

One of the main issues we considered in formulating recommendations under this need was how far and fast state government can reasonably be expected to go in retrofitting existing infrastructure, in particular transport infrastructure. In the end, we recommended that this program should be accelerated, but we recognise that this is huge task for government and not something that can happen overnight. The challenges associated with retrofitting did, however, reinforce the need to get infrastructure right at the design stage, not just for current users but also for generations ahead.

We also considered an option to improve access to government transactions and information online (ref. AST) under this and other needs, but given the State Government's announcement of $81 million to develop Services Victoria, this was assumed to be base case. More broadly, we considered how much emphasis should be placed on technology and ICT as an alternative delivery channel for services under this need. Given the risks associated with compounding social isolation for people with mobility challenges, we believe such initiatives should complement, but not replace, improvements to buildings, infrastructure and the urban form.

Timeline

Target for completion of recommendation or implementation period of program

- Changing behaviour/better use
- New or expanded asset(s)
- Planning/prioritisation or further investigation of new or expanded asset(s)

Location

- Statewide

Sector

- All sectors
- Transport

Recommendation	0-5 years	5-10 years	10-15 years	15-30 years	Location, sector(s)
6.1 Retrofit existing infrastructure and better design new infrastructure to improve accessibility.					
6.1.1 Universal Design					
6.1.2 Transport interchanges					
6.1.3 Public transport accessibility					
6.2 Increase transport choice to reduce barriers to mobility.					
6.2.1 On-demand transport services					
6.2.2 Driverless vehicles					

Need 7.

Provide better access to housing for the most vulnerable Victorians

Meeting this need will help achieve objectives:

1. ● Prepare for population change
2. ● Foster healthy, safe and inclusive communities
3. ● Reduce disadvantage
4. ● Enable workforce participation
5. ○
6. ○
7. ○
8. ○
9. ○
10. ● Build resilience to shocks

Rising accommodation costs have become a significant pressure point for vulnerable Victorians. Access to affordable properties for low-income households, particularly in areas with good access to jobs and services, is limited and demand for affordable housing is growing at the same time that the relative supply of existing public housing stock is decreasing.

The supply of affordable housing for low-income households in Victoria, many of which experience other forms of disadvantage, is already extremely limited and is likely to worsen as the cost of housing in the private market rises and the population grows.

Currently, Victoria's dedicated affordable housing supply is made up of around 65,000 public and 18,500 community housing dwellings and 5,500 discounted rental market properties. In addition to this, rooming houses and caravan parks provide accommodation for an unconfirmed number of people, with estimates ranging from 4,000 to 12,000, depending on how information is collected. Government also provides financial support to low-income households renting in the private market whose income is not sufficient to cover their housing costs.

We have identified that between 75,000 and 100,000 vulnerable, low-income households are not having their housing requirements appropriately met. Most, but not all, of the demand is centred around metropolitan Melbourne. This figure has been determined by bringing together several data sources that often don't reflect the full need when considered in isolation, including that there are over 30,000 people on the Victorian waiting list for public housing and almost 120,000 households in receipt of Commonwealth Rent Assistance in Victoria experiencing housing stress, of which 50,000 are in the very lowest income bracket. Existing provisions are therefore not meeting current demand, let alone providing capacity for future population growth.

Compounding these demand pressures, Victoria's public housing asset base is deteriorating. In 2012, the Victorian Auditor-General found that around 10,000 properties are at or nearing obsolescence.

For vulnerable Victorians facing a range of physical, psychological, social and economic barriers, there is a clear need to provide better access to housing now and over the coming decades.

Recommendations

The provision of adequate shelter is a basic human need and is vital to the functioning of Victoria's society and economy. Many factors contribute to housing stress and homelessness and we know that these issues can't be solved with a housing response alone, but it is a critical part of the picture.

The recommendations below cover interventions that can be taken in the short to medium term to reduce the number of low-income households suffering housing stress. These include increasing financial assistance to households for private rentals, better using existing public housing stock and urban planning reforms. While these will go some way to meeting the need, Victoria still has a shortage of affordable rental properties that are accessible for low-income households and located in areas with good access to jobs and services (for example, see figure 6). Intervention from government is required to reduce housing stress through a significant increase in the supply of dedicated affordable housing. There is currently no overarching strategy in place to determine what interventions are most suited for meeting the varied needs of vulnerable Victorians, and determining this is a vital first step.

Meeting this need would involve significant investment over time. Infrastructure Victoria believes government should aim to significantly increase the supply of dedicated affordable housing over the next ten years. Further work is required to confirm the quantum of new affordable housing. This housing could be provided by the private sector through mechanisms activated by government or through direct government provision of new social housing. While it is unlikely government will ever fully meet demand, a concerted effort is required at the very least.

State government has a leadership role to play in meeting the housing challenge, but it will need to partner with the Commonwealth and local governments and the private and community housing sectors to achieve the best outcomes.

What do we mean by affordable housing?

Affordable housing and housing affordability are two deeply interrelated, but separate things. For this strategy, we have adopted the definition that affordable housing is that which reduces or eliminates housing stress for low-income and disadvantaged families and individuals to assist them with meeting other essential basic needs on a sustainable basis, while balancing the need for housing to be of a minimum appropriate standard and accessible to employment and services.

This definition has been taken from the *Commonwealth Council on Federal Financial Relations Affordable Housing Working Group: Issues paper January 2016*. Under this definition, affordable rental housing is provided at a subsidised rent to households through access and affordability requirements set by government. The broader issue of the affordability of housing for home owners and renters is not covered under the strategy as it does not relate to the 'most vulnerable' and applies to privately owned assets.

7.1 Support low-income households to access and remain in the private rental market.

7.1.1 **Housing rental assistance.** Extend current state government housing rental assistance and advocacy programs over 0-30 years to support people to stay in the private rental market and avoid the need for higher cost social housing support (ref. HRA).

7.2 Better use and allocate the existing stock of public housing.

7.2.1 **Public housing refurb/rationalisation.** Increase investment in the rationalisation and refurbishment of public housing assets over 0-30 years to replace or divest obsolete stock, make existing stock more fit-for-purpose and sustainable, and enable stock and title transfer to the community housing sector where appropriate. This should be coordinated with the provision of new stock to enable secure tenancies to be maintained for residents throughout the construction works (ref. SHA and SHS3).

7.3 Reform planning provisions to support the development of well-located, affordable housing.

7.3.1 **Affordable housing fast-track approvals.** Provide an alternative statutory approvals process for affordable housing developments by amending the planning system within 0-5 years. This will facilitate growth in the supply of affordable housing by ensuring projects are not subject to lengthy approvals processes, while still incorporating local community issues in the decision-making process (ref. SHS1).

7.3.2 **Affordable housing planning mechanisms.** Review planning provisions and implement inclusionary zoning and/or provide incentives to deliver affordable rental housing in areas that are appropriate for high and medium density housing and close to public transport and services within 0-5 years. Inclusionary zoning should be considered primarily for government land and in areas where government is undertaking actions that will provide uplift to private land values (such as improved public transport access or land rezoning). Other incentivised planning provisions, such as floor area ratio bonuses, are appropriate for development on privately owned land. This work should be done in consultation with local government, the private sector and community housing organisations (ref. SAH and AHR).

7.4 Increase access to affordable housing for vulnerable households.

7.4.1 **Affordable housing plan.** Develop a statewide plan for the provision of dedicated affordable housing within 0-5 years so that a more comprehensive, coordinated approach is taken, bringing efficiency and certainty to the significant expenditure required. The plan should be led by an overarching affordable housing strategy that would outline the full range of interventions to be implemented to address the unmet requirement, in addition to just the provision of affordable housing assets. The detail of the plan should then provide targets for a pipeline of different affordable housing assets over 30 years and identify government land provision and funding streams (ref. SCP).

7.4.2 **Crisis and transitional accommodation.** Significantly expand access to crisis and transitional accommodation (with support services) within 0-5 years. An increase in the supply of short-term housing responses is required for highly vulnerable Victorians, particularly people experiencing homelessness, households escaping family violence and young people (ref. CHP and TSA).

7.4.3 **Affordable rental housing provision.** Significantly increase the provision of social housing and support investment by the private sector in the provision of affordable private rental housing over 0-30 years. The current shortfall in affordable housing for low-income households requires government to think differently and recognise dedicated affordable housing as key infrastructure. Increasing the supply of social housing is relatively straightforward: more state government investment leads to more housing. Increasing the supply of affordable private rental housing is more complex because it requires subsidisation or planning mechanisms to be introduced by the State Government (as noted under Recommendation 7.3.2) or financial investment models to be adopted by the Commonwealth Government, given that state governments do not control the relevant financial levers (ref. SHE and ARH).

Funding recommendations

The delivery of the following major projects is expected to involve significant costs. If government chooses to adopt these recommendations, a range of funding mechanisms should be considered.

Recommendation	General government revenue	User charges	Beneficiary charges	Property development	Asset sales
7.2.1 Public housing refurb/ rationalisation	✓	✓		✓	✓
7.4.3 Affordable rental housing provision	✓	✓		✓	

✓ Potential funding mechanism

Funding recommendations – additional comments

General government revenue, through a mix of federal and state revenue, will continue to be a major source of funding for public housing refurb/rationalisation and affordable rental housing provision, but there are potential additional funding mechanisms.

Property development should be considered, including examining opportunities for selling or providing development rights to deliver a combination of social and private housing, with the new social housing stock returned to the state. Leasing parts of premises within or around the public and social housing should also be considered.

Charging rent is a form of user charge and should continue to be collected; however, we recognise that existing social housing rental payments (including subsidies received such as Commonwealth Rental Assistance payments) are only expected to partially contribute to the cost of social housing.

Additionally, selling obsolete stock when land is surplus or the existing housing asset is no longer fit-for-purpose will help provide a one-off funding boost.

Things we considered

In identifying infrastructure solutions for housing stress and homelessness, many factors must be considered. As this is an infrastructure strategy, we are not considering the depth and complexity of services needed to address homelessness. An infrastructure solution for homelessness relies on providing a pathway of services and assets from short-term crisis accommodation to long-term secure housing, requiring availability of suitable housing and support services at each stage.

We are also not attempting to address broader issues in the housing market affecting affordability, but any implementation of solutions to improve access to housing for vulnerable Victorians must consider the impact on the broader housing sector.

One of the biggest issues we considered in making these recommendations was how much government could reasonably afford to invest in housing for low-income Victorians immediately and over the next 30 years, balancing this priority against all the other needs identified in this strategy. See the next page for further insight into what we are considering to determine how many new affordable rental properties might be required.

We have also recommended several changes to planning regulations that may be viewed as imposing responsibility on other parts of the community that don't directly benefit from dedicated affordable housing provision. Our aim is to provide social housing in accessible locations mixed through the community that provide good access to services and jobs, rather than as concentrations of disadvantage or in locations on the fringe of metropolitan areas. We are cognisant of the potential impacts of these regulatory changes and have therefore recommended further work is done to strike a balance between competing requirements.

The National Disability Insurance Scheme commenced its roll out in Victoria in July 2016. Introduction of the scheme is likely to impact on the demand for social housing, but exactly how it will do so is unknown. This will need to be monitored closely as the scheme is implemented.

INSIGHT: How many new affordable properties?

Given that 75,000 to 100,000 at risk households do not have access to affordable housing, a substantial response is warranted. We have recommended that a significant investment is made over time, but have not specified the number of new properties required, as we are currently unable to nominate a figure with full confidence. So how could that number be determined?

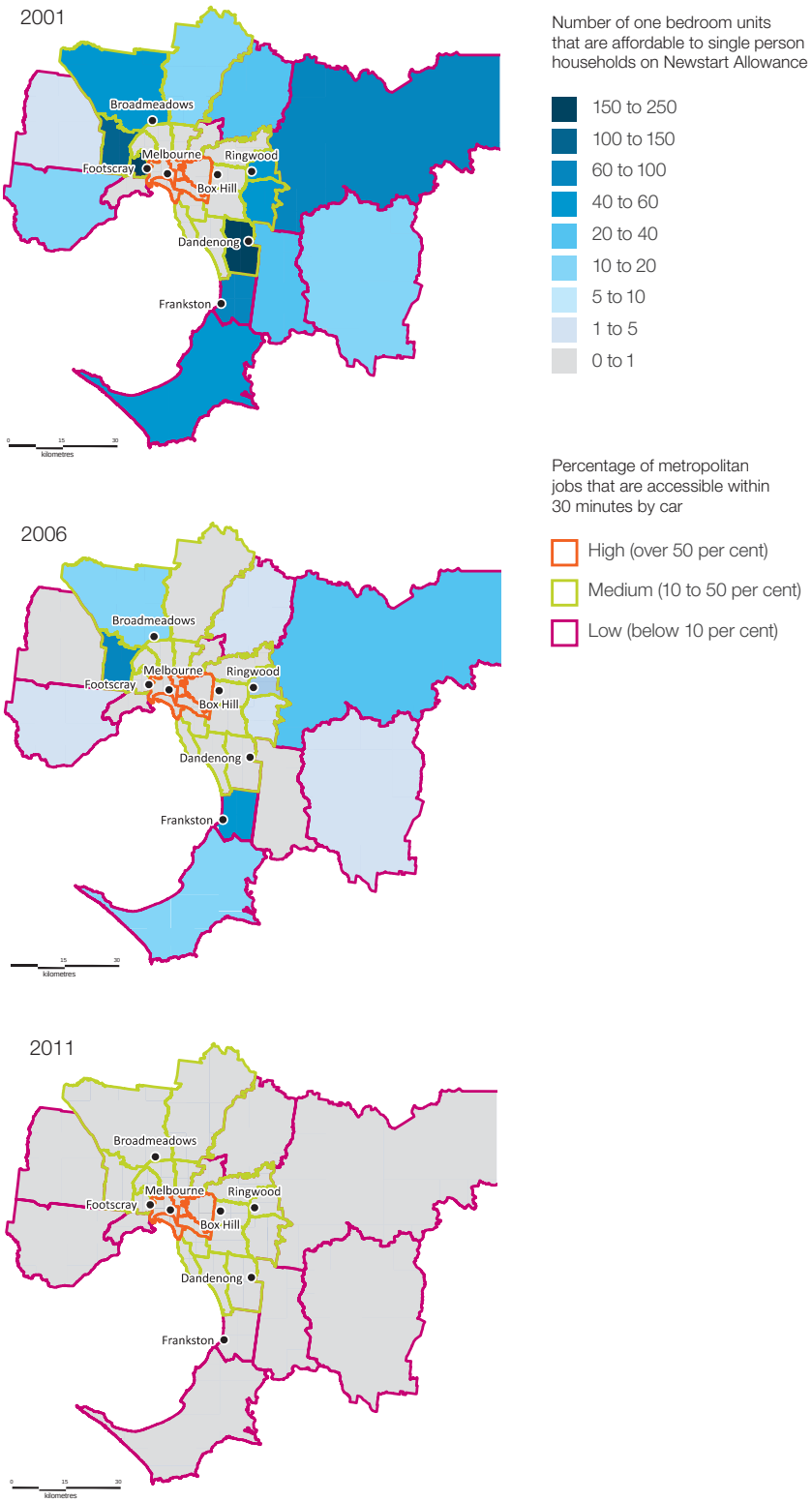
Different approaches can be taken to improve access to housing for low-income households, including government increasing the number of dedicated affordable housing properties and/or increasing subsidies for private rentals. Investing in social housing comes with greater certainty in terms of outcome, but is costly. In contrast, the subsidy approach is less certain as it relies on there being an adequate supply of suitable rental properties in locations with good access to jobs and services and, depending on the scale of implementation, could trigger an inflationary response in rental market rates. However, in many instances, the subsidy required to alleviate financial housing stress is much less costly than providing dedicated affordable rental properties and is a viable alternative.

Once the approach has been determined and the required quantum of new properties confirmed, the next step is to set the rate at which it is delivered, considering what additional stock could be economically provided by the construction industry, what level of funding could be provided by government and how quickly private sector funding could be attracted. To engage the private sector in affordable housing investment, mechanisms will need to be put in place by government and then be understood by the private sector before a strong response will be received. Therefore, in the 0 to 5 year period, we expect that much of the 'heavy lifting' in expanding affordable housing provision will need to be undertaken directly by government.

We also considered what is happening in like jurisdictions. It is hard to do a direct comparison with other states around Australia as both the needs and the response of each state vary. A shortage of affordable housing is a problem faced by all states. Western Australia set themselves a target of providing 20,000 affordable homes over the 10-year period from 2010 to 2020. In 2016, due to the success of supporting initiatives, government increased this target to 30,000 by 2020. However, the type of dwellings under Western Australia's program cover many different forms of affordable housing, including housing solutions for middle income earners. In New South Wales, two major initiatives have been launched targeting the provision of approximately 23,000 new or replacement social housing dwellings and over 3000 affordable homes in the next ten years.

With the best information that we have been able to obtain, we believe that the provision of approximately 30,000 new dedicated affordable dwellings could be an appropriate infrastructure response to contribute to the current unmet demand for access to housing. However, further investigation and the development of a comprehensive housing plan is required to confirm a target number of required dedicated affordable dwellings.

Figure 6: Since 2001, access to affordable housing for job seekers has reduced in Melbourne, particularly in areas with good access to employment.



Source: SGS Economics and Planning, *Revisiting the economics of inclusionary zoning*, 2015

Timeline

Target for completion of recommendation or implementation period of program

- Changing behaviour/better use
- New or expanded asset(s)
- Planning/prioritisation or further investigation of new or expanded asset(s)

Location

- Statewide

Sector

- Health and human services

Recommendation	0-5 years	5-10 years	10-15 years	15-30 years	Location, sector(s)
7.1 Support low-income households to access and remain in the private rental market.					
7.1.1 Housing rental assistance					
7.2 Better use and allocate the existing stock of public housing.					
7.2.1 Public housing refurb/ rationalisation					
7.3 Reform planning provisions to support the development of well-located, affordable housing.					
7.3.1 Affordable housing fast-track approvals					
7.3.2 Affordable housing planning mechanisms					
7.4 Increase access to affordable housing for vulnerable households.					
7.4.1 Affordable housing plan					
7.4.2 Crisis and transitional accommodation					
7.4.3 Affordable rental housing provision					

Need 8.

Address increasing demand on the justice system

Meeting this need will help achieve objectives:

1. ● Prepare for population change
2. ● Foster healthy, safe and inclusive communities
3. ● Reduce disadvantage
4. ○
5. ○
6. ○
7. ○
8. ○
9. ○
10. ○

Demands on the justice system are expected to grow, driven by population growth and demographic change, new forms of crime, community expectations, and policy and legislative settings. Increased demands for justice services flow across the system, from police to courts to prisons. There is a need to consider how infrastructure can meet demands on the system and support changing service delivery approaches.

Over the coming decades, demand on the justice system, parts of which are already nearing capacity, is expected to increase. In part, this will be due to population growth and demographic change. Technology will enable new forms of crime, as well as new methods for commissioning 'old' crimes. Policy and legislative settings related to incarceration, sentencing and parole will also be important drivers.

The justice system is highly interdependent, with increased demand in one part, be it police, courts or corrections, having a direct flow-on effect to other parts of the system (and affiliated human services). Over the past 15 years, Victoria's prison population has almost doubled and is currently around 6,500 people. Over the next 15 years, this number is expected to reach around 11,000.

In addition, the current supply of justice services does not always match the demand profile. There has been a tendency to rely upon fixed assets, some of which are in poor condition, not fit-for purpose and in sub-optimal locations. The 2014 *Victoria Police blue paper* noted that, to date, the geographic distribution of police operational staff has been matched to population size rather than crime rates or the need for police activity.

Over the next 30 years, given the likely demands on the system, improving justice services must not be constrained by the existing asset base or delivery approach. Better integration between justice, health and human services could promote a stronger focus on prevention and rehabilitation, while developments in technology could lead to greater efficiencies in the system and make connections between government and citizens more targeted.

Recommendations

Demand in the justice system is driven by a number of factors, but a crucial one is success (or otherwise) of the state's education, human services and health sectors, which are often conceived of separately. Actions under Needs 3, 7 and 9 could contribute indirectly to meeting this need, but these sectors also have a great opportunity to come together to jointly support people at risk and drive a more preventative approach to crime.

The recommendations below cover a range of initiatives aimed at managing and meeting demand on the justice system, but at their core is an integrated approach to the delivery of justice and human services (and, where possible, health services) enabled by infrastructure. This approach is one of the driving motivations for recommending a new network of police station supersites in Melbourne and regional cities, and more integrated court facilities. Co-location will be an important means to achieving greater service integration, but will not be the answer in all cases. ICT infrastructure that supports integrated service delivery will be critical.

The recommendations also highlight actions to leverage private sector innovation to reduce demand on the public justice system and to use existing assets more efficiently, including hearing Magistrates', County and Supreme Court trials in multi-purpose facilities.

8.1 Develop an integrated service model and deliver integrated facilities across justice and human services.

8.1.1 **Justice/human services integrated planning.** Develop joint service delivery plans for justice and human services within 0-5 years that identify opportunities for incrementally delivering integrated facilities and systems. This includes planning ahead when refurbishing existing facilities or delivering new facilities or ICT upgrades. The service delivery plans should include consideration of related family violence, mental health and alcohol and other drugs facilities (ref. JCS).

8.1.2 **Police station supersites.** Deliver a hub and spoke network of police station supersites in Melbourne and regional cities (without affecting stations in rural and remote areas) over 5-30 years. Priority should be given to areas where there is an oversupply of local stations (such as southeast Melbourne) or high demand for services (such the growth areas of Wyndham and Werribee). These should be delivered in most instances as integrated facilities for a greater focus on crime prevention (see Recommendation 8.1.1) (ref. PSS).

8.1.3 **Courts in high growth areas.** Deliver new or refurbished courts and tribunals into a number of high growth metropolitan areas such as Melton, and regional centres such as Geelong and Bendigo, over 5-30 years. These should be delivered in most instances as integrated facilities, similar to the current justice precinct pilots in Werribee and Wyndham (see Recommendation 8.1.1) (ref. JDG).

8.2 Build a more technologically supported and mobile police and justice workforce.

8.2.1 **Police communications channels.** Create new communications channels between the public and the police and broader justice workforce by delivering a non-emergency call centre (using the Police Assistance Line 131 444 available in other states) and supportive technology platforms within 0-5 years. When planning and delivering this system, consider whether it could support an integrated service model with human services and health (ref. MPW).

8.2.2 **Dispute resolution technology.** Review and remove barriers to the introduction of technology by the private sector that facilitates dispute resolution over 0-5 years, including by amending court procedures and professional regulations. This is aimed at improving access to justice and enabling case load to be diverted from courts, in particular the Magistrates' Court (ref. JSD).

8.2.3 **Justice case management ICT system.** Develop a justice case management ICT system that builds on work occurring for courts and aims to create one view of the client across the criminal justice system over 0-10 years. This should be designed and delivered with consideration of how to link with human services and health (ref. CSC).

8.3 Meet demand for better access to justice services with new and refurbished assets.

8.3.1 **Courts maintenance.** Address a backlog in court maintenance for high-demand courts over 0-15 years to enable safer and more accessible environments and maximise the capacity of existing courts and tribunals (ref. CMD).

8.3.2 **Courts in Melbourne's CBD.** Address growing demand pressures on courts in the CBD legal precinct by delivering a program of refurbishment within 15-30 years that enables court buildings in the precinct to be used as multi-jurisdictional facilities that can hold all Magistrates', County and Supreme Court trials (ref. JLP).

Funding recommendations

The delivery of the following major projects is expected to involve significant costs. If government chooses to adopt these recommendations, a range of funding mechanisms should be considered.

Recommendation	General government revenue	User charges	Beneficiary charges	Property development	Asset sales
8.1.2 Police station supersites	✓			✓	✓
8.1.3 Courts in high growth areas	✓			✓	✓

✓ Potential funding mechanism

Funding recommendations – additional comments

General government revenue will continue to be a major source of funding for police station supersites and courts in high growth areas, but there are potential additional funding mechanisms.

Property development could be considered when developing new police supersites and new or refurbished courts and tribunals, for example, commercially leasing parts of premises within or around the public infrastructure, such as cafés, shops or complementary non-government services and businesses. Property development has previously been used for court facilities, such as the Victorian County Court project.

Additionally, any police and court sites that are no longer fit-for-purpose and are surplus to government requirements should be sold, which can provide a one-off funding boost.

Things we considered

Consistent with our principles, Infrastructure Victoria is interested in opportunities to manage demand for infrastructure. Previously, we put forward an option on justice diversionary policies and programs as an important demand management measure and this was supported during consultation, particularly by the metropolitan citizen jury (ref. JDP). In the end, we considered this to be out of scope for an infrastructure strategy. We have, nonetheless, emphasised the importance of prevention through the recommendation for more integrated justice and human services planning.

We also considered whether additional prison capacity would be required over the next 30 years. While we expect there will be a need to address capacity issues in women's prisons over the next five to ten years, the State Government's 2015 announcement of $66 million to support additional beds in women's prisons means this capacity issue has been addressed in part for the next five years. Recent investment to expand capacity in men's prisons means there is unlikely to be unmet need in the short term. We will continue to monitor these numbers and reconsider these figures in the next iteration of the strategy.

In any event, we believe that reform to the way the justice and human services sectors deliver services should drive a preventative justice agenda to avoid, where possible, the need for more prisons. We also note that government policy and legislative choices contribute significantly to prison demand and this changes from year to year.

INSIGHT: Integrated justice and human services facilities?

In future, we think that justice service delivery should be integrated more closely with human services and health, to drive a greater focus on prevention. Bringing these services together is a complex process involving many players and considerations. This effort goes beyond government and into community organisations that play a key role in delivering human services. There have already been some steps towards the integration of planning and delivery of justice and human services across Victoria and we recommend this should go even further, though we haven't sought to prescribe a particular model.

From an infrastructure perspective, it is critical that this joint planning happens so that government doesn't miss opportunities to co-locate facilities or integrate ICT systems. Planning for integrated facilities must take into consideration the different needs of communities and cohorts. This is not about infrastructure leading more integrated services delivery. It is about infrastructure enabling more integrated service delivery in a timely manner.

There are already some good examples of existing or planned facilities that enable integrated service delivery. The Neighbourhood Justice Centre in Collingwood facilitates access to multiple services including courts, correctional services, counsellors, drug and alcohol and mental health clinicians. The proposed integrated justice precinct in East Werribee presents an opportunity for this integrated approach to provide a 'one-stop-shop'. The 2014 *Victoria Police blue paper* argued that police station supersites would 'help Victoria Police to work more effectively with other government agency partners to prevent crime, and importantly to reduce the underlying causes and direct drivers of crime in society.' The Victorian Government's response to the Royal Commission into Family Violence has led to work beginning on the delivery of Safety and Support Hubs, which seek to provide integrated services.

Timeline

Target for completion of recommendation or implementation period of program

- Changing behaviour/better use
- New or expanded asset(s)
- Planning/prioritisation or further investigation of new or expanded asset(s)

Location

- Statewide
- Melbourne

Sector

- ICT
- Health and human services
- Justice and emergency services

Recommendation	0-5 years	5-10 years	10-15 years	15-30 years	Location, sector(s)
8.1 Develop an integrated service model and deliver integrated facilities across justice and human services.					
8.1.1 Justice/human services integrated planning					
8.1.2 Police station supersites					
8.1.3 Courts in high growth areas					
8.2 Build a more technologically supported and mobile police and justice workforce.					
8.2.1 Police communications channels					
8.2.2 Dispute resolution technology					
8.2.3 Justice case management ICT system					
8.3 Meet demand for better access to justice services with new and refurbished assets.					
8.3.1 Courts maintenance					
8.3.2 Courts in Melbourne's CBD					

Need 9.

