future transport 2056

FUTURE TRANSPORT STRATEGY 2056

NSW GOVERNMENT

NSW Common Planning Assumptions

Common Planning Assumptions are used across agencies to ensure alignment and understanding of the relevant data, policies and assumptions to underpin planning decisions and policy analysis for government strategies and investment decisions. This supports consistency in the advice provided to Government and the community.

The Common Planning Assumptions represent a consistent baseline or a starting point, and are developed based on current and past trends and agreed policies and plans. They are not targets or scenarios.

This strategy and supporting analysis are based on the agreed Common Planning Assumptions as at March 2018. Details of the Common Planning Assumptions used are set out in the Common Planning Assumptions Book version 3.1

Contents

Acknowledgement of Country

Transport for NSW acknowledges Aboriginal people as the traditional custodians of the lands and waterways on which we build infrastructure, deliver projects and serve Transport's customers and are grateful to Elders past and present for their continual leadership.

Many of the transport routes we use today – from rail lines, to roads, to water crossings – follow the traditional Songlines, trade routes and ceremonial paths in Country that our nation's Aboriginal peoples followed for tens of thousands of years.

Transport for NSW is committed to honouring Aboriginal peoples' cultural and spiritual connections to the land, waters and seas and their rich contribution to society. We recognise the impacts we make on Aboriginal culture and heritage through our infrastructure projects.

The implementation of Future Transport 2056 and the Transport Reconciliation Action Plan 2019-2022 bring us opportunities to work in partnership with Aboriginal people and communities. Our future projects will positively reflect the values, sustainability and spirituality of the Aboriginal cultures in the areas where we work.

To do this we will engage with Aboriginal people on projects; respect and value their expertise; and integrate their understanding of Country and place into the design process and outcome. This is called Designing with Country.

CHAPTER

1

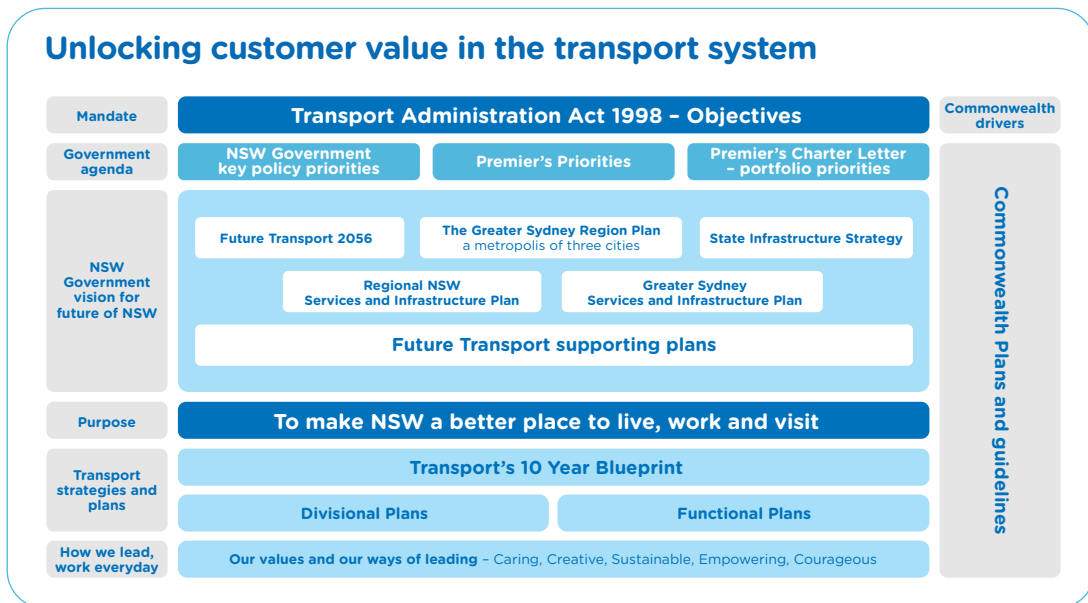# Introduction

The 40-year vision

Future Transport 2056 sets the 40-year vision, directions and principles for customer mobility in NSW, guiding transport investment over the longer term. It presents a glimpse of the large economic and societal shifts we will see in the future and places the customer at the centre of everything we do, to ensure we harness rapid advances in technology and innovation to create and maintain a world-class, safe, efficient and reliable transport system.

Future Transport 2056 is being delivered through a strategy and a suite of supporting plans setting out our 40-year vision for transport in NSW.

The Services and Infrastructure Plans set the customer outcomes for Greater Sydney, and regional and outer metropolitan NSW for the movement of people and freight. They include a series of initiatives to be delivered in the short, medium and long term to meet customer needs.

The Future Transport Technology Roadmap sets the technology vision and strategic priorities for passenger and freight mobility and aligns them with the growing toolkit of digital capabilities, data analytics, artificial intelligence, and other innovative approaches that can deliver world-class services for our customers.

The Supporting Plans are more detailed issue-based or place-based plans that help to implement the Strategy across NSW.

Unlocking customer value in the transport system

Mandate	**Transport Administration Act 1998 – Objectives**		**Commonwealth drivers**
Government agenda	**NSW Government key policy priorities** · **Premier's Priorities** · **Premier's Charter Letter – portfolio priorities**		
NSW Government vision for future of NSW	**Future Transport 2056** · **The Greater Sydney Region Plan** a metropolis of three cities · **State Infrastructure Strategy** **Regional NSW Services and Infrastructure Plan** · **Greater Sydney Services and Infrastructure Plan** **Future Transport supporting plans**		**Commonwealth Plans and guidelines**
Purpose	**To make NSW a better place to live, work and visit**		
Transport strategies and plans	**Transport's 10 Year Blueprint** **Divisional Plans** · **Functional Plans**		
How we lead, work everyday	**Our values and our ways of leading** – Caring, Creative, Sustainable, Empowering, Courageous		

How Future Transport fits within the strategic context of Transport

Future Transport 2056 was developed collaboratively with the Greater Sydney Commission, Infrastructure NSW and the Department of Planning, Industry and Environment to ensure NSW's overarching strategies for transport and land use planning align and complement each other, delivering an integrated vision for the State.

These plans help guide Transport's funding priorities and strategic direction to achieve the best outcomes for our people, our customers, our communities, and the people of NSW.

How Future Transport enables agility in the face of change

Future Transport 2056 is no longer a static document. It has shifted to a new, dynamic planning approach, designed to guide future transport planning in a more unpredictable environment. The vision-led planning approach helps us respond and adapt to changes as they arise, by setting an agile planning framework that allows us to embed flexibility and strategic readiness into our activities, encourages scenario testing, and plans for the delivery of major investments according to performance-based or need-based 'triggers' rather than rigid timeframes.

This agile approach to planning is helping us effectively respond to new challenges and opportunities, such as the 2020 bushfires and COVID-19, which have significantly impacted the community and changed how our customers interact with the transport network – resulting in significant changes to mobility patterns, and highlighting the need to prioritise health and safety, and improve network resilience.

It also allows us to respond to changing technology and innovation. The next 40 years will see more technology-led transformation than the past two centuries. Technology is changing how we travel – and how we deliver transport. Future Transport ensures that we are able to leverage rapid advances in technology and innovation to create and maintain a world-class, safe, accessible, efficient and reliable transport system over the next 40 years.

This is why we are taking the opportunity to refresh the Strategy, shifting to a dynamic document going forward to ensure it reflects current programs and priorities, providing updates that indicate where our thinking has evolved, demonstrating the resilience of the network, and showcasing some of the projects and activities undertaken over the past two years that are delivering customer and community outcomes.

In the coming months we will also commence a review of Future Transport 2056 to ascertain whether it remains suitable to deliver on our long-term customer and community outcomes or whether it needs to be adjusted to adapt to changing trends.

What is new in the refresh of Future Transport 2056?

Since its release in 2018, Future Transport 2056 has evolved to reflect the changing environment that we operate within, and to remain current in an ever-changing world. The strategy has been updated to respond to major changes that impact the way transport is delivered, including responding to recent shocks and events, such as the COVID-19 pandemic and the bushfires. Transport's response to these shocks, and the impact on the way services are planned and delivered, is incorporated into the strategy.

Other changes to Future Transport 2056 include updates to reflect the ongoing evolution of Transport as an organisation such as the changes brought about by Transport's 10 Year Blueprint and Evolving Transport. It has also been updated to demonstrate the way Transport delivers services and projects to address key Future Transport concepts and priorities, such as the 30-minute city, the hub-and-spoke model, and the Movement and Place Framework, and its role in delivering environmental, social, financial and economic sustainability.
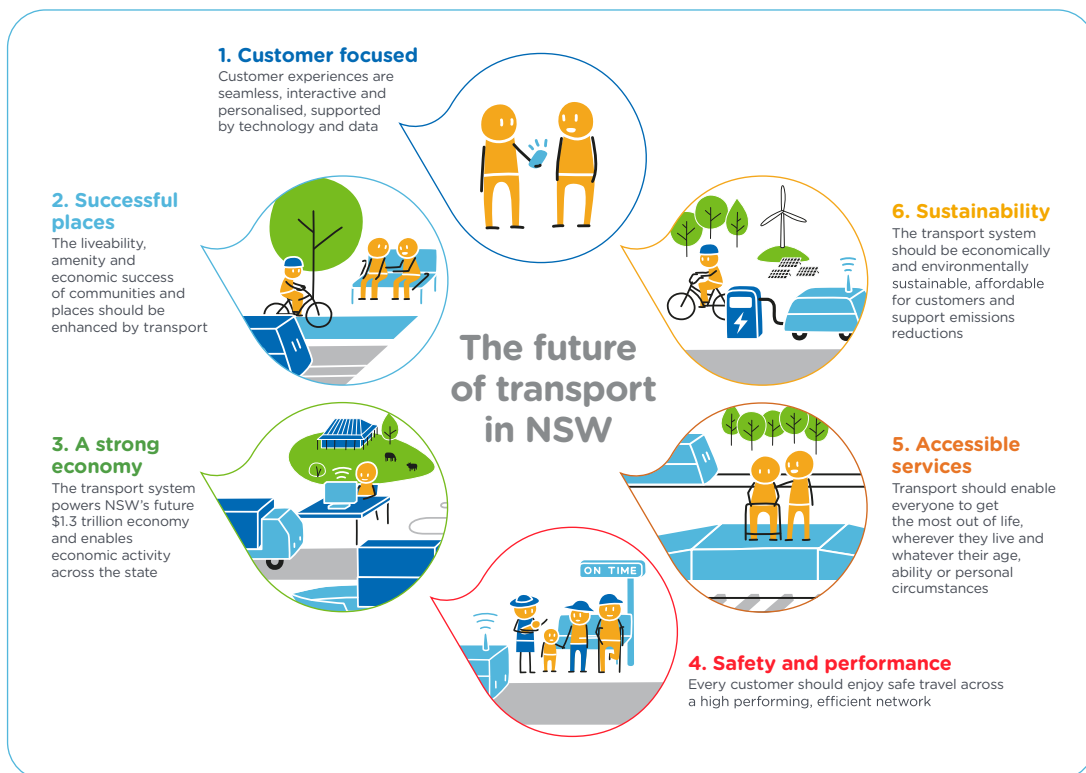
This update also provides a snapshot of Transport's successes and performance since the Strategy's first release in 2018, including progress against existing and new initiatives, and how technology and data analytics advancements are changing the way Transport operates. An example of how Transport is delivering successful places is through its collaboration with local councils to repurpose streets and streetscapes to be pedestrianised and to extend restaurants into alfresco dining areas.

Guiding Principles

In an age of uncertainty, setting a vision and guiding principles allows us to be flexible and adapt to change as we create the future transport network.

Our population is forecasted to increase to around 12 million people by 2056; freight volumes are estimated to double in the Greater Sydney area and increase by 25 per cent in regional and outer metropolitan NSW; and the passenger network is preparing for over 28 million trips a day. This means planning for the future has never been more important. While recent events, such as COVID-19, impacted demand and mobility patterns, particularly for public transport trips, long-term expectations still forecast a significant increase in demand for transport.

Future Transport 2056 outlines six state-wide principles to guide planning and investment. These are aimed at harnessing rapid change and developing new technologies and innovation to support a modern, innovative and resilient transport network.

1. Customer focused
Customer experiences are seamless, interactive and personalised, supported by technology and data

2. Successful places
The liveability, amenity and economic success of communities and places should be enhanced by transport

3. A strong economy
The transport system powers NSW's future $1.3 trillion economy and enables economic activity across the state

4. Safety and performance
Every customer should enjoy safe travel across a high performing, efficient network

5. Accessible services
Transport should enable everyone to get the most out of life, wherever they live and whatever their age, ability or personal circumstances

6. Sustainability
The transport system should be economically and environmentally sustainable, affordable for customers and support emissions reductions

The future of transport in NSW

Six state-wide principles

Customer focused

Vision: Customers' experiences and their end-to-end journeys are seamless, interactive and personalised, supported by technology and data.

Customer focused

The future of mobility, in both regional and outer metropolitan NSW and Greater Sydney, is customer focused, data enabled and dynamic, allowing the network and services to effectively respond to rapidly evolving customer needs and preferences. Customers' end-to-end journey experience will be seamlessly integrated across different transport modes, including information, payment and transfers between modes.

In the future, personal mobility packages, such as Mobility as a Service (MaaS), will bundle traditional 'modes' with technology platforms and new service offerings, like on-demand bus and ferry services, car share, rideshare, carpool, bike share and smart parking.

Our smartphones and smart devices will be the gateway for each journey, allowing customers to make travel choices based on what matters most to them – service frequency, cost, emissions, comfort or travel time.

Transport will be supported by 'big data' – the extremely high volume of data generated each day from the transport network that can be analysed to reveal travel patterns and trends. As digital technologies like artificial intelligence, 5G and the 'internet of things' increase – growing volumes of rich data – service providers will be able to better connect with customers, know their preferences and tailor service offerings in real time. Transport's real-time Digital Twin will create a digital real-world model of cities and communities to facilitate better planning, operations and delivery.

The ever-increasing coverage, capacity, variety and speed of wireless communication technologies and connected devices will allow vehicles and infrastructure to communicate with each other to improve the quality and safety of customer journeys and enable the use of automated passenger and freight services across Greater Sydney and regional and outer metropolitan NSW
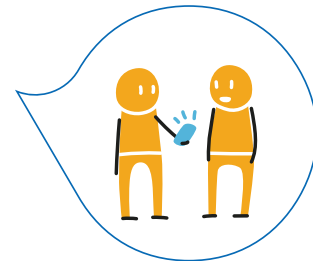
Successful places

Vision: The liveability, amenity and economic success of communities and places are enhanced by transport.

Recent events, such as COVID-19, have reinforced the vital role that successful places play in supporting healthy lives and strong communities, attracting talent and delighting visitors.

Successful places

Transport influences the experience of all those who live in, visit and work in a place, as well as people travelling through. Transport shapes the physical environment, such as our streetscapes, and influences local activity. The design of transport infrastructure supports the environmental outcomes of places.

Public spaces are key components of a successful place where people can meet and enjoy their leisure time, such as in town squares, libraries and community centres, parks and sportsgrounds, and on waterways.

Being able to safely and easily access these spaces by walking, cycling and public transport encourages people to be more physically active, improves mental health and increases social interactions and recreational opportunities in communities.

Transport's role in supporting the creation of successful places and integrating the movement of goods and people in place design, such as through improved streetscapes, better public transport and more convenient access, provides an opportunity for local communities and the private sector to work together to create attractive places for our diverse communities.

A strong economy

A strong economy

Vision: In 2056, the transport system powers NSW's $1.3 trillion economy and enables economic activity across the State.

Over the short term, the transport system will play a key role in NSW's economic recovery, by supporting mobility and job creation through its operations and infrastructure investments, and ensuring the efficient movement of freight and goods.

Transport plays a key role in supporting new economic and social opportunities, including supporting the development of the Western Parkland City, the Aerotropolis and surrounding employment lands, and connecting the regions of NSW to key corridors and growth areas.

Transport data provides vital insights to drive decision making and the provision of services by the private sector. The data is a valuable asset that can support innovation and stimulate economic activity.

By 2056, increased automation, freelancing, 'virtualisation' and a strong services economy will enable a vibrant, modern economy that creates and supports new industries and jobs. Economic productivity will grow, as the transport network moves people more efficiently to job centres and provides companies with access to the right workers, skills and customers.

Technology will enable productivity-enhancing flexibility in the way people work and the times of day they travel. Better digital connectivity, emerging technology trends, such as augmented and virtual reality, and the growth of the service and digital economy, will help create a future of work that is 'anytime, anywhere' for even more people. Recent experiences during the COVID-19 pandemic, where many people were required to work from home for extended periods of time, has demonstrated how effective technology can be in changing how we work and in what circumstances we choose to travel.

Technology, such as robotics and automation, will transform existing industries and drive new ones – with the World Economic Forum predicting that some 65 per cent of children entering primary school today will hold jobs in the future that do not yet exist.

First- and last-mile freight will be transformed by technology delivering efficiencies in logistics and small parcel movements, incorporating innovative direct-to-consumer deliveries and supporting 'freight as a service', micro-freight delivery models and supply chain resilience. Advances in automated manufacturing relating to drones and 3D printing also have the potential to impact supply chains.

At the same time, today's substantial freight task will continue to expand. Our primary industries and mining industry will continue to grow, strengthening links to global export markets.

Safety and performance

Safety and performance

Vision: Every customer enjoys safe travel, regardless of transport mode or location, across a high-performing, integrated and efficient network.

NSW has set a target of zero trauma on the transport system by 2056, committing to significant reductions in absolute and per capita rates of trauma across road, rail, waterway and air transport infrastructure and services.

Achieving our safety vision will require a mix of targeted and proven initiatives that consider how people, vehicles, speeds and infrastructure work together to create a safe system now and into the future. It will also mean providing information and technology to support people to make safer decisions about their mobility choices.

Designing trauma out of the network will mean ensuring the majority of road travel occurs on 4- to 5-star roads, incorporating key safety measures such as median and roadside safety barriers, wide centrelines, audio tactile line markings, reduced speeds and traffic calming methods.

It also means prioritising a set of public safety performance measures that will track the level of risk in our system across our fixed infrastructure; vehicles, vessels and rolling stock; operators and controllers; and customers and the community. This includes responding to new and emerging public health concerns, such as COVID-19, with Transport delivering innovative solutions to keep our network running while maintaining the highest health and safety standards.

As technology develops and is tested and proven, new vehicles (such as connected and automated vehicles (CAVs)) and smart infrastructure are expected to reduce rates of road trauma caused by human error, if key safety features are embedded into them; but will also present new challenges, as road environments and road users adapt to this new technology, and as CAVs interact with traditional vehicles in mixed traffic. New technologies are also expected to improve traffic flow and efficiently manage higher traffic volumes.

City-shaping public transport passenger and road vehicle corridors will help deliver a safer, more reliable, high-performing network. Key corridors, including all NSW motorways, will be designed and upgraded as smart corridors that accommodate the vehicles of the future and other digital technologies.

Greater separation of major traffic flows will support higher performance and safety, with freight bypasses of major regional cities and centres. Improved separation of transport modes will remove interactions that cause unnecessary safety risks and negative impacts upon efficiency (such as level crossings and separated cycleways).

Prioritising safety during planning, design, construction, management and operation across our major transport projects will help to deliver a safe and integrated network. Providing safe and direct access to and from our future transport interchanges, especially for pedestrians and bike riders, not only delivers a safer integrated environment but can enhance the qualities of our places as well

Accessible services

Accessible services

Vision: Transport enables everyone to get the most out of life, wherever they live and whatever their age, ability or personal circumstances.

Access to transport is fundamentally important for all people in NSW. However, based on 2018 ABS data[1], 12 per cent of the 1.2 million people living with disability (including age-related disability) in NSW are unable to use any form of public transport. A further 18 per cent have difficulty or require assistance using public transport. Almost 17 per cent do not have or do not know whether they have access to public transport in their local area.
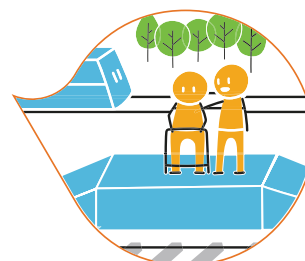
An accessible network will mean more choice for people with mobility constraints and make travel on both public transport and by private vehicle easier and safer for everyone.

Technology that provides customer information, travel planning and wayfinding, such as websites, real-time information at transport facilities, on board trains, buses and ferries, and via trip planning apps, is progressively becoming more accessible. In particular, there have been significant advances in smart phone apps that provide specialised assistance for people with disability.

As technology advances, we will seek opportunities to improve the accessibility of transport information and the way we gather feedback from all customers, while continuing to engage and provide information through face-to-face methods and other means. We are continuing to work with customers living with disability to remove barriers from our transport networks; such as improving the design of bus stop poles to include Braille and tactile information.

Over time, the whole transport network will be physically accessible through the delivery of new assets or by upgrading or repurposing existing assets. Transport is working to deliver greater choice for all our customers, including through human-centred design approaches in infrastructure delivery and operations.

In regional NSW, NSW TrainLink services will use a new fleet of accessible trains for intercity and regional travel. In addition, the Country Public Transport Infrastructure Grant Scheme will continue assisting councils with the renewal of the State's bus stops to provide accessibility and shelter. Transport is also working in regional and rural communities to provide innovative mobility access solutions across NSW. This includes engaging with Aboriginal communities to improve their access to transport services and available subsidies.

In metropolitan areas, new accessible ferries will replace some of the current fleet as they are retired and the Sydney Metro and Sydney Light Rail are now among the first projects to deliver fully accessible fleets and assets in Australia. Other projects, such as the Transport Access Program, continue to upgrade our existing train and ferry networks to achieve compliance with the Disability Standards for Accessible Public Transport 2002.

An accessible transport network also means easier access for people with prams and young children, people wheeling luggage trolleys, people using walking frames, and so on; making our transport system more equitable for all types of customers travelling under a range of circumstances.

1   Australian Bureau of Statistics, *Disability, Ageing and Carers 2018*

Sustainability

Sustainability

Vision: The transport system is economically, environmentally and socially sustainable, operationally resilient, affordable for customers and supports emissions reductions.

Moving to an environmentally, economically and socially sustainable transport system is essential to tackle climate change, create liveable places and a productive economy, reduce congestion, and support the better health and wellbeing of our communities.

Taking a whole-of-life approach requires consideration of future needs, challenges and opportunities, and integrating design, planning, financing and governance decisions.

The implementation of a new cross-cluster delivery approach that shares operational and capital costs equitably across users, taxpayers, investors and other beneficiaries, will support ongoing financial sustainability. By 2056, a transport network of public and private assets will enable NSW to maintain its competitiveness in a global low-carbon economy.

Investment in infrastructure will aim to provide jobs, skills development, or improvements in the local economy across a project's lifecycle and build resilience into the network against threats, such as bushfires. To deliver fairness in the distribution of impacts and opportunities, we will improve our understanding of the social effects of transport infrastructure projects, and the values and heritage of the communities we work in.

Sustainable transport needs to be lean, clean and green. This means reducing overall transport demand through integrated land use planning, lowering vehicle emissions by using more sustainable transport and investing in more sustainable fleet (such as the new electric diesel bi-modal regional rail fleet), and transitioning to low-carbon fuels or electricity that is sustainability generated.

Taking this whole-of-life approach to assess economic, environmental and social impacts also requires us to consider future needs, challenges and opportunities, and to integrate flexible solutions into the design, planning, financing and governance decisions we make now, in the context of future decision making, risks and uncertainty.

New technologies will also help us get the most out of our existing assets, solving network issues without significant capital investment. For example, smart motorways will better manage traffic flows and congestion, potentially reducing the need for extra road space, while digital twins (virtual replicas of the physical world) can help save costs through predictive maintenance and identification of network problems.
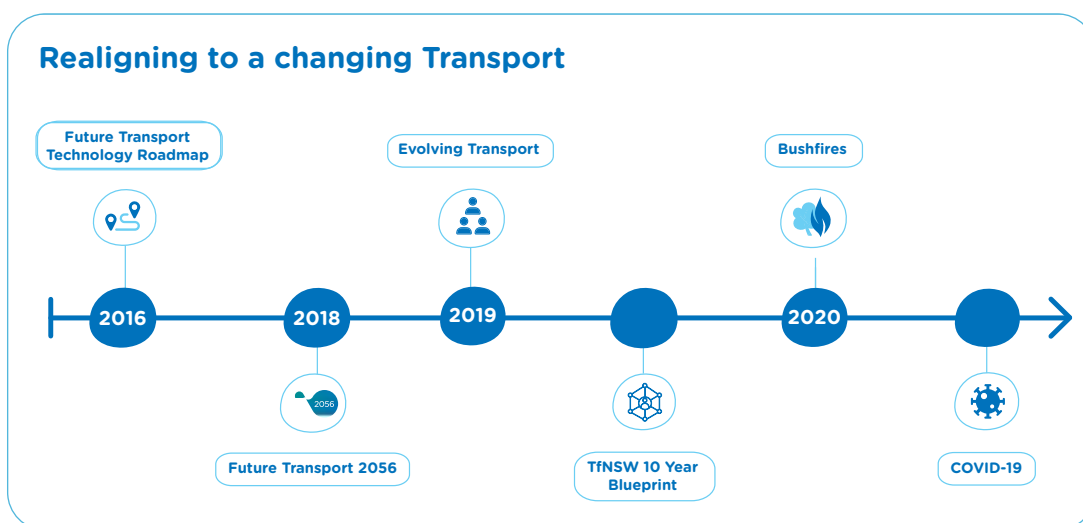
CHAPTER

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Planning and delivery

A new approach

The strategic context for transport – and the needs, wants and expectations of our customers – are evolving, while expectations for safety, reliability, accessibility and affordability remain the same. The past two years alone have seen significant changes in how we respond to evolving customer needs.

Realigning to a changing Transport

Future Transport Technology Roadmap		Evolving Transport		Bushfires	
2016	2018	2019		2020	
	Future Transport 2056		TfNSW 10 Year Blueprint		COVID-19

Realigning to a changing Transport

Rapid technological change and disruption, along with more recent events such as the bushfires, flooding and COVID-19, will all have far-reaching implications for the future of transport. Together with long-term industrial, demographic and social shifts, these changes will reshape our economy and society, and therefore transport, in complex and unknown ways.

As a result, planning and delivering transport in an environment of uncertainty about what the future will hold is our new reality. Unpredictable change introduces significant risk to long-term planning, but also offers opportunities, if we are ready and able to identify, respond to and capitalise on these.

To do so effectively, and successfully forge a path towards our Future Transport vision, we need to embrace new approaches to planning and delivering transport.

Future Transport provides the platform to embrace new approaches to planning and delivering transport and successfully respond to the challenges and opportunities presented by technological disruption and unpredictable changes.

The old model of government being the sole planner, deliverer and operator of public transport, and providing more capacity on the network to meet forecast demand, is no longer viable. This approach also does not guarantee delivery of what our customers need or want in the future.

Our new approach in how we work towards our Future Transport vision, and how we address ambiguity, is defined by:

> embedding agility and flexibility

> openly collaborating and partnering

> delivering for people and places

Embedding agility and flexibility

Prioritising agile solutions

For any given challenge there is a range of potential solutions. For example, when it comes to road congestion, we can build wider roads, encourage mode shift to public transport, deploy smart road infrastructure to manage congestion 'hot spots' or encourage road users to re-time discretionary travel.

Major infrastructure projects are often needed to improve the capacity and performance of our transport network. However, major infrastructure assets are costly, time consuming and disruptive to plan and deliver, and are relatively inflexible solutions in a rapidly-changing world.

Because of this, our approach will prioritise more agile service, policy and demand management solutions over large-scale infrastructure solutions wherever viable. We will also incorporate integrated and scalable technology, digital and data solutions in all infrastructure investments, so that our fixed assets can be utilised in ways that match, respond to and meet demand. This will enable us to better respond to dynamic customer needs, get the most out of the assets we already have and improve levels of service without significant capital investment.

Future Transport's planning framework will deliver major investments according to performance-based or need-based 'triggers' rather than rigid timeframes, and coordinate a range of solutions to meet the needs of people and businesses across the State. This flips the emphasis from infrastructure provision and capital investment to more nimble non-infrastructure responses, which deliver more flexible solutions when there is uncertainty over long-term infrastructure needs.