Provide access to high-quality education infrastructure to support lifelong learning

Meeting this need will help achieve objectives:

1. ● Prepare for population change
2. ○
3. ● Reduce disadvantage
4. ● Enable workforce participation
5. ● Lift productivity
6. ● Drive Victoria's changing, globally integrated economy
7. ○
8. ○
9. ○
10. ● Build resilience to shocks

Our economy and society are changing so rapidly that education is paramount to ensuring Victoria's global competitiveness and enabling workforce participation. There is a need for education infrastructure to provide opportunities for people across all phases of their lives, as well as be responsive and adaptable to rapid change.

Access to educational opportunities across all life stages has the capacity to create more equitable, prosperous societies, contributing to increased wellbeing, workforce participation and productivity. International education is also now Victoria's largest export, reflecting structural shifts in the economy towards service and knowledge-based industries.

Participation in education is increasing and more Victorians are undertaking education for longer, but there are still gaps. The majority of Victorian students (around 85 per cent) progress through to the completion of year 12, but many are still leaving school early. An increasing proportion of the population are undertaking higher education and vocational education and training, but there is some evidence of a disparity between the courses being studied and likely industry requirements.

There are major shifts underway as digital technology is increasingly incorporated into teaching methods; however, there will be continued demand for 'bricks and mortar' classrooms. One of the biggest challenges in providing education infrastructure is balancing strong and growing demand in some areas and oversupply in others, particularly in the context of a complex provider landscape crossing the public, private and non-profit sectors. Maintenance of the large stock of public education assets presents another ongoing challenge.

Recommendations

Learning can happen in a range of settings, but schools are likely to be central to delivering education. There is an opportunity to get more out of school infrastructure over the coming decades.

We have assumed there will be an ongoing increase in the supply of schools to meet demand over the next 30 years. Rather than focus on the increasing business-as-usual activities, the recommendations below cover a range of initiatives to plan and use schools differently.

The first step is ensuring that the capacity of existing schools is being fully utilised. This involves planning for schools at a network level to avoid new schools being built when there is excess capacity nearby, while maintaining parent/student choice and leveraging technology to enable more sharing of teachers and resources across school sites. The second step involves improving investment decisions in school infrastructure, drawing on the strong evidence base that already exists. This relies on greater transparency around priorities and longer lead times for new and upgraded schools. The third and most transformative step requires the reconceptualisation of schools as places that are shared by the community and as sites for lifelong learning.

Complementing these initiatives are recommendations about opening up other facilities as shared, digitally enabled spaces for learning, including government-owned TAFEs and municipal libraries.

9.1 Improve network planning and demand management for schools.

9.1.1 **School network planning.** Improve demand management for schools and better use existing schools before new adjacent schools are approved for funding within 0-5 years. This would require a review of existing network planning mechanisms with a view to improving perceptions and/or addressing the causal factors of why some schools are considered less desirable. This would also consider mechanisms for a network of schools to work together to lift the performance of the entire network, such as a hub and spoke approach, with a high-performing lead school assisting other schools, as well as sharing of school facilities, resources and teachers (ref. SOO).

9.2 Enable digital learning in schools.

9.2.1 **Education delivery through technology.** Expand and accelerate the provision of ICT infrastructure in schools (such as Wi-Fi and video conferencing), with a particular focus on regional and rural schools and schools in disadvantaged areas, over 0-10 years, to support new ways of learning and enable the sharing of resources and teachers across school sites. This includes ensuring students in smaller schools have access to a wide range of curriculum such as Science, Technology, Engineering and Maths (STEM) subjects and languages other than English (ref. SRS).

9.3 Improve delivery of new and upgraded kindergarten and school infrastructure.

9.3.1 **School investment pipeline.** Publish, on an annual basis, 5-year investment priorities for new and upgraded government schools, alongside the planning data that shows demonstrated need, within 0-5 years. This transparency will assist communities to understand how priorities are made, provide greater certainty and lead times to enable co-investment to occur and reduce the need for community advocacy (ref. SIF).

9.3.2 **School maintenance.** Pilot a new regional maintenance model for schools within 0-5 years. This should demonstrate whether or not economies of scale could be derived at a regional level and tighter control over costs maintained (ref. SRM1).

9.3.3 **Schools as community facilities.** Transform state schools into community facilities (for example, integrating kindergartens and long day care and sharing of sports facilities, community arts facilities and libraries) over 5-30 years. This would involve designing all new schools as community facilities and progressively transitioning existing schools during major scheduled upgrades. Consideration would need to be given to reforming funding, governance and planning arrangements for these facilities. Areas experiencing rapid growth and regional and rural communities that face challenges in providing and maintaining community assets would particularly benefit from integrating community facilities with schools (ref. SCF).

9.4 Support the development of spaces for lifelong learning.

9.4.1 **Tertiary education/VET in schools.** Investigate and work to resolve any regulatory or workforce barriers that prevent tertiary education courses being offered on school sites, particularly in rural and regional areas where access to vocational training is a significant issue, within 0-5 years (ref. STE).

9.4.2 **Community use of TAFE assets.** Conduct an audit of TAFE assets to understand opportunities for shared community use of facilities within 0-5 years. Sharing these facilities would assist in maintaining the longer-term viability of these assets (ref. TAF).

9.4.3 **Public libraries.** Provide additional support to local government for the delivery of 21st century municipal libraries (new or upgraded) over 0-30 years. Even a limited increase in state government funding would better recognise the cost of these facilities, which perform a crucial role in supporting lifelong learning and meeting multiple community needs. Opportunities for integrating municipal libraries on school sites should be considered where schools are well located (see Recommendation 1.4.6/2.3.3/5.3.1/9.3.3) (ref. LLH).

Funding recommendations

Funding advice is not provided for this need because our funding recommendations focus on major projects, policies or reforms with a significant cost to government.

Things we considered

One of the most complex aspects we considered when formulating a response to this need was that education services, and the infrastructure that supports them, are provided by many different players. Childcare centres and kindergartens are provided by local government, community organisations and the private sector. Over a third of Victorian school students attend non-government schools and the provider landscape for vocational education and tertiary studies is even more complex. The Commonwealth has a role in funding across all education sectors.

For simplicity, we focused our recommendations on things state government can control or influence, but many of the initiatives could see flow-on benefits for other providers. Longer term, more transparent planning of government schools could, for example, facilitate better planning by independent and Catholic schools. It could also result in more opportunities for partners like local government to deliver shared community facilities, such as kindergartens and sports and arts facilities on school sites.

We also considered the role of technology in transforming access to education, particularly in rural areas where some schools can only offer limited curriculum, although we note that face-to-face teaching, learning and interactions will always be required.

While early childhood education is certainly key to lifelong learning, there is a limited role for the state in relation to infrastructure provision, therefore it has not been a major focus as part of this need. However, we have considered how these centres can be co-located with schools and other community facilities.

INSIGHT: Schools as community facilities?

Throughout the strategy we have highlighted the opportunities where we can be make better use of the state's existing infrastructure. Schools are an essential part of Victorian communities, but often they are only used from 8.00am to 4.00pm, Monday to Friday. Outside of these hours, many of the buildings and grounds sit idle. Using schools as community facilities would be a significant reform and we believe it would contribute to Needs 1, 2, 5 and 9.

This reform would change state government's role to become a genuine co-investor with local government and others in the delivery of community facilities, by allowing councils and other partners to leverage the state's investment in land and schools. The preferred use of school facilities would be led by service planning and be tailored to each community's needs. It could involve using school halls as competitive sports courts on weekends or co-locating early childhood education facilities on school grounds. The State Government has recently announced $50 million for the new Shared Facilities Fund to help more schools become thriving community hubs. Our recommendation builds on this work by mandating this approach to give certainty to potential funding partners that this will be the way schools will be delivered, managed and upgraded in the future.

State and local government will need to establish a much more robust partnership as councils will have an increased role in the planning for new schools and upgrades to existing school facilities. There are already some great examples of state and local government jointly planning for shared school assets for broader community benefit. In Bendigo, the former Sandhurst Prison was recently transformed into a major community cultural facility called the Ulumbarra Theatre, largely at the initiative of the Bendigo Senior Secondary College, which took over the site of the former prison in 2006. The theatre complex, managed by the City of Bendigo, now hosts local and international acts and is a shared space for events, performing arts and learning.

Timeline

Target for completion of recommendation or implementation period of program

- Changing behaviour/better use
- New or expanded asset(s)
- Planning/prioritisation or further investigation of new or expanded asset(s)

Location

- Statewide

Sector

- ICT
- Cultural, civic, sporting, recreation and tourism
- Education and training

Recommendation	0-5 years	5-10 years	10-15 years	15-30 years	Location, sector(s)
9.1 Improve network planning and demand management for schools.					
9.1.1 School network planning					
9.2 Enable digital learning in schools.					
9.2.1 Education delivery through technology					
9.3 Improve delivery of new and upgraded kindergarten and school infrastructure.					
9.3.1 School investment pipeline					
9.3.2 School maintenance					
9.3.3 Schools as community facilities					
9.4 Support the development of spaces for lifelong learning.					
9.4.1 Tertiary education/VET in schools					
9.4.2 Community use of TAFE assets					
9.4.3 Public libraries					

Need 10.

Meet growing demand for access to economic activity in central Melbourne

Meeting this need will help achieve objectives:

1. ● Prepare for population change
2. ○
3. ● Reduce disadvantage
4. ● Enable workforce participation
5. ● Lift productivity
6. ● Drive Victoria's changing, globally integrated economy
7. ○
8. ○
9. ○
10. ● Build resilience to shocks

Victoria's high productivity industries are typically concentrated in central Melbourne. The centralisation of economic activity is only expected to continue as the economy is increasingly services driven. Demand for central city access from all parts of Melbourne and many regional areas is likely to grow strongly, leading to increasing capacity constraints on the transport system, which are particularly pronounced in Melbourne's west and north.

Victoria's population growth patterns, combined with the shift in economic activity from distributed manufacturing to more centralised service and knowledge-based industries, has, and will, put increasing pressure on demand for travel to and from central Melbourne for work, leisure and specialist services, particularly during peak periods. Better access will be required from all parts of Melbourne and across regional Victoria, particularly Geelong, Ballarat, Bendigo and Latrobe City.

Capacity constraints will be experienced across the transport network, but are expected to be most pronounced in Melbourne's west and north growth areas, where the number of jobs has not kept pace with the number of residents (see figure 7). Accordingly, people travel outside of these areas for work, often to the central city, and this trend is expected to continue. In contrast, high growth areas in the southeast of Melbourne are less reliant on the central city for job opportunities given their proximity to other employment centres including Dandenong and Monash.

Without action to manage and meet demand for access to economic activity in central Melbourne and address congestion, the state is likely to become less productive, equitable and attractive as a place to live and work. Transport and planning initiatives, such as building Melbourne Metro and encouraging growth in alternative employment centres, will go some way to addressing this need, but more fundamental changes to the transport system are likely to be required to meet the challenges ahead.

The transport infrastructure in operation today will still be the core infrastructure in use in 30 years' time. The response will require changes in the planning, use and operation of our transport network for greater efficiency to sustain current and future demand.

Recommendations

A well-planned, systematic approach is required to respond to the huge demand challenges facing Victoria's transport system over the next 30 years and maintain adequate access to economic activity in central Melbourne. The great unknown is exactly when and how driverless vehicles will impact travel patterns, but it could result in a surge of additional trips within the next 15 years. Government needs to plan now for how these could be integrated into the transport network and urban form.

The recommendations below outline four key steps to addressing these challenges. The first step reprises the arguments set out under Need 1, specifically that Melbourne's growth needs to be shaped in a way that makes best use of available transport capacity (Recommendations 10.1 and 10.3). The second step involves doing preparatory work for the introduction of transport pricing within 5-10 years (Recommendation 10.2). We believe this will be a critical reform to change behaviour and manage demand across the network. The third step involves getting maximum performance out of the current network, including targeted upgrades of existing public transport assets, improvements to road operations and preparation for new technologies (Recommendations 10.4 to 10.7). The final step, and one that should only be taken when all other avenues are exhausted, involves more substantial capital expenditure to extend the reach of the public transport network (Recommendations 10.8 to 10.10).

In some cases the recommendations highlight areas where more money could be spent, while in others the focus is on how it could be spent more wisely. Some of the highest impact reforms proposed don't involve spending much at all.

No major new roads have been recommended under this need as public transport will continue to be the backbone for access to central Melbourne. However, the transport network is very interrelated and road projects recommended under other needs, such as the Outer Metropolitan Ring Road, could also improve overall access to central Melbourne by relieving congestion elsewhere. Ultimately, major policies and reforms will have the greatest impact on managing radial movements into the city.

10.1 Promote urban consolidation to enable people to live closer to jobs, public transport and the central city.

10.1.1 **Development in established areas.** Intensify housing development in established areas of Melbourne, Geelong, Ballarat and Bendigo that are already well serviced with infrastructure by amending planning schemes within 0-5 years. This should focus initially on Melbourne's eastern and southern suburbs, in particular around train stations on the Lilydale, Belgrave, Glen Waverley, Alamein, Frankston, Sandringham, Pakenham and Cranbourne lines, as these are expected to experience fewer capacity constraints over the next 30 years. Investigations to better understand the capacity of the tram network should also commence, with a view to intensifying housing along tram corridors. To achieve this reform and ensure local needs are considered, state government will have to work closely with affected local councils (ref. UDC).

10.1.2 **Development in/around employment centres.** Target intensification and development of businesses, services and housing around activity centres, particularly major employment centres and the transport corridors that feed them, by amending planning schemes within 0-5 years. This will enable more people to live closer to jobs. To achieve this reform and ensure local needs are considered, state government will have to work closely with affected local councils (ref. STO).

10.2 Introduce a transport network pricing regime to manage congestion and obtain the most efficient use of the transport network.

10.2.1 **Transport modelling.** Improve transport modelling tools within 0-5 years to better assist long-term strategic transport planning, particularly to support the operation of driverless vehicles and the impact of transport network pricing on freight and people movements (ref. ABM).

10.2.2 **Transport network pricing.** Introduce a transport network price regime within 5-10 years that will reduce congestion and crowding and enable faster travel times for high-value trips, considering all modes and with a focus on addressing equity concerns. This reform will fundamentally change the way the transport network is used and will play an important role in preparing for the arrival of driverless vehicles and improving freight productivity (ref. TNP).

10.3 Encourage people living along congested corridors and in higher density areas to shift to active travel to reduce the demand on other transport modes.

10.3.1 **Cycling/walking data.** Improve walking and cycling data capture and analysis, including expanding the network of bike counters, within 0-5 years to support improved investment proposals and target opportunities for growth (ref. BWP1).

10.3.2 **Cycling corridors/walking improvements.** Finalise and roll out Victoria's strategic cycling corridors and identified walking network improvements within 0-15 years, focusing on state government roads and land or other significant locations. An accelerated roll-out should include:

- expanding walking and cycling networks, including to address missing links (ref. BWP2)
- improving standards for existing walking and cycling networks, in particular the separation of walking and cycling paths and also from other road users (ref. BWP3)
- identifying and prioritising locations where grade separated bicycle highways in the central city could facilitate safer and more direct access into and across central Melbourne (ref. BHT).

10.4 Enhance and upgrade existing public transport infrastructure to maximise the efficiency and operation of an integrated multi-modal network.

10.4.1 **Public transport real-time information.** Provide open source access to real-time public transport information across the metropolitan and regional networks covering all modes within 0-5 years. This will enable private developers to create applications that will allow people to more confidently use public transport and attract increased patronage (ref. TNI).

10.4.2 **Train timetabling.** Implement the required timetable changes on the metropolitan train network to deliver the peak period service uplifts enabled by the completion of the Regional Rail Link within 0-5 years. This will significantly increase capacity on overcrowded lines in the west of Melbourne, particularly the Werribee line (ref. PTT).

10.4.3 **Metropolitan bus network.** Reform the metropolitan bus network starting from a clean slate, with a review of the existing routes and services based on the approach taken in the City of Brimbank in 2013, within 0-5 years, with a focus on major employment centres. This reform of the bus network will progressively deliver more targeted services, primarily with existing resources (ref. MBN).

10.4.4 **Transport interchanges.** Develop a transparent prioritisation process within 0-5 years for upgrading transport interchanges beyond current commitments. This framework should focus on identifying upgrades that facilitate faster and easier passenger transfers, including for people with mobility challenges, and support a multi-modal network. Priority interchanges for upgrade are expected to include those that serve the Monash, Dandenong and Latrobe National Employment Clusters (NECs) and the Box Hill and Broadmeadows Metropolitan Activity Centres (MACs) (ref. MII).

10.4.5 **Metropolitan rail upgrades.** Review and update Public Transport Victoria's *Network development plan – Metropolitan rail* within 0-5 years to transparently identify and prioritise network upgrades and enhancements required to remove physical and operational constraints that will maximise the use of the existing rail network. High-priority projects that will increase the reliability of passenger services, reduce ongoing maintenance costs and support the delivery of additional services could include upgrading and renewal of life-expired signalling systems, untangling rail junctions (such as at Clifton Hill) and providing additional platforms at existing stations (such as Dandenong station) (ref. MRC).

10.4.6 **Metropolitan rail stations.** Upgrade metropolitan rail stations with high passenger volumes, such as Caulfield and South Yarra stations, subject to transparent assessment to identify priority locations, over 5-30 years. These upgrades will facilitate faster, safer and easier passenger access and transfers (ref. MRI).

10.4.7 **High-capacity signalling.** Roll out high-capacity signalling systems on key sections of the metropolitan rail network, beyond current commitments, over 10-30 years to support the operation of additional services at peak times and improve reliability. This program should build on existing studies and imminent trials, with a likely early focus being the lines that operate through Clifton Hill (ref. RSF).

10.5 Adopt a consistent, asset management-based approach to funding and procuring new trains and trams, to better manage the average asset age and meet service demands.

10.5.1 **Metropolitan rolling stock.** Institute an asset management-based approach to a long-term program of tram and train rolling stock procurement within 0-5 years, building on the 2015 *Victorian rolling stock strategy*. This program should implement a cycle for the continuous build of new rolling stock, beyond the current commitments, that avoids the stop-start procurement of recent decades. This will enable the timely retirement of older rolling stock and the ability to meet the demands of increased patronage across the network (ref. HCT3 and HCT4).

10.5.2 **10-car metropolitan trains.** Introduce 10-car high-capacity metro trains to operate on lines that run via the Melbourne Metro tunnel within 10-15 years to support further patronage growth to the west and southeast, complementing electrification of the Melton line (see Recommendation 1.3.6/10.8.3) and enabling a later extension to Melbourne Airport (see Recommendation 10.9.2/11.3.2) (ref. HCT2).

10.6 Make better use of the existing road network to maximise passenger throughput, traffic flow and value for money.

10.6.1 **Road asset management.** Implement a performance-based road asset management framework within 0-5 years that sets a priority order of road users and identifies roads surplus to requirements. This work should be supported by a review of responsibility for roads between the state and local governments to ensure these responsibilities are consistent with the purpose of the road. This would include removing anomalies where the state is responsible for roads with a local transport function, and where local government is responsible for roads that provide an arterial road function that are difficult for the council to fund for maintenance. This would enable the development of well-targeted increases in road maintenance (ref. RMF).

10.6.2 **Traffic management systems.** Upgrade and expand advanced traffic management systems to manage flows on metropolitan motorways, employing tools such as lane use management, access ramp signalling, CCTV and variable message signs, over 0-10 years. This will improve the efficiency and reliability of the motorway network and could potentially apply to some key arterial routes such as the Hoddle Street/Punt Road corridor with benefits to freight reliability and traffic flows (ref. ATM).

10.6.3 **Road space allocation.** Accelerate the roll-out of changes to road space allocation, whether physical changes or alterations to road signals, to improve throughput of people, particularly in areas of high congestion, over 0-15 years. Key locations for prioritising higher capacity public transport and active transport modes include the Hoddle Street/Punt Road corridor, tram routes in the northern suburbs, untreated sections of the CBD and access routes to major employment centres. Road space allocation decisions should factor in both the projected transport network benefits and local urban outcomes. Longer-term planning should consider how the allocation of road space may need to be adapted in light of new vehicle technologies, particularly driverless vehicles (ref. RSA).

10.6.4 **Doncaster bus system.** Upgrade the existing Doncaster Area Rapid Transit (DART) bus system within 5-10 years to support increased demand and improve the reliability of services. The roll-out should incorporate the latest technology and support infrastructure required for a modern bus rapid transit system, such as traffic signal priority, dedicated lanes and upgraded boarding facilities (ref. DBI).

10.7 Prepare the road network and regulatory frameworks for the arrival of driverless vehicles.

10.7.1 **Innovative transport services.** Remove barriers to the entry of new market players offering innovative transport services within 0-5 years to increase travel options and encourage higher vehicle occupancy. Particular areas of opportunity include ride hailing, car pooling and private minibuses and coaches providing either on-demand or fixed schedule services through third-party applications. In regional areas, the ability to earn a supplementary income and provide much needed local on-demand transport has the potential for widespread community benefit. This should be undertaken with a review of metropolitan bus contracts to ensure that these new players are not contractually precluded or otherwise disadvantaged from entering the market (ref. MAS).

10.7.2 **Driver assistance applications.** Introduce regulatory changes, where needed, to enable the testing of advanced driver assistance applications and develop a prioritisation strategy for deployment of roadside units progressively over 0-15 years, acknowledging that the technology continues to evolve. Advanced Driver Assistance Systems will provide drivers with real-time information about the road environment, such as safety warnings, to improve safety and create more efficient traffic flow. The results of testing and the prioritisation strategy will inform the future deployment of roadside enabling ICT, starting with high-demand corridors and freeways (ref. ADA).

10.7.3 **Driverless vehicles.** Introduce regulatory changes to enable the testing and deployment of driverless vehicles within 0-15 years to improve traffic flow, expand the range of transport options for many people and potentially improve the carrying capacity of roadways by allowing vehicles to safely travel closely together at the same speed. Further research and consultation will be required to develop a national approach to maximising the benefits of driverless vehicles (ref. ACT).

10.8 Expand the reach of the public transport network into high growth areas to improve their connections to central Melbourne.

10.8.1 **Fishermans Bend tram link.** Extend the tram network to Fishermans Bend to stimulate high-density major urban redevelopment within 5-10 years. This tram extension would have a city-shaping and catalytic impact of opening up Australia's largest urban renewal precinct and enable housing for 80,000 people and 60,000 jobs to be located adjacent to central Melbourne (ref. CCT).

10.8.2 **Geelong/Werribee/Wyndham rail.** Deliver new stations with rail capacity expansion on the existing Regional Rail Link corridor in western Melbourne to support these high growth areas while maintaining travel times and relieving overcrowding on the Geelong line within 5-15 years. Further work is required to determine the scope and sequence of this rail upgrade (ref. WVW, GWR and GRE).

10.8.3 **Melton rail electrification.** Extend the electrified rail network to Melton within 10-15 years to support the western growth corridor and improve services on the Ballarat line. This electrification is critical to meeting the significant projected patronage growth on the Melton line for access to the central city and requires the support of 10-car high-capacity metro trains (see Recommendation 10.5.2) to operate on this line (ref. MRE1).

10.8.4 **Wallan rail electrification.** Extend the electrified rail network to Wallan within the early part of 15-30 years to support the northern growth corridor and improve services on the Seymour line. This electrification is critical to meeting the significant projected patronage growth on this line for access to the central city and requires the support of the City Loop reconfiguration (see Recommendation 10.10.1) to provide capacity for the additional services (ref. WRE1).

10.8.5 **Clyde rail extension.** Construct an extension of the Cranbourne rail line from Cranbourne to Clyde within 15-30 years to connect this designated growth precinct with the central city, including assessment of options to use alternative modes. This will provide better access to high growth areas in the southeast of Melbourne (ref. CRE).

10.8.6 **Wollert transport links.** Complete a feasibility study within 0-5 years for creating a high-capacity transport link (rail or bus) connecting growth areas around Wollert to the rail network and on to central Melbourne. This link is likely to be required within 15-30 years and would provide a viable alternative to private vehicles for local trips and commuting to the central city from these high growth areas (ref. WRE2).

10.9 Upgrade and, over time, construct high-capacity public transport links between Melbourne Airport and the CBD to create strong interstate and global links with the central city.

10.9.1 **Melbourne Airport bus.** Deliver a high level of on-road priority to bus services linking Melbourne Airport to central Melbourne over 0-10 years. This will maximise the capacity, efficiency and reliability of these services and defer the need for a more costly investment in a heavy rail line to Melbourne Airport to the 15-30 year period (see Recommendation 10.9.2/11.3.2). Upgrading airport bus services will make this mode more attractive for use by employees at the airport and surrounding facilities and for travellers, reducing demand and congestion on the Tullamarine Freeway (ref. MAB).

10.9.2 **Melbourne Airport rail link.** Deliver a rail line to Melbourne Airport, preferably linking with both central Melbourne and the southeast, within 15-30 years once the additional capacity of the airport bus has been exceeded (see Recommendation 10.9.1/11.3.1). This rail line will provide higher-capacity and higher quality service for interstate and international visitors to travel from the airport to the central city. Further network planning to confirm the optimum way to integrate this line into the network will be required, given projected high growth on the Sunbury and Melton lines, with which a Melbourne Airport rail link is currently proposed to share tracks along the Sunshine corridor. Opportunities to improve access to employment in and around Melbourne Airport as part of the project should be investigated (ref. MAH).

10.10 Expand public transport capacity with major new infrastructure projects to transform the network.

10.10.1 **City Loop reconfiguration.** Reconfigure the City Loop within the early part of 15-30 years to deliver a major capacity uplift to the Craigieburn and Upfield corridors and enable electrification to Wallan (see Recommendation 1.3.7/10.8.4). Further planning for the City Loop reconfiguration should focus on developing network plans that optimise the way people move around the network, given the project will significantly increase the level of passenger interchange. It should also minimise disruption to rail customers during construction, leveraging the capacity available shortly after completion of Melbourne Metro expected in 2026 (ref. CLR).

10.10.2 **Melbourne Metro - future stages.** Identify trigger points that would require a major uplift in capacity on the Mernda, Werribee and Sunshine rail corridors within 0-5 years. It is likely this extra capacity will be required in the latter part of the 15-30 year period or potentially beyond 30 years. A new rail tunnel linking Newport and Clifton Hill, offers a potential solution, along with providing greater accessibility to Fishermans Bend and Parkville. However, this is a particularly high cost solution and further network planning is required, considering both how such an investment could deliver greater benefits (given that current plans do not show any improvements to the Sunshine corridor) and all available options to better use existing infrastructure first (ref. MMS).

Funding recommendations

Transport network pricing (Recommendation 10.2.2) is a major pricing reform that helps to change transport user behaviour. It could also generate revenue that could help fund some transport infrastructure.