Future Transport Planning Framework

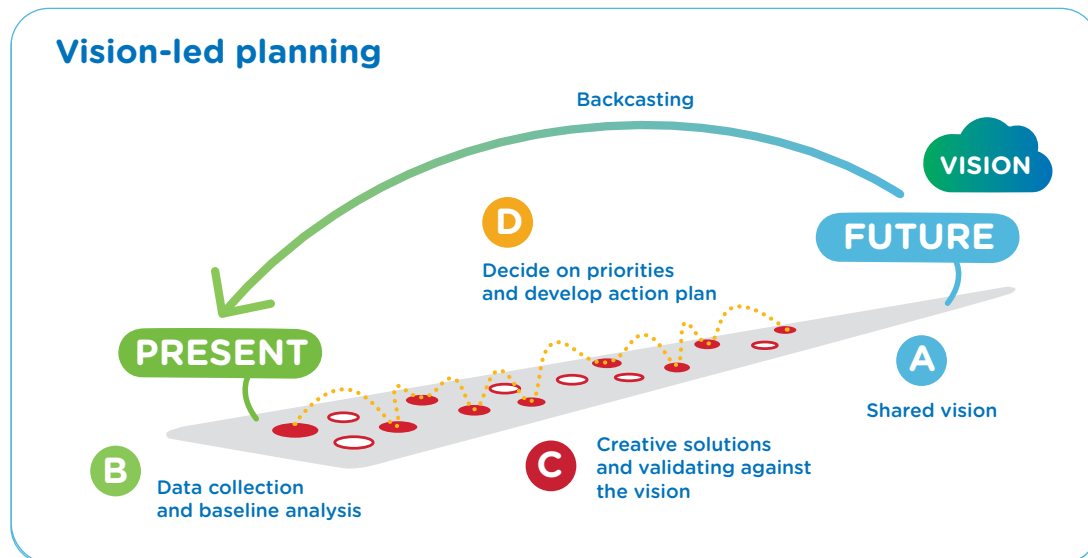| Short-term options	Long-term options
Service changes, demand management, operational strategies, regulation and technology are quicker to deploy, can be implemented with low capital investment, and should be the 'first responders' to changing demand and customer preferences.	Infrastructure construction and repurposing takes longer to implement and requires significant capital investment.

Future Transport Planning Framework

Vision-led planning

The need for government to be increasingly agile and responsive is the hallmark of our approach to vision-led planning.

Instead of the traditional 'predict and provide' approach, which responds to and reinforces today's experience and historic trends, Future Transport introduces an alternative 'vision and validate' approach that considers what customers will need and want to experience tomorrow. This approach enables agile and responsive vision-led, place-based planning, while giving industry and communities the certainty they need for their own plans and decisions about where to invest, locate and live.

'Vision and validate' centres on a co-design approach, and forging partnerships with our customers, local councils and stakeholders. It starts with co-developing shared visions for places founded in a rich understanding of what our customers and communities want and need, and validating the visions through scenario testing, stakeholder engagement and policy alignment.

Supported by a common view of what defines success and how this will be measured, these partnerships will endure through delivery – working together to evaluate and adjust as we move forward in response to emerging outcomes and changing needs, priorities and circumstances.

Vision-led planning

Backcasting

VISION

FUTURE

D
Decide on priorities
and develop action plan

PRESENT

A
Shared vision

B
Data collection
and baseline analysis

C
Creative solutions
and validating against
the vision

Vision-led planning

A flexible, agile investment approach

Future Transport 2056 is underpinned by service and infrastructure plans (SIPs) for Greater Sydney, and regional and outer metropolitan NSW that identify projects and programs to help us achieve our 40-year vision over time.

The timeframes of the service and infrastructure plans are indicative, based on preliminary evidence of when these initiatives may need to be implemented or committed. Change can mean initiatives will need to be reprioritised based on need.

All initiatives in the strategy and plans will be investigated and tested, alongside other key government planning processes, such as the development of the State Infrastructure Strategy, Greater Sydney District Plan and regional plans, to ensure any major impacts in growth patterns or use are considered.

Find out more about the services and infrastructure plans.

Openly collaborating and partnering

From the first stages of planning, we are engaging all levels of government, customers, communities and industry to test our understanding of the problem, develop a genuine appreciation of customer and community needs, and harness their input and expertise to develop a shared vision and the best possible solutions.

This approach will support the fundamental shift from government being the sole provider of transport to being an enabler of transport infrastructure and services.

This new way of thinking represents a new era in transport, where we emphasise the importance of involving people who use or are affected by the transport network in the conversation, as well as learning by doing and experimentation.
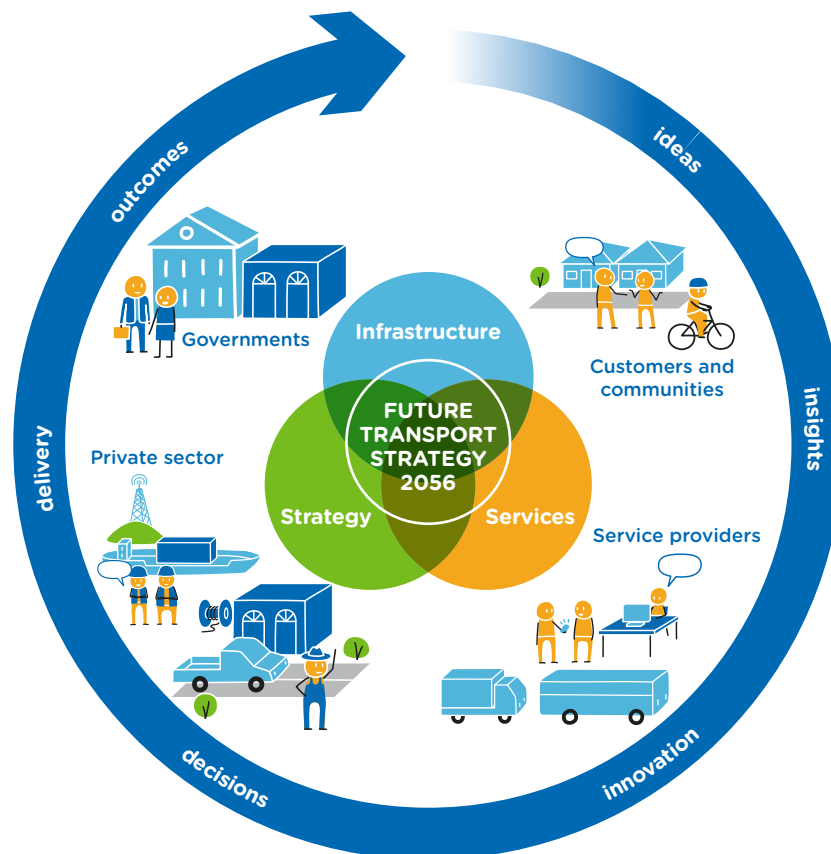
Some of the ways Transport for NSW is applying co-design are outlined here:

›   introducing a new approach to planning, involving early collaboration with our stakeholders in planning and design processes to define a shared vision for a place and identify the land use and multimodal transport strategies to achieve this

›   partnering with other government organisations (such as the NSW Department of Health) and joint organisations of councils to co-design solutions, share insights and jointly own problems and initiatives

›   establishing regulatory 'sand-boxing', which allows trials to be undertaken in restricted settings, such as the autonomous vehicle trials

›   piloting on-demand public transport across urban, regional and outer metropolitan NSW

›   testing the benefits of crowdsourced solutions to key transport challenges through the Transport Digital Accelerator

›   delivering real-time bus occupancy and train carriage occupancy levels for customers. This was recognised at the 2019 Transport Ticketing Awards in London for setting a global benchmark with innovative real-time passenger information

›   introducing COVID safe travel notifications on the Opal app, a world first innovation using real-time capacity and predictive data to help customers make better choices when travelling

›   working with other agencies, local government and local communities through the Regional Community Infrastructure Program to re-purpose and reuse non-operational and life-expired transport assets to deliver transport, community and economic benefits to regional and outer metropolitan NSW

›   adopting an agile approach to procurement and technology testing that promotes sectors and other organisations to propose potential solutions

›   incorporating new camera technology and artificial intelligence software to meet privacy, policy and regulatory obligations and ensure safety outcomes are achieved.

›   introduction of the world first Mobile Phone Detection Camera Program.

> enhancing the availability of open data to support innovative solutions and collaborative planning. Our ability to provide more real-time data on our assets and services will increase over time as we invest in more connected and smart technologies

> introducing opportunities to suspend or reduce operational curfews to enhance the efficiency of road freight deliveries to retail premises

Co-design and collaborative problem solving

To deliver future transport outcomes and adapt to changing needs, we need to find new ways of working, continuously innovate, and involve everyone that benefits from, or is impacted by, transport and land use planning decisions.

outcomes

ideas

insights

delivery

decisions

innovation

Governments

Infrastructure

Customers and communities

Private sector

FUTURE TRANSPORT STRATEGY 2056

Strategy

Services

Service providers

Collaborative problem solving and delivery

Embracing technology and innovation

Transport for NSW has a vision to create well-connected communities linked by integrated and innovative public transport networks and safer roads, offering a range of mobility services and real time information to give customers the freedom to choose how and when they want to get around. We will also help create successful and healthy places so the liveability, amenity and economic success of communities and places are enhanced by transport.

Transport for NSW will use technologies and innovations to deliver on these objectives for all our customers, including regional and outer metropolitan and Greater Sydney customers, and our freight and logistics customers who are vital to the economic performance of the State.

As technology evolves, we will continue to harness it and adapt. Transport for NSW will continue the pace of innovation, to deliver exceptional mobility for our customers by ensuring transport technology is inclusive and provides solutions for all customers, on all modes across NSW.

The Future Transport Technology Roadmap aligns with the Future Transport 2056 strategy and other NSW strategies, providing a focus for achieving the Future Transport principles.

Delivering for people and places

Place-based planning recognises that every place is unique and that transport infrastructure and services need to reflect local character and the movement needs of the local community. Place-based planning also responds to the broader challenges facing metropolitan and regional areas, such as adapting to a changing climate, changing demographics, population growth, and supporting healthy lifestyles and social interaction.

A place-based approach to the planning, design, delivery and operation of transport networks recognises the network of public spaces formed by roads and streets, and the spaces these adjoin and impact.

Places also have a complementary relationship with transport networks – movement supports better places by providing connectivity and integrating the movement of people and goods, and transport networks are most rational and productive where they connect and improve the places they serve. This is why we are partnering with local councils and other stakeholders from the start of the planning process to establish a common understanding of local challenges and opportunities, develop a shared vision for land use and transport for the future, co-design ideas and prioritise solutions.

Regional and outer metropolitan NSW plays a vibrant role in the culture and economy of NSW. Future transport investment in regional and outer metropolitan NSW will deliver a 'hub-and-spoke' network to provide better connections and improve access to regional cities and centres. This will connect customers and communities to each other and to jobs, schools, hospitals and services, as well as to cultural, social and recreational opportunities. Find out more about service and infrastructure initiatives for regional and outer metropolitan NSW.

A 'metropolis of three cities' and the '30-minute city' will be key features of Greater Sydney, where people can access jobs and services in their nearest metropolitan or strategic centre within 30 minutes by walking, cycling or public transport, seven days a week. This will give people better access to jobs, education and essential services, give people more time back in their days, and grow a sense of community. The 30-minute city will be supported by strong walking and cycling connections to increase this mode share and improve sustainability and health outcomes. Find out more about service and infrastructure initiatives for Greater Sydney.

Transport Reconciliation Action Plan 2019-2023

Many of the transport routes we use today – from rail lines, to roads, to water crossings – follow the traditional Songlines, trade routes and ceremonial paths in Country that our nation's Aboriginal peoples followed for tens of thousands of years.

We acknowledge the deep and lasting impact of the traumas associated with past policies and we understand that in order for the foundations of healing to be laid we have a responsibility to engage in genuine truth telling.

Respecting and listening to a diverse range of thoughts and options is also critical in ensuring we make better decisions, drive innovation and creativity, and have the capability to deliver our vision, which is to give everyone the freedom to choose how and when they get around, no matter their personal circumstances or where they live.

Respect for Aboriginal and Torres Strait Islander peoples and cultures is both an acknowledgement of the past and a celebration of the world's oldest living culture, based on innovation, caring for Country and a collaborative approach to community and wellbeing.

The Transport Reconciliation Action Plan 2019-2023 acknowledges and pays respect to the role of Aboriginal and Torres Strait Islander peoples as custodians of the lands where we live and work and their ongoing connection to the land and waterways of NSW. This plan demonstrates our commitment to working towards reconciliation both within Transport and in communities across NSW.

Continuing the next phase of transport improvements

10 Year Blueprint

Future Transport 2056 provides us with the long-term foundation for everything we do. To help guide us in delivering this, Transport's 10 Year Blueprint defines the outcomes, ambitions and priorities that will keep Transport aligned and focused on creating value for the people we serve: our customers, communities and the people of NSW, and also for the people of transport. It highlights where we need to focus our efforts in order to achieve our long-term vision for transport, as well as enabling us to deliver on the NSW Government's focus areas.

Primary outcomes

The Blueprint is built on four primary outcomes, which describe the highest order value we create for our customers, communities, the people of NSW and the people of Transport.

These aspirational descriptions of the end-state encourage us to think in new ways about the role we play and how it contributes to our society and wellbeing. Defining these primary outcomes provides a clearer sense of purpose in our work, establishes a foundation for partnering effectively with our many stakeholders, and allows us to be on track for the 40-year vision.

The primary outcomes are about the value we create for people – everything we do in Transport is intended to create value for the key groups of people we serve:
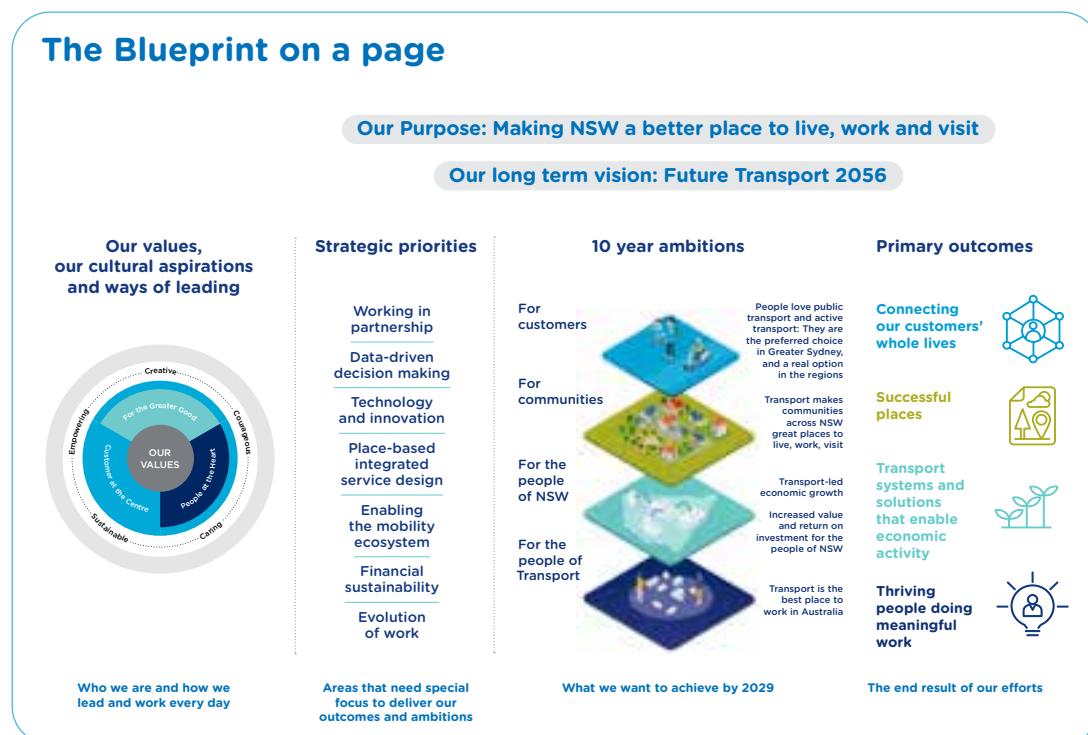
The 10 Year Blueprint

For customers

Connecting our customers' whole lives
We will deliver and enable transport solutions that blend seamlessly into our customers' lifestyles, catering for the wide range of journey types needed by people and or the movement of freight.

For communities

Successful places
We will help create places that integrate the right mix of infrastructure, services, and experiences for communities, supporting them to achieve their desired social, cultural and economic outcomes.

For the people of NSW

Transport systems and solutions that enable economic activity
We will deliver quality assets and efficient transport networks, at the right price, and ensure transport investments and solutions service the people of NSW.

For the people of Transport

Thriving people doing meaningful work
We will be proactive and deliberate in designing our ways of working and workplaces, so we build on our people's capabilities, create a culture of success and align our people to work together in new ways to foster innovation.

Primary outcomes of the 10 Year Blueprint

Implementing the Blueprint

Transport's 10 Year Blueprint is guided by three core principles which are the foundations of our culture – for the greater good, people at the heart, and customer at the centre, which are underpinned by Transport's five ways of leading – leadership that is empowering, creative, courageous, caring and sustainable.

The Blueprint on a page

Our Purpose: Making NSW a better place to live, work and visit

Our long term vision: Future Transport 2056

Our values, our cultural aspirations and ways of leading	Strategic priorities	10 year ambitions	Primary outcomes
	Working in partnership	**For customers** — People love public transport and active transport: They are the preferred choice in Greater Sydney, and a real option in the regions	**Connecting our customers' whole lives**
	Data-driven decision making	**For communities** — Transport makes communities across NSW great places to live, work, visit	**Successful places**
	Technology and innovation		
	Place-based integrated service design	**For the people of NSW** — Transport-led economic growth. Increased value and return on investment for the people of NSW	**Transport systems and solutions that enable economic activity**
	Enabling the mobility ecosystem		
	Financial sustainability	**For the people of Transport** — Transport is the best place to work in Australia	**Thriving people doing meaningful work**
	Evolution of work		
Who we are and how we lead and work every day	Areas that need special focus to deliver our outcomes and ambitions	What we want to achieve by 2029	The end result of our efforts

Blueprint guides Transport to ensure we are on track to deliver Future Transport 2056

Our Blueprint is implemented by embedding the outcomes, ambitions and strategic priorities into our internal planning and resource allocation processes. Transport is developing an outcomes based approach to ensure we have a clear sense of the long-term value we want to create, and empower our people to deliver for customers, communities and the people of NSW.

Our seven **strategic priorities** are the big levers of change we need to pull and where we expect to see a lot of new activity emerging. Our **ambitions** describe what it will look and feel like when we are successfully implementing our outcomes over the next 10 years.

Underneath each primary outcome, we have **intermediate outcomes** that we are actively working towards. Collectively they form a framework of outcomes that create a rich picture of what we need to deliver to achieve our desired end state. Different people and teams across Transport will play different roles in contributing to these outcomes.

Find out more about the 10 Year Blueprint.

Evolving Transport

Evolving Transport has emerged as a key action of the 10 Year Blueprint, and is an important foundation for preparing our organisation for the future.

Evolving Transport is our transformation program that is positioning us to deliver even better outcomes for customers and communities across the State, now and into the future. It is fundamental in ensuring we can deliver our 10 Year Blueprint and Future Transport 2056 vision.

Evolving Transport is about:

› achieving more integration and collaborative thinking about transport

› being transport mode agnostic and managing the transport network holistically

› implementing more efficient and effective ways of working

› creating an operating model that places customers and communities at the centre of planning, design and delivery

Evolving Transport is our transformation program that is positioning us to deliver even better outcomes for customers and communities across the State, now and into the future.

Putting our people at the heart

Our people at Transport are central to bringing Future Transport 2056 to life. It's through our workforce, both at the frontline and in back-office roles, that we will achieve the 10 Year Blueprint's three core principles: to put our customers at the centre and people at the heart – all for the greater good, and realise the principles of Future Transport 2056.

To deliver the priorities of our 10 Year Blueprint, we need to be an integrated, flexible, diverse and inclusive business that delivers for customers, communities and the people of NSW. We want to excite our people by demonstrating the type of workforce we will need and the work they will do as, and how it will feel working for Transport towards 2056. This will enable the development of a workforce that is fit for the future, and the delivery of the Future Transport vision.

Our People Strategy will help us build an increasingly engaged workforce that will help create the necessary organisational culture to deliver for our customers, community and people. It is among a number of strategies designed to set the foundation for Transport to achieve these bigger-picture outcomes.

Delivering through change

Recent events have highlighted the importance of an agile planning approach. Our response has demonstrated our ability to effectively adapt and respond to short-term changes, along with any potential lasting impacts on our customers' needs and the transport network.

Building resilience

Transport for NSW, like the broader community, has and will continue to be tested by disruptions that require us to adapt to changing circumstances, many of which are unanticipated events. These will impact our trajectory towards delivering the Future Transport vision, and progress will not always be linear. These challenges will require us to adapt while remaining focused on how we deliver value for our customers and communities.

In these events, we will be guided by our future vision and the latest data around the needs, wants and sentiments of our customers and community. While challenging, such events are also an opportunity adapt and learn, for the benefit of the community in the future.

Bushfires

The transport network was significantly affected, both during and after the bushfires. Transport staff across the State put in an extraordinary effort to support communities in responding to the bushfire crisis, with hundreds of staff out in the fire-affected regions helping to coordinate the response. This included managing road closures, directing customers to alternative routes and services, geotechnical and arborist teams inspecting roads and rail line conditions, and crews clearing vegetation and debris.

The damage

› 880 kilometres of State roads and 23 assets, mostly along rail corridors, were damaged or destroyed with a repair estimate of $90 million

› major arterial roads impacted included Kings Highway (35 kilometres), Oxley Highway (50 kilometres), Gwydir Highway (70 kilometres) and Princes Highway (400 kilometres)

› on a local level, there were 150 kilometres of damaged roads, 48 bridges destroyed and 17 damaged, with repair estimates exceeding $83 million

The repair

› the swift rebuilding effort by almost 1,000 transport staff in the immediate aftermath of fire kept critical lifelines to regional NSW open and working

› the State's Main West Line through the Blue Mountains required more than 150,000 hours of work to rebuild track infrastructure damaged by fires and floods

Regional Transport teams also took proactive steps to improve freight movements and ensure food, fuel and other supplies could reach affected communities. This included accelerating the assessment of fire damaged sections of the Princes Highway to ensure timely recovery efforts to safely re-open roads.

NSW TrainLink teams arranged replacement of train services on the Blue Mountains Line as a result of bushfire damage to sections of the track and signalling structures, and for the entire journey between Dubbo to Broken Hill.

Additionally, Maritime teams worked with a number of agencies, including the Rural Fire Service and Marine Area Command, to ensure the safety of boaters, and assist with the delivery of provisions and supplies, and evacuations by water.

An agile and resilient network is needed to reduce the impact on any future bushfire events. We are increasing future resilience of the transport network by ensuring the use of fire-resistant materials, and designing places to ensure multiple entry and exit points. We are also improving evacuation routes, access for emergency services and the resilience of strategic transport corridors to support access and connectivity during these events.

COVID-19

Transport responded swiftly to the COVID-19 pandemic, delivering innovative solutions to keep the network running while maintaining the highest health and safety standards for customers and the team at Transport. This was supported by our collaboration with industry, including with our public transport operators and point to point providers.

A centralised taskforce was formed, drawing on all parts of the cluster and empowered to act in a connected way to respond to the ever-changing COVID-19 situation, in partnership with key stakeholders across NSW Government. The taskforce contributed to implementing strategies that helped to keep our network safe and running throughout the COVID 19 pandemic. Transport is providing ongoing support the NSW COVID-19 response, but initial actions, included:

› Maintaining public transport service delivery across NSW

› Placing 'dots' on public transport seats to show customers the safest places to sit and stand, and to facilitate physical distancing capacity limits on services

› Maintaining a 98 per cent social distancing score across services

› Deploying marshalling response and support teams on the Greater Sydney and the Outer Metropolitan transport networks

› Providing COVID safe travel notifications on the Opal Travel app with advanced alerts for physical distancing on trains and Metro

› Automating pedestrian crossings at key intersections in the Sydney CBD and around health precincts

› Transferring more than 130,000 passengers by coach to quarantine between March 2020 and February 2021

› Providing over one million additional cleaning hours on the network

› Working with NSW Health, NSW Police Service, local communities and interstate colleagues to manage multiple border closures and restrictions, included managing the Victorian border closure which required more than 30 checkpoints to be established and maintained along the Murray River border towns

› Supporting the national freight protocols regarding the movement of freight, and managing a number of COVID-19 testing sites for freight operators

Transport also acted quickly to provide more services to support its customers, including providing options for walking and cycling and demand management..

COVID-19 has drastically changed our lives, with a higher percentage of people now working from home and travelling less on the transport network. Although COVID-19 has presented many challenges, some huge opportunities have also arisen and an agile approach to planning and service delivery has enabled a quick response to changing customer needs.

One of the most striking lifestyle changes to emerge in response to COVID-19 is the change in how and where people work. Flexible working arrangements, including working from home, are likely to persist, which may subdue some activities in CBD hubs such as the Sydney CBD, Parramatta CBD and Chatswood, while increasing local centre activities. An enduring increase in people working from home could give more people choice in where to live, such as further from their place of work. These patterns will also be impacted by changing demographics, with potentially slower population growth in NSW in the short term.

Transport for NSW is actively monitoring these trends, and collecting data to inform our planning to manage these longer term impacts of COVID-19.

In addition to responding to meeting changing customer needs, Transport also plays a key role in supporting the recovery of the community from COVID-19, through its role as an infrastructure and services provider, employer, and job creator. As an example, Transport is helping to stimulate local economies and create jobs via an accelerated $100 million of funding for road and rail projects between March and November 2020.

Transport is also working with independent infrastructure bodies, including Infrastructure NSW, on plans for infrastructure recovery, long-term sustainability and resilience.

Transport for NSW is actively monitoring these trends, and collecting data to inform our planning to manage these longer term impacts of COVID-19.

How COVID is driving change

HOW COVID-19 IMPACTED TRANSPORT DEMAND*

As at August 2020 public transport trips are now 45% of the August 2019 rate, up from 20% in April 2020

JULY 2019
APRIL 2020 -80%
AUGUST 2020 -50%
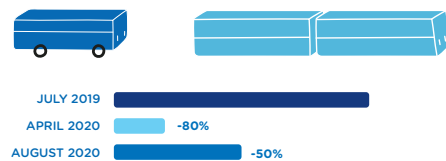
62% of people are walking more
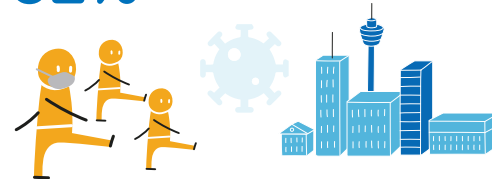
↑**106%** 106% increase in cycling in April 2020, when compared with April 2019

83% concerned about hygiene on public transport which could see more private car use (April 2020)

*Source: City-shaping of COVID-19, Greater Sydney Commission, September 2020

HOW TRANSPORT RESPONDED TO KEEP THE NETWORK OPERATING (March to November 2020)

Keeping the network safe

1,385,000 + additional hours

cleaning public transport and transport hubs

350 customer sanitisation stations across public transport

2,000 train carriages cleaned 5 times a day

31,569 taxis, ride share vehicles and other point to point cleaned for free at twelve vehicle sanitisation stations across NSW
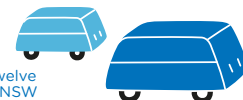
Introducing more transport options to reduce crowding

Pop-up cycleways announced or delivered across **10 LGAs**

+space repurposed for parking for where other transport options are not available, including in Moore Park

12 speed-zone reductions creating improved pedestrian and cycling environments, including in Manly and Liverpool

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HOW TRANSPORT IS SUPPORTING THE RECOVERY (March to November 2020)

$100m in accelerated projects for roads and rail

$12.6m support package for taxi industry, providing relief during the COVID-19 shutdown

90 fast-tracked projects across NSW, including in bushfire affected communities (delivered or in progress)

300+ businesses and organisations supported in making decisions relating to returning to work after COVID-19

How COVID-19 is driving change

Walking and cycling

Transport reacted quickly to COVID-19 to encourage walking and cycling and reduce crowding on the transport network. This included:

> 18 kilometres of pop-up cycleways, contributing to 10,000 total bicycle trips per week in September 2020

> 12 speed-zone reductions to improve pedestrian and cycling environments, including in Manly and Liverpool

> creating public space using road space and supporting local businesses, as delivered in The Rocks

> touchless pedestrian sensors introduced across Sydney

Public transport demand management

In July 2020, to encourage customers to shift away from travelling during peak hours, Transport for NSW made the Opal off-peak discount available on bus and light rail, as well as on train and metro. Peak hours were re-aligned to the busiest times on the network to incentivise customers to travel when the network is least busy and has sufficient capacity to achieve social distancing. Other Opal price changes were also made in July 2020 to better manage demand.

Realising the opportunities

While the COVID 19 pandemic has been a challenging and uncertain time for everyone, some of the ways communities and workplaces are navigating the changes brought about by COVID present opportunities for the future. For example, more flexible or remote working practices tend to reduce peak demand on the transport network and at the same time contribute to health and wellbeing by freeing up more time for exercise and family. It is important that we take this time to understand how customer behaviours and choices have changed during the pandemic and how we can help people maintain the improvements they have experienced by providing more flexible transport choices.

Transport for NSW is involved in research to understand the medium and longer term implications of the pandemic and what these mean for how people use the transport network for work, shopping and access to essential services and social activities.

Transport is also continually reviewing customer trends on a day to day basis and better utilising data and insights to maintain service levels in a fluid environment and help customers plan ahead.

Over the coming months, Transport will be undertaking a full review of Future Transport 2056 to ascertain whether it remains suitable to deliver on our long-term customer and community outcomes or whether it needs to be adjusted to adapt to changing trends. How we can harness opportunities arising from experiences during the COVID pandemic will be considered during this review.