Infrastructure Victoria is also examining transport network pricing as part of our research program. We are considering how pricing regimes across all modes, including roads and public transport, could be used to change behaviour, manage demand and/or recover costs, and address equity concerns.

The delivery of the following major projects and policies is expected to involve significant costs or present opportunities to capture some of the value of urban planning decisions. If government chooses to adopt these recommendations, a range of funding mechanisms should be considered.

Recommendation	General government revenue	User charges	Beneficiary charges	Property development	Asset sales
10.1.1 Development in established areas			✓	✓	
10.1.2 Development in/around employment centres			✓	✓	
10.3.2 Cycling corridors/ walking improvements	✓		✓		
10.4.5 Metropolitan rail upgrades	✓	✓	✓		
10.4.6 Metropolitan rail stations	✓	✓		✓	
10.4.7 High-capacity signalling	✓	✓			
10.5.1 Metropolitan rolling stock	✓	✓			
10.5.2 10-car metropolitan trains	✓	✓			
10.8.1 Fishermans Bend tram link	✓	✓	✓		
10.8.2 Geelong/ Werribee/ Wyndham rail	✓	✓	✓	✓	
10.8.4 Wallan rail electrification	✓	✓	✓	✓	
10.9.2 Melbourne Airport rail link	✓	✓	✓	✓	
10.10.1 City Loop reconfiguration	✓	✓	✓		
10.10.2 Melbourne Metro - future stages	✓	✓	✓	✓	

✓ Potential funding mechanism

Funding recommendations – additional comments

For public transport infrastructure, existing user charges (public transport fares) should continue to be charged but are only expected to cover a portion of ongoing operating costs.

Development in established areas and development in/around employment centres require planning scheme changes that are likely to increase the value of land in certain areas. To capture part of this value, government could levy beneficiary charges such as developer contributions.

Beneficiary charges, such as developer contributions, could be considered for cycling corridors/walking improvements. This could be sourced from existing developer contributions such as the Growth Areas Infrastructure Contribution, developer contribution plans and open space contributions.

Beneficiary charges should be considered for Fishermans Bend tram link, Wallan rail electrification, Geelong/Werribee/Wyndham rail and Melbourne Airport rail link if there is a substantial uplift in land values and business activity in the vicinity of the new projects. New beneficiary charges could include land betterment levies on commercial and/or residential property and developer contributions.

If government decides to pursue Melbourne Metro - future stages as a project following further investigation, the mechanisms discussed above could also be examined for this project.

A major beneficiary contribution could be negotiated with Melbourne Airport, reflecting the direct benefits a new rail link would provide to its business. Higher than standard public transport fares (especially for express services) for the new line could be considered. Funding from general government revenue should be minimised, and should reflect the broader public benefit the project delivers, such as congestion relief. Depending on the outcomes of network planning to confirm the optimum way to integrate the Melbourne Airport rail link into the network, should it include new or upgraded train stations, property development could also be considered.

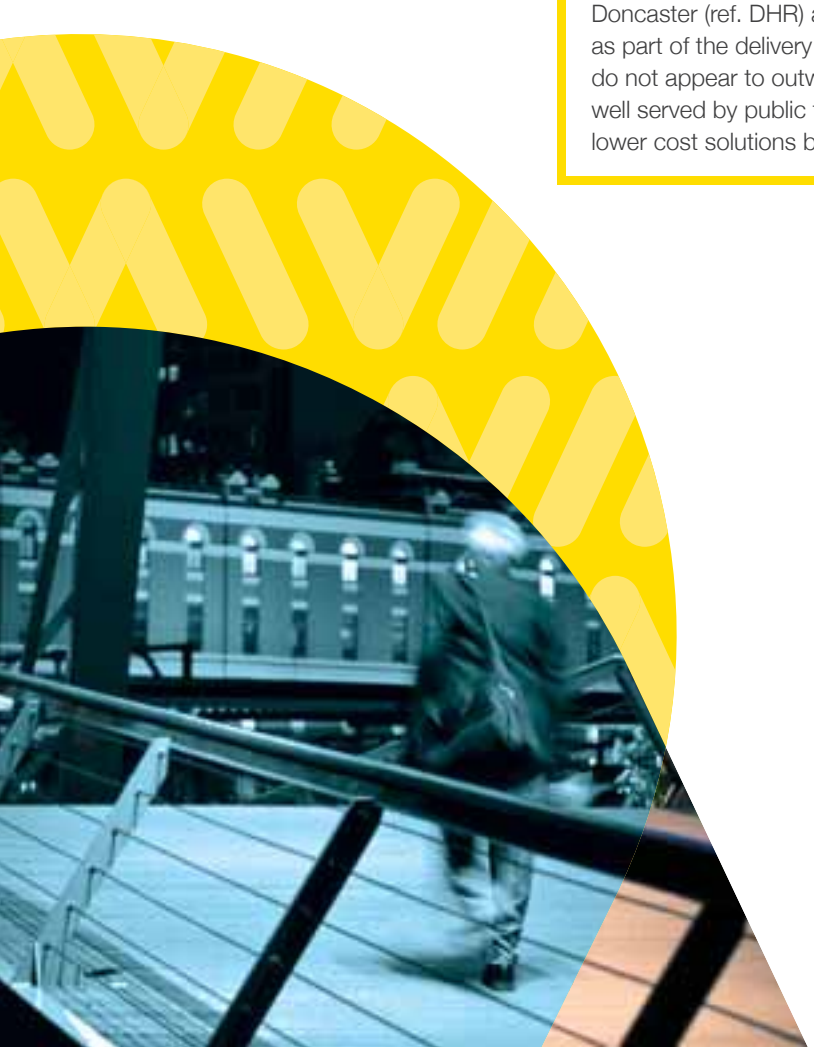
Property development should be pursued for metropolitan rail stations, Wallan rail electrification, Geelong/Werribee/Wyndham rail, Melbourne Metro - future stages, development in established areas and development in/around employment centres, for example, selling or leasing land or air rights surrounding new train stations for commercial, residential or retail development. In particular, for metropolitan rail stations, opportunities at South Yarra and Caulfield train stations could be investigated as part of any upgrades. For development in established areas and development in/around employment centres, funding raised could be reinvested in those areas to meet infrastructure needs arising from intensification.

Things we considered

The recommendations for this need are all framed around transport and land use planning solutions, but we did also consider the role that telecommuting could play in minimising the need for travel to the central city (ref. ITT). In the end we decided to deprioritise this option because there wasn't a clear role for government in encouraging telecommuting. In addition, while people are increasingly connecting with each other digitally as a complementary or precursor approach to meeting face to face, the role of the central city in bringing people together appears to remain strong.

There is a theme across several of our recommendations of moving our rail network towards more of a 'metro' style of operation. In practice, this means changing the network from one where train lines often merge as they approach the city to one where lines operate separately, but people often have to change trains to get to their final destination. It's a trade-off, but we think the benefits of improved capacity and reliability are worth it, so long as careful planning is put into how people move around the system. This is relevant to introducing the full service uplift delivered by Regional Rail Link, the Melbourne Metro rail project currently underway, and future projects such as reconfiguring the City Loop. Indeed, on a more local scale, our recommendation to reform the metropolitan bus network will involve similar trade-offs between services that wind around local streets serving many different places and a more efficient and direct network.

A number of the options we considered for this need did not emerge as priorities; however, there are some projects we would specifically recommend against. These include building a new heavy rail line to Doncaster (ref. DHR) and building a new station at South Yarra (ref. SYM) as part of the delivery of Melbourne Metro. The benefits of these projects do not appear to outweigh the costs, with South Yarra already being very well served by public transport and, in the case of Doncaster, alternative lower cost solutions being available.

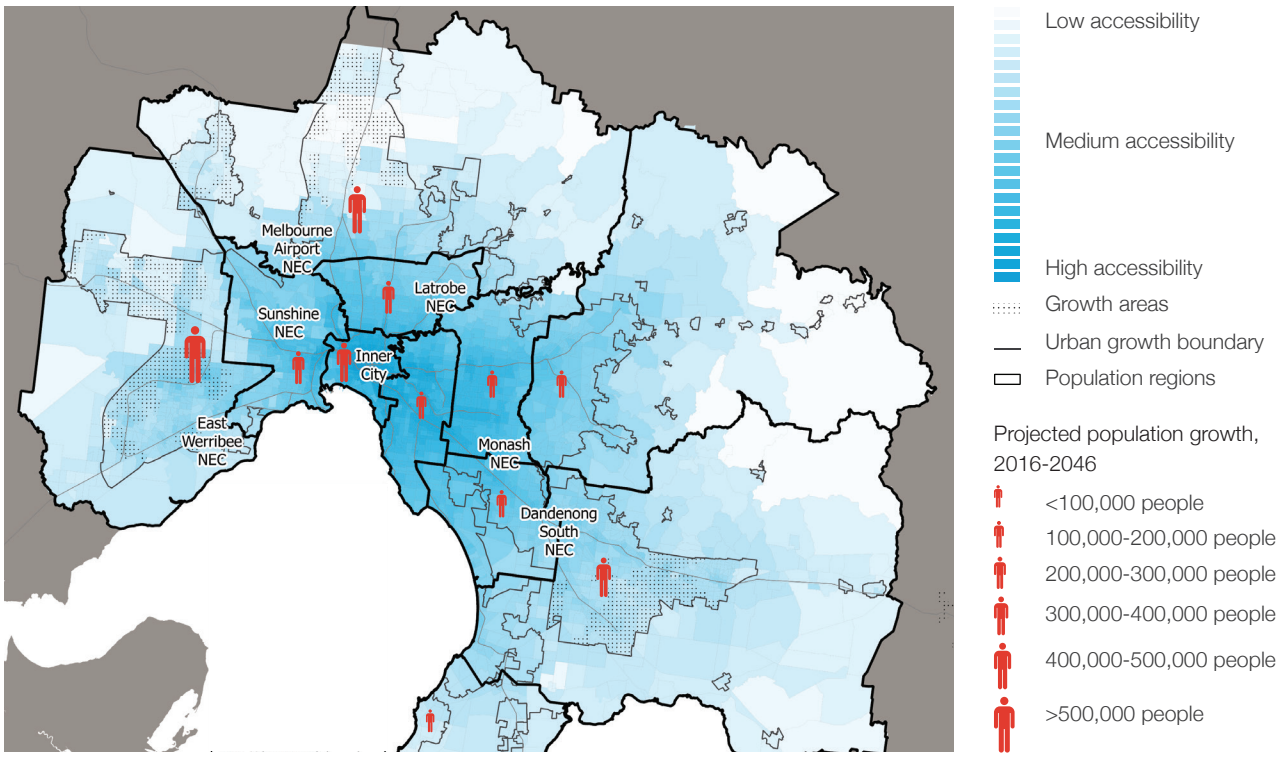


INSIGHT: Transport network pricing?

As Melbourne's population increases year by year, congestion, and its associated economic impacts, is likely to rise substantially and place a burden on Victoria's ability to remain competitive. Government can no longer 'build its way out' of congestion with more and more transport capacity (particularly if this simply induces demand). A well-designed transport pricing regime would reduce congestion and improve transport choices, including encouraging more trips by walking and cycling, and spread the peak on both roads and public transport. It could also affect business choices about how they move freight – by road or rail, or at different times of the day.

We are considering how pricing regimes balance objectives, such as changing behaviour and managing demand, cost recovery and addressing equity and social impacts. The design of this regime is complicated. The price signal needs to be strong enough to change behaviour, but also support our aspirations for providing access to jobs and services regardless of where people live. For example, people may not have any choice other than to pay for road travel because of a lack of public transport options or the nature of their employment. Conversely, pricing is likely to have benefits for business in the form of reduced freight costs. The design of any pricing mechanism needs careful consideration of its impacts and implications, including the infrastructure investments that may be required to support its introduction, and the need to ensure it is set at an appropriate rate.

Figure 7: With no action, by 2046 there will be a mismatch between where population growth is projected to occur and areas with high accessibility to jobs.



Source: Accessibility mapping from 2046 base case modelling by KPMG/Arup/Jacobs, *Economic appraisal and demand modelling*, 2016, and population growth projections from Victorian Department of Environment, Land, Water and Planning, *Victoria in future 2016*, and unpublished Victorian Government population projections

Timeline

Target for completion of recommendation or implementation period of program

- Changing behaviour/better use
- New or expanded asset(s)
- Planning/prioritisation or further investigation of new or expanded asset(s)

Anticipated construction/operation period

Location

- Statewide
- Melbourne

Sector

- All sectors
- Transport
- ICT
- Cultural, civic, sporting, recreation and tourism

Recommendation	0-5 years	5-10 years	10-15 years	15-30 years	Location, sector(s)
10.1 Promote urban consolidation to enable people to live closer to jobs, public transport and the central city.					
10.1.1 Development in established areas					Statewide, All sectors
10.1.2 Development in/around employment centres					Statewide, All sectors
10.2 Introduce a transport network pricing regime to manage congestion and obtain the most efficient use of our transport network.					
10.2.1 Transport modelling					Statewide, Transport
10.2.2 Transport network pricing					Statewide, Transport
10.3 Encourage people living along congested corridors and in higher density areas to shift to active travel to reduce the demand on other transport modes.					
10.3.1 Cycling/walking data					Statewide, Transport, Cultural, civic, sporting, recreation and tourism
10.3.2 Cycling corridors/ walking improvements					Statewide, Transport, Cultural, civic, sporting, recreation and tourism
10.4 Enhance and upgrade existing public transport infrastructure to maximise the efficiency and operation of an integrated multi-modal network.					
10.4.1 Public transport real-time information					Statewide, Transport, ICT
10.4.2 Train timetabling					Melbourne, Transport
10.4.3 Metropolitan bus network					Melbourne, Transport
10.4.4 Transport interchanges					Statewide, Transport
10.4.5 Metropolitan rail upgrades					Melbourne, Transport
10.4.6 Metropolitan rail stations					Melbourne, Transport
10.4.7 High-capacity signalling					Melbourne, Transport
10.5 Adopt a consistent, asset management-based approach to funding and procuring new trains and trams, to better manage the average asset age and meet service demands.					
10.5.1 Metropolitan rolling stock					Melbourne, Transport
10.5.2 10-car metropolitan trains					Melbourne, Transport

Recommendation	0-5 years	5-10 years	10-15 years	15-30 years	Location, sector(s)
10.6 Make better use of the existing road network to maximise passenger throughput, traffic flow and value for money.					
10.6.1 Road asset management					
10.6.2 Traffic management systems					
10.6.3 Road space allocation					
10.6.4 Doncaster bus system					
10.7 Prepare the road network and regulatory frameworks for the arrival of driverless vehicles.					
10.7.1 Innovative transport services					
10.7.2 Driver assistance applications					
10.7.3 Driverless vehicles					
10.8 Expand the reach of the public transport network into high growth areas to improve their connections to central Melbourne.					
10.8.1 Fishermans Bend tram link					
10.8.2 Geelong/Werribee/ Wyndham rail					
10.8.3 Melton rail electrification					
10.8.4 Wallan rail electrification					
10.8.5 Clyde rail extension					
10.8.6 Wollert transport links					
10.9 Upgrade and, over time, construct high-capacity public transport links between Melbourne Airport and the CBD to create strong interstate and global links with the central city.					
10.9.1 Melbourne Airport bus					
10.9.2 Melbourne Airport rail link					
10.10 Expand public transport capacity with major new infrastructure projects to transform the network.					
10.10.1 City Loop reconfiguration					
10.10.2 Melbourne Metro - future stages					

Key new and upgraded transport links in Melbourne

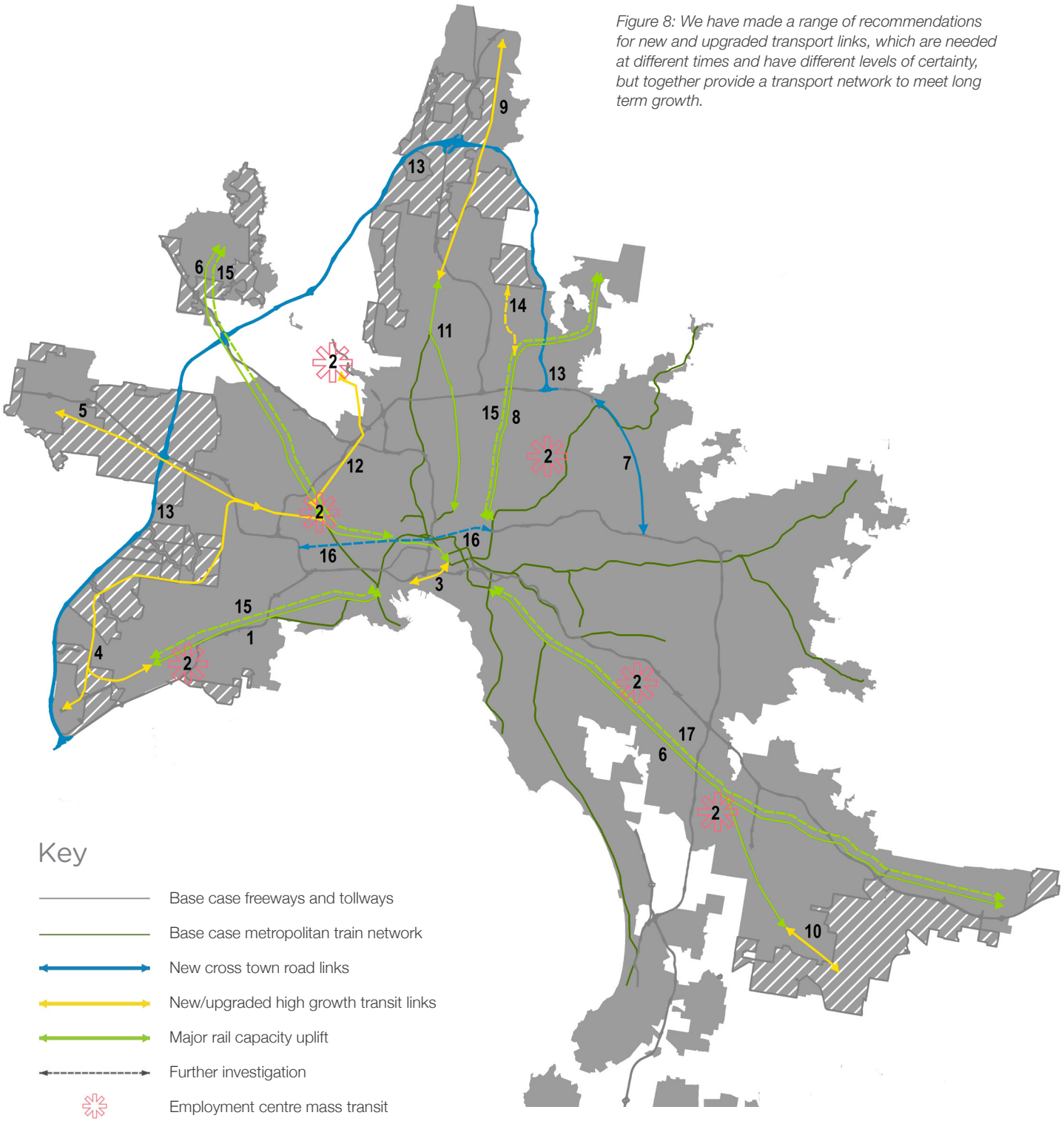


Figure 8: We have made a range of recommendations for new and upgraded transport links, which are needed at different times and have different levels of certainty, but together provide a transport network to meet long term growth.

Note: In many cases, alignments are yet to be determined and are indicative only.

Number (not in priority order)	New and upgraded transport links	Recommendation number(s)
Short to medium term (complete within 15 years)		
1	Train timetabling	10.4.2
2	Employment centre mass transit*	11.4.4
3	Fishermans Bend tram link	1.2.1, 10.8.1
4	Geelong/Werribee/Wyndham rail	1.3.4, 10.8.2, 12.3.1
5	Melton rail electrification	1.3.6, 10.8.3
6	10-car metropolitan trains	10.5.2
7	North East Link	11.4.6, 13.5.1
8	High-capacity signalling (priority line, e.g. Clifton Hill)	10.4.7
Longer term (Complete within 15- 30 years)		
9	Wallan rail electrification	1.3.7, 10.8.4
10	Clyde rail extension	1.3.8, 10.8.5
11	City Loop reconfiguration	10.10.1
12	Melbourne Airport rail link	10.9.2, 11.3.2
13	Outer Metropolitan Ring Road	11.4.7, 13.5.2
Longer term (further investigation)		
14	Wollert transport links	10.3.9, 10.8.6
15	Melbourne Metro – future stages	10.10.2
16	Eastern Freeway-CityLink-Western Ring Road	11.4.8, 13.5.3
17	Regional rail eastern corridor	12.3.3, 13.5.4

* The middle and outer employment centres covered by Recommendation 11.4.4 include East Werribee, Sunshine, Melbourne Airport, Latrobe, Monash and Dandenong South.

Need 11.

Improve access to middle and outer metropolitan major employment centres

Meeting this need will help achieve objectives:

1. ● Prepare for population change
2. ○
3. ● Reduce disadvantage
4. ● Enable workforce participation
5. ● Lift productivity
6. ● Drive Victoria's changing, globally integrated economy
7. ○
8. ○
9. ○
10. ● Build resilience to shocks

While central Melbourne is a significant source of economic activity, employment centres in middle and outer metropolitan Melbourne, such as Monash, Dandenong South, Sunshine, East Werribee, Latrobe and Melbourne Airport (and surrounds), will also be critical to the state's economy over the long term. These centres are particularly important employment destinations for people living in surrounding areas, but access will need strengthening.

The development of Melbourne as a city with a strong central hub complemented by thriving middle and outer metropolitan employment centres has the potential to improve access to jobs and educational opportunities for more Victorians and help grow the state's economy.

For the purposes of this strategy, middle and outer metropolitan major employment centres include: five of the six National Employment Clusters (NECs) identified in *Plan Melbourne 2014*, specifically Monash, Dandenong South, Latrobe, Sunshine and East Werribee; a number of well-established and growing Metropolitan Activity Centres (MACs), such as Box Hill, Ringwood and Broadmeadows; and Melbourne Airport (and surrounds), which is also a key passenger and freight gateway. Parkville has not been included due to its proximity to the central city.

As recognised in *Plan Melbourne 2014*, the transport system will need to provide for growing employment in these centres. Public transport is a particular area for improvement and all transport modes could see major change with new technologies. By 2046, average morning peak trip times for residents across Melbourne to their nearest national employment cluster are forecast to be around 20-25 minutes by car and 65-70 minutes by public transport. This is partly a legacy of Melbourne's 'radial' public transport network, which has evolved to emphasise trips to the CBD over 'orbital' journeys.

Recommendations

Complementing the growth of a strong CBD, there is great potential for Melbourne to have a network of thriving major employment centres located in the middle and outer suburbs. This will improve access to jobs and services across Melbourne and provide a boost to the economy overall. But it will only happen if the right land use settings and transport links are in place.

The recommendations below cover a range of initiatives to support the development of employment centres outside of the central city. These include intensifying development around existing and emerging employment centres and enhancing 'orbital' or cross-town travel through better public transport services (particularly buses) and building major new road links.

While some of the recommendations that appear under other needs, such as increasing the share of walking and cycling as a transport mode, introducing transport network pricing and preparing for the arrival of driverless vehicles, have not been called out specifically under this need, there is clearly potential for these actions to help improve access to middle and outer suburban employment centres as well.

11.1 Promote growth in business activity, services and higher density housing in major employment centres and transport corridors to enable more people to live closer to jobs.

11.1.1 **Development in/around employment centres.** Target intensification and development of businesses, services and housing around activity centres, particularly major employment centres and the transport corridors that feed them, by amending planning schemes within 0-5 years. This will enable more people to live closer to jobs. To achieve this reform and ensure local needs are considered, state government will have to work closely with affected local councils (ref. STO).

11.1.2 **Government service/infrastructure planning.** Formalise an area-based, whole-of-government, integrated service and infrastructure planning and investment prioritisation process within 0-5 years to improve coordination and minimise siloed decision-making. Initially this would focus on mechanisms to make state government departments plan services and infrastructure better together. Once state government has become more integrated, it will be critical to include local and federal government in this process to enable more effective integrated land use and infrastructure planning (ref. SIP).

11.2 Make better use of the existing transport infrastructure to support an integrated multi-modal network linking major employment centres with the rest of the city.

11.2.1 **Metropolitan bus network.** Reform the metropolitan bus network starting from a clean slate, with a review of the existing routes and services based on the approach taken in the City of Brimbank in 2013, within 0-5 years, with a focus on major employment centres. This reform of the bus network will progressively deliver more targeted services, primarily with existing resources (ref. MBN).

11.2.2 **Road asset management.** Implement a performance-based road asset management framework within 0-5 years that sets a priority order of road users and identifies roads surplus to requirements. This work should be supported by a review of responsibility for roads between the state and local governments to ensure these responsibilities are consistent with the purpose of the road. This would include removing anomalies where the state is responsible for roads with a local transport function, and where local government is responsible for roads that provide an arterial road function that are difficult for the council to fund for maintenance. This would enable the development of well-targeted increases in road maintenance (ref. RMF).

11.2.3 **Transport interchanges.** Develop a transparent prioritisation process within 0-5 years for upgrading transport interchanges beyond current commitments. This framework should focus on identifying upgrades that facilitate faster and easier passenger transfers, including for people with mobility challenges, and support a multi-modal network. Priority interchanges for upgrade are expected to include those that serve the Monash, Dandenong and Latrobe NECs and the Box Hill and Broadmeadows MACs (ref. MII).

11.2.4 **Level crossing removals.** Develop a transparent prioritisation process within 0-5 years for targeted removal of level crossings beyond current commitments made by government. This should build on work already completed by VicRoads and consider desired land use outcomes, including supporting major employment centres, noting that, even over a 30-year period, it is likely that removing all remaining metropolitan level crossings will not be viable. Level crossing removals reduce the potential for conflicts between road users and rail operations and reduce congestion on surrounding roads (ref. MLC).

11.2.5 **Road space allocation.** Accelerate the roll-out of changes to road space allocation, whether physical changes or alterations to road signals, to improve throughput of people, particularly in areas of high congestion, over 0-15 years. Key locations for prioritising higher capacity public transport and active transport modes include the Hoddle Street/Punt Road corridor, tram routes in the northern suburbs, untreated sections of the CBD and access routes to major employment centres. Road space allocation decisions should factor in both the projected transport network benefits and local urban outcomes. Longer-term planning should consider how the allocation of road space may need to be adapted in light of new vehicle technologies, particularly driverless vehicles (ref. RSA).

11.3 Upgrade and construct high-capacity public transport links between the major employment centre at Melbourne Airport and the CBD to create strong interstate and global links with the central city.

11.3.1 **Melbourne Airport bus.** Deliver a high level of on-road priority to bus services linking Melbourne Airport to central Melbourne over 0-10 years. This will maximise the capacity, efficiency and reliability of these services and defer the need for a more costly investment in a heavy rail line to Melbourne Airport to the 15-30 year period (see Recommendation 10.9.2/11.3.2). Upgrading airport bus services will make this mode more attractive for use by employees at the airport and surrounding facilities and for travellers, reducing demand and congestion on the Tullamarine Freeway (ref. MAB).