CHAPTER

3

Reviewing our progress

Delivering benefits to our customers and communities

Continuing the next phase of transport improvements

Since Future Transport 2056 was first launched in March 2018, we have continued to deliver improvements to infrastructure and services for our customers. The Future Transport vision is being delivered through a series of supporting plans, which include initiatives from the Greater Sydney and Regional Services and Infrastructure Plans, to be delivered or investigated in the first 10 years of the strategy.

Projects already delivered include the Metro North West Line , L2 Randwick and L3 Kingsford light rail lines, and 24 additional Waratah trains to support increased demand on the rail network, as well as Newcastle Light Rail, M1 Pacific Motorway Upgrades, Northconnex, the M8 and the new M4. These projects have provided benefits across the community, including improving connectivity, efficiency, safety and accessibility.

We have also introduced contactless payments, trialled cutting-edge technology such as connected and automated vehicles in both metropolitan and regional NSW, launched an on-demand bus service in Wagga Wagga and invested in modernising the Regional Rail Fleet. Investigations are also underway for a NSW fast rail network, which will identify opportunities for regional growth and improved services.

We are working with partners and collaborating across the NSW Government to redevelop and renew urban precincts across metropolitan Sydney to create neighbourhoods that are connected by public transport, walkable, sustainable and attractive to residents, visitors and businesses. Examples include the Circular Quay Renewal, and Central Precinct Renewal and Tech Central.

The NSW Government continues its largest ever infrastructure program with the delivery of a record $72.2 billion investment in transport projects over the next four years. This includes significant investments in Sydney Metro City & Southwest, Sydney Metro – Western Sydney Airport, Sydney Metro West, New England Highway Improvements, Princes Highway upgrades, WestConnex, Sydney Gateway, Parramatta Light Rail and the More Trains, More Services program.

View the Future Transport 2056 interactive project map and find out more about progress at Future Transport initiatives.

Measuring customer satisfaction

Customer satisfaction results give us valuable insight into how we are tracking on the things our customers care about, including timeliness, safety and security, comfort, cleanliness, and information.

Below are some key highlights from the results emerging from the May 2019 customer satisfaction survey, compared with the same period one year earlier. Due to COVID-19, the Customer Satisfaction Survey was not undertaken as scheduled in May 2020.
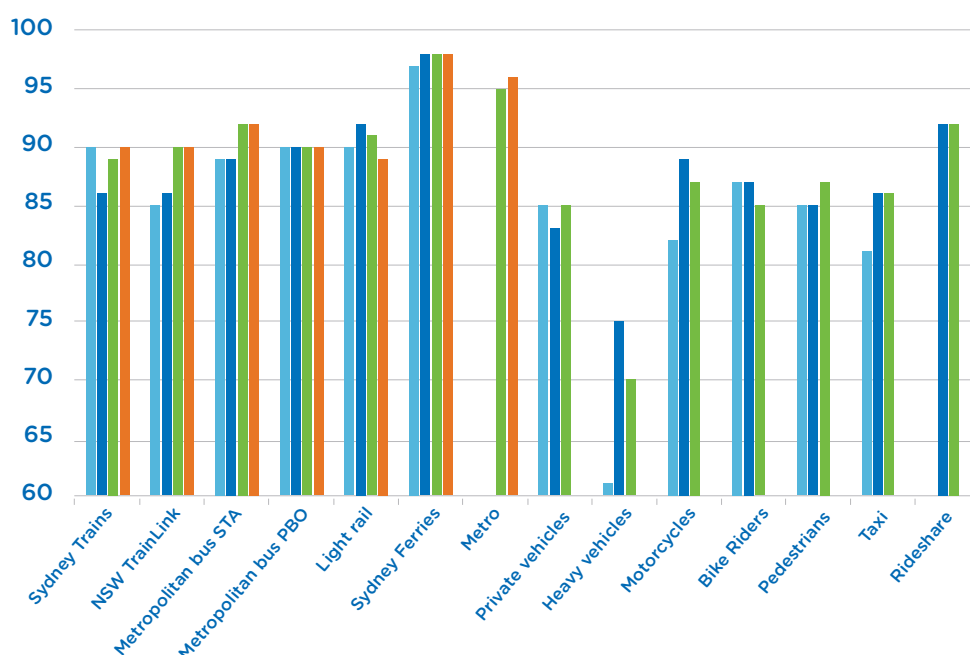
To view the results in full, read the Customer Satisfaction Index – May 2019.

Our customer satisfaction performance

Per cent of customer satisfaction

■ 2016–17   ■ 2017–18   ■ 2017–18   ■ 2019–20   Target: Maintain or improve

Due to COVID-19, the Customer Satisfaction Survey was not undertaken as scheduled in May 2020

Our customer satisfaction performance

Our performance for public transport and accessible fleet

Per cent of customer satisfaction

- 2016–17
- 2017–18
- 2017–18
- 2019–20

Target - Public Transport: Reduce gap with overall customer satisfaction
Target - Accessible Fleet: Year-on-year increase

PUBLIC TRANSPORT — ACCESSIBLE FLEET
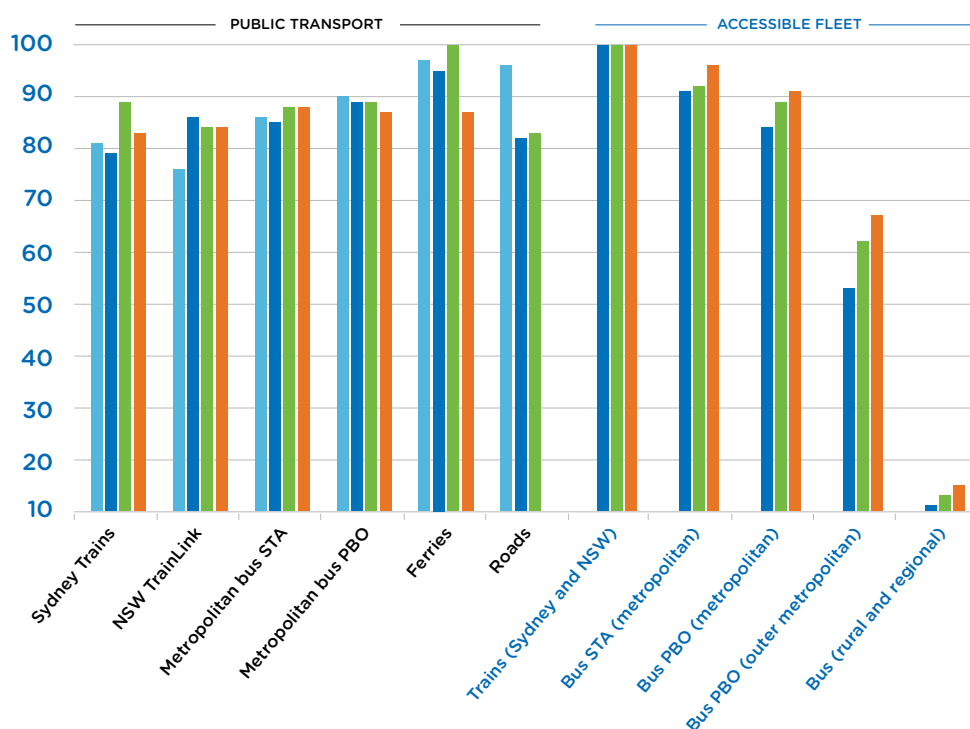
Our performance for public transport and accessible fleet

Tracking customer and community outcomes

Transport is measuring the way our customers use the transport network. This includes the proportion of people walking, cycling and using public transport.

An example of this is Future Transport's vision to increase the use of public transport, walking and cycling in regional NSW for all trips, improving levels of social inclusion and bringing flow-on health benefits. This includes setting targets for regional and outer metropolitan NSW and in some cases setting targets for a specific place or region to support greater use of walking, cycling or public transport.

Our targets for increasing public transport and walking and cycling in regional and outer metropolitan NSW

Creating healthier and more connected communities

Public transport mode share → **3% to 5%**

Walking mode share → **4% to 8%**

Cycling mode share → **2% to 5%**
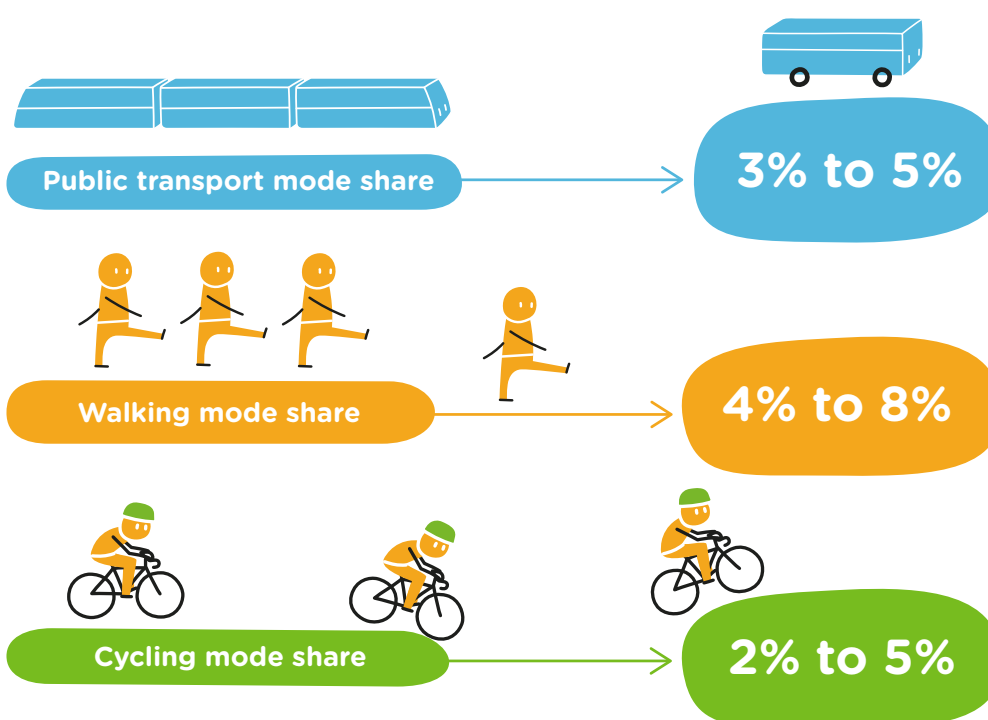
Our progress delivering the Future Transport services and infrastructure initiatives

Using advanced data analytics to measure performance

As data capture and analysis advances, we will continue to develop more sophisticated performance measures to better understand changing patterns of movement for people and goods, particularly in areas where many data gaps exist. We are using this smart data and advanced analytics, as well as new technologies to rapidly adapt our work and accelerate benefits across our passenger transport and freight networks.

Initiatives that are improving the way we collect, analyse and use data include:

› partnering with industry and making transport data sets available through the Open Data Hub, to support innovative solutions, including performance measurement

› making real-time data available to app developers, with over eight million unique downloads by customers in total to date

› analysing rich Opal and telecommunications data to explore customers' travel patterns and improve transport planning decisions

› creating the real-time Digital Twin with Transport's intelligent systems and decision engines, which will use artificial intelligence to better predict anomalies and customer movements across the day

› generating automatic congestion alerts for Transport Management Centre (TMC) operators, using machine learning to quickly identify unusual traffic conditions, detect breakdowns, crashes or other incidents faster, and minimise traffic impacts

Transport for NSW is using more and more of the increasing volume of data becoming available to help us plan and improve how we deliver services and infrastructure. This is an evolving process as Transport continues to collect and analyse data and develop innovative methods to model and test future scenarios.

Events since 2018, especially COVID-19 and the 2020 bushfires, have fundamentally impacted how we live, work and travel. Their cumulative impacts to transport, employment and other forecasts cannot be quantified meaningfully at this point in time. However, data capture around travel demand during these events, and during the COVID-19 pandemic in particular, will provide valuable insights for scenario testing other potential 'shocks' to the network.

CHAPTER

4

Our customers and communities

What do our customers and communities value?

The reliability, accessibility and safety of the transport system will always be a key contributor to customer satisfaction. Customer and community expectations are continuously changing across the State, with greater demand for technology-enabled personalisation, flexibility, and ease of use.

Customers and the community also place a high value on safety. In fact, safety is a non-negotiable aspect of transport within NSW. People expect to safely complete their transport movements, and for their friends and family to do the same – as road and transport trauma are unacceptable to the community.

Mobile phone technology is prompting a culture of immediacy, evident in the growth of tech-enabled point to point services, flexible on-demand services, shared mobility services and e-commerce sales for home delivery. In the future, our customers will expect to shape service provision in real time, based on their customised needs.

The way people use the network is also changing. In the future, our customers will be less likely to have a driver's licence or own a car. Their travel patterns will also be different from today because they are more likely to be flexible about where and what hours they work, and to consider walking and cycling or micromobility devices, and shared and innovative mobility services as part of an increasingly diverse array of options for their journeys. Consumer habits are evolving with the rise of e-commerce, increasing 'last-mile' deliveries with expectations of tracked and tighter delivery windows.

A successful transport system that is safe, integrated and facilitates greater walking, cycling and public transport use can deliver positive outcomes, including physical and mental health, and social, economic and environmental sustainability. Our customers, regardless of the transport mode they choose or their location, should be free to enjoy safe and secure door-to-door journeys across the transport network. Transport is partnering with agencies across NSW to deliver initiatives, such as the 24-hour Economy Strategy, which provide greater accessibility, amenity, safety and connectivity around the clock.

At Transport for NSW, we are increasingly using human-centred design and 'co-design' approaches, aimed at identifying factors that impact the travel experience of customers. This is helping us to achieve the safe, productive and sustainable movement of people and goods by assessing, testing and validating solutions with customers and communities. This collaborative approach has a high rate of success in providing solutions that address not only the root cause of customer pain points, but also their needs.

Our customers rely on the transport system to access vital services, such as health and education. Collaborating with other government agencies is helping us better understand the needs of customers and provide transport solutions that enable connectivity and whole-of-life outcomes. An example of this cross-government collaboration includes the Western Sydney Place Infrastructure Compact (PIC). The PIC is based on the expert input of more than 30 NSW Government agencies, utility providers and local Councils, working together under the Western Sydney City Deal and the leadership of GSC.

New and emerging technologies, such as virtual and augmented reality, will also offer better and more immersive ways to engage our customers and local communities on our plans, projects, and services.

Customers and communities' value a transport network that is integrated, accessible and efficient; however, the specific needs and challenges across the state vary.

In regional and outer metropolitan areas, the hub-and-spoke network provides connections radiating to the catchment areas of regional cities and centres, connecting customers and communities to places of employment, leisure and learning, delivering flexibility, efficiency, access, equity, timeliness, and safety.

In Greater Sydney, the '30-minute city' will mean residents can access jobs and services in their nearest metropolitan or strategic centre within 30 minutes by public transport, walking or cycling. This will give people better access to jobs, education and essential services.