11.3.2 **Melbourne Airport rail link.** Deliver a rail line to Melbourne Airport, preferably linking with both central Melbourne and the southeast, within 15-30 years once the additional capacity of the airport bus has been exceeded (see Recommendation 10.9.1/11.3.1). This rail line will provide higher-capacity and higher quality service for interstate and international visitors to travel from the airport to the central city. Further network planning to confirm the optimum way to integrate this line into the network will be required, given projected high growth on the Sunbury and Melton lines, with which a Melbourne Airport rail link is currently proposed to share tracks along the Sunshine corridor. Opportunities to improve access to employment in and around Melbourne Airport as part of the project should be investigated (ref. MAH).

11.4 Build new transport links to enhance the accessibility of the major employment centres.

11.4.1 **Employment centre arterial roads.** Develop a transparent prioritisation framework within 0-5 years for future arterial road upgrades servicing major employment centres that support growth in use by all transport modes, particularly higher-capacity modes such as buses. A likely focus will be on ensuring an adequate road network that supports growing services and knowledge sector employment at the Sunshine, Monash and Latrobe NECs (ref. ARN).

11.4.2 **Growth area local buses.** Expand the local bus network coverage in growth areas and provide service enhancements over 0-15 years to support local trips and connection with other trunk services, such as SmartBus routes and local train stations, subject to transparent assessment to determine priorities. This would include new buses, better timetables and more services and help to ensure quality access to jobs and services including to major employment centres from growth areas (ref. LBS).

11.4.3 **SmartBus network.** Expand the SmartBus network and provide service enhancements over 0-15 years to support cross-town travel, subject to transparent assessment to determine priorities. This should include consideration of how the SmartBus network could complement or form part of the mass transit networks for major employment centres (see Recommendation 11.4.4) to provide a trunk access network supported by local bus networks. Key areas of priority are in the western suburbs and around the inner city (ref. SNE).

11.4.4 **Employment centre mass transit.** Create mass transit bus or light rail networks that feed into major employment centres and connect to existing heavy rail lines and other major centres over 0-15 years to support intense development and business interaction. Feasibility and planning of the networks, integrated with broader land use and transport planning, would need to be undertaken and a range of transport technologies could be considered. Priorities should be identified to support land use plans and it is likely the Monash, Latrobe and Sunshine NECs would be early priorities given their existing scale, potential for growth in the short term and geographic location spanning beyond the rail network (ref. MTN).

11.4.5 **Outer metropolitan arterial roads.** Roll out a program of upgrades to the arterial road network, focusing on congested roads in outer metropolitan areas, over 5-15 years. The first step is to identify priority locations and works, which could include widening and duplication of existing roads, grade separations, connections to motorways and provision of bus lanes to improve safety and local access for people and goods (ref. OMA).

11.4.6 **North East Link.** Construct the North East Link within 10-15 years. As a first step, there needs to be a detailed assessment of alternative alignments. This link would enhance access to major employment centres, particularly the Latrobe NEC and the Epping, Ringwood and Broadmeadows MACs, through improved orbital road connectivity and improve the capacity of the freight network, particularly from the southeast and Gippsland (ref. NEL).

11.4.7 **Outer Metropolitan Ring Road**. Construct the Outer Metropolitan Ring Road within 15-30 years. As a first step, there needs to be further consideration of staging and integrated land use planning. The resulting redistribution of traffic would enhance access to major employment centres in the west and north, including the East Werribee, Sunshine and Latrobe NECs, Melbourne Airport and the Epping and Broadmeadows MACs and improve the capacity of the freight network (ref. OMR).

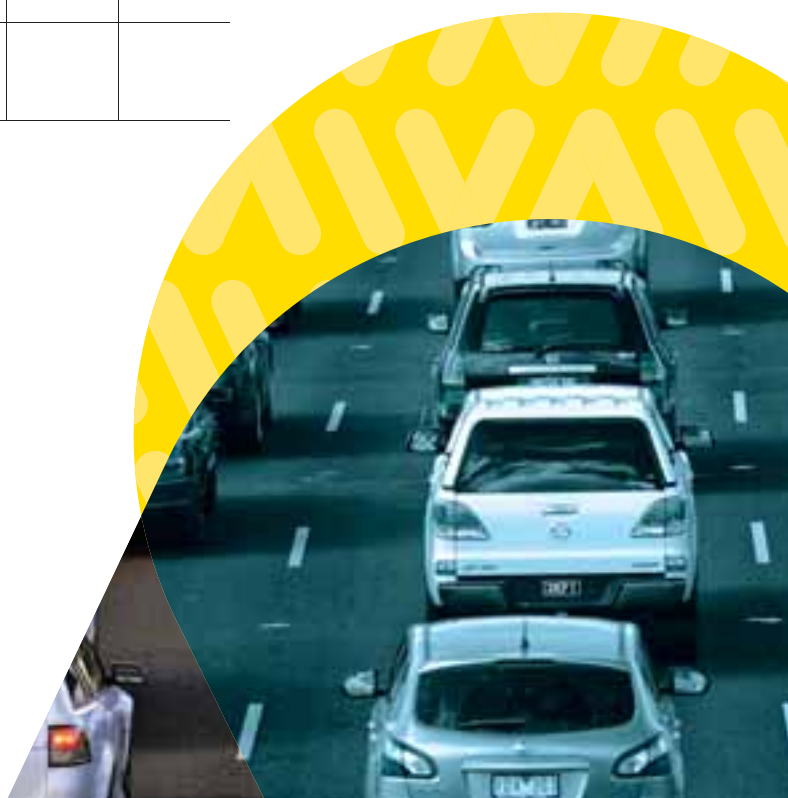
11.4.8 **Eastern Freeway-CityLink-Western Ring Road.** Plan for longer-term links between the Eastern Freeway and CityLink and between CityLink and Western Ring Road within 0-5 years to ensure future provision is not precluded, as these links may be required in the latter part of the 15-30 year period. While introducing transport network pricing would particularly attenuate demand on links to and through the congested central areas of Melbourne, emerging transport technologies and other uncertainties that could increase the need for these links make it prudent to review potential alignments and protect the corridor where appropriate. This has the potential to support accessibility to major employment centres as an alternative corridor to the M1 Monash and M80 Ring Road and improve the capacity of the freight network (ref. EWW and EWE).

Funding recommendations

The delivery of the following major projects is expected to involve significant costs. If government chooses to adopt these recommendations, a range of funding mechanisms should be considered.

Recommendation	General government revenue	User charges	Beneficiary charges	Property development	Asset sales
11.1.1 Development in/around employment centres			✓	✓	
11.2.4 Level crossing removals	✓	✓		✓	
11.3.2 Melbourne Airport rail link	✓	✓	✓	✓	
11.4.1 Employment centre arterial roads	✓	✓	✓		
11.4.4 Employment centre mass transit	✓	✓	✓	✓	
11.4.5 Outer metropolitan arterial roads	✓	✓	✓		
11.4.6 North East Link	✓	✓	✓		
11.4.7 Outer Metropolitan Ring Road	✓	✓	✓	✓	
11.4.8 Eastern Freeway-CityLink-Western Ring Road	✓	✓	✓		

✓ Potential funding mechanism



Funding recommendations – additional comments

Property development should continue to be pursued for level crossing removals prioritised beyond current commitments. This includes selling or leasing land or air rights surrounding new projects for commercial, residential or retail development. Property development opportunities could be also be pursued for development in/around employment centres.

Beneficiary charges should be considered for Melbourne Airport rail link, employment centre mass transit, Outer Metropolitan Ring Road, North East Link and Eastern Freeway-CityLink-Western Ring Road (should it go ahead) if there is a substantial uplift in land values and business activity in the vicinity of new projects. New beneficiary charges could include land betterment levies (based on land value increases) on commercial and/or residential property, following investigations to clarify the uplift in land value. Investing in major transport projects can increase land values from improved access to transport and jobs and reduced travel times for individuals and businesses, even in established areas. Developer contributions could also be considered for development in/around employment centres, Melbourne Airport rail link, employment centre mass transit, Outer Metropolitan Ring Road, outer metropolitan arterial roads and employment centre arterial roads (following the recommended prioritisation process).

A major beneficiary contribution could be negotiated with Melbourne Airport, reflecting the direct benefits a new rail link would provide to its business. Higher than standard public transport fares (especially for express services) for the new line could be considered. Funding from general government revenue should be minimised, and should reflect the broader public benefit the project delivers, such as congestion relief.

Funding for North East Link and Outer Metropolitan Ring Road should include user charges. These user charges could be applied as part of a transport network pricing regime or tolls could be charged ahead of such a reform. This funding approach could also be applied for Eastern Freeway-CityLink-Western Ring Road should it be pursued in the longer term following planning work. Ahead of a transport network pricing regime, user charges could also be applied to employment centre arterial roads following the recommended prioritisation process.

For public transport infrastructure, existing user charges (public transport fares) should continue to be charged but are only expected to cover a portion of ongoing operating costs.

Infrastructure Victoria is examining transport network pricing as part of our research program. We are considering how pricing regimes across all modes, including roads and public transport, could be used to change behaviour, manage demand and/or recover costs, and address equity concerns.

Things we considered

One of the key choices we made under this need was whether to recommend a heavy rail line to Rowville (ref. RHR) or a new mass transit network (incorporating light rail or bus rapid transit) to improve public transport access to the Monash NEC, which is Melbourne's most established middle to outer suburban employment centre. We decided to recommend the latter as it was a lower cost solution that had greater potential to meet the need.

We also considered which infrastructure responses were most appropriate for meeting the needs of different employment centres. Research we commissioned has shown that the Monash and Latrobe NECs have the most pressing need for reduced travel times, particularly by public transport. Sunshine NEC is currently well served by rail and will benefit from improvements arising from the full implementation of the Regional Rail Link service uplifts and from Melbourne Metro, due to be in operation by 2026. These three centres are likely to experience the most significant productivity gains from improved transport access. On equity grounds, it will be important over the medium to longer term to support transport improvements to the East Werribee NEC and South Dandenong NEC/ Dandenong MAC because these will become increasingly important employment centres for their catchments, which include the rapidly growing suburbs on Melbourne's fringe.

Most of the recommendations for this need are about transport access to the NECs and other employment centres, such as Box Hill, Ringwood and Broadmeadows. However, based on learnings from other jurisdictions, there are a number of complementary land use and other interventions that could help transform and grow employment centres across Melbourne. These include:

- early designation of a key 'town centre' to connect a core to the remainder of the catchment
- early investment in place making, community and cultural infrastructure to make centres attractive places to live, work and invest in
- increasing residential and commercial densities along key transport corridors that feed the centres
- improving National Broadband Network (NBN) connectivity
- strong governance to manage the planning and infrastructure coordination.

INSIGHT: Major new roads?

In recommending a series of major expansions to Melbourne's motorway network, we thought carefully about the mixed feedback we received through consultation. This was notable for the Eastern Freeway to CityLink connection, which received both support and opposition, and on which our two citizen juries did not come to a decisive view. We also looked at the evidence available, including modelling that we commissioned. The modelling put all major transport projects in perspective, demonstrating that transport pricing reform and new technologies such as driverless vehicles have the potential to dwarf the contribution any one project might make. This is shown in figure 9, which compares the potential impact on accessibility to employment in Melbourne from the introduction of driverless cars and the construction of the Outer Metropolitan Ring Road.

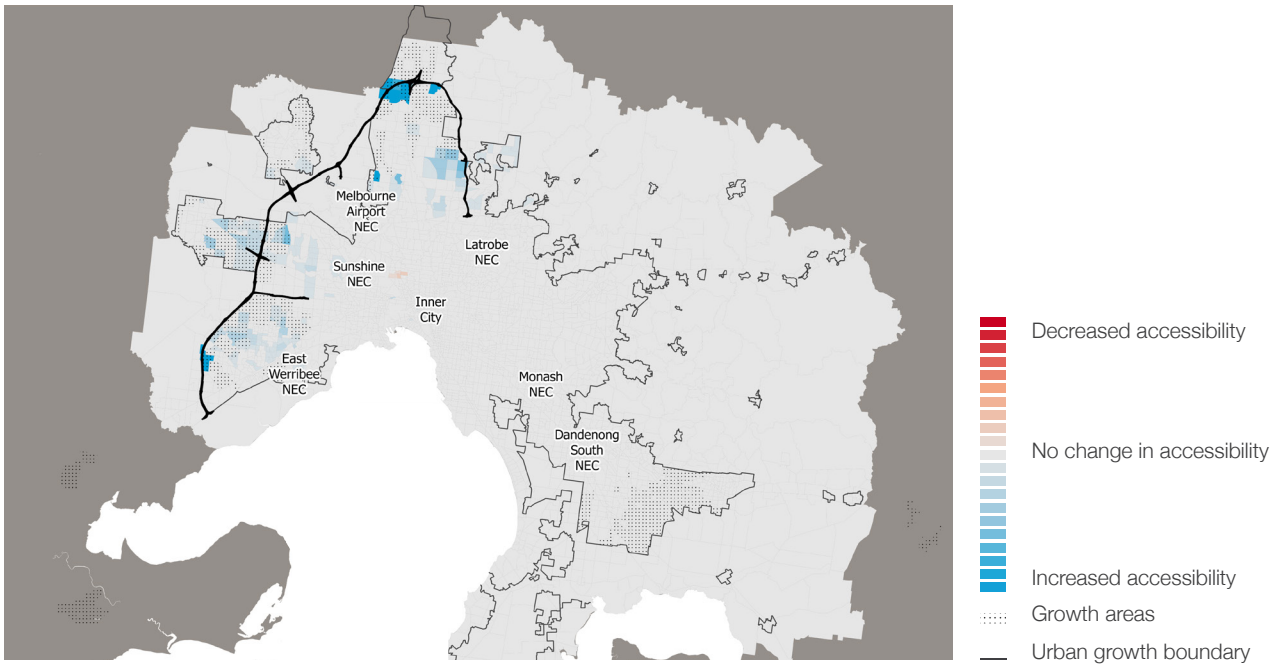
Of course, we need to be cautious about relying on models at the best of times, but particularly when looking at a technology that doesn't yet exist. The case study on driverless vehicles on page 33 emphasises that no one really knows when driverless vehicles will become commonplace on Victorian roads or how people will use them. Nonetheless, this modelling does show that Victoria can't build its way out of congestion and that we must not overstate the role of individual projects in a mature network, such as in the established suburbs of Melbourne.

What is less clear is the effect that new technologies might have on the need for these projects. Driverless vehicles are likely to mean the state can get greater use of the existing road network, offering the potential to defer further major investment. But based on what we know today of these technologies, they are likely to achieve best performance in motorway conditions – so perhaps additional connectivity in our motorway network will offer greater benefits. At this point in time, we think further expansions to Melbourne's motorway network are likely to be needed, but as with all of our longer-term recommendations, we must continue to be alert to the changing landscape, particularly new technologies.

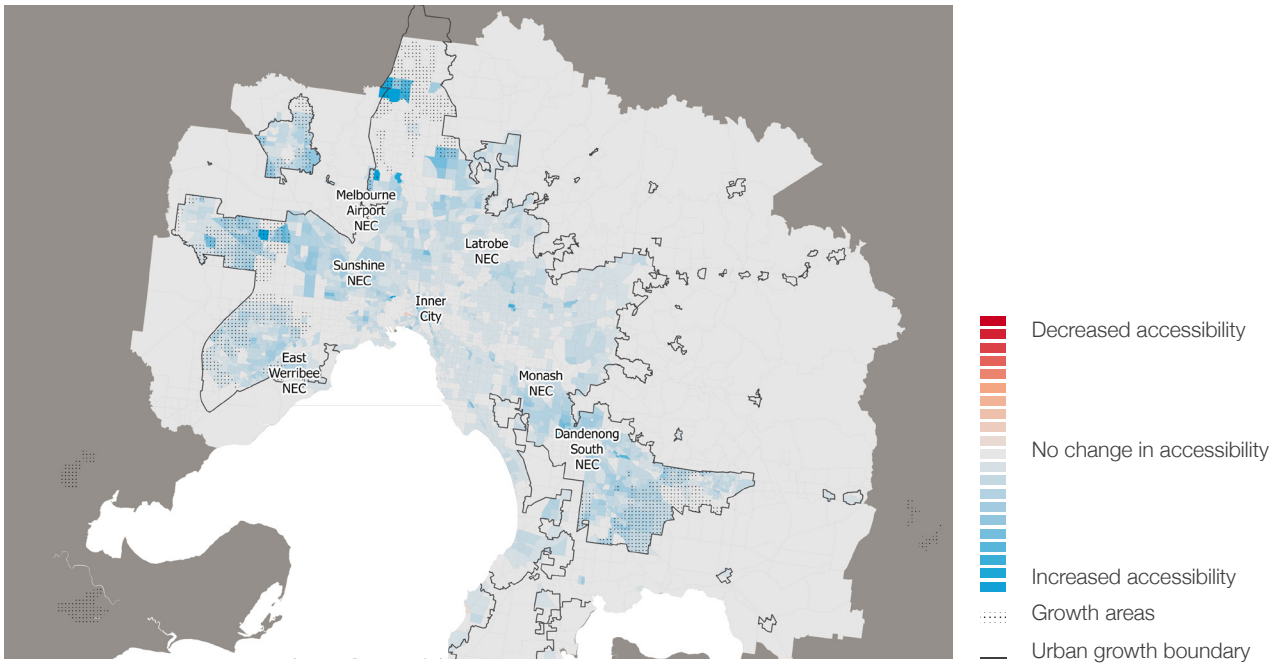
The modelling and economic analysis we commissioned showed both North East Link and Outer Metropolitan Ring Road as being relatively high-performing projects, offering substantial benefits in terms of linking people to employment across the city and improving freight reliability and travel times. The Outer Metropolitan Ring Road offered sweeping benefits around the north and west of Melbourne, but we think the introduction of this link needs careful management and land use integration to reap the greatest benefits and avoid the potential for it to drive less efficient, dispersed land use patterns. The North East Link provides accessibility through some of the most congested parts of the road network and improves access to major employment centres. It makes sense to proceed in the medium term, largely supporting existing land uses.

The Eastern Freeway to CityLink connection would also offer congestion relief, although there is evidence that it duplicates some of the effects of the North East Link. While the Eastern Freeway to CityLink connection offers greater congestion reduction in inner Melbourne, it could also increase congestion in other parts of the network such as the east and the relatively poor-performing northern part of the network. We still think there is some likelihood this project will be needed over the long term, but sequenced after better-performing projects. The focus for now should be on making sure the option is not precluded. Further work would be needed to identify the appropriate sequencing between this link and the more westerly section from CityLink to the Western Ring Road.

Figure 9: By 2046, a new Outer Metropolitan Ring Road is projected to increase accessibility to jobs in parts of Melbourne, but this contribution could be dwarfed by the impact of non-build solutions, such as driverless vehicles.



Projected change in accessibility to employment due to the Outer Metropolitan Ring Road, Melbourne, 2046



Projected change in accessibility to employment due to a driverless vehicle scenario, Melbourne, 2046

Source: KPMG/Arup/Jacobs, *Economic appraisal and demand modelling*, 2016

Timeline

Target for completion of recommendation or implementation period of program

- Changing behaviour/better use
- New or expanded asset(s)
- Planning/prioritisation or further investigation of new or expanded asset(s)

Anticipated construction/operation period

Location

- Statewide
- Melbourne

Sector

- All sectors
- Transport

Recommendation	0-5 years	5-10 years	10-15 years	15-30 years	Location, sector(s)
11.1 Promote growth in business activity, services and higher density housing in major employment centres and transport corridors to enable more people to live closer to jobs.					
11.1.1 Development in/around employment centres					Statewide, All sectors
11.1.2 Government service/ infrastructure planning					Statewide, All sectors
11.2 Make better use of the existing transport infrastructure to support an integrated multi-modal network linking major employment centres with the rest of the city.					
11.2.1 Metropolitan bus network					Melbourne, Transport
11.2.2 Road asset management					Statewide, Transport
11.2.3 Transport interchanges					Statewide, Transport
11.2.4 Level crossing removals					Melbourne, Transport
11.2.5 Road space allocation					Statewide, Transport
11.3 Upgrade and construct high-capacity public transport links between the major employment centre at Melbourne Airport and the CBD to create strong interstate and global links with the central city.					
11.3.1 Melbourne Airport bus					Melbourne, Transport
11.3.2 Melbourne Airport rail link					Melbourne, Transport
11.4 Build new transport links to enhance the accessibility of the major employment centres.					
11.4.1 Employment centre arterial roads					Melbourne, Transport
11.4.2 Growth area local buses					Melbourne, Transport
11.4.3 SmartBus network					Melbourne, Transport
11.4.4 Employment centre mass transit					Melbourne, Transport
11.4.5 Outer metropolitan arterial roads					Melbourne, Transport
11.4.6 North East Link					Melbourne, Transport
11.4.7 Outer Metropolitan Ring Road					Melbourne, Transport
11.4.8 Eastern Freeway-CityLink-Western Ring Road					Melbourne, Transport

Need 12.

Improve access to jobs and services for people in regional and rural areas

Meeting this need will help achieve objectives:

1. ● Prepare for population change
2. ● Foster healthy, safe and inclusive communities
3. ● Reduce disadvantage
4. ● Enable workforce participation
5. ● Lift productivity
6. ● Drive Victoria's changing, globally integrated economy
7. ○
8. ○
9. ○
10. ● Build resilience to shocks

Along with Melbourne, Victoria's regions play an important role in the state's economy, making significant contributions to sectors such as agriculture, tourism and energy production. Some of Victoria's regional cities are also growing strongly (in line with the broader trend towards urbanisation). There are, however, barriers to accessing jobs and services in the regions including comparatively poor digital and transport connectivity.

The population and economy of Victoria's regions are growing more slowly than metropolitan Melbourne, but they nonetheless make an important contribution to the state, particularly in industries such as agriculture, manufacturing, mining and tourism.

Growth within the regions also varies considerably, but is largely consistent with the broader trend towards urbanisation. While many rural areas are experiencing population decline, the three largest regional cities, Geelong, Ballarat and Bendigo, are all projected to be in the top 20 per cent of Victorian LGAs in terms of relative and absolute population growth over the next 30 years. Moreover, these and other smaller regional cities often serve much larger catchments as job and service centres.

Limitations in transport and digital networks can make access to jobs and services challenging in regional and rural areas. Distances travelled are typically longer and car dependence higher. Poor ICT connectivity is a significant barrier, with sub-optimal internet access and mobile black spots throughout the state (see figure 10). Given some of the challenges facing regional and rural areas, including higher rates of ageing, overall poorer socio-economic outcomes, and vulnerability to the impacts of climate change, these barriers can exacerbate disadvantage and impede economic growth.

Recommendations

The majority of the recommendations in the draft strategy have applicability to the state as a whole and would thus contribute to meeting this need in different ways. The recommendations below focus on improving connectivity to jobs and services for regional and rural Victorians via ICT and transport networks.

Addressing this need is complex because the growth profiles of different locations in regional and rural Victoria are so varied. For large and growing regional centres, the solutions are much the same as those in high growth areas of metropolitan Melbourne – increase urban densities to better leverage existing infrastructure and provide additional transport capacity and other infrastructure to new suburbs as required. For low growth areas, the focus is much more on maintaining basic services and infrastructure, noting that, in some cases, those basic levels are not provided. The recommendations below address both settings and have benefits for both high growth (Need 1) and low growth (Need 2) areas of regional Victoria.

Connections within and between rural towns and centres is clearly a focus under this need, but some of the recommendations under Needs 10 and 11 are also designed to benefit regional Victorians. This recognises that people living in regional and rural Victoria also need to be able to travel efficiently to and around Melbourne. We note that the introduction of new transport technology, including driverless vehicles, could be particularly transformative in regional and rural areas both from the perspective of increased mobility and improved safety, but this depends in part on improving ICT.

12.1 Roll out high quality service provision via mobility, technology and ICT to reduce the need for long-distance travel.

12.1.1 **Police communications channels.** Create new communications channels between the public and the police and broader justice workforce by delivering a non-emergency call centre (using the Police Assistance Line 131 444 available in other states) and supportive technology platforms within 0-5 years. When planning and delivering this system, consider whether it could support an integrated service model with human services and health (ref. MPW).

12.1.2 **Dispute resolution technology.** Review and remove barriers to the introduction of technology by the private sector that facilitates dispute resolution over 0-5 years, including by amending court procedures and professional regulations. This is aimed at improving access to justice and enabling case load to be diverted from courts, in particular the Magistrates' Court (ref. JSD).

12.1.3 **ICT infrastructure.** Improve ICT connectivity across Victoria, and particularly in major economic centres and rural and regional areas, over 0-10 years by using the Victorian Government's existing communications infrastructure base and significant purchasing power to maximise benefits from the NBN roll-out (and other Commonwealth initiatives) and ventures by private sector telecommunications providers. This would require a coordinated, partnership-based approach, with departments and agencies working with each other and with other levels of government and the private sector to identify and pursue opportunities to provide better ICT services (ref. ETP).

12.1.4 **Education delivery through technology.** Expand and accelerate the provision of ICT infrastructure in schools (such as Wi-Fi and video conferencing), with a particular focus on regional and rural schools and schools in disadvantaged areas, over 0-10 years, to support new ways of learning and enable the sharing of resources and teachers across school sites. This includes ensuring students in smaller schools have access to a wide range of curriculum such as Science, Technology, Engineering and Maths (STEM) subjects and languages other than English (ref. SRS).

12.1.5 **Health care ICT systems.** Improve the capability of digital health systems over 0-10 years. This will involve implementing digital clinical systems across public hospitals and health services, establishing clinical and research information exchanges and connecting all elements with a secure communications network. This will enable patient information to be shared within and between health service providers and the research community, improving quality and safety, coordinating services and enabling developments in medical research and technology (ref. EEA).

12.1.6 **Health care delivery through technology.** Expand the roll out of video conferencing and remote monitoring for health care and enable technologies to 'plug in' and share information over 5-10 years to deliver real-time, cost-effective and convenient health services (ref. TEH).

12.1.7 **Integrated community health hubs.** Expand the provision of integrated, community-based health hubs over 5-30 years, in partnership with a mix of health providers and other human services and justice service providers. This will allow for a greater focus on primary and preventative health, reducing pressure on hospitals (ref. ICP).

12.2 Strengthen transport links between regional centres and surrounding communities to provide additional access to opportunities.

12.2.1 **Road asset management.** Implement a performance-based road asset management framework within 0-5 years that sets a priority order of road users and identifies roads surplus to requirements. This work should be supported by a review of responsibility for roads between the state and local governments to ensure these responsibilities are consistent with the purpose of the road. This would include removing anomalies where the state is responsible for roads with a local transport function, and where local government is responsible for roads that provide an arterial road function that are difficult for the council to fund for maintenance. This would enable the development of well-targeted increases in road maintenance (ref. RMF).

12.2.2 **Innovative transport services.** Remove barriers to the entry of new market players offering innovative transport services within 0-5 years to increase travel options and encourage higher vehicle occupancy. Particular areas of opportunity include ride hailing, car pooling and private minibuses and coaches providing either on-demand or fixed schedule services through third-party applications. In regional areas, the ability to earn a supplementary income and provide much needed local on-demand transport has the potential for widespread community benefit. This should be undertaken with a review of metropolitan bus contracts to ensure that these new players are not contractually precluded or otherwise disadvantaged from entering the market (ref. MAS).

12.2.3 **Regional rolling stock.** Institute an asset management-based approach to a long term program of regional rolling stock procurement within 0-5 years, building on the 2015 *Victorian rolling stock strategy*. This program should implement a cycle for the continuous build of new regional rolling stock, incorporating the next generation regional train, that avoids the stop-start procurement of recent decades. This will enable the timely retirement of older rolling stock and the ability to meet the demands of increased patronage across the network (ref. RRS).

12.2.4 **Regional rail upgrades.** Further develop *Victoria's regional network development plan* within 0-5 years to transparently identify and prioritise the upgrades and enhancements required to remove physical and operational constraints on the existing regional rail network. High-priority projects that will increase the reliability of passenger services, reduce ongoing maintenance costs and support the delivery of additional services could include track duplications (for example, between Geelong to Waurn Ponds), replace ageing bridge assets (such as the Avon River bridge at Stratford) and upgrade signalling systems (for example, on sections of the line north of Bendigo) (ref. RRC).

12.2.5 **Regional highways.** Transparently identify and prioritise upgrades to regional highways that will increase productivity and safety for road users within 0-5 years. High-priority projects that will improve the level of service for commercial vehicles and improve safety and capacity for all road users could include highway duplications (for example on the Western Highway from Ararat to Stawell), road widenings with centre safety barriers (for example on the Goulburn Valley Highway), town bypasses (for example Shepparton and Traralgon), upgraded river crossings (for example at Swan Hill and Echuca), and upgrades to improve traffic flow such as overtaking lanes (ref. RHU).

12.2.6 **On-demand transport services.** Redeploy local community transport and taxis (or similar) to provide on-demand services in regional and rural areas, including for people who experience mobility challenges, within 0-10 years. This initiative may require ongoing subsides and regulation changes and should build on the recent trials of such services in Yarrawonga and Warrnambool. The first steps will be to refine the proposed service changes based on the evaluation of these trials and to identify high-priority locations for implementation (ref. PTA).

12.2.7 **Regional city local buses.** Provide new and expanded local bus routes within regional Victorian cities over 0-10 years. This requires the transparent identification and prioritisation of routes, which could include Ballarat and Wodonga, using the review methodology recently conducted on the Bendigo bus network. It would likely involve the provision of new buses, services and routes (ref. RBU).

12.2.8 **Regional coaches.** Provide new and expanded coach services between regional towns and cities over 0-10 years to provide greater opportunity for communities to access jobs and services in their regions. This requires the transparent identification of priority locations to improve connections with neighbouring centres and rail stations, which could include St Arnaud, Heathcote and Orbost. It would likely involve the provision of new coaches, routes and services (ref. RCU).

12.2.9 **Long-distance rail services.** Provide targeted additional rail services on existing long-distance lines over 0-10 years, with a focus on providing greater opportunity for communities to access to jobs and services in Melbourne and within their regions. The primary focus should be on delivering five services five days per week on the long-distance lines to Warrnambool, Bairnsdale, Albury-Wodonga, Echuca, Swan Hill and Shepparton (ref. RTL).

12.2.10 **Regional local road maintenance.** Provide additional support for road maintenance and upgrades in regional Victoria over 5-30 years, following further scoping of works and monitoring of outcomes of currently committed investment programs. This program will provide extra support to assist local government to maintain and upgrade local regional roads to improve access to jobs and services and meet the needs of first and last-mile freight in regional areas. A transparent framework to distribute funds should be developed, which relies on local government knowledge of priorities given its role as asset owners and managers. The Commonwealth Roads to Recovery program has allocated approximately $370 million to Victorian local government roads from 2015-16 to 2017-18, in addition to funds already committed by state and local government. The longer-term planning should identify and prioritise the need for regional road investment across the state (ref. RRU).

12.3 Build additional capacity on high-demand public transport routes in regional areas to meet growing demand.

12.3.1 **Geelong/Werribee/Wyndham rail.** Deliver new stations with rail capacity expansion on the existing Regional Rail Link corridor in western Melbourne to support these high growth areas while maintaining travel times and relieving overcrowding on the Geelong line within 5-15 years. Further work is required to determine the scope and sequence of this rail upgrade (ref. WVW, GWR and GRE).

12.3.2 **Torquay transport links.** Complete planning and investigation work within 0-5 years to protect a public transport corridor linking Torquay to Geelong. In the short to medium term, the growth in transport demand in this area can be met with regional bus upgrades (see Recommendation 12.2.7). As the population and transport demand continues to grow, this corridor is likely to require a higher-capacity bus or rail link within 15-30 years. This link would provide a viable alternative to private vehicles for local trips and commuting to the central city from these high growth areas (ref. TRE).

12.3.3 **Regional rail eastern corridor.** Identify trigger points that would require a major uplift in capacity on the Dandenong rail corridor within 0-5 years. It is likely this extra capacity will be required in the latter part of the 15-30 year period or potentially beyond 30 years. One solution could involve the construction of additional tracks along the corridor to support demand for increased rail services from the southeast of Melbourne and Gippsland. However, this is a particularly high cost solution and further network planning is required, considering both how to maximise the benefits of such an investment and all available options to better use existing infrastructure first. A number of factors will need to be considered in the future capacity planning for this corridor, such as demand for additional metropolitan and regional passenger services, the potential growth in the freight task from Gippsland and the location and timing of a second port (ref. RRE1).

Funding recommendations

The delivery of the following major projects is expected to involve significant costs. If government chooses to adopt these recommendations, a range of funding mechanisms should be considered.

Recommendation	General government revenue	User charges	Beneficiary charges	Property development	Asset sales	Donations and bequests
12.1.5 Health care ICT systems	✓	✓				
12.1.7 Integrated community health hubs	✓			✓		✓
12.2.3 Regional rolling stock	✓	✓				
12.2.4 Regional rail upgrades	✓	✓				
12.2.5 Regional highways	✓	✓				
12.3.1 Geelong/ Werribee/ Wyndham rail	✓	✓	✓	✓		
12.3.3 Regional rail eastern corridor	✓	✓	✓	✓		

✓ Potential funding mechanism

Funding recommendations – additional comments

Beneficiary charges should be considered for Geelong/Werribee/Wyndham rail if there is a substantial uplift in land values and business activity in the vicinity of the new train stations. New beneficiary charges could include land betterment levies on commercial and/or residential property and developer contributions. Some funding could also be sourced from existing developer contributions, such as the Growth Areas Infrastructure Contribution.

Property development could also be pursued for Geelong/Werribee/Wyndham rail, for example, selling or leasing land or air rights surrounding new train stations for commercial development. Commercial opportunities could range from commercial residential development to retail (such as cafés and shops) and businesses.

For the regional rail eastern corridor, should the extra capacity on the Dandenong rail corridor be required and the solution involve new train stations, beneficiary charges, such as developer contributions and land betterment levies, could be considered if there is a substantial uplift in land values and business activity in the vicinity of any new train stations. Existing user charges (public transport fares) should continue to be charged but are only expected to cover a portion of ongoing operating costs. Should there be additional capacity for rail freight, changes to user charges would be accounted for within the existing pricing structure set by the responsible rail regulator.

User charges could contribute funding for regional highway upgrades that have been identified and prioritised. Reforms to road user charges, particularly heavy vehicles, are needed so that charges are commensurate with the impact by those users. We recognise that this is underway through national reform processes.

Infrastructure Victoria is examining transport network pricing as part of our research program. We are considering how pricing regimes across all modes, including roads and public transport, could be used to change behaviour, manage demand and/or recover costs, and address equity concerns.

Opportunities for user charging could be examined for health care ICT systems, such as charging for access by private sector researchers.

Property development could be considered for integrated community health hubs. This could include leasing parts of the premises within or around the public infrastructure. Donations and bequests should also continue to be pursued; however, we recognise that they will only ever make a small contribution to a project.

Things we considered

We considered a number of rail options under this need that have not been prioritised for a variety of reasons. We know that returning rail services to Mildura and between Bendigo, Ballarat and Geelong are very well-supported options (ref. MPR and BBG), but they are also relatively high cost. We have prioritised increasing coach services and upgrading the existing passenger rail network and enabling more innovative transport solutions, including on-demand services, before considering expansions of the existing passenger network. We also considered whether to recommend a rail shuttle between Gippsland and Pakenham (ref. GPR). While this may be required over the long term, particularly if building new tracks on the southeast corridor proves to be unviable, it is too early to make a call either way. There is no easy solution on this corridor. Finally, we considered high-speed rail between Melbourne and Sydney and to Geelong (ref. HSR and GFR). While we haven't recommended high-speed rail as a priority given its high cost and other pressing needs across the state, the Victorian Government would need to be an active participant should the Commonwealth Government or the private sector seek to pursue such a scheme. Over the much longer term, it's possible that revolutionary new technologies will become available that bring down the cost and delivery of a much faster service than currently achieved in high-speed rail systems internationally.

INSIGHT: What can Victoria do to improve internet and mobile coverage?

Communications infrastructure in Australia is predominantly delivered by the private sector and regulated by the Commonwealth Government. The Productivity Commission is currently undertaking an enquiry to determine to what extent, in the evolving Australian telecommunications market, policies may be required to support universal access to a minimum level of retail telecommunications services. The findings of the inquiry will be available in April 2017 and will set the direction on this issue.

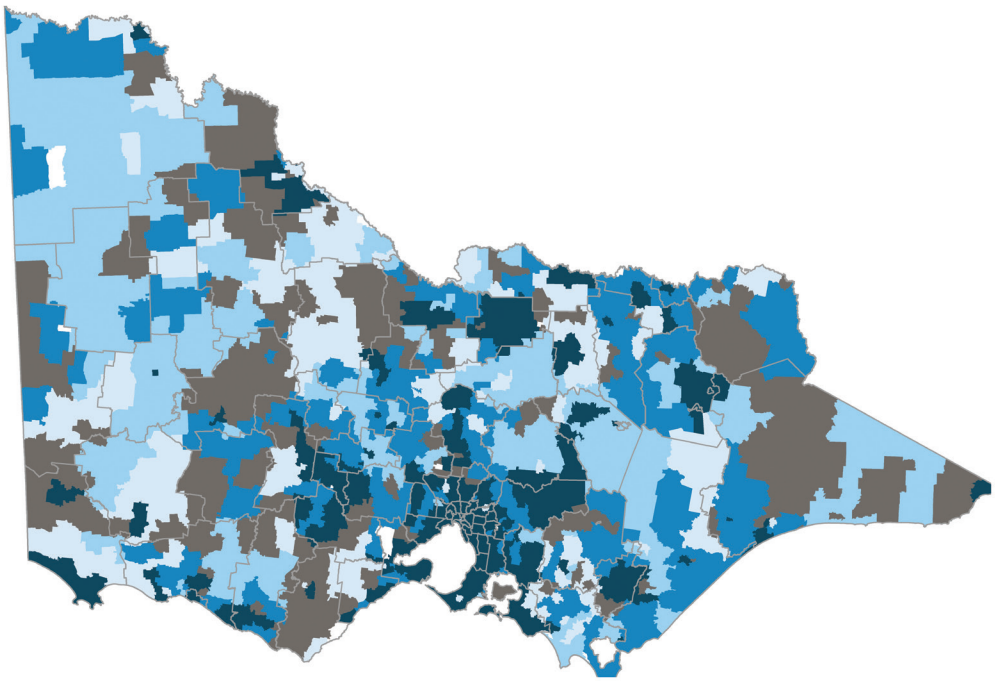
The State Government does, however, have some important levers for improving ICT connectivity across Victoria. It is both a communications infrastructure owner and a significant purchaser of ICT services. We've recommended government use these levers to influence the shape of Commonwealth initiatives and private sector ventures to get better outcomes for all parties and for the people of Victoria.

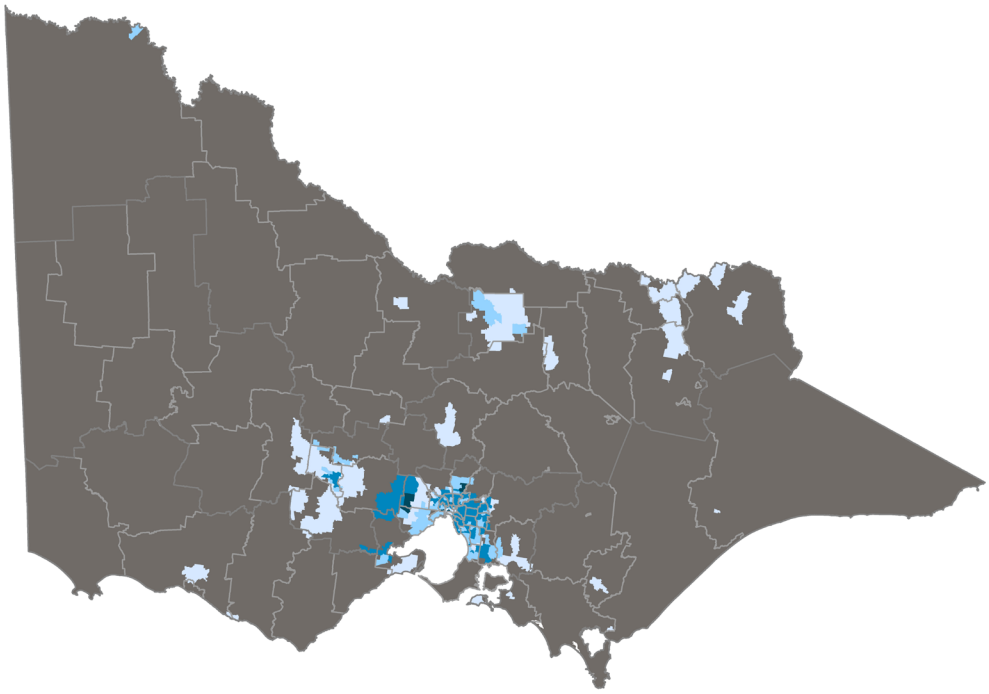
For example, VicTrack operates Victoria's second largest telecommunications network, providing primary telecommunications services for the transport sector. Included in its asset portfolio is a network of base stations and towers running along train lines. Opportunities therefore exist to partner with private communications providers to upgrade these assets for mutual benefit.

There are also potential opportunities arising from the expected transition of emergency management communications from existing traditional radio networks, which cover 96 percent of the land mass and 99 percent of the population, to new mobile systems that will enable greater interconnectivity and data sharing. Whatever solution is pursued, enhanced communications coverage will be required, which could be of broader benefit to the community.

The impact of such initiatives could be even more powerful if state government took a more coordinated, proactive approach to using and integrating its existing ICT networks and leveraging off the public sector's combined purchasing power.

Figure 10: In 2013, the availability of fixed broadband was patchy across Victoria, but the quality of broadband services was consistently poor in most regional and rural areas.





Source: Commonwealth Department of Communications, *MyBroadband data cube*, 2013

Note: The original data at Distribution Area level has been aggregated to suburb level on these maps. For the most up-to-date, small area information, see nationalmap.gov.au.

Timeline

Target for completion of recommendation or implementation period of program

- Changing behaviour/better use
- New or expanded asset(s)
- Planning/prioritisation or further investigation of new or expanded asset(s)

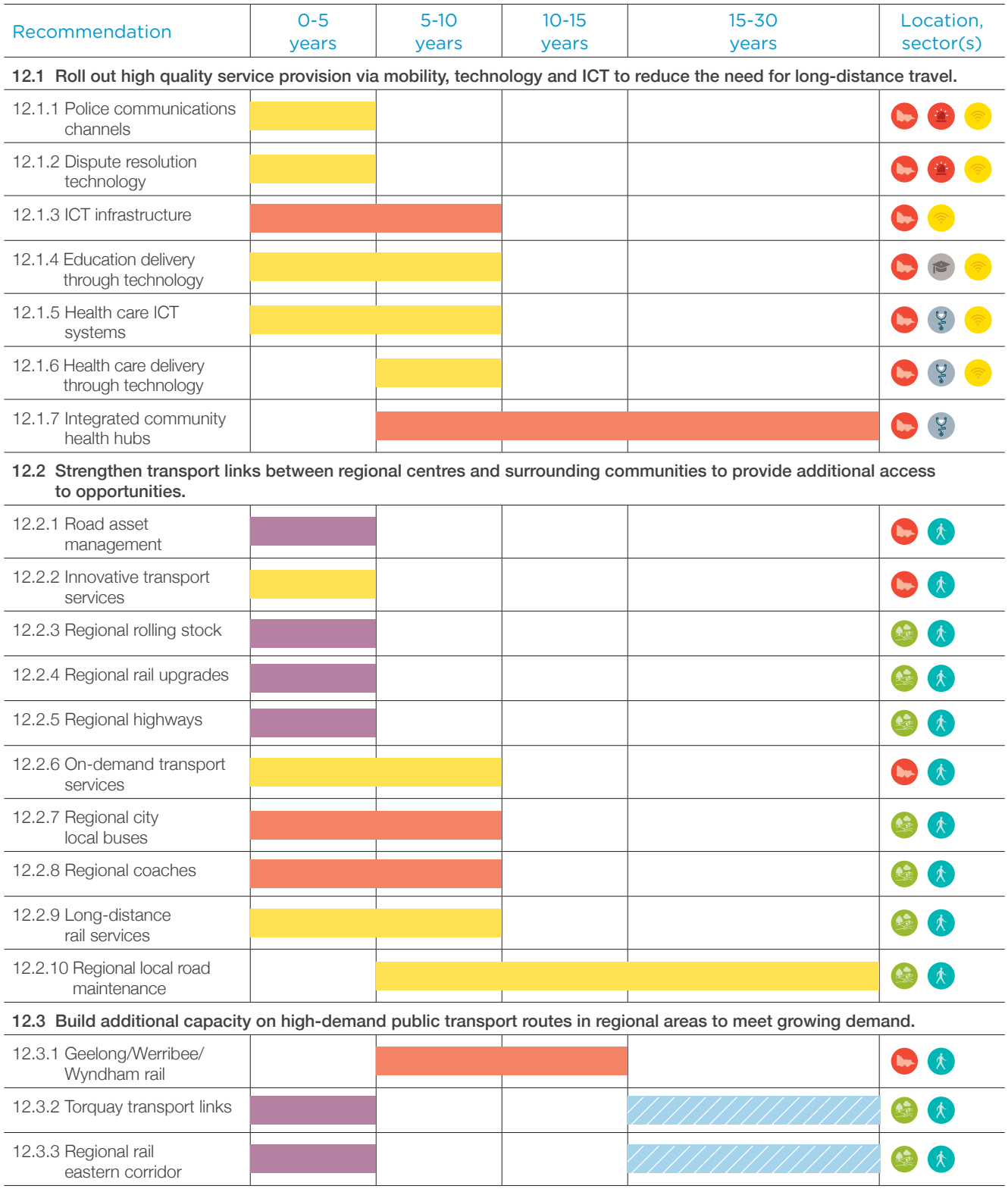
Anticipated construction/operation period

Location

- Statewide
- Regional and rural Victoria

Sector

- Transport
- ICT
- Education and training
- Health and human services
- Justice and emergency services



Need 13. Improve the efficiency of freight supply chains

Meeting this need will help achieve objectives:

1. ● Prepare for population change
2. ○
3. ○
4. ○
5. ● Lift productivity
6. ● Drive Victoria's changing, globally integrated economy
7. ○
8. ○
9. ○
10. ● Build resilience to shocks

Freight volumes across Victoria are expected to increase over the coming decades, though demand will be influenced by a number of factors including technological advances (such as 3D printing) and the consumer shift in growth from goods to services. There is a need to plan ahead for port capacity and address pressures across the freight network to improve transport efficiency.

As Victoria grows over the coming decades, freight volumes are expected to increase markedly, potentially reaching around 170 billion net tonne-kilometres per annum by 2046, an increase of over 125 per cent on present day levels. However, total volumes will be influenced by a number of factors, including logistics practices, technological advances (such as 3D printing), a changing climate, shifting agricultural locations, and a decoupling of freight demand from gross state product.

Reducing the cost of freight handling, storage and transport or improving reliability of supply chains (including first and last mile) will increase productivity in the coming years. For example, as nearly all of Victoria's freight is moved on roads, efficiency benefits are expected from the commitment to improved access to the Port of Melbourne. Business is also looking to technology as a key driver of supply chain efficiency.

The Port of Melbourne and the regional commercial ports are gateways for freight catchments extending throughout metropolitan Melbourne, regional Victoria and well into southern New South Wales, South Australia and Tasmania. In addition, airfreight is playing an increasing role in facilitating Victoria's trade, particularly for high-value, time-sensitive commodities (such as fresh produce bound for growing Asian markets). Victoria's ports have sufficient capacity to meet forecast demand for some time to come and are operating efficiently by world standards.

However, it is important that additional port capacity is available when required in the future, particularly for key trades such as containerised imports and exports, bulk liquid imports and regional exports. In the longer term, as the Port of Melbourne meets its maximum capacity, a second container port may be needed. Opportunities to expand existing or establish new facilities are limited, so careful planning is needed with long lead times. Constraining capacity at key gateways would have significant adverse impacts with both direct and indirect effects on the economy.

Recommendations

Improving the efficiency of freight supply chains in Victoria is critical for a range of sectors, including agriculture, manufacturing and retail, and for the functioning of the economy overall (see figure 11).

Many of the recommendations below are aimed at increasing the productivity and capacity of the freight network. This includes the introduction of transport network pricing, facilitating the deployment of connected and driverless vehicles, and upgrading and building roads. In many ways, these actions are just as important for moving freight as they are for moving people.

We also recognise that freight does not stop at the state border and it is critical that Victoria maintains high-capacity links to markets across land, air and sea. Infrastructure Australia has recommended the development of a national freight and supply chain strategy and we agree this is needed. Our recommendations have focused on steps Victoria can take to improve supply chains and link in with broader national plans, such as securing a site for the Western Intermodal Freight Terminal, to which the Commonwealth's proposed inland freight rail project could connect.

A range of strategic choices are still to be made, including the location of a potential second container port and the role of rail freight in supporting the freight task. Planning for an efficient freight network requires partnerships between government and industry and an integrated approach to land use planning.

13.1 Introduce a transport network pricing regime to manage congestion and obtain the most efficient use of the transport network.

13.1.1 **Transport modelling.** Improve transport modelling tools within 0-5 years to better assist long-term strategic transport planning, particularly to support the operation of driverless vehicles and the impact of transport network pricing on freight and people movements (ref. ABM).

13.1.2 **Transport network pricing.** Introduce a transport network price regime within 5-10 years that will reduce congestion and crowding and enable faster travel times for high-value trips, considering all modes and with a focus on addressing equity concerns. This reform will fundamentally change the way the transport network is used and will play an important role in preparing for the arrival of driverless vehicles and improving freight productivity (ref. TNP).

13.2 Prepare the road network and regulatory frameworks for the arrival of driverless freight vehicles.

13.2.1 **Traffic management systems.** Upgrade and expand advanced traffic management systems to manage flows on metropolitan motorways, employing tools such as lane use management, access ramp signalling, CCTV and variable message signs, over 0-10 years. This will improve the efficiency and reliability of the motorway network and could potentially apply to some key arterial routes such as the Hoddle Street/Punt Road corridor with benefits to freight reliability and traffic flows (ref. ATM).

13.2.2 **Driverless freight vehicles.** Remove regulatory barriers to enable the testing and deployment of freight vehicle platooning (trucks travelling in close proximity linked by technology and with minimal drivers) within 0-15 years. This could improve traffic flow, reduce fuel consumption, increase productivity and improve the carrying capacity of roadways. Further research and consultation will be required to develop a national approach to maximising the benefits of freight vehicle platooning (ref. DFV).

13.2.3 **Driver assistance applications.** Introduce regulatory changes, where needed, to enable the testing of advanced driver assistance applications and develop a prioritisation strategy for deployment of roadside units progressively over 0-15 years, acknowledging that the technology continues to evolve. Advanced Driver Assistance Systems will provide drivers with real-time information about the road environment, such as safety warnings, to improve safety and create more efficient traffic flow. The results of testing and the prioritisation strategy will inform the future deployment of roadside enabling ICT, starting with high-demand corridors and freeways (ref. ADA).

13.3 Increase the capacity and optimise the use of freight terminals for interstate and international trade.

13.3.1 **Freight precincts.** Identify existing and future potential precincts requiring planning protection in respect of air, land and sea freight operations within 0-5 years. These precincts are required to protect the future expansion of Victorian freight and logistics hubs in response to the growing freight task and to avoid negative impacts on surrounding land uses (ref. FPL).

13.3.2 **Port of Melbourne rail access.** Prepare a port rail access policy for the Port of Melbourne within 0-5 years. This will enable the preparation of a timely response to the first rail access strategy, which will be delivered by the new Port of Melbourne operator within three years of the signing of the port lease, as required under the *Delivering Victorian Infrastructure (Port of Melbourne Lease Transaction) Act 2016*. This will assist in assessing the potential proposals of a Port of Melbourne container shuttle and Webb Dock freight rail access. These projects have the ability to provide an alternative mode for the movement of freight in and out of the port and reduce congestion in and around the port area (ref. PMM and WDF).

13.3.3 **Western Intermodal Freight Terminal.** Identify trigger points within 0-5 years for the construction of the Western Intermodal Freight Terminal. Within this timeframe it is recommended that the location is finalised and land protected as the new facility may be required within 10-15 years. Factors affecting the timing of the operation of the new terminal include the capacity of the current Dynon intermodal terminal, potential for urban renewal projects in the Dynon precinct, the proposed delivery of the Inland Rail project and road congestion around the port entrance. This project has the potential to relocate the terminal closer to customers in the west of Melbourne and reduce the volume of truck movements in the central city (ref. WIF).

13.4 Improve the productivity of Victoria's existing freight transportation network.

13.4.1 **Regional highways.** Transparently identify and prioritise upgrades to regional highways that will increase productivity and safety for road users within 0-5 years. High-priority projects that will improve the level of service for commercial vehicles and improve safety and capacity for all road users could include highway duplications (for example on the Western Highway from Ararat to Stawell), road widenings with centre safety barriers (for example on the Goulburn Valley Highway), town bypasses (for example Shepparton and Traralgon), upgraded river crossings (for example at Swan Hill and Echuca), and upgrades to improve traffic flow such as overtaking lanes (ref. RHU).

13.4.2 **Regional rail gauge standardisation.** Standardise the rail gauge in northeast Victoria within 5-10 years and continue planning for the remainder of the broad gauge regional rail network to determine other priority areas for standardisation. The standardisation of the regional freight network will increase accessibility of rolling stock from across Australia, open up competition between Victoria's ports and reduce the transport logistics costs of freight rail (ref. RRG).

13.4.3 **High Productivity Freight Vehicles.** Roll out a program of upgrades to the road network supporting high mass High Productivity Freight Vehicles (HPFV), particularly bridges to accommodate heavier axle loads, over 5-15 years. The first step is to confirm the future HPFV network, then identify priority locations and works, focusing on supply chains that will benefit most. This program should be integrated with asset management plans and be undertaken in partnership with local government where appropriate. Work in this area will reduce the number of freight trips required, improving productivity, road safety and environmental performance (ref. HPF).

13.4.4 **Regional local road maintenance.** Provide additional support for road maintenance and upgrades in regional Victoria over 5-30 years, following further scoping of works and monitoring of outcomes of currently committed investment programs. This program will provide extra support to assist local government to maintain and upgrade local regional roads to improve access to jobs and services and meet the needs of first and last-mile freight in regional areas. A transparent framework to distribute funds should be developed, which relies on local government knowledge of priorities given its role as asset owners and managers. The Commonwealth Roads to Recovery program has allocated approximately $370 million to Victorian local government roads from 2015-16 to 2017-18, in addition to funds already committed by state and local government. The longer-term planning should identify and prioritise the need for regional road investment across the state (ref. RRU).