OUR CUSTOMERS

Residents and communities
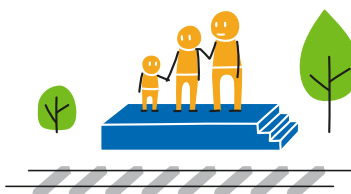
Public transport users
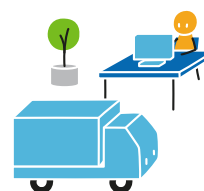
Service providers

Road users (private, public, freight)

Pedestrians and bike riders
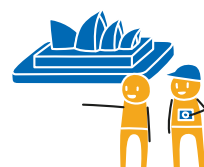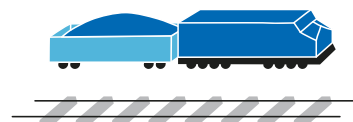
Visitors and tourists

Infrastructure managers
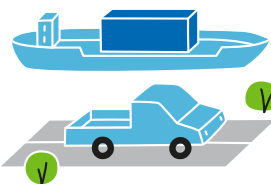
Local and global businesses

Freight rail customers

Transport's customers

Growing customer satisfaction and responding to changing customer needs and attitudes

Each year, our customers take more than 424 million trips on Sydney, intercity and regional trains, over 391 million trips on metropolitan, outer metropolitan, rural and regional buses; and nearly 13.5 million journeys every day on Sydney's road network.

Over 500 million 'walking only' trips are taken each year and with nearly every public transport journey starting or ending with a walk to or from the station or stop, walking and cycling trips total around 2.2 billion journeys a year. In 2016, over 480 million tonnes of freight was moved in NSW and by 2036, this is forecast to increase by 28 per cent to 618 million tonnes.

To gain an insight into what our customers value, we have developed a Customer Satisfaction Index, which reflects the voices of over 17,000 customers. By listening to their feedback, we have achieved increases in customer satisfaction of eleven and twelve per cent for buses and trains respectively, since 2012. A similar survey is also undertaken to understand road safety experiences, attitudes and understanding.

Responsive service innovation has played a key role in increasing customer satisfaction. The introduction of the Opal card and contactless payments allowing tap and go debit card payments across the entire Opal network significantly improved satisfaction levels by enabling greater convenience and ease of connection between modes.

In regional areas, on-demand services, real-time public transport information, integrated ticketing and an improved, more user-friendly web-based regional ticketing platform, has helped increase customer access to, and experience of, public transport.

Web and mobile-based customer interactions and electronic transactions are also assisting Transport to improve service levels and match services to demand by generating data about travel patterns. This enables us to better understand and meet customer needs.

It is important to recognise that customer expectations are not static and often changing circumstances, such as COVID-19, can significantly impact how customers interact with the transport network and the service they expect to receive. In circumstances like this we need to be flexible and responsive to customer needs. Transport acted quickly to respond to changing customer needs as a result of COVID-19 and to maintain confidence in our services, with initiatives such as the roll out of pop-up cycle lanes, automated pedestrian crossings, increased cleaning of public transport and measures to allow social distancing.

We will continue to personalise interactions, moving to more proactive, integrated service systems, smart digital mobility platforms, and frictionless access and payments, as outlined in the Future Transport Technology Roadmap.

Who are our customers?

Our public transport customers

Public transport customers are seeking convenient, reliable and safe public transport options. More than 737 million trips are taken on the NSW public transport network each year, with public transport providing a sustainable and convenient travel option across NSW for tourists and residents alike.

Public transport customers will benefit from increasingly available real-time information that supports a simple to understand, easy to use and personalised public transport system. Customers will compare travel times across transport modes in real-time, to make choices about how to reach their destination. Greater information availability also means that in times of disruption or major incidents, we are able to communicate and re-route customers to minimise impact on them.

Metropolitan public transport customers will benefit from a shift towards turn-up-and-go services across Greater Sydney and between its three cities, with turn-up-and-go services already provided by Sydney Metro and light rail services. This is supported by Transport for NSW's ambition for 30-minute access for customers to their nearest metropolitan or strategic centre by public transport, walking or cycling, seven days a week.

For regional NSW, the emphasis will be on creating a transport system that provides greater coverage across NSW and gives customers more travel options, for both local and longer distance trips. This includes day-return regional centre connectivity for expanded geographical catchments, and same-day connectivity to global gateway or capital cities for all locations in NSW on public transport options, such as bus, coach and rail. On demand bus services are also being introduced in some regional centres to deliver better value-for-money services and increased public transport patronage.

Transport for NSW is working to improve its public transport network by modernising and investing in the rail network, including the L2 Randwick, L3 Kingsford, and Parramatta light rail lines, a new Sydney Metro network, and a significant upgrade of rolling stock with the New Intercity Fleet (NIF), Regional Rail Fleet and Waratah trains.

Transport for NSW is deploying a Digital Systems Program, which modernises railway signalling by negating the need for trackside infrastructure and replacing it with a digital railway. This will be rolled out across Greater Sydney between now and mid-2030 and will enable us to track train position and speed in real time, run more trains and more services, and improve network performance driving a shift in focus from performance measures based on train scheduling to getting the customer there on time.

Bus services are also being upgraded, benefitting regional cities around NSW. Hundreds of additional weekly bus services and more travel choices are being introduced through programs such as the 16 Regional Cities. The delivery of major initiatives across regional NSW will continue to improve journeys for regional customers, including the Fast Rail Network Strategy and Regional Rail Fleet.

Healthier communities

Our walking and cycling customers

We will support place amenity and improve safety, access and inclusion through our walking and cycling networks

Our walking and cycling customers require, safe, connected and convenient infrastructure to enable them to walk or cycle more regularly.

More people walking and cycling for short, everyday trips can improve transport network outcomes overall, in addition to delivering positive health and wellbeing, productivity, place, sustainability and environmental outcomes across NSW communities.

Two in five adults in NSW do not meet the national recommendations for physical activity – and for children, rates of physical inactivity are higher, with three in four not meeting national recommendations. Beyond the health impacts of physical inactivity, there is an economic cost; in Australia the annual productivity loss attributed to physical inactivity is $15.8 billion.

Making cities better places to live is a major focus for the NSW Government. NSW Government agencies work together to integrate planning of land use, transport networks and the built environment to create a sense of 'place' – amenable and walkable public spaces and streetscapes that support a range of activities, communities and social interaction.

Encouraging walking and cycling can support place amenity by enabling access to these destinations by space-efficient modes and reducing the incentive to travel by private car. To increase the number of people walking and cycling, we need to deliver safe, well-connected and accessible routes from door-to-door that prioritise travel by these modes to local destinations, such as centres, jobs, services, schools, public transport and parks. Appropriate walking and cycling infrastructure can support more short trips to be taken by bicycle, or other forms of approved micromobility devices, as well as walking.

Future directions to investigate

› physically separate different road user groups with an expanded network of bus lanes, cycleways and freight priority where possible

› incorporate pedestrians and bike riders needs at the planning, design and construction stages for all new and re-purposed road asset projects

› improve direct, customer-based assistance, information and wayfinding products

› improve accessibility by providing road environments that support the safe use of bicycles and approved micromobility devices to assist with short journeys within centres and to connect people with public transport

› improve multimodal interchanges, particularly in regional NSW, so customers can more easily connect to flexible services and experience seamless and reliable journeys

› plan centres with a greater focus on walking and cycling, as well as public transport priority options

› complete walking and cycling networks to and within centres and invest in safe, direct and continuous green corridor connections

› continue rolling out secure bike storage across the network at selected railway stations

› continue providing education campaigns for bike riders and pedestrians that encourage behaviours such as wearing helmets when cycling and safely crossing roads, especially for children and families

› encourage customers to use the transport system differently by shifting to walking, cycling or public transport and traveling outside the peaks to reduce congestion and channel demand where there is capacity

Our maritime customers

We will manage our maritime customers' needs to ensure continued economic growth, safety, access and sustainability

Our maritime customers include commercial and regional ports, commercial vessel and ferry operators, maritime businesses, recreational and tourist waterways users, maritime services and Defence. As the population grows, so does the demand for maritime activities, foreshore land and access to waterways. To deliver for customers and the community, we must balance support for commerce, sustainability and recreation, and protect the environmental and cultural significance of our waterways.

Maritime in NSW

RECREATIONAL AND COMMERCIAL BOATING

240,000
Registered recreational vessels

Up to
$2b
Direct revenue from recreational boating

7,000
People employed in recreational boating sector

10,000
Registered commercial vessels

Over
500,000
Boat and personal watercraft licences

$3.4b
Annual value of economic activity anually generated from recreational fishing

850,000
Licensed recreational fishers in NSW

ASSETS AND INFRASTRUCTURE

2,140 km
of coastline

12,000 km²
of navigable waters

29
Ports

23
Coastal harbours

6 Commercial and regional ports

5,686
Trade ship visits

354
Cruise ship visits

710
Boat ramps

94
Slipways

234
Ferry wharves

74
in Sydney Harbour
160
in the rest of NSW

22,810
Moorings
6,144
in Sydney Harbour
16,666
in the rest of NSW

NSW Maritime Infrastructure Plan 2019 – 2024 (TfNSW), Port Authority Annual Report 2018/19 (Port Authority of New South Wales)

The three largest commercial ports of Port Botany, Port of Newcastle and Port Kembla are NSW's gateway for international trade and play a major role in the NSW economy. The commercial ports, as both freight and maritime customers, are also considered in the sections below.

NSW Ports

QUEENSLAND

- Tweed Heads
- Brunswick Heads
- Ballina
- Evans Head
- Iluka
⚓ Yamba
- Wooli
- Coffs Harbour
- South West Rocks

NEW SOUTH WALES

- Port Macquarie
- Laurieton
- Crowdy Head
- Tuncurry
- Tea Gardens
- Nelson Bay
⚓ **Port of Newcastle**
- Brooklyn
⚓ **Port of Sydney**
⚓ **Port Botany**
- Wollongong
⚓ **Port Kembla**
- Kiama
- Greenwell Point
- Ulladulla
- Batemans Bay
- Narooma
- Bermagui
⚓ Eden

VICTORIA

KEY
⚓ ⚓ **Commercial and regional ports**
- **Coastal harbours**

NSW Ports * Lord Howe Coastal Harbour (600 km east of Port Macquarie) not shown

These ports are privately operated under long-term leases by NSW Ports (Botany and Kembla) and the Port of Newcastle. Together, the ports facilitate NSW's exports and imports of grain, coal, containerised cargo, bulk liquids, gas, motor vehicles, dry bulk and general cargo. See the NSW Freight and Ports Plan 2018-2023.

Sydney Harbour is home to many of our diverse maritime customers and is a working harbour that supports the movement of construction materials, and staging for major construction projects, fuel importation, commercial vessels servicing and contractors. The harbour is used by many key customers, including cruise ships, ferries, charter and recreational vessels and defence, which are both water and land based. The Wharf Access Policy is key in managing commercial vessel operator access to government wharves.

Within NSW there are over 240,000 registered recreational vessels and 850,000 licensed recreational fishers. The safety of our recreational customers upon our waterways is essential and our long-term vision is to achieve zero fatalities and zero serious injuries by 2056 through initiatives identified in our Maritime Safety Plan 2017–2021.

NSW's 29 commercial ports and coastal harbours are places for commerce, ferries, cruising, marine services, commercial fishing, tourism and the community. We identified our customers' needs through Regional Boating Plans, which informed the NSW Maritime Infrastructure Plan 2019-2024, to deliver prioritised investments in infrastructure, including dredging, to deliver the greatest benefits to recreational boaters, commercial fishers and the tourism industry.

As a member of the Marine Estate Management Authority, Transport for NSW works with partners across government to enable safe and sustainable boating through initiatives identified in the Marine Estate Management Strategy 2018-2028.

Future technology will play a role in providing more personalised information for customers wanting to access our waterways and creating a safer and more environmentally sustainable marine environment by enabling innovative solutions, such as autonomous and electric vessels.

Future directions to investigate

Our customers will have increased access to the foreshore and waterways, with commercial activities strengthened to enable the continued sustainable use of built and natural assets. Future directions include:

› develop a long-term maritime strategy to provide coordinated direction on a range of identified initiatives supporting customers

› investigate the enhancement of data collection and analysis to strengthen our understanding of the use of maritime land and waterways for commercial and recreational purposes, to inform infrastructure investment and management

› balance demand for foreshore land between maritime and non-maritime uses while facilitating working harbour functions across NSW

› manage the increased demand for maritime activities by enhancing the regulatory environment and reviewing the governance arrangements to support these activities.

› embed the 23 coastal harbours into Transport for NSW maritime strategy and planning

› investigate options to further improve safety outcomes, environmental protection, and access to and on the water, in consultation with maritime customers and local councils

› develop a long-term strategy covering all government-contracted ferry services, fleet replacement, wharf access and berthing needs

› investigate future technology safety initiatives for maritime customers to deliver our Towards Zero vision

› improve information to our maritime customers, including foreshore access, maritime wayfinding, bar crossings, weather and condition warnings

› investigate future technology initiatives to adapt to changing climate, including increasing sea levels, storm impacts and flooding events

› develop a maritime heritage strategy, considering the natural and built environments, and balancing maritime customer needs and the wider community

› investigate and embed future technologies to support our maritime customers, including zero-emission vessels, design advancements and increased automation including safety systems, to reduce the impact of maritime activities on the environment

See how we are supporting our maritime customers in the Maritime Infrastructure Plan 2018.

Our road customers

We will meet the changing needs of road customers to ensure safe, direct and timely journeys

Our road network is the State's largest asset, carrying the majority of customers and freight, including cars, buses, trucks, pedestrians and bike riders. To move the increasing number of people and goods, we must respond to the changing needs of road customers.

We need to provide safe roads and save speed settings, promote safe speeds, encourage the use of the safest vehicles, ensure appropriate road rules continue to be in place, and encourage safe road use, as we move towards a zero trauma network by 2056 through initiatives under the NSW Road Safety Plan 2021.

The development and introduction of enhanced safety features in vehicles that help to prevent crashes and reduce the crash outcomes, and the development of connected and automated vehicles (CAVs) over the coming years, will bring about different opportunities for customers and service providers. The NSW Government is working with industry to incentivise the use of safety technologies in higher productivity vehicles, such as the use of performance based standards (PBS) vehicles that are equipped with enhanced safety features to transport construction materials across Newcastle, Sydney and Wollongong. Automation is also expected to increase safety and reduce congestion and environmental impacts, particularly if used for shared vehicles.

The ever-increasing coverage, capacity, variety and speed of wireless communication technologies and connected devices will allow vehicles and infrastructure to communicate with each other to improve the quality and safety of customer journeys. 'Smart' roads will improve the management of roads for our customers, including users of city-shaping bus services, as real-time data is used to manage the network and to help avoid congestion, incidents, scheduled maintenance and other events.