13.5 Increase the capacity and connectivity of Victoria's freight transportation network.

13.5.1 **North East Link.** Construct the North East Link within 10-15 years. As a first step, there needs to be a detailed assessment of alternative alignments. This link would enhance access to major employment centres, particularly the Latrobe NEC and the Epping, Ringwood and Broadmeadows MACs, through improved orbital road connectivity and improve the capacity of the freight network, particularly from the southeast and Gippsland (ref. NEL).

13.5.2 **Outer Metropolitan Ring Road.** Construct the Outer Metropolitan Ring Road within 15-30 years. As a first step, there needs to be further consideration of staging and integrated land use planning. The resulting redistribution of traffic would enhance access to major employment centres in the west and north, including the East Werribee, Sunshine and Latrobe NECs, Melbourne Airport and the Epping and Broadmeadows MACs and improve the capacity of the freight network (ref. OMR).

13.5.3 **Eastern Freeway-CityLink-Western Ring Road.** Plan for longer-term links between the Eastern Freeway and CityLink and between CityLink and Western Ring Road within 0-5 years to ensure future provision is not precluded, as these links may be required in the latter part of the 15-30 year period. While introducing transport network pricing would particularly attenuate demand on links to and through the congested central areas of Melbourne, emerging transport technologies and other uncertainties that could increase the need for these links make it prudent to review potential alignments and protect the corridor where appropriate. This has the potential to support accessibility to major employment centres as an alternative corridor to the M1 Monash and M80 Ring Road and improve the capacity of the freight network (ref. EWW and EWE).

13.5.4 **Regional rail eastern corridor.** Identify trigger points that would require a major uplift in capacity on the Dandenong rail corridor within 0-5 years. It is likely this extra capacity will be required in the latter part of the 15-30 years period or potentially beyond 30 years. One solution could involve the construction of additional tracks along the corridor to support demand for increased rail services from the southeast of Melbourne and Gippsland. However, this is a particularly high cost solution and further network planning is required, considering both how to maximise the benefits of such an investment, and all available options to better use existing infrastructure first. A number of factors will need to be considered in the future capacity planning for this corridor, such as demand for additional metropolitan and regional passenger services, the potential growth in the freight task from Gippsland and the location and timing of a second port (ref. RRE1).

Funding recommendations

Transport network pricing (Recommendation 13.1.2) is a major pricing reform that helps to change transport user behaviour. It could also generate revenue, which could help fund some transport infrastructure.

Infrastructure Victoria is also examining transport network pricing as part of our research program. We are considering how pricing regimes across all modes, including roads and public transport, could be used to change behaviour, manage demand and/or recover costs, and address equity concerns.

The delivery of the following major projects is expected to involve significant costs. If government chooses to adopt these recommendations, a range of funding mechanisms should be considered.

Recommendation	General government revenue	User charges	Beneficiary charges	Property development	Asset sales
13.3.3 Western Intermodal Freight Terminal	✓	✓	✓		✓
13.4.1 Regional highways	✓	✓			
13.4.3 High Productivity Freight Vehicles	✓	✓			
13.5.1 North East Link	✓	✓	✓		
13.5.2 Outer Metropolitan Ring Road	✓	✓	✓	✓	
13.5.3 Eastern Freeway-CityLink-Western Ring Road	✓	✓	✓		
13.5.4 Regional rail eastern corridor	✓	✓	✓	✓	

✓ Potential funding mechanism

Funding recommendations – additional comments

As commercial businesses will predominately benefit from the Western Intermodal Freight Terminal, business should significantly contribute to the cost of the project. General government revenue could contribute to part of the project if there are broad public benefits in the investment. Opportunities to raise additional funding for the Western Intermodal Freight Terminal could be pursued through beneficiary charges on commercial businesses. Beneficiary charges could be levied on land surrounding the terminal to ensure that government captures a portion of the increased value of that land following its site selection. Beneficiary charges, such as developer contributions or a land betterment levy could be applied and funding raised could be invested in supporting infrastructure for the terminal and terminal precinct. There may also be opportunities to sell or lease land at Dynon if those assets become surplus. User charges for access to the terminal should also be explored.

Beneficiary charges should be considered for North East Link, Outer Metropolitan Ring Road and Eastern Freeway-CityLink-Western Ring Road (should it go ahead) if there is a substantial uplift in land values and business activity in the vicinity of new projects. New beneficiary charges could include land betterment levies (based on land value increases) on commercial and/or residential property, following investigations to clarify the uplift in land value. Investing in major transport projects can increase land values from improved access to transport and jobs and reduced travel times for individuals and businesses, even in established areas. Developer contributions could also be considered for Outer Metropolitan Ring Road.

Funding for North East Link and Outer Metropolitan Ring Road should also include user charges. These user charges could be applied as part of a transport network pricing regime or tolls could be charged ahead of such a reform. This funding approach could also be applied for Eastern Freeway-CityLink-Western Ring Road should it be pursued in the longer term following planning work.

For the regional rail eastern corridor, should the extra capacity on the Dandenong rail corridor be required and the solution involve new train stations, beneficiary charges, such as developer contributions and land betterment levies, could be considered if there is a substantial uplift in land values and business activity in the vicinity of any new train stations. Existing user charges (public transport fares) should continue to be charged but are only expected to cover a portion of ongoing operating costs. Should there be additional capacity for rail freight, changes to user charges would be accounted for within the existing pricing structure set by the responsible rail regulator.

User charges could contribute funding for regional highway upgrades that have been identified and prioritised. Reforms to road user charges, particularly heavy vehicles, are needed so that charges are commensurate with the impact by those users. We recognise that this is underway through national reform processes.

Things we considered

Our responses to this need have been made in the context of considerable uncertainty. Transition of the Port of Melbourne long-term lease is imminent, the location of a second container port is subject to further advice (discussed further on the next page), and Commonwealth plans for national freight networks are in development. We expect to be in a stronger position to make recommendations and determine and address any public interest issues once these uncertainties are resolved, but in the meantime we have still identified opportunities to improve the efficiency of freight supply chains.

There is a tension between providing road and rail in support of freight. We recognise that freight moved by road is often more cost competitive than moving freight by rail. This is largely because road freight operators do not pay the full cost of their use of the public road network (for example, ongoing maintenance costs). Further research is required to determine the most efficient combination of road and rail infrastructure required to support the Victorian economy. We will also monitor the progress of the Commonwealth Government's proposed Inland Rail project for improving freight operations between Melbourne and Brisbane.

One of the options we considered was the construction of a new airport in southeast Melbourne (ref. IAS), a facility that could potentially offer benefits for both passengers and freight. We note that Infrastructure Australia found that the regulatory framework for airports appears to be working appropriately, but recommended that new airports be planned to ensure curfews and other restrictions are avoided. While the decision to develop new airports is ultimately one for the private sector, and we do not see a need for government investment, there is a clear role for state government in responding to proponents by facilitating approvals and putting in place the appropriate land use controls.

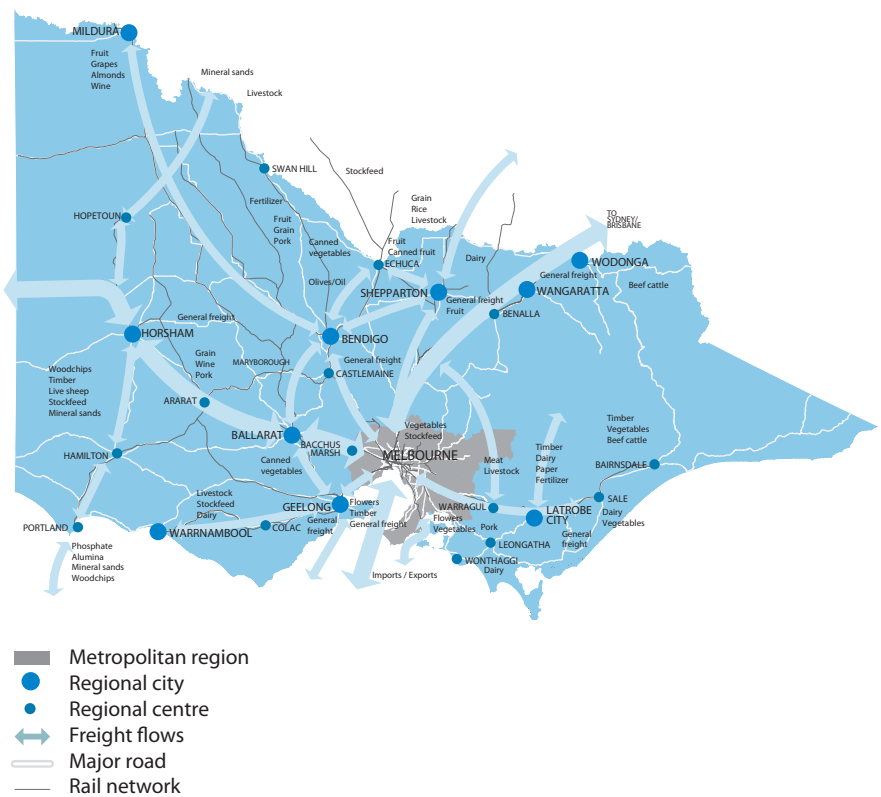
INSIGHT: A new port?

When Victoria will need a second port and where it might be located are decisions that will have a significant impact on the shape of future Victorian supply chains. They are also decisions that must consider significant uncertainty. Shifting global patterns of production and consumption, technological disruption and changing expectations around environmental and social amenity are difficult to predict, but all influence the timing and location of a second container port.

The decision to proceed with a second container port is unlikely to be required for some time, and it will be important for government to understand the triggers and lead times associated with developing a second port. Keeping options open for longer can incur some costs, but there are also big costs and many risks associated with making the decision prematurely. Making a decision on incomplete information risks getting the decision wrong, which would have significant negative consequences for Victoria's economy, environment and society.

The draft strategy does not include a recommendation related to the timing or location of a new port (even though this was an option considered during consultation), as government has specifically asked Infrastructure Victoria to provide advice on these matters by May 2017. However, scenario analysis of what this could mean for related options, such as major landside transport links, has informed our recommendations on a range of road and rail projects.

Figure 11: Efficient freight supply chains are critical to the success of Victoria's regions and the state economy.



Note: Latrobe City is the grouping of Traralgon, Morwell, Moe and Churchill.

Source: Victorian Department of Transport, Planning and Local Infrastructure, *Plan Melbourne: Metropolitan planning strategy*, 2014

Timeline

Target for completion of recommendation or implementation period of program

- Changing behaviour/better use
- New or expanded asset(s)
- Planning/prioritisation or further investigation of new or expanded asset(s)

Location

- Statewide
- Melbourne
- Regional and rural Victoria

Sector

- Transport
- ICT

Anticipated construction/operation period

Recommendation	0-5 years	5-10 years	10-15 years	15-30 years	Location, sector(s)
13.1 Introduce a transport network pricing regime to manage congestion and obtain the most efficient use of the transport network.					
13.1.1 Transport modelling					
13.1.2 Transport network pricing					
13.2 Prepare the road network and regulatory frameworks for the arrival of driverless freight vehicles.					
13.2.1 Traffic management systems					
13.2.2 Driverless freight vehicles					
13.2.3 Driver assistance applications					
13.3 Increase the capacity and optimise the use of freight terminals for interstate and international trade.					
13.3.1 Freight precincts					
13.3.2 Port of Melbourne rail access					
13.3.3 Western Intermodal Freight Terminal					
13.4 Improve the productivity of Victoria's existing freight transportation network.					
13.4.1 Regional highways					
13.4.2 Regional rail gauge standardisation					
13.4.3 High Productivity Freight Vehicles					
13.4.4 Regional local road maintenance					
13.5 Increase the capacity and connectivity of Victoria's freight transportation network.					
13.5.1 North East Link					
13.5.2 Outer Metropolitan Ring Road					
13.5.3 Eastern Freeway-CityLink-Western Ring Road					
13.5.4 Regional rail eastern corridor					

Need 14.

Manage threats to water security, particularly in regional and rural areas

Meeting this need will help achieve objectives:

1. ● Prepare for population change
2. ○
3. ○
4. ○
5. ○
6. ○
7. ● Promote sustainable production and consumption
8. ● Protect and enhance natural environments
9. ● Advance climate change mitigation and adaptation
10. ● Build resilience to shocks

Victoria's history of drought makes us acutely aware of how important it is to manage water resources sustainably. The demands of a growing population and climate change will put this resource under further pressure. The impacts of water scarcity affect the state as a whole, but are most acutely felt in regional and rural areas.

Water security is about ensuring that households, the community, agriculture, industry and the environment can sustainably access adequate quantities of acceptable quality water for a range of purposes.

The experience of water security varies across Victoria. Investment in water infrastructure has increased water supply security for Melbourne, Geelong, Ballarat and Bendigo. With construction of the Wonthaggi desalination plant, Melbourne in particular has a more secure water supply. Major irrigation modernisation projects around the state and particularly in the north are minimising water losses and making additional water available for other uses. The ability to carry over or trade water has been key in allowing farmers in northern Victoria to manage water supply risks, and environmental water entitlements have improved water security for the environment. Victorians have demonstrated their ability to minimise water use in dry periods and manage water resources more carefully.

Regional and rural supply systems are still, however, vulnerable to low levels of water security during extended dry periods. The impacts of climate change for Victoria include warmer and drier conditions indicating that we need to think differently about how we use and manage water. This includes, for example, less reliance on rainfall-dependent water sources. Victoria also has access to alternative sources of water such as treated wastewater and stormwater. These resources are currently underutilised; however, they have potential to increase water security, while improving environmental outcomes by conserving available resources.

Recommendations

Victoria has been a pioneer in various aspects of water resource management, including water entitlement frameworks, water trading and academic research into stormwater management. The sector is also generally responsive to reforms and initiatives.

The recommendations below seek to leverage on these strengths as water resources become scarcer. They are also framed around key learnings from water management during the millennium drought.

There is potential for stronger governance frameworks to enable long-term planning in the interests of customers. Transparent governance arrangements that separate policy, regulatory and delivery functions will better position the water sector to liaise with customers and deliver outcomes that innovatively improve water security.

Climatic variability and population growth forecasts mean that the timing for major supply augmentation is uncertain. In Melbourne, for example, this could occur anywhere within 15 to 30-plus years. The recommendations below seek to delay major augmentation projects for as long as possible, while ensuring that clear structures are in place for the water industry to evolve as required to make efficient long-term decisions.

14.1 Increase efficiency in meeting water demands.

14.1.1 **Water governance.** Clarify roles, responsibilities and governance structures in the water sector within 0-5 years. Changes should be designed to enable: innovative solutions to source and use water, while providing appropriate regulatory oversight on aspects ranging from public health impacts to monitoring and pricing; all types of water use to be captured in a consistent manner, including water for firefighting and water for recreational use; optimal use of existing infrastructure; and efficient long-term planning and investment in the interests of customers (ref. WIO2).

14.1.2 **Water trading.** Introduce more sophisticated water trading that better represents existing and emerging water uses across the state, as well as the emergence of new water products, over 0-10 years. This will assist, particularly during dry periods, in allowing distribution of water across competing demands through the use of price signals. Further research on the policy and technological settings required to maximise the potential of the water market will be needed (ref. WME).

14.1.3 **Irrigation water delivery.** Deliver modernisation or pipelining projects for irrigation water delivery systems in areas where this is yet to be addressed within 0-10 years to ensure systems across the state are operating with minimal water losses. This closes out the range of initiatives to improve delivery efficiency in irrigation systems (ref. WDE).

14.2 Conserve readily available water resources.

14.2.1 **Recycled water (non-potable use).** Introduce a targeted incentive fund within 0-10 years to increase uptake of recycled treated wastewater delivered through reticulated systems (third-pipe schemes) where there is potential for significant reduction in demand for water from storages (ref. RTH).

14.2.2 **Stormwater harvesting.** More comprehensively and consistently invest in stormwater harvesting projects at greenfield sites over 5-30 years. The first step to achieving this is to formally incorporate stormwater as a water resource in statutory instruments and water resource planning frameworks. In addition to boosting water supply, this measure provides environmental benefits as harvesting slows the rate at which storm water drains into waterways, thereby minimising erosion and pollutant loading (ref. SRH).

14.3 Plan for the long-term availability of rainfall-independent water supply sources.

14.3.1 **Major water supply augmentation.** In liaison with water businesses, transparently determine trigger points for major water supply augmentation within 0-5 years to enable timely investment decisions in the long-term interests of the community. Major water supply augmentation may be required in 15-30 years or beyond. To increase water security, consideration of rainfall-independent technologies is appropriate. Choice of technologies may be staged over time and would require engagement with the community. Consideration of suitable technologies should include:

- recycling wastewater for drinking (ref. RWW)
- increasing the capacity of Wonthaggi desalination plant from 150 GL to 200 GL (ref. WDP)
- additional groundwater capacity (ref. WSA1)
- new major desalination capacity elsewhere in the state (ref. WSA1).

Funding recommendations

The delivery of the following major project is expected to involve significant costs. If government chooses to adopt this recommendation, the following funding mechanism should be considered.

Recommendation	General government revenue	User charges	Beneficiary charges	Property development	Asset sales
14.3.1 Major water supply augmentation		✓			

✓ Potential funding mechanism

Funding recommendations – additional comments

We recommend determining trigger points for major water supply augmentation within 0-5 years to enable timely investment decisions in the long-term interests of the community. Water projects are typically funded through user charges. Future water investments should continue to be funded through user charges, providing a clear price signal to incentivise users to use water efficiently. Like other user charges, government would need to consider balancing competing objectives, such as changing behaviour, managing demand, cost recovery and addressing social and environmental impacts.

Things we considered

Key assumptions behind the recommendations for this need are that the recently announced water price review by the Essential Services Commission will be implemented as proposed, and that existing water use efficiency programs and processes to implement water demand reduction initiatives when required continue to operate and are developed further. The recommendation for the introduction of a more sophisticated water market also includes scope to consider pricing over the long term.

One of the options we considered for meeting this need was further utilising recycled water for agriculture (ref. RTA). This is already being explored successfully in some areas and opening up new opportunities for the agricultural sector. There was, however, limited evidence to produce a clear recommendation on supplementing current large-scale demand for water for irrigation from storages with recycled water. Key factors were uncertainty around future market requirements and possible changes in location and types of agricultural activities over the 30-year timeframe.

We also considered the role of domestic greywater recycling (ref. DGR), that is diverting and reusing all household wastewater except toilet water, in contributing to water security. While there is potential for greenfield sites to be developed to incorporate greywater recycling, further research is required on the level to which this option should be applied. For example, evidence on a cost-effective level of treatment, scale of application and broader wastewater management impacts would inform a recommendation.

Similarly, we considered whether additional infrastructure connectivity and optimisation is required (ref. WIO1). While a range of smaller-scale projects has been identified, longer-term uncertainty on the cost-effectiveness of large-scale connections prevented a clear recommendation on this.

Building major new dams as a long-term strategy to increase water security is not recommended (ref. WSA2). Evidence suggests that stream flows in Victorian catchments are likely to decrease with climatic variation. Opportunities to site dams with suitable yields for major water supply augmentation are very limited and would require consideration of environmental impacts.

INSIGHT: Governance and the water cycle city?

The objectives of water management have changed over time from securing large quantities of water to supply growing cities, to minimising public health safety risks through wastewater management, to mitigating flood impacts by providing drainage, and more recently to incorporating principles of environmental sustainability.

Recognising interdependencies of the water cycle is important in water management planning. Research suggests that we are in the phase of the 'water cycle city', defined as conserving available water resources while actively considering a diverse range of new supply sources to meet fit-for-purpose uses. This means, for example, considering how to optimally match rainfall run-off, stormwater, groundwater, recycled water, greywater and desalinated water resources to household, irrigation and industrial demands.

There is growing interest in solutions to secure water resources as cities around the world grapple with growing populations, environmental degradation and the broader impacts of climate change. However, research drawing on information from Australia, New Zealand and Canada also indicates that in moving towards a total water cycle approach to urban water management, institutional barriers present a major hurdle to overcome. This is because institutional arrangements generally reflect 'older' water management objectives such as large-scale, centralised water supply and a conservative approach through risk-free preferences.

Going forward, however, and considering the significant investments required for major water supply augmentation, governance arrangements that enable informed community debate, innovation and adaptability are more likely to lead to environmentally sustainable and cost-effective approaches to water management that may begin to fully realise the vision of the water cycle city. In some cases this may mean localised solutions that increase resilience while utilising available water resources.

Timeline

Target for completion of recommendation or implementation period of program

- Changing behaviour/better use
- New or expanded asset(s)
- Planning/prioritisation or further investigation of new or expanded asset(s)

Location

- Statewide
- Regional and rural Victoria

Sector

- Water and waste
- Science, agriculture and environment

Anticipated construction/operation period

Recommendation	0-5 years	5-10 years	10-15 years	15-30 years	Location, sector(s)
14.1 Increase efficiency in meeting water demands.					
14.1.1 Water governance					
14.1.2 Water trading					
14.1.3 Irrigation water delivery					
14.2 Conserve readily available water resources.					
14.2.1 Recycled water (non-potable use)					
14.2.2 Stormwater harvesting					
14.3 Plan for the long-term availability of non-rainfall-dependent water supply sources.					
14.3.1 Major water supply augmentation					

Need 15.

Manage pressures on landfill and waste recovery facilities

Meeting this need will help achieve objectives:

1. ● Prepare for population change
2. ○
3. ○
4. ○
5. ○
6. ○
7. ● Promote sustainable production and consumption
8. ● Protect and enhance natural environments
9. ● Advance climate change mitigation and adaptation
10. ● Build resilience to shocks

Despite increasing rates of recycling across Victoria, growth in population and industries will mean more waste. Current trends indicate that total waste generation could increase significantly over the next 30 years, placing pressures on landfills and resource recovery centres. How waste is minimised and managed will be a continuing challenge for the state, particularly in the medium to long term.

Victorians generate approximately 12 million tonnes of waste per year. This figure is expected to reach over 20 million tonnes by 2046. The construction and demolition sector is the largest contributor of waste, producing around 44 per cent of all waste generated. This is followed by commercial sectors at around 32 per cent, and municipal waste at around 24 per cent. It is not simply population growth that contributes to waste generation, but the associated economic activities such as building new homes and infrastructure. Given this, it unsurprising that 80 per cent of waste is generated in metropolitan Melbourne.

Waste management is important for all Victorians, but more so for communities in areas where alternative land use options are limited. There is sufficient capacity within Victoria's landfills to accommodate waste over the next ten years. There is, however, a gap in clear and publicly available information on the location of existing landfills and the distances required between these sites and other land uses. Information signalling the location of future landfill and waste management sites is also difficult for industry and the community to access. These gaps can lead to unintended land use conflicts now and in the future and create uncertainty in the waste management industry, preventing long-term planning, investment and innovation.

Currently, 66 per cent of all waste material generated in Victoria is recovered through waste recovery facilities or recycling facilities. These facilities are expected to come under pressure over the next five to 15 years. The composition of waste is also changing as products and consumer choices evolve over time. To ensure that waste is managed in a sustainable manner as the state grows and prospers, there is a need to rethink initiatives in this area.

Recommendations

Waste management infrastructure in Victoria is predominantly privately owned and operated, but state government still has a role in ensuring appropriate system design to secure better environmental, social and economic outcomes and ensuring that planning and approvals processes do not threaten adequate capacity.

The recommendations below focus on how state government can help increase resource recovery rates and secure capacity for waste management and landfill. They highlight areas where planning provisions need to provide more certainty for the market and enable greater community engagement on what the future of waste management should look like, including where waste management facilities should be located. They also indicate that pricing mechanisms will need to be reformed over the longer term to better reflect the true cost of waste to landfill, incentivise waste minimisation and recovery and better enable uptake of more efficient technologies, though we have not recommended a particular model.

The waste industry is also heavily dependent on the transport system and would benefit from recommendations in Need 13.

15.1 Incentivise waste minimisation and remove barriers to increasing waste recovery rates.

15.1.1 **Recycled materials in construction.** Remove barriers in public sector procurement processes that limit use of recycled materials that meet technical specifications in the building and construction market within 0-5 years (ref. RMU).

15.1.2 **Organic waste.** Accelerate actions identified in the *Victorian organics resource recovery strategy* to increase recovery of organic waste sent to landfill and address the low rates of recovery, such as 3 per cent for food waste in 2011-12, within 0-10 years (ref. OWM).

15.1.3 **Waste pricing.** Review waste disposal charges to landfill and investigate different pricing mechanisms within 0-5 years. It is anticipated that the system will need to be reformed within 15-30 years to better reflect the true cost of waste disposal to landfill. Investigation should include research and community engagement on the roles of different pricing mechanisms, including household waste disposal fees (ref. HWD).

15.2 Secure capacity for waste management.

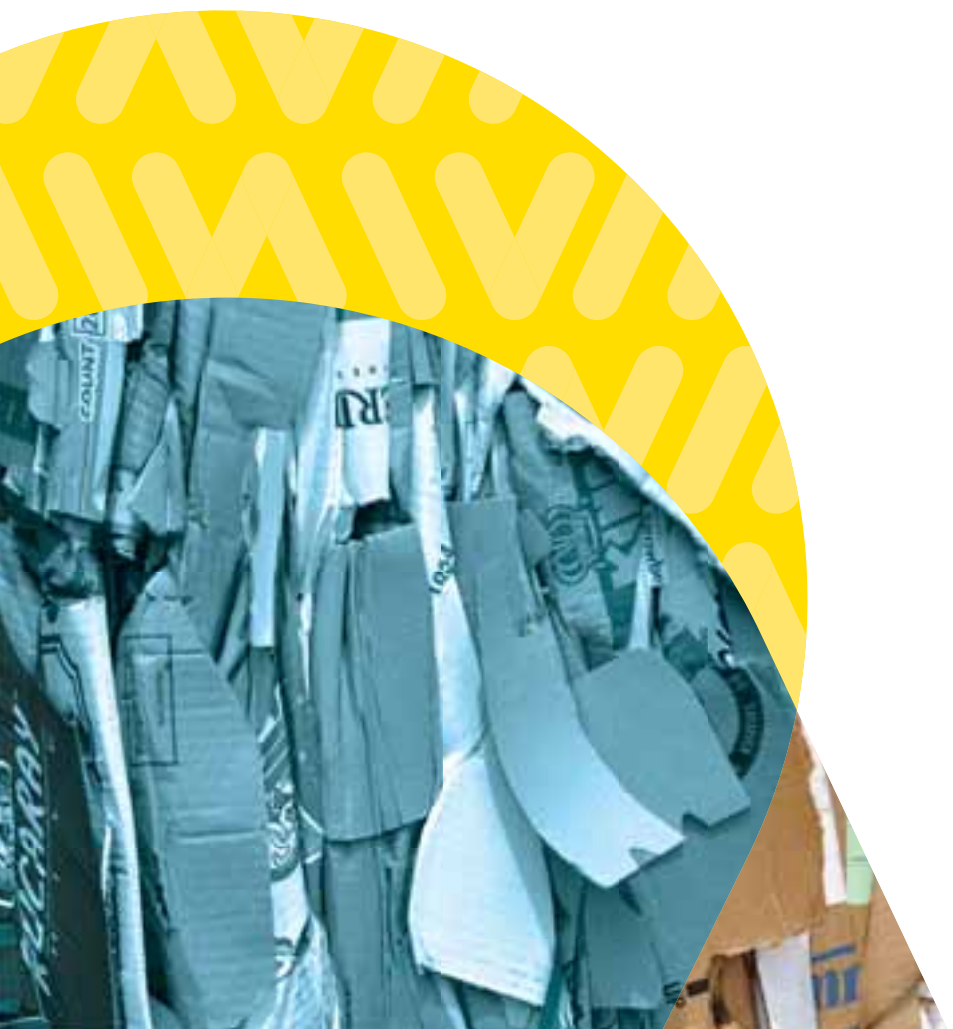
15.2.1 **Landfill buffers.** Revise planning provisions to provide greater guidance for landfills and sensitive land uses and greater integration of the Environmental Protection Agency's buffer zones for landfills within 0-5 years. Land use conflicts with sensitive land uses could be managed by applying the 'reverse amenity' principle. This aims to ensure that sensitive land uses are not located or designed in ways that would expose people to unacceptable amenity impacts. The use of zones, overlays and particular provisions could also be considered to streamline, create consistency and improve decision-making processes (ref. FLS).

15.2.2 **Waste management sites.** Minimise barriers to long-term investment in waste management infrastructure by ensuring that planning provisions for future waste management and landfill sites are clear, transparent and easy for agencies, industry and the community to understand within 0-5 years (ref. FWL).

Funding recommendations

Following the recommended review of waste pricing (Recommendation 15.1.3), government may pursue a major pricing reform that could aim to change behaviour to reduce waste going to landfill by better reflecting the true cost of waste disposal.

Government should consider a number of issues when designing waste pricing. This user charge should better reflect the cost of waste disposal. The pricing regime will need to be designed carefully to prevent creating perverse incentives like illegal dumping and to address equity concerns.



Things we considered

Consultation highlighted that the success of waste minimisation and recovery is highly dependent on community engagement. While recommending educational programs was considered beyond the scope of this infrastructure strategy, we acknowledge the importance of this aspect of waste management.

Consultation also revealed that consolidation of most landfill sites (ref. LOC) tends to happen as part of operational business decisions. This option has therefore been assumed to be base case, acknowledging that limited evidence was available to recommend specific additional actions for landfill sites in regional areas.

Government has committed to banning e-Waste to landfill and released a consultation paper to this effect. We have assumed that actions will be developed out of this consultation process and implemented, so the option on this is now considered base case (ref. EWS).

Another option we considered was using waste to generate energy (ref. EGW). This involves consideration of waste incineration as a future method of waste disposal. This approach has been successfully adopted in a number of European countries. However, with the clarification of pricing mechanisms and planning processes, we think the market is best placed to respond to new technologies and opportunities for innovation in waste management. There is no clear role for state government.

In considering pricing mechanisms that could minimise waste being sent to landfill, we recognise that household waste disposal fees were not supported in consultation; however, evidence and international examples suggest that there is merit in considering this option in determining an appropriate pricing mechanism. We also considered whether an increase to the existing landfill levy would be effective (ref. LLI). There is limited evidence to demonstrate the effectiveness of landfill levy charges in influencing waste recovery and therefore a clear recommendation was not made on this.

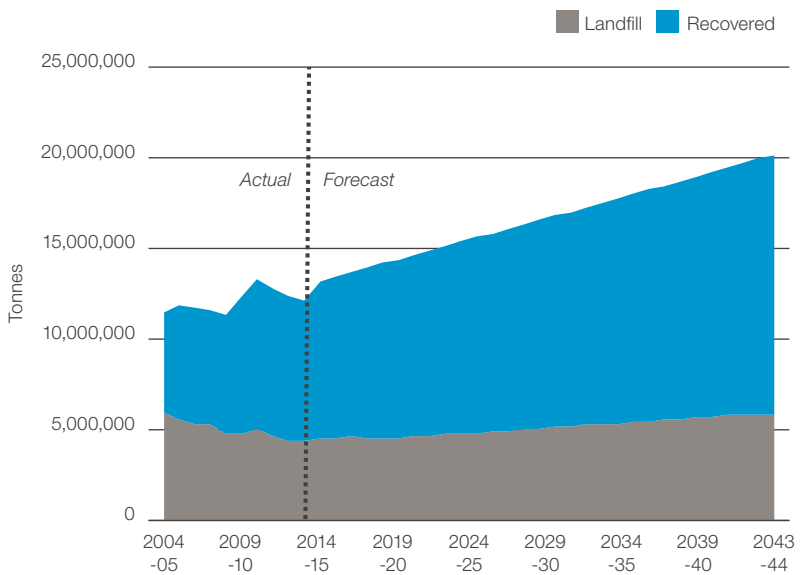
INSIGHT: The future of waste?

Progress has already been made in Victoria to reduce the amount of waste going to landfill. The proportion of waste recovered has been increasing and this trend is expected to continue over the coming decades (see figure 12). But the state still has a long way to go.

In Sweden, 99 per cent of household waste is recovered, partly due to the widespread conversion of waste to energy through incineration. Technological advances have made this method cleaner and more viable. Sweden is also now looking at how it can move further up the 'waste hierarchy' to minimise the amount of waste produced in the first place.

We have not recommended specific waste recovery technologies, such as converting waste to energy, on the basis that these innovations should be market led in the Victorian context. Having the right price signals in place should, however, make such technologies more viable and encourage waste minimisation. The challenge for government is enabling long-term planning and finding an effective pricing mechanism.

Figure 12: Although the recovery rate is rising, Victorians are forecast to generate over 50 per cent more waste over the next 30 years, of which approximately 150 million tonnes is expected to go to landfill.



Source: Sustainability Victoria, *Waste resource recovery projection model v1.1*, 2013

Timeline

Target for completion of recommendation or implementation period of program

Changing behaviour/better use

Planning/prioritisation or further investigation for behaviour change/demand management initiatives

Anticipated construction/operation period

Location

Statewide

Sector

Water and waste

Recommendation	0-5 years	5-10 years	10-15 years	15-30 years	Location, sector(s)
15.1 Incentivise waste minimisation and remove barriers to increasing waste recovery rates.					
15.1.1 Recycled materials in construction					
15.1.2 Organic waste					
15.1.3 Waste pricing					
15.2 Secure capacity for waste management.					
15.2.1 Landfill buffers					
15.2.2 Waste management sites					

Need 16.

Help preserve natural environments and minimise biodiversity loss

Meeting this need will help achieve objectives:

1. ● Prepare for population change
2. ● Foster healthy, safe and inclusive communities
3. ○
4. ○
5. ○
6. ○
7. ● Promote sustainable production and consumption
8. ● Protect and enhance natural environments
9. ● Advance climate change mitigation and adaptation
10. ● Build resilience to shocks

Victoria's national parks and other protected areas seek to preserve biodiversity and healthy ecosystems. They also provide 'ecosystem services' such as water catchment and filtration, and are part of Victoria's environmental and cultural heritage, including indigenous heritage. Pressure on these areas and other natural environments is expected to grow due to factors such as urbanisation, climate change and invasive pests.

Victoria's natural environments span national parks and other protected areas, urban green spaces, and private and public land. All have the capacity to contribute to biodiversity outcomes in Victoria. Biodiversity is important, both because of its intrinsic environmental value and because many of the products we use are derived from plants and animals. National parks are particularly important for protecting native ecosystems, providing essential services such as water purification, and enabling tourism and sporting and recreation activities.

Victoria is the most cleared state in Australia. Its natural environments and habitat corridors have, and will, come under pressure from population growth, development on the edges of urban centres, agricultural activity and climate change. The number of endangered and critically endangered plant and animal species in Victoria has increased over the last decade, while dryland salinity is a problem across the state, particularly in the north and west.

There is a need to consider how Victoria's national parks and other protected areas, which cover around four million hectares, can be adequately maintained, and how better preservation of biodiversity on private land, where government's role is more limited, can be achieved.

Recommendations

Victoria's natural environments, which span public and private land, are essential assets for the state. The recommendations below seek to ensure that the value of the ecosystem services they provide are properly accounted for, that the maintenance and conservation effort in national parks and other protected areas is increased, and that biodiversity on private land is supported through the development of expanded habitat corridors.

In particular, we highlight that asset management planning could have strong applicability to national parks. This would help prioritise investments in parks and enable Parks Victoria to incorporate the costs of asset management into business-as-usual funding arrangements.

We also see great opportunity in leveraging community and private sector effort and expertise to achieve better environmental outcomes across the state. This will require clearer allocation of accountabilities and better coordination and monitoring of activities to achieve overall biodiversity gains.

16.1 Reflect the benefits of ecosystem services to the community.

16.1.1 **Parks pricing/funding/expenditure.** Implement a pricing, funding and expenditure regime for national parks and other protected areas within 0-5 years, which ensures that funding and revenue reflect an evaluation of the ecosystem services provided and enables assessment of return on investments. The first step would be to account for all assets and benefits that are provided on a park-by-park basis to inform assessment of cost-effective management actions underpinned by appropriate pricing, funding and expenditure (ref. NPP1).

16.2 Raise maintenance and conservation efforts in national parks and other protected areas.

16.2.1 **Parks governance.** Establish governance arrangements between the Department of Environment, Land, Water and Planning and Parks Victoria within 0-5 years that ensure clear accountability for outcomes and enable Parks Victoria to act as an asset manager, forward planning for maintenance and renewal to address existing or emerging challenges, such as responding to bushfires (ref. NPP3).

16.2.2 **Parks partnerships.** Commercially engage community and private sector conservation groups to deliver services in parks, particularly where scientific expertise can be used, to address acute biodiversity challenges. This could include the establishment of measurable performance targets, for example, improved numbers of an endangered species (ref. NPP2).

16.3 Renew focus on natural environments and biodiversity outside national parks and other protected areas.

16.3.1 **Green infrastructure.** Increase the amount and quality of green infrastructure in urban settings over 0-15 years to support a range of outcomes, including creating new spaces for planned and incidental exercise, improving biodiversity by increasing forested areas in urban settings and supporting water-sensitive design to mitigate flooding events. The first step is to produce a green infrastructure plan in partnership with local government (ref. UFF).

16.3.2 **Habitat corridors.** Deliver expanded habitat corridors over 5-30 years to protect biodiversity from emerging challenges, including climate change, by connecting remnant vegetation with areas such as rivers and roadsides, providing incentives (including tax relief) to private land owners, and undertaking strategic land purchases, supported by fencing and revegetation (ref. HCL).

16.3.3 **Environmental water delivery.** Utilise infrastructure to deliver optimal environmental watering in 15-30 years where further research on watering requirements identifies sites that would benefit from infrastructure investment. It is likely that these sites would have to be of high environmental value to justify investment (ref. EWD).

Funding recommendations

Funding advice is not provided for this need because our funding recommendations focus on major projects, policies or reforms with a significant cost to government.

Things we considered

In developing the strategy, we have looked closely at the relationship between environmental outcomes and infrastructure. One of the key decisions we made is that the state's natural environments act as assets, like hospitals or railways, in addition to having intrinsic value.

Natural assets provide services to the community (sometimes referred to as ecosystem services) at a low cost, such as purifying water and air and storing carbon. These assets, like any other, require maintenance, otherwise these benefits can be diminished. This is why we have put forward recommendations to government to support the strengthening and expanding of this asset base for future generations.

We also considered whether natural environments should extend to private land. We concluded that getting the right outcome is the crucial matter. Extinctions can occur in national parks and rare species can thrive on private land, so effort should lie where it is most effective. Drawing artificial boundaries is not useful in this context.

One specific option we considered under this need and several others relates to green infrastructure in urban areas (ref. UFF). This was originally cast as 'urban forests' and had been filtered out in our first round of assessments. Evidence brought forward during consultation, including case studies, caused us to reconsider this assessment, reframe the option and recommend it in the draft strategy. Figure 13 shows the variability of canopy cover in different urban areas in Victoria.

INSIGHT: What is green infrastructure?

The Australian Standard describes green infrastructure as the network of natural and build landscape assets, including green spaces and water systems within and between settlements, noting that individual components of this environmental network, such as gardens, parks, recreation areas, highway verges and waterways, are sometimes referred to as 'green infrastructure assets'.

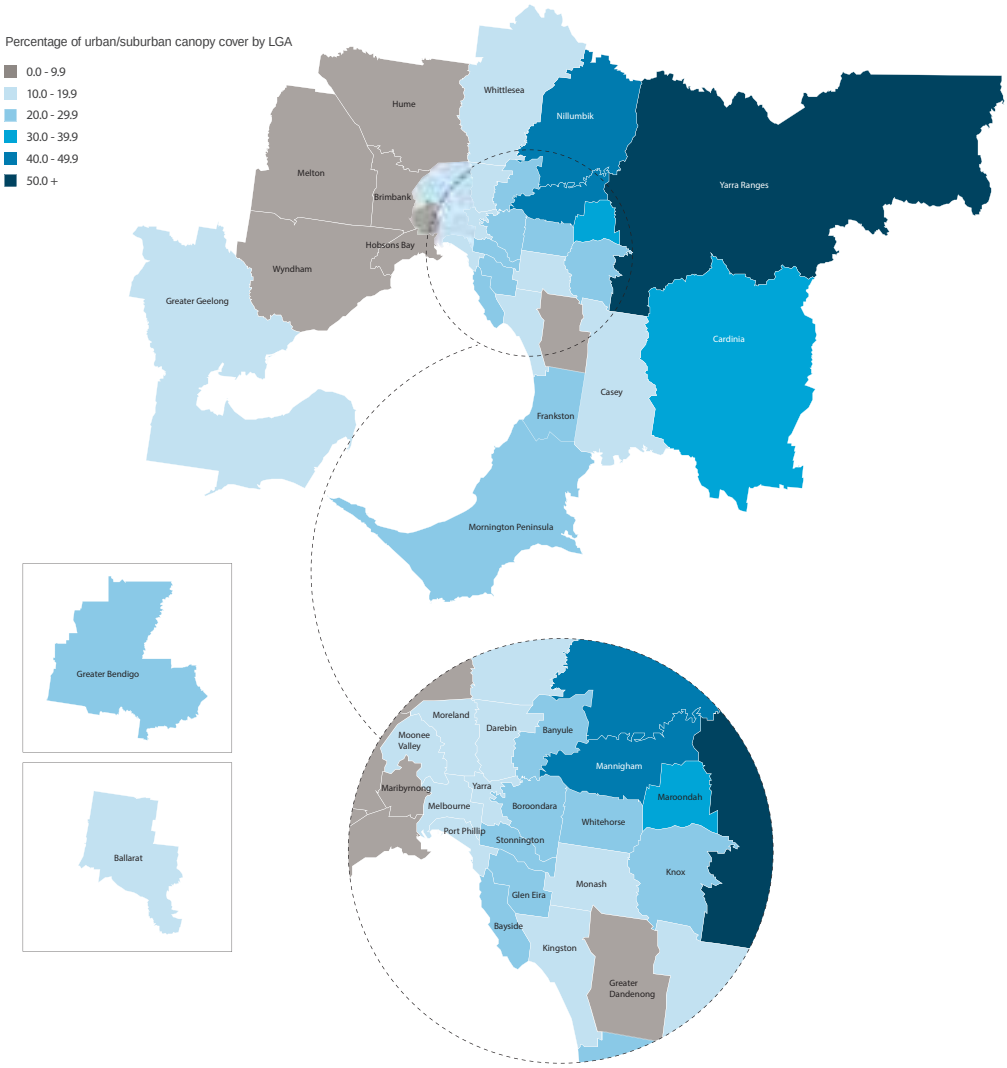
Following consultation, it became clear that we originally looked at this option too narrowly as 'urban forests'. The wide benefits of this infrastructure include:

- creating space for activity to address obesity and diabetes rates and reduced fitness, particularly in young children
- creating space to address social exclusion, noting the ageing population and the increasing importance of positive mental health
- opportunities for walking and cycling for transport
- providing shade to mitigate the 'heat island effect' to address the challenges of climate change and heat-related death
- protecting and enhancing natural environments and supporting biodiversity by providing the critical connections within and between ecosystems
- reducing emissions and addressing air quality, including acting as a carbon sink
- providing a more efficient and effective means of managing stormwater to protect against flooding
- delivering energy savings through natural temperature regulation.

Because of the multiplicity of benefits, there is no clear ownership for this infrastructure, despite the efforts of some local governments to take the lead in this area. Accordingly, the delivery of green infrastructure can often be ad hoc and opportunistic, rather than strategic and holistic.

Green infrastructure should be considered alongside any other infrastructure (or network) planning in urban environments. It has been specifically recommended for a couple of needs and could help support a number of others. Necessary first steps would involve creating a plan in consultation with local government identifying opportunities and priorities for investment.

Figure 13: Canopy cover in urban/suburban Victoria varies significantly, with the lowest levels concentrated in parts of Melbourne's west and north.



Source: B Jacobs, N Mikhailovich and C Delaney, *Benchmarking Australia's urban tree canopy: An i-tree assessment (NY13028),* 2014, prepared by the Institute for Sustainable Futures, University of Technology Sydney and funded by Horticulture Innovation Australia Limited using the Nursery R&D levy and funds from the Australian Government

Timeline

Target for completion of recommendation or implementation period of program

- Changing behaviour/better use
- New or expanded asset(s)

Location

- Statewide

Sector

- Transport
- Cultural, civic, sporting, recreation and tourism
- Science, agriculture and environment
- Water and waste

Recommendation	0-5 years	5-10 years	10-15 years	15-30 years	Location, sector(s)
16.1 Reflect the benefits of ecosystem services to the community.					
16.1.1 Parks pricing/funding/ expenditure					
16.2 Raise maintenance and conservation efforts in national parks and other protected areas.					
16.2.1 Parks governance					
16.2.2 Parks partnerships					
16.3 Renew focus on natural environments and biodiversity outside national parks and other protected areas.					
16.3.1 Green infrastructure					
16.3.2 Habitat corridors					
16.3.3 Environmental water delivery					

Need 17.

Improve the health of waterways and coastal areas

Meeting this need will help achieve objectives:

1. ● Prepare for population change
2. ● Foster healthy, safe and inclusive communities
3. ○
4. ○
5. ○
6. ○
7. ● Promote sustainable production and consumption
8. ● Protect and enhance natural environments
9. ● Advance climate change mitigation and adaptation
10. ● Build resilience to shocks

Some waterways and coastal environments in Victoria are in poor condition. This issue is likely to be exacerbated as development increases across catchments and coastlines and the impacts of climate change are felt, including more frequent and more intense storm and flood events and rising sea levels. Improving waterway and coastal health is important because it affects ecosystems and habitats, and water quality and quantity.

Victoria's waterways and marine environments provide economic, social and environmental benefits to the state. They support biodiversity, are a quintessential part of Australian culture and enable a range of industries. Healthy waterways are critical to securing water supplies.

An assessment of waterway health by the Victorian Government in 2010 found that 23 per cent of river length was in excellent or good condition, 43 per cent in moderate condition, and 32 per cent in poor or very poor condition. Basins in eastern Victoria had more river length in good or excellent condition compared to the rest of the state (see figure 14). Soil erosion, land clearing and stormwater run-off are some key factors influencing waterway health, and the intensity of these activities is likely to increase with population growth and climate change.

The quality of inland water can also significantly impact on coastal areas. Urban stormwater and agricultural run-off can introduce litter, nutrients and saline water to marine environments. At the same time, rising sea levels and more severe storm events can lead to beach erosion and damage to coastal environments. These impacts affect not just the environment, but also communities, businesses and industries that depend on coastal areas for agriculture, tourism and sports and recreation activities.

Recommendations

The recommendations on the health of waterways and coastal areas draw on significant research undertaken to date and highlight areas for further work. They also build on broader recommendations to protect and enhance Victoria's natural environments, as outlined under Need 16.

The recommendations include a number of measures to improve water quality and flows, including better stormwater management and completion of riparian fencing in priority areas. They also call for more work to be done, and ongoing research, to improve environmental watering over the long term. This builds on work to date to secure environmental water entitlements, increase delivery of environmental flows from storages by water businesses, and the establishment of the Victorian Environment Water Holder.

The recommendations also recognise the connection between inland water management and the protection of coastal heath, with actions covering the interface of inland drainage into coastal areas.

17.1 Improve the quality of inland and coastal waters.

17.1.1 **Stormwater quality.** Integrate good practice stormwater quality management measures in regulatory and policy frameworks within the next 0-5 years to consistently address stormwater quality management under all types of development and better enable integrated water cycle management in metropolitan and regional urban areas (ref. SRQ).

17.1.2 **Riparian fencing.** Expand fencing of riparian areas in priority waterways over 10-30 years to minimise damage resulting from livestock access to these areas, while allowing for flexibility in uptake of approved and innovative alternatives, such as fenceless farming (ref. RFI).

17.2 Manage waterway flow rates.

17.2.1 **Stormwater harvesting.** More comprehensively and consistently invest in stormwater harvesting projects at greenfield sites over 5-30 years. The first step to achieving this is to formally incorporate stormwater as a water resource in statutory instruments and water resource planning frameworks. In addition to boosting water supply, this measure provides environmental benefits as harvesting slows the rate at which storm water drains into waterways, thereby minimising erosion and pollutant loading (ref. SRH).

17.2.2 **Environmental water delivery.** Utilise infrastructure to deliver optimal environmental watering in 15-30 years where further research on watering requirements identifies sites that would benefit from infrastructure investment. It is likely that these sites would have to be of high environmental value to justify investment (ref. EWD).

Funding recommendations

Funding advice is not provided for this need because our funding recommendations focus on major projects, policies or reforms with a significant cost to government.

Things we considered

One of the main things we considered in responding to this need was the availability of existing evidence. Periodic benchmarking of the condition of rivers and streams means that we have a reasonable understanding of the health of inland waterways across Victoria, but research on the health of the state's coastlines is less advanced and holistic. Work is progressing in this area, however, including through the 2014 *Victorian coastal strategy* and the Commissioner for Environmental Sustainability, and we will continue to monitor evidence demonstrating both the extent of issues related to coastal health and potential responses.

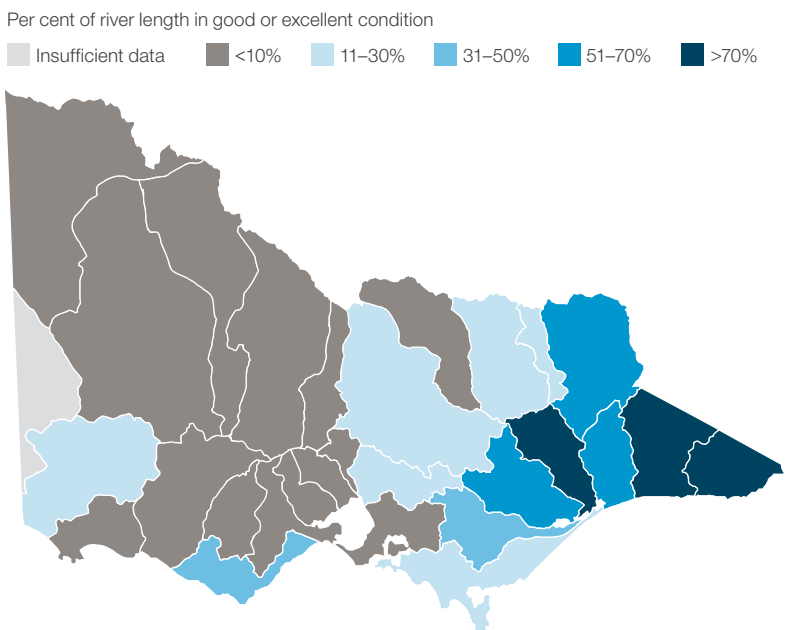
We also considered the impacts of ageing septic tanks on the environment (ref. WMS). There was limited evidence to produce a clear recommendation given the uncertainty around the scope of this issue. We will also continue to monitor evidence and the need for action in the future.

INSIGHT: Fenceless farming?

One of the recommendations for this need is to strategically expand riparian fencing, that is the fencing of waterways to minimise damage caused by livestock. The benefits include improved water quality, better habitats to support biodiversity and more stable stream banks.

There is scope to do more in this area, but we also know that a lot could change over the coming decades. Fenceless farming technologies are already in development, which allow farmers to track animals using Global Positioning Systems (GPS) and create virtual fences by sending signals, such as sounds, vibrations and electrical impulses, through custom-made collars. This technology can be used to control the movement of livestock and reduce the need for riparian fencing. We will continue to monitor these developments for future iterations of the draft strategy.

Figure 14: In 2010, at the end of the Millennium drought, basins in eastern Victoria had more river length in good or excellent condition then basins in western Victoria.



Source: Victorian Department of Environment and Primary Industries, *Index of stream condition: The third benchmark of Victorian river condition*, 2013, adapted by SGS Economics and Planning

Note: The Index of Stream Condition benchmark assessed the condition of approximately 29,000km of rivers and streams throughout Victoria. It is a snapshot of river condition, not a means to assess trends.

Timeline

Target for completion of recommendation or implementation period of program

- Changing behaviour/better use
- New or expanded asset(s)

Location

- Statewide

Sector

- Science, agriculture and environment
- Water and waste

Recommendation	0-5 years	5-10 years	10-15 years	15-30 years	Location, sector(s)
17.1 Improve the quality of inland and coastal waters.					
17.1.1 Stormwater quality					
17.1.2 Riparian fencing					
17.2 Manage waterway flow rates.					
17.2.1 Stormwater harvesting					
17.2.2 Environmental water delivery					

Need 18.

Transition to lower carbon energy supply and use

Meeting this need will help achieve objectives:

1. ● Prepare for population change
2. ○
3. ○
4. ○
5. ○
6. ○
7. ● Promote sustainable production and consumption
8. ● Protect and enhance natural environments
9. ● Advance climate change mitigation and adaptation
10. ● Build resilience to shocks

Transitioning to a lower carbon future will present a number of challenges and opportunities for Victoria over the coming decades. This change is not simply about moving to more sustainable energy generation, but is also about reconsidering energy consumption across all infrastructure sectors.

According to the International Panel on Climate Change, to maintain global temperatures at less than two degrees above pre-industrial levels, there is a need for a 40 to 70 per cent reduction in global greenhouse gas emissions by 2050, and near zero emissions by 2100. The impacts of global warming include, but are not limited to, more extreme weather events, rising sea levels and the acidification of oceans.

Australia's energy supply is dominated by emissions intensive coal-fired power stations, particularly brown coal plants in Victoria. Emissions intensive generators are not exposed to the full costs they impose on the environment and society, including contributing to climate change, which is effectively a market failure. Policy and regulatory frameworks have been developed to mitigate the impacts of climate change (noting that these frameworks could change over time). Australia was a signatory to the 2015 Paris Accord, which committed to limiting average global temperature rises to well below two degrees Celsius above pre-industrial levels. In June 2016, the Victorian Government committed to a target for net zero greenhouse gas emissions by 2050. The Victorian Government has also committed to generating 25 per cent of the state's electricity from renewable sources by 2020 and 40 per cent by 2025. All these actions point to a substantial transition from reliance on coal generation to lower emission energy.