Integrating the Movement and Place Framework into speed zone decision making allows the alignment of speed limits with road function and surrounding land uses, delivering benefits to both road safety and the place qualities of our urban areas.

Future directions to investigate

› provide better road connections that support a hub-and-spoke network between key centres, and are safe and resilient to extreme weather events, particularly in regional and outer metropolitan NSW

› prioritise efficient vehicles, taking into account the type of corridor, customer mix and the importance of local spaces

› physically separate different road user groups with an expanded network of bus lanes, bicycle lanes, and freight priority, where possible

› deliver 'smart' roads and work with industry and innovators on new technologies that can improve safety and the road-user experience

› incorporate safety measures at the planning, design and construction stages for all new road and road renewal projects

› work with the Australian Government to fast track vehicle safety features into the Australian market consistent with timeframes adopted in world leading jurisdictions

› apply the Movement and Place Framework approach to support better places and provide connectivity and access for people and goods

› continue to explore wireless communication technologies, to allow heavy vehicles and infrastructure to communicate with each other, to improve the safety and efficiency of freight corridors

› continue to embed and prioritise road safety in our major projects, to deliver future transport interchanges that are safely integrated and connected to the existing network

Many types of people use our roads

Our freight customers

A market for freight pathways will benefit our freight customers and support innovation

Freight is worth $66 billion to the NSW economy each year and our freight customers are major partners in securing the social and economic prosperity of NSW. Freight customers as well as customers of the wider transport system and communities value safety, productivity and sustainability as well as certainty which drives business decisions and underpins continued investment and innovation.

The NSW Freight and Ports Plan sets out a plan for action from 2018 to 2023. The plan is a call to action for government and industry to work together to make the freight system safer, more productive and more sustainable for the benefit of industry, customers and communities across NSW.

The NSW Freight and Ports Plan has five objectives:

› **increased economic growth** – by providing confidence and certainty that encourages continued investment in the freight industry

› **increased efficiency, connectivity and access** – by improving the efficiency of existing infrastructure and ensuring greater connectivity and access along key freight routes

› **greater freight capacity** – by maximising infrastructure investment and increasing land use capacity to accommodate growth

› **improved safety** – by creating a safer freight supply chain involving safe networks, safe transport, safe speeds and a safer environment for people

› **enhanced sustainability** – by developing a sustainable supply chain that delivers benefits to our environment and continued operations into the future

What are the needs of our freight customers?

Freight customers need a reliable transport network that enables them to move freight safely, productively and sustainably. Freight customers also need government to develop and implement strategies and policies that are clear, consistent, and underpin the imperatives of safer, more productive and more sustainable movement of freight across all modes.

How customer needs are changing

Over the last few years there has been significant growth in online shopping and home delivery services. COVID-19 has resulted in changing travel patterns and an acceleration in the demand for home delivery services. This in turn is driving change within the freight sector. It is yet to be seen whether there will also be a longer-term change in consumer demand for the types and origin of goods that will impact supply chains and movement of goods.

Freight and logistics operators are increasingly harnessing data and analytics to achieve efficiencies that make them competitive on a local and international level. This will allow customer expectations for rapid, same-day or even next-hour deliveries to be met. Direct business-to-consumer delivery models and on-demand service models will blur the lines between traditional freight companies and retail businesses, and lead to innovative partnerships.

As the last-mile freight task increases and becomes more dispersed in line with consumer demand, it will change travel patterns for the movement of goods, particularly on the road network. In Greater Sydney, the NSW Government in collaboration with councils and industry partners, is delivering innovative approaches for last-mile logistics and improving the safety and productivity of last-mile deliveries. The NSW Government is also working with local councils and industry in regional NSW to facilitate first- and last-mile access to the farm gate, to support the safe and productive movement of agricultural products.

Increasingly the freight industry is turning to automation and the use of higher productivity vehicles on road and high efficiency rollingstock on rail to maximise productivity. Automation will drive improvement of freight operations across ports and distribution centres, as freight customers seek expedited deliveries, as well as improved reliability, productivity, and safety. Industry has already delivered and is planning for new fully automated IMEX intermodal facilities and distribution centres at key strategic locations such as Moorebank.

Higher productivity and efficiency is not however being achieved at the expense of safety and sustainability. The NSW Government is working with industry to incentivise the use of safety technologies in higher productivity vehicles, such as the use of performance-based standards (PBS) vehicles that are equipped with enhanced safety features to transport construction materials across Newcastle, Sydney and Wollongong. In the future the development of connected and automated vehicles (CAVs), while presenting some significant challenges to overcome, will further enhance productivity, safety and sustainability and bring about different opportunities for customers and service providers.

The use of 'high productivity vehicles' fitted with satellite tracking will also provide road managers with insights into the demands on their road networks and inform congestion management. The implementation of advanced train control systems incorporating in-cab signalling systems will lead to better utilisation of rail capacity and improved scheduling for both passengers and freight. TfNSW is working with the Australian Rail Track Corporation to deliver interoperability between the various systems and ensure seamless freight rail operations across the country.

With more last-mile deliveries, as well as a growing traditional container and bulk freight task, we will need an efficient, 'smart' freight network. More effective freight corridor planning, including physical separation where appropriate, and support for intelligent transport systems (ITS), cooperative-ITS technology, connected and automated vehicles (CAVs), and electric vehicles, will be increasingly important to freight customers and essential to growing the NSW economy.

The opening of Western Sydney International (Nancy-Bird Walton) Airport in 2026 will significantly expand capacity in the air freight sector. The airport will operate 24/7 and will be an important freight hub for NSW, as it will enable dedicated overnight freight movements that are currently unable to land at Sydney Airport due to curfew restrictions, and improve access for cargo destined for Western Sydney logistics centres. The airport will improve links to international markets for producers across Greater Sydney and beyond, into regional NSW, supporting the export of higher

value, fresh produce and perishable products. Integration of the airport with surrounding freight and logistics lands, including the Integrated Logistics Hub and proposed Agribusiness Precinct, will deliver supply chain and agglomeration efficiencies for whole of the NSW economy.

Inefficiencies in the NSW empty-container supply chain result in significant additional costs and delays for both imports and exports. The Empty Container Supply Chain Study identified that almost $50 million in costs could be avoided through a suite of actions, including technology upgrades, improved data sharing, increased empty container park capacity, and greater utilisation of rail. Transport is leading the Empty Container Working Group, a committee made up of key stakeholders in the empty container supply chain, to identify challenges and industry led voluntary opportunities to improve the efficiency and resilience of the broader container supply chain.

In focus

Western Sydney IMT and the Mamre Road precinct

Collaboration between Transport for NSW and the Department of Planning, Industry and Environment has identified and protected the site of a future Western Sydney Intermodal Terminal (hatched area on the figure below) in the Mamre Road Precinct in the Western Parkland City.

Located on the proposed Western Sydney Freight Line, the site offers a unique opportunity to deliver an intermodal terminal that is integrated with the adjoining industrial precinct through a dedicated freight road network. This network will provide access into the recently rezoned industrial lots that will serve the freight and logistics industry. It offers the opportunity to utilise autonomous vehicles and removes the need to use public roads for container transfers within the precinct.

The intermodal terminal will also be strategically located in close proximity to the existing freight and logistics lands in the Broader Western Sydney Employment Area (around Eastern Creek and Erskine Park) and the developing freight activities associated with Western Sydney Airport. This will mean streamlined and expedited distribution of import containers to the warehouses and distribution centres located close by.

Development of the Western Sydney Freight Line, the Mamre Road precinct and the intermodal terminal will enable 24/7 movement of containers between the developing freight and logistics lands in the Western Parkland City.

The development of the Mamre Road precinct will complement the development of the freight and agribusiness precincts around the Aerotropolis and the Western Sydney Airport. Infrastructure integration coupled with the use of digital systems to streamline documentation and reduce red tape will see significant improvements in efficiency and reductions in costs to importers and exporters alike.

MAMRE ROAD PRECINCT ROAD NETWORK MAP
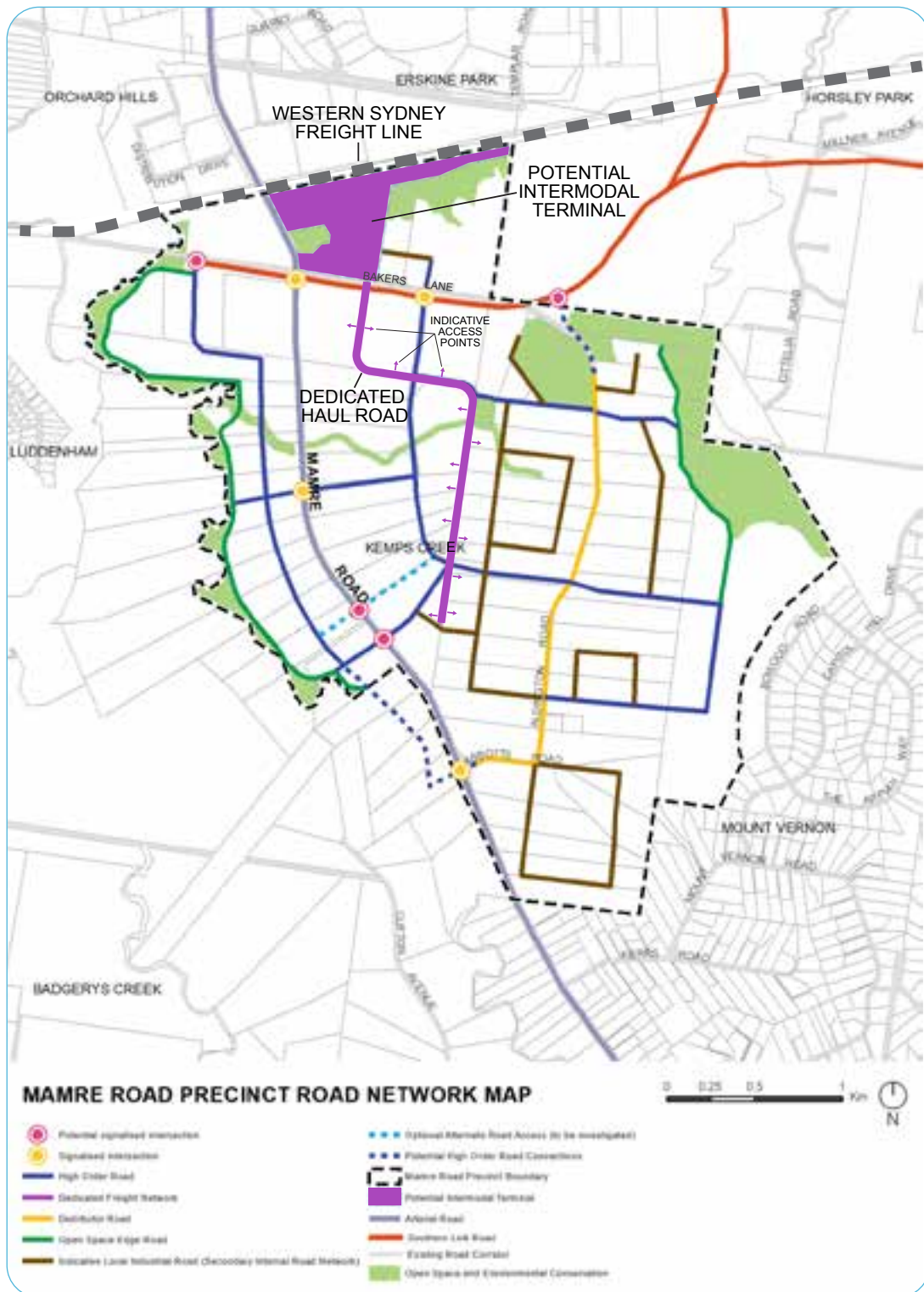
Mamre Road precinct road network

Future directions to investigate

› continue to create or optimise road networks and streamline access to those networks to accommodate safer and more productive, higher productivity freight vehicles (HPVs)

› continue to work with the freight rail industry to increase volumes of freight on rail and improve sustainability by reducing operational noise impacts

› maximise the long-term capacity and performance of the State's three major ports through the development of a strategic framework that underpins efficiency gains in landside container operations

› integrate transport and land use planning to protect key freight and logistics places and corridors from encroachment in urban areas

› continue to work with the Australian Government, National Transport Commission (NTC) and other jurisdictions on road pricing as part of the Heavy Vehicle Road Reform program

› continue to work with industry to expand intermodal rail capacity, particularly in Western Sydney

› maximise the benefits to NSW of Inland Rail and improve east-west connections to support regional export supply chains

› continue to develop freight data sets for industry and government that support evidence-based policy, improve transparency and accountability, and provide a platform for innovation

› facilitate greater freight rail access through improved access for higher productivity rolling stock

› explore innovative financing and investment strategies to facilitate the expedited delivery of freight infrastructure

› in consultation with the National Heavy Vehicle Regulator, investigate the use of technology and telematics linking vehicle mass and performance to infrastructure capacity to provide bespoke vehicle and task-specific networks in real time

› investigate the potential for sharing real-time data between Transport and industry, to enable end-to-end freight connectivity

› investigate the development of a freight community system to streamline supply-chain processes and reduce red tape

› continue to explore road safety and traffic efficiency technology opportunities for the freight sector

› maximise road and rail freight access to the new Western Sydney International (Nancy-Bird Walton) Airport, including investigating the potential for an air freight-focused intermodal terminal

Supporting diverse customer needs

How our transport network supports access, inclusion and participation

Access and inclusion are important outcomes for all of our customers, regardless of their age, ability, where they live and their personal circumstances.

Integrated planning for safe and accessible travel by walking, private vehicle, catching public or flexible transport, and using assisted transport services will be essential to support older people, people living with disability and others with mobility constraints. Accessible transport helps people to remain healthy, active and independent.

Children and young people need access to safe, accessible and affordable transport. Although school bus travel is subsidised, many children are still unable to participate in excursions and sporting, social and cultural activities that can supplement their education and promote their health.

Transport is delivering a number of initiatives that seek to promote access, inclusion and participation for the whole community. These initiatives include:

› engaging with Aboriginal communities across NSW to improve their access to transport services and available subsidies

› providing innovative mobility access solutions for remote and regional areas, especially for customers using wheelchairs

› continuing to review transport passes, subsidies and schemes to improve customer experience and operational efficiency

In addition to integrating access and inclusion principles in the Greater Sydney and regional NSW Services and Infrastructure Plans, Future Transport 2056 is supported by the following plans that address access, inclusion and participation; with a focus on people with disability, older people and others, including people who experience transport disadvantage or come from culturally and linguistically diverse backgrounds

› Disability Inclusion Action Plan 2018 - 2022

› Older Persons Transport and Mobility Plan 2018 - 2022

› Social Access Plan – under development

› Multicultural Services Plan (2020)

The Regional NSW Services and Infrastructure Plan highlights that the cost of travel can also impact transport access and inclusion. Following recommendations by the Independent Pricing and Regulatory Tribunal (IPART), bus fares in regional NSW have been reduced by almost 30 per cent on average. More affordable fares provide equity across NSW and encourage social inclusion.

For the first time, people in regional NSW are now able to purchase a daily ticket that provides them with unlimited travel within certain sections. Eligible concession holders will pay half the adult fare for the daily ticket and the regional excursion daily ticket for pensioners is the same price as the Opal senior pensioner/concession fare.

Other recommendations from the IPART review will continue to be investigated, including restructuring services to better match emerging needs, including on-demand services.

With technology advances, such as augmented reality, digital identity and artificial intelligence, there will be even greater opportunities to provide more seamless and accessible transport information, services and customer experiences.

New technologies and big data will be used to better understand and anticipate changing travel needs and expectations across customer groups, target concessions and subsidies more effectively, and develop new services to provide government support where it is most needed.

At the same time, there will remain a need to offer information and connectivity to customers who do not have access to mobile or internet technologies, or are uncomfortable using these, which is why face-to-face customer service will continue to be an important part of delivering for our customers. Transport has also recently extended the trial of the Regional Seniors Travel Card, which helps make their trips more affordable and convenient.

Future directions to investigate

> continue to work with the Australian Government on the modernisation of Disability Standards for Accessible Public Transport 2002 and support the transport industry to become more accessible and inclusive

> improve service provision for people with little or no access to transport through the development of flexible, on-demand and personalised service models

> review fares and concession policies to ensure support is provided where it is most needed and there is fare parity between metropolitan and regional services

> improve information and wayfinding products that support customer travel planning and decision making

> provide alternative planning, booking and payment methods for people without access to digital platforms, such as mobile and internet technologies

> work closely with the disability and ageing sector to identify barriers and consult on solutions to improve the accessibility of services, including improvements in the engagement with regional and outer metropolitan NSW communities

Designing fully accessible infrastructure

Supporting reconciliation and strengthening Aboriginal communities

Future Transport supports OCHRE (Opportunity, Choice, Healing, Responsibility and Empowerment), the NSW Government's plan to improve outcomes for Aboriginal peoples. Transport recognises the importance of connecting, learning and collaborating with Aboriginal peoples and embedding Aboriginal cultural ways of doing and being to strengthen Transport's reconciliation commitments.

Our Transport Reconciliation Action Plan 2019-2022 outlines a number of priorities to realise our vision for reconciliation, where respect, collaboration and partnership foster greater inclusion, recognition and celebration for Aboriginal peoples across all segments of NSW's vibrant community.

Future Transport recognises Aboriginal peoples' need for strong connections to social, professional, sporting, medical, education and employment activities. By investing in transport infrastructure and service improvements, and making use of innovative technology and service delivery models, Transport for NSW will aim to improve transport access to these activities and reduce isolation.

Under Future Transport, respecting and embracing the culture and values of Aboriginal peoples at every stage of investment will help realise the power of transport projects to make great places. As such, Transport is an active participant in the NSW Government's Local Decision Making Accords responding to community priorities across the State's nine regional areas and within Greater Sydney.

Through the Reconciliation Action Plan we are committed to working collaboratively with NSW Aboriginal communities and peak bodies to gain the necessary consent to share their storylines, and present these stories in appropriate places.

The Action Plan outlines our cluster-wide approach to recognising and acknowledging Aboriginal peoples through a range of practical activities that span three pillars – relationships, respect and opportunities.

Transport also has a role to play in supporting employment opportunities, creating jobs and fostering skills, and in ensuring Aboriginal people share in these opportunities, especially regionally, for employment and skills development for Aboriginal communities. The *NSW Governments' Aboriginal Prosperity Framework* includes initiatives such as the Aboriginal Participation in Construction Policy and Aboriginal Procurement Policy, which align with Transport's Aboriginal Participation Strategy, and will bring more Aboriginal people and businesses into the business of transport, and enable them to share in the economic and other benefits of the State's growth. These policies aim to support an estimated 3,000 full-time equivalent employment opportunities for Aboriginal people through NSW Government procurement activities..

See our Transport Reconciliation Action Plan 2019-2022 to read more about how we are working with our Aboriginal communities.

Future directions to investigate

› continue to use transport planning and social procurement, including the Aboriginal Participation in Construction Policy and Aboriginal Procurement Policy, to help achieve Closing the Gap targets by better connecting Aboriginal communities to employment, education and health services

› continue to implement the NSW Road Safety Plan 2021 actions, to increase access to licensing, safe and legal driving and improve social outcomes by expanding the Driver Licencing Access Program which assists disadvantaged people from communities with lower rates of driver licence attainment to obtain and retain their driver licence, including many Aboriginal communities, some Culturally and Linguistically Diverse communities (including refugee and resettlement communities identified by Multicultural NSW), and people from low socio-economic backgrounds

› continue to implement targeted Aboriginal road safety initiatives to reduce injuries and fatalities on NSW roads which includes child car seat and bike safety programs, provision of more transport options, and developing and implementing an Aboriginal community engagement and capacity building program to support road safety in Aboriginal communities

› continue to improve opportunities for people in Aboriginal communities to access sporting, cultural and social events, as well as meet family and community obligations

› continue to implement Transport for NSW's Reconciliation Action Plan 2019-2022 and plan for the next Reconciliation Action Plan

› develop an Aboriginal Arts Strategy to embrace Aboriginal culture and heritage and embed cultural expressions in infrastructure projects and transport services

› develop an Aboriginal Cultural Heritage Framework and Aboriginal co-design principles for place making

› work with our industry partners to contribute to the NSW Aboriginal Prosperity Framework and deliver the Transport Aboriginal Participation Strategy

› continue to implement Transport's Aboriginal Maritime Safety Plan 2020-2022 to reduce the number of Aboriginal fatalities or injuries on the water

Supporting a world-class travel experience for visitors

NSW is Australia's top-performing state for tourism. In 2017/18, the sector contributed $42.5 billion to the State economy and employed more than 278,000 people, one of every 14 jobs in the State. The visitor economy is especially important to regional and outer metropolitan NSW, which accommodated 46 per cent of overnight stays in NSW in 2017, and generated $14.9 billion in visitor expenditure.

Recent events, such as COVID-19 and the 2019/20 bushfires, have impacted the tourism industry across NSW, driving a decline in tourism activity and expenditure. However, the NSW tourism industry is resilient and expected to return to being a significant contributor to the NSW economy over the longer term. In the short term, ensuring a safe and reliable transport network to the regions and encouraging domestic travel to make up for the shortfall in international visitors can support the tourism sector and play a key role in revitalising regional economies. This forms part of the road to recovery – one of five strategic pillars that underpin the NSW Government's recently released Visitor Economy Strategy 2030.

Visitors, whether from overseas, interstate or intrastate, expect services that are accessible, comfortable, easy to find and well connected to popular destinations. They also value wayfinding signage and access to mobile apps that help them plan and pay for seamless journeys.

In the future, visitors will increasingly expect efficient connections between airports, cruise ship terminals, mass transit services, on-demand services, and car and bike rentals. The NSW Government's Statewide Destination Management Plan and 20-Year Economic Vision for Regional NSW support the need for improved travel between regional centres, cities and international gateways.

Supporting tourism across all modes

Intrastate aviation will continue to be important in connecting visitors to our regions. The intrastate air routes that connect the North Coast holiday destinations of Ballina, Coffs Harbour and Port Macquarie are traditionally the busiest on the NSW air network. The new Regional Rail Fleet will also increase the attractiveness and accessibility of rail travel to and from regional and outer metropolitan NSW.

The State is a prime destination for marine tourism. In many coastal, riverside and lakeside communities, particularly in regional areas, visitors are attracted to a range of activities on our waterways. The Maritime Infrastructure Plan is supporting marine tourism in NSW.

Around 85 per cent of domestic visitors and nearly 40 per cent of international visitors self-drive to their destination in NSW. This highlights the importance of the road network to safely facilitate visits and the need for investment in highways and roads, roadside facilities and effective signage. Camping and caravan tourism, which relies on a safe and efficient road network, continues to be popular in NSW, with 4.7 million domestic caravan and camping visitors contributing $2.6 billion to the State's economy in 2019.

Creating attractive and vibrant places that are safe and well connected to the transport network will not only benefit NSW residents but also attract tourists, boosting the visitor economy. With multiple services across Greater Sydney connecting visitors to key points of interest, transport is essential in delivering NSW's 24-hour Economy vision for Sydney, which will help attract visitors by enhancing community activity and entertainment, and leveraging Sydney's global reputation as a world-class cultural and entertainment hub.

Future directions to investigate

> improve public transport connections to arrival and departure points, such as airports and cruise terminals

> support the NSW Government's Visitor Economy Industry Action Plan 2030 and Visitor Economy Strategy 2030

> review the Future Transport 2056 Tourism and Transport Plan to ensure it is responsive to the impacts of the 2020 bushfires and COVID-19

> continue to support and promote safe and sustainable recreational and commercial boating, tourism growth and regional economic development through the strategic approaches set out in the NSW Maritime Safety Plan 2017 -2021, the NSW Maritime Infrastructure Plan and the NSW Marine Estate Management Strategy

> facilitate the development of new smartphone apps that provide a single point of information and allow visitors to purchase products that bundle travel with cultural activities and tourist attractions

> provide clear wayfinding to assist visitors and infrequent transport users to navigate the network easily and seamlessly, including walking and cycling networks

> promote accessible tourism opportunities, including rural rail journeys, and provide accessible roadside facilities

> support the 24-hour Economy initiative to grow a vibrant, safe and diverse 24-hour economy in Sydney, enhancing NSWs standing as a global destination, including pivoting to new maintenance models to support the initiative

See how we are improving transport for visitors in the Tourism and Transport Plan.

Transport connects visitors to tourist attractions

CHAPTER

5

Future mobility and services

Technology-enabled mobility and services

Emerging technologies and innovations, matched with advanced data analytics, bring major new opportunities for customer services and operational improvements. Technology development has always occurred, but the pace of development and opportunities is now growing significantly, making this area a major focus for Transport for NSW.

Mobility is increasingly technology led, where data sharing and smartphone apps are matching customers with transport services in many more ways than before, with opportunities to personalise services to suit customers' changing needs. Mobile technology and intelligent systems are providing customers with a single integrated platform for planning, booking and paying for end-to-end journeys on a wide range of modes. Customers can also opt-in to receive more personalised and proactive trip planning, payment and service information.

Recent innovations mean public transport passengers, bike riders, pedestrians and drivers can easily access relevant information, increasing customer satisfaction. For example, we have real-time passenger capacity information for Waratah trains and metropolitan buses, so passengers can see which services have spare capacity before boarding (updated quickly for physical distancing rules as part of NSW's COVID-19 response). Bike riders can now plan their trip under three different preferences – easier, moderate or most direct.

We created Contactless Transport Payments for an easy way to pay for public transport using a credit or debit card or a linked device, and have extended the convenience of Opal fares to new on-demand services through Opal Connect. Customers with disability and mobility impairments can access multi-modal accessible trip planning, including via voice command, and regional bus customers can now access real-time tracking and passenger occupancy information in trials that will be rolled out in more regional cities, to help them decide how and when to travel.

Our operational technologies are also developing rapidly, with smart sensors able to share rich insights on movement patterns and disruptions with intelligent decision engines, supported by artificial intelligence and machine learning able to quickly and accurately adjust road and rail network management. With NSW's new Spatial Digital Twin, real-time data from sensors will provide a digital 3D spatial representation of transport assets and services that can be visualised with historic and future scenarios to facilitate better planning, design and modelling of NSW's future needs.

Telematics visualisation shows heavy vehicle counts on roads in NSW, using satellite tracking and wireless communication technology to remotely monitor where, when and how vehicles are being operated on the road network. These smarter technologies help our infrastructure and service investments operate more efficiently, to provide the best value to the community.

In addition, emerging vehicle technologies are providing benefits, with electric vehicles now offering valuable cost savings and cleaner, quieter operation. Zero-emission buses will replace diesel buses and improve air quality in centres, and e-bikes and cargo bikes are providing new forms of transport. More vehicles are gaining new levels of automation for improved safety, and NSW continues to trial more highly automated vehicles in metropolitan and regional settings.

The rise of ridesharing is an example of how traditional service models have been updated with technology through advances in GPS navigation devices, smartphones and networks that can coordinate drivers, customers and payment systems. NSW is supporting the integration of ridesharing for 'first- and last-mile' connections to public transport services.

Car sharing is also on the rise, with State and local governments in NSW actively enabling car sharing through changes to parking permit arrangements. Bike sharing has also been introduced by the private sector.

As the scale and pace of innovation increases, so too does the challenge of predicting technology adoption. Just as with changes in travel patterns due to COVID-19, our forecasts and modelling of future mobility patterns need to allow for such uncertainties, look for early 'no regrets' actions, and be able to adapt and innovate; and we must provide the right settings and environment for this to happen.

While customers – and markets – ultimately determine whether a technology is widely used, governments play a key role in enabling new technology solutions by first ensuring safety, and also adapting regulations, service provision, data sharing and collaboration with customers, the private sector, and the research, design and start up communities.

The role of government in enabling new services

Creating the right environment for new service models and forms of mobility

Government has been the default provider of transport services. However, the emergence of new technologies and innovative mobility service models is changing and diversifying the transport landscape. The private sector is becoming more involved in transport service delivery and operating in environments that are traditionally the domain of governments alone, and the role of governments is increasingly shifting from direct provider to orchestrator.

These changes have the potential to catalyse a transformative shift away from a reliance on private vehicles to more shared, efficient and sustainable mobility. This could offer significant benefits to customers and the community, and support the environmental and financial sustainability of the transport system. Part of the role of government is to investigate the opportunities and risks that such a paradigm shift might present, and shape outcomes to deliver the best possible benefits for our customers and the wider community.

The role of government is increasingly becoming about setting network and customer outcomes and ensuring policy and regulatory frameworks are in place to support new service models and integrate new forms of mobility into the transport system. This may involve reducing any regulatory burdens and setting safety and service standards. Government also provides an integration role, enabling customers to move across the transport network and different transport providers. For example, Opal Connect allows customers to move across the network with a single digital account.

In some instances, the role for government will be to get out of the way and allow the market to deliver services. This may be the case where demand for services is high or where the private sector is better equipped to meet customer needs. This aligns with the NSW Government's position on regulatory frameworks, to ensure unnecessary restrictions on competition are removed.

In other cases, the role of government will be to identify and address market failure