Brown coal is, however, a cheap and abundant resource in Victoria and complying with new policies and international expectations will require a well-managed transition that minimises impacts on electricity prices. Impacts on communities in the Latrobe Valley will also require careful consideration. There are further challenges and opportunities to consider including the adoption of battery storage technology, effective integration of new energy supply sources in Victoria's electricity grid, and influencing energy consumption patterns to reduce overall demand. The cost of transitioning away from brown coal will not be insignificant.

Recommendations

Over the next 30 years, both the technologies and structure of the energy sector could look fundamentally different. Awareness of these technological and business disruptions is critical. The recommendations below have been developed based on the premise that action is required to ensure a smooth transition away from brown coal energy generation to lower emission generation technologies. However, moving away from an energy source Victoria has long relied on and bringing on-board new technologies to be in place when needed is complex, particularly given there is current oversupply in the energy market.

The energy sector is almost entirely under private ownership. Victoria is part of the National Electricity Market and changes in federal policies on climate change will impact the state. Given these considerations, the recommendations below focus on providing certainty to the market, minimising disruptions in supply, aligning Victoria with broader policy initiatives, and focusing on areas where there is a clear role for government. Furthermore, federal policies change over time and Victoria's energy policies need to be able to adapt to these changes.

Demand management is also an important part of the transition story. With greater engagement, clearer pricing structures and leadership, residential, commercial and industrial customers may reduce overall energy consumption with time. The demand measures recommended are intended to complement and further existing policies and initiatives such as energy efficiency schemes (voluntary and mandatory) and ensure take-up of the benefits afforded by smart meters in Victoria.

18.1 Facilitate a reduction in energy consumption.

18.1.1 **Energy pricing.** Mandate cost-reflective pricing for all energy customers within 0-5 years to fully realise the benefits of smart meters, increase customer engagement on energy consumption patterns and influence customer choices to reduce peak and potentially total energy demand (ref. EDM2).

18.1.2 **Energy efficiency of existing public buildings.** Develop targeted energy use efficiency programs to retrofit existing public sector buildings over 0-10 years. This initiative will show leadership in energy use efficiency and influence energy use reduction for existing buildings in the commercial and industrial sector. This should involve maximising social benefits from these programs, such as improving the energy efficiency of public housing to reduce energy bills for tenants (ref. EDM1).

18.1.3 **Energy efficiency of new buildings.** Implement more sophisticated energy efficiency requirements for new buildings by replacing existing prescriptive initiatives with a broader greenhouse gas emissions target approach within 0-10 years. There is a range of existing initiatives to address energy efficiency for new buildings. A greenhouse gas emissions target can go a step further and enable holistic consideration of the energy impact of new buildings during design, while allowing the market to determine uptake of cost-effective products (ref. EED).

18.2 Enable an orderly transition away from brown coal energy supply to lower-emission energy sources.

18.2.1 **Brown coal transition.** Develop policy mechanisms within 0-5 years for innovation or exit of brown coal energy generation to provide clearer signals and certainty to industry and the community and contribute to reduction targets for greenhouse gas emissions. This would consider impacts on energy prices, infrastructure associated with energy security (such as changes to the grid) and transition assistance. Mechanisms that could be investigated include:

- environmental standards on coal generation licences (ref. BCL)
- reverse auction process for coal generation (ref. BCA).

18.2.2 **Electricity network capability.** In liaison with the Australian Energy Market Operator (AEMO), provide information specific to the Victorian market on areas of the electricity grid well suited to absorb additional capacity within 0-5 years to ensure that project development processes for lower emission technologies are efficient, enhance information sharing between project developers and network planners, and increase visibility on likely developments in the Victorian electricity system (ref. ENI).

18.2.3 **Small-scale solar.** Update guidance on the installation of solar PV on buildings within 0-5 years to ensure that installations are made in a technically appropriate and effective manner with increasing uptake of this technology (ref. SSE).

Funding recommendations

Funding advice is not provided for this need because our funding recommendations focus on major projects, policies or reforms with a significant cost to government.

Things we considered

The Victorian Government released a consultation paper on a technology neutral renewable energy auction scheme in June 2016. Given that evidence suggests large-scale wind and solar projects are likely to be the most cost-effective low-emission technologies to implement at a large scale over the short to medium term, in response to this policy the wind and solar option considered during the development of the strategy is now assumed to be base case (ref. WSE). We see the auction scheme as an important step in establishing a renewable energy industry and assume that the government will monitor timely development of sufficient renewable capacity.

In the medium to long term, cost-effective low-emission technologies are expected to be implemented by the market. This includes the wide range of technologies assessed in developing this draft strategy. However, as with the announcement of the auction scheme, regulatory oversight is required to ensure government appropriately manages the risks of not meeting environmental targets. Over time, low-emission technologies are likely to become increasingly cost-effective and the role for government in establishing these technologies will diminish. We note that assessment results and public consultation did not favour large-scale nuclear technology (ref. NPC) and we have also not recommended this option.

One of the options we considered was a pilot grid-scale battery storage project to provide the market with information on operation of the electricity market and incentivise further innovation (ref. ESI). Given the likely costs of this project, its benefit being short term in nature and limited evidence on market impacts, and taking into consideration outcomes of early investigations by AEMO, this did not end up being recommended as an area for government action. We anticipate the private sector will pursue this given the potential benefits this technology could bring.

We considered whether improvements to the gas market were required given the substantial near-term role gas could play in counterbalancing intermittent wind and solar production (ref. EGE). There is a significant amount of work being done by the Australian Energy Market Commission examining operation of the eastern gas market. We consider implementation of relevant aspects of this work in Victoria to be base case. We also considered onshore gas exploration in Victoria. While there is certainly further dialogue and understanding around this issue required, we see this as primarily a resources industry question. With gas supply and prices now being exposed to international trade, it was not clear cut that increasing local supply would fundamentally change the competitiveness of gas in terms of Victoria's supply mix.

While the energy sector is a primary focus for emissions reduction, it's important not to forget about other sectors. For example, the transport sector is an obvious and significant contributor to Victoria's carbon emissions. The majority of our transport sector recommendations for new projects will make only a minor difference to overall emissions – positive or negative. However, the tools we see as most likely to affect transport emissions are land use changes and pricing. We considered the role of electric vehicles and formed a view that the Victorian Government has already taken key steps in facilitating this via trials. It is now over to the private sector to take advantage of this market opening, particularly as the price of battery storage comes down. Further electrification of the transport network could have a major effect on electricity demand and even effect the function of the grid by effectively distributing batteries across the network.

INSIGHT: Cost-reflective energy prices?

The dominant issue facing the energy sector over the next 30 years is decarbonising energy generation. Due to their high emissions intensity and age, this is likely to result in the withdrawal of one or more of the brown coal-fired power stations in the Latrobe Valley. Wind and solar have potential to provide new low-emission energy generation in the short to medium term (see figure 15). Compared to other low-emission technologies, wind and solar are mature, competitive and scalable. A challenge with wind and solar, however, is that they produce an intermittent supply source, creating a need for energy storage and other low-emission technologies that can provide system reliability and security. Victoria's electricity grid has also been designed to transport energy from brown coal deposits, rather than locations suited to wind and solar power generation.

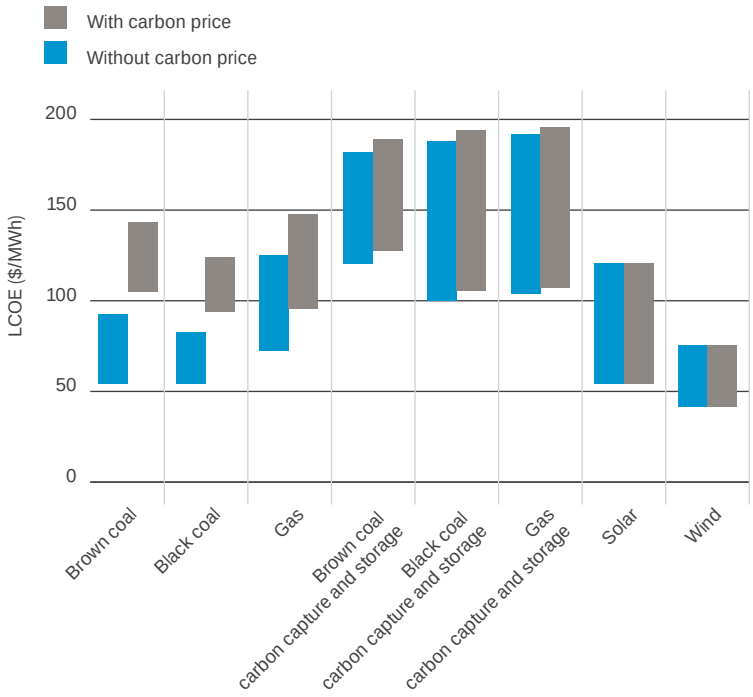
Because brown coal is a cheap and abundant resource, a transition to lower-emission energy generation will impact electricity prices. Recent observations of high prices in South Australia have been attributed by some to the increased renewable energy generation in that state. There are, however, a number of factors at play including high gas prices, heavy reliance on gas generation and interconnector limitations. The Victorian generation sector is well connected with three neighbouring regions and has a more diversified energy supply. However, policy design still needs to consider affordability and security for both Victoria and interconnected states, along with environmental sustainability.

The uptake of distributed solar has been a success story in Australia and in Victoria. Uptake was originally driven by high feed-in tariffs. As these subsidies were withdrawn, the cost of solar still decreased further due to increased global production and advances in technology. As a result, uptake has continued to be strong and is expected to remain so over the coming years.

The existing tariff structure has, however, resulted in cross-subsidisations. Customers with solar have cost savings proportional to their reduction in energy consumption, not the reduction in peak demand usage. Yet network costs are driven by peak demand usage and these costs are a large proportion of electricity bills. Cross-subsidisations exist beyond those related to solar uptake. In general, customers with higher peak demands than average are benefiting from existing tariff arrangements.

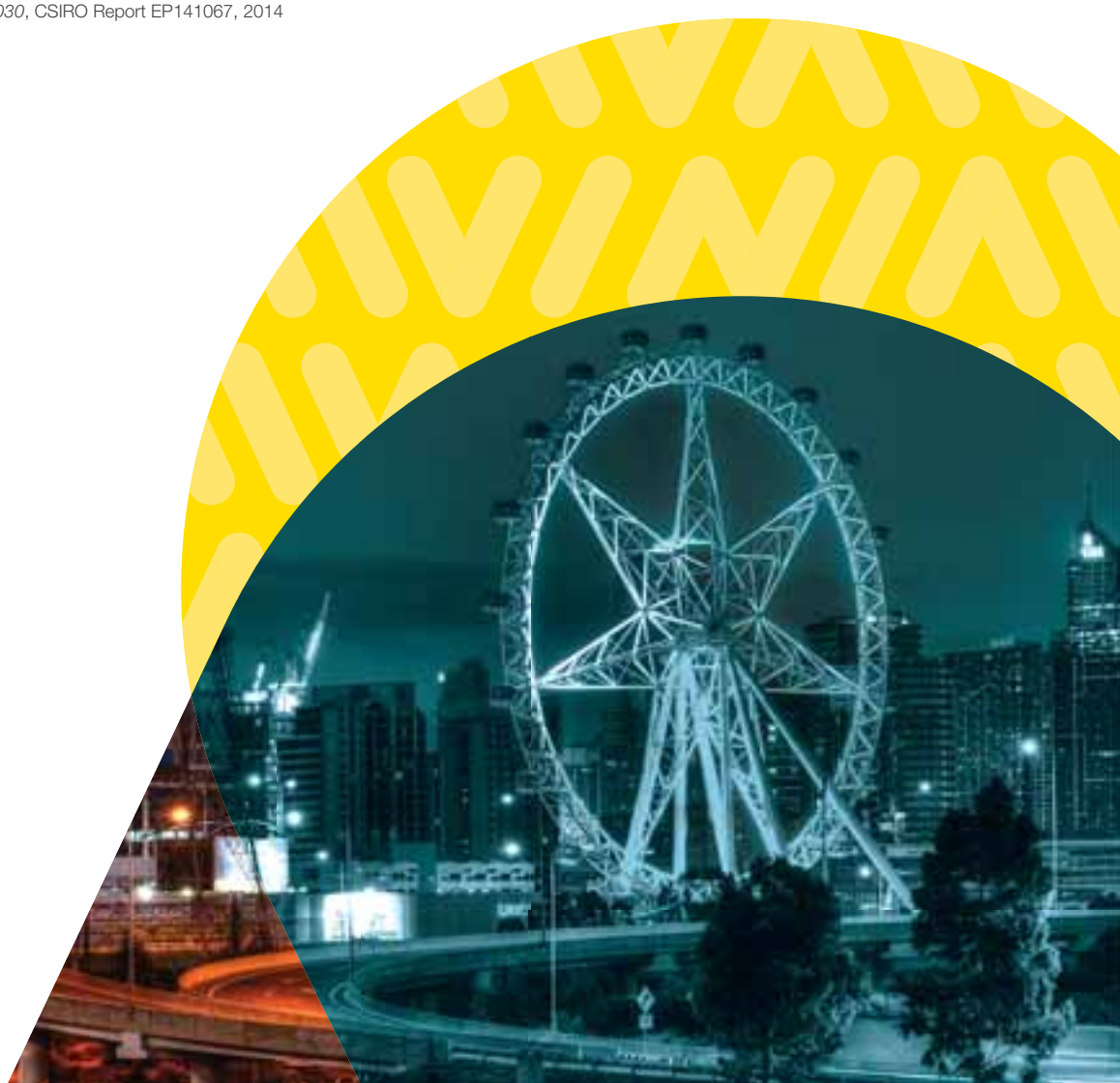
Moving everyone to cost-reflective tariffs will start to address these issues while potentially reducing the need for new network infrastructure. In the short term, this may reduce the incentive for households and businesses to invest further in solar as customers change their energy consumption patterns and see cost savings in electricity bills. In the medium to long term, however, this tariff structure would provide opportunities for further investment in both solar and battery storage technologies to better manage daily demand profiles.

Figure 15: By 2030, solar and wind technologies are expected to be competitive with brown coal, even without a price on carbon.



Projected 2030 levelised cost of electricity.

Source: TS Brinsmead, J Hayward and P Graham, *Australian electricity market analysis report to 2020 and 2030*, CSIRO Report EP141067, 2014



Timeline

Target for completion of recommendation or implementation period of program

Changing behaviour/better use

Location

Statewide

Sector

Energy

Recommendation	0-5 years	5-10 years	10-15 years	15-30 years	Location, sector(s)
18.1 Facilitate a reduction in energy consumption.					
18.1.1 Energy pricing					
18.1.2 Energy efficiency of existing public buildings					
18.1.3 Energy efficiency of new buildings					
18.2 Enable an orderly transition away from brown coal energy supply to lower-emission energy sources.					
18.2.1 Brown coal transition					
18.2.2 Electricity network capability					
18.2.3 Small-scale solar					

Need 19. Improve the resilience of critical infrastructure

Meeting this need will help achieve objectives:

1. ○
2. ● Foster healthy, safe and inclusive communities
3. ○
4. ○
5. ● Lift productivity
6. ○
7. ○
8. ○
9. ● Advance climate change mitigation and adaptation
10. ● Build resilience to shocks

There is a need for Victoria's critical infrastructure to be more resilient and adaptable in the face of creeping challenges, particularly climate change, and unexpected disruptions both large and small. This will be increasingly important as infrastructure systems become more interdependent over time.

Over the next 30 years, Victoria's infrastructure will need to be resilient in the face of disruptive events. These events are, by their very nature, unpredictable. Such shocks include extreme weather events, natural disasters, pandemics, physical and cyber-attacks, as well as more minor disruptions to networks. These are expected to become more frequent and severe. Climate change will also bring creeping challenges, such as higher temperatures and rising sea levels, that may increase maintenance, modification and replacement costs for infrastructure.

It is particularly important to mitigate the impact of disruptions on critical infrastructure, in other words infrastructure that it critical to the continuity of supply of essential services to the state as a whole or specific region/s and the social and economic wellbeing of Victorians.

As the complex interdependencies between different types of infrastructure increases, both through physical and ICT systems, building resilience will become increasingly important. This is because the impact of shocks in one area or type of infrastructure can have compound and damaging flow-on effects across networks (see figure 16).

In recent years, Victoria has adopted an 'all hazards' approach to emergency management, centred on mitigating the consequences of a disruptive event rather than the cause. The focus for critical infrastructure is therefore to extend this 'all hazards' approach to infrastructure by enhancing performance of a system in the face of multiple hazards.

Recommendations

Victoria's critical infrastructure is too important to the state's society, economy and environment to be considered solely within other needs identified in this draft strategy. Without such a focus, emerging risks to this infrastructure could be missed, particularly in the context of climate change adaptation.

The recommendations below are not aimed at assessing risks to specific assets nor determining the scope of Victoria's critical infrastructure. This work is well underway already and being led by Emergency Management Victoria.

Instead, the recommendations address critical infrastructure issues from a network perspective, including building the resilience of ICT, public transport and coastal protection infrastructure.

19.1 Minimise potential vulnerabilities of critical infrastructure.

19.1.1 **Critical infrastructure control systems.** Ensure security of control systems for critical infrastructure is continually strengthened to meet best practice standards through regulatory change and contractual agreements within 0-5 years (ref. ECS).

19.1.2 **ICT infrastructure.** Improve ICT connectivity across Victoria, and particularly in major economic centres and rural and regional areas, over 0-10 years by using the Victorian Government's existing communications infrastructure base and significant purchasing power to maximise benefits from the NBN roll-out (and other Commonwealth initiatives) and ventures by private sector telecommunications providers. This would require a coordinated, partnership-based approach, with departments and agencies working with each other and with other levels of government and the private sector to identify and pursue opportunities to provide better ICT services (ref. ETP).

19.1.3 **Public transport resilience.** Upgrade critical public transport infrastructure to improve resilience to all hazards, including all weather conditions, subject to transparent identification of priorities and taking an asset management planning approach, over 0-30 years (ref. PTN).

19.1.4 **Coastal protection infrastructure.** Improve coastal protection infrastructure over 5-30 years, following the identification of key locations proximate to the coast where assets of state importance are at risk from rising sea levels and extreme weather and tidal events (ref. CPI).

19.2 Improve contingency and response planning in the face of disruptions.

19.2.1 **Critical infrastructure contingency planning.** Introduce regulatory and contractual requirements for public and private operators of critical infrastructure to develop and maintain adequate contingency plans for the delivery of essential services in the event of major disruptions, particularly ICT failures, within 0-5 years (ref. CSB).

19.2.2 **Transport contingency planning.** Develop a multi-modal transport contingency plan, building on existing modal plans, within 0-5 years to maintain access on key transport corridors in the event of disruption (ref. CRR1).

19.2.3 **Relocatable community infrastructure.** Increase the provision of temporary or 'pop up' community infrastructure, such as relocatable buildings, over 0-10 years, to respond to rapidly changing community needs. Temporary infrastructure is of particular use in areas of high population growth where permanent infrastructure cannot be provided in a timely way and after emergencies, such as bushfires, where existing infrastructure is destroyed (ref. RCI).

19.2.4 **Transport control centres.** Establish fully integrated transport control centres to enable better management of the system across transport modes over 15-30 years. This should occur progressively as and when existing separate control centres become due for major renewal (ref. ITC and CRR2).

Funding recommendations

The delivery of the following major project is expected to involve significant costs. If government chooses to adopt this recommendation, a range of funding mechanisms should be considered.

Recommendation	General government revenue	User charges	Beneficiary charges	Property development	Asset sales
19.1.4 Coastal protection infrastructure	✓		✓		

✓ Potential funding mechanism

Funding recommendations – additional comments

General government revenue will continue to be a major source of funding for coastal protection infrastructure.

Although the focus of our recommendation is on protecting state assets, there will in some cases be spin-off benefits generated for private or commercial asset holders. In these instances, a beneficiary charge should be sought, such as a co-contribution from the private beneficiaries.

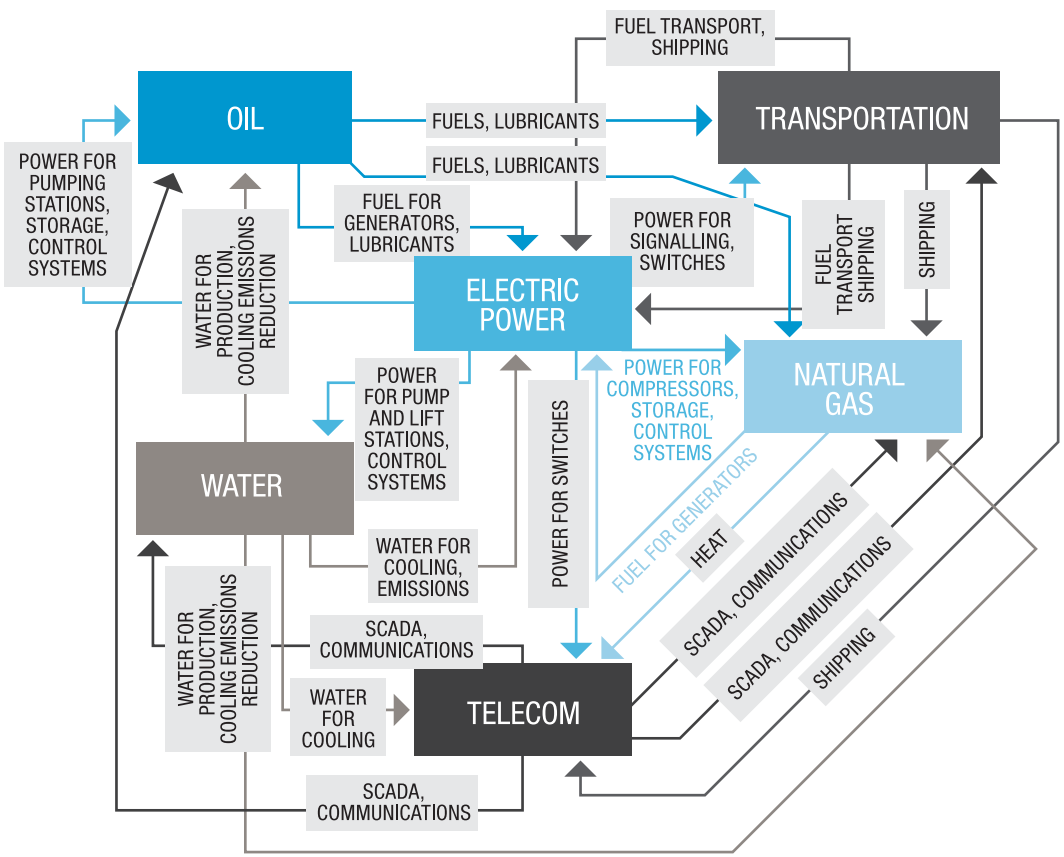
Things we considered

One of the main issues we considered in framing the response to this need was the intersections with the Commonwealth and local governments. For example, work on cyber security needs to be led by the Commonwealth, but there is still a critical role for state government to assess key risks to Victoria and ensure action is being taken in prevention and contingency planning for cyber-attacks. Similarly, local government has primary responsibility for coastal protection infrastructure, but state government also has a strong interest in protecting areas of state significance.

We also considered whether there was a need for diversification of data centres as they are currently concentrated within Melbourne's CBD (ref. DCD). Feedback on this option highlighted that there is a problem, but there is a limited role for the state. The requirements for the location of a data centre are set by industry and we could find limited evidence of a state-level regulatory barrier.

We acknowledge that broader aspects of resilience related to extreme weather events are being addressed through major initiatives such as implementing the findings of the 2009 Victorian Bushfires Royal Commission and the *Victorian flood plain management strategy* (2016). We consider these initiatives to be base case.

Figure 16: Different types of infrastructure are connected in complex ways and these interdependencies are only expected to increase with advances in technology.



Source: Emergency Management Victoria, *Critical infrastructure resilience strategy*, 2015, adapted from S Rinaldi et al, 'Identifying, understanding and analysing critical infrastructure interdependencies', *IEE control systems magazine,* Dec 2001

Timeline

Target for completion of recommendation or implementation period of program

- Changing behaviour/better use
- New or expanded asset(s)

Location

- Statewide

Sector

- Transport
- ICT
- Cultural, civic, sporting, recreation and tourism
- Education and training
- Health and human services
- Science, agriculture and environment
- Water and waste

Recommendation	0-5 years	5-10 years	10-15 years	15-30 years	Location, sector(s)
19.1 Minimise potential vulnerabilities of critical infrastructure.					
19.1.1 Critical infrastructure control systems					
19.1.2 ICT infrastructure					
19.1.3 Public transport resilience					
19.1.4 Coastal protection infrastructure					
19.2 Improve contingency and response planning in the face of disruptions.					
19.2.1 Critical infrastructure contingency planning					
19.2.2 Transport contingency planning					
19.2.3 Relocatable community infrastructure					
19.2.4 Transport control centres					


BEND

GETTING INVOLVED

THIS IS YOUR FINAL CHANCE TO SHAPE VICTORIA'S 30-YEAR INFRASTRUCTURE STRATEGY.

We have consulted on the objectives, needs and options for the strategy during 2016 – now we need to know what you think about our draft strategy.

THE STRATEGY IS ALL ABOUT ACHIEVING GOALS.

Tell us if you think the draft recommendations will help meet the objectives and needs we agreed with the community earlier in the year.

PROVIDE EVIDENCE TO SUPPORT YOUR SUBMISSION.

Our decision-making will be based on evidence that supports a change to the strategy.

How can I get involved?

Visit yoursay.infrastructurevictoria.com.au

- Share a thought
- Make a submission

The sum of all parts

Throughout the year we've been asking people what they think about our infrastructure challenges and opportunities. Now we want to know what you think about our recommendations.

We have taken a holistic approach to our strategy and we ask you to do the same. We ask you to think not only about individual initiatives, but also about the relationships between recommendations and if, as a whole, they will help create the Victoria we want.

Making a submission

You can make a formal submission in response to the draft strategy via our website. We have developed a brief survey as part of our submissions process. We are keen to hear your feedback on the following:

- Will the recommendations in the draft 30-year infrastructure strategy help achieve the objectives and meet the needs?
- Is the timing of recommendations in the draft strategy appropriate?
- Overall, do the recommendations in the draft strategy work well together (for example, is the balance between new build and making better use of existing infrastructure right)?

You can provide a submission by simply responding to the survey, or you can complete the survey and then attach your own submission.

How your input will be used

The survey results and formal submissions will be considered to inform the final strategy, which will be delivered to Parliament in December 2016.

We will release a consultation report, summarising key feedback and how it's been used, alongside the final strategy.

The formal submissions that we have permission to share will be published on our website.

Keep in touch

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About us

Infrastructure Victoria is an independent advisory body, which began operating on 1 October 2015 under the *Infrastructure Victoria Act 2015*.

It has three main functions:

- preparing a 30-year infrastructure strategy for Victoria, to be refreshed every three to five years
- providing written advice to government on specific infrastructure matters
- publishing original research on infrastructure-related issues.

Infrastructure Victoria will also support the development of sectoral infrastructure plans by government departments and agencies.

The aim of Infrastructure Victoria is to take a long-term, evidence-based view of infrastructure planning and raise the level of community debate about infrastructure provision.

Infrastructure Victoria will not directly oversee or fund infrastructure projects.

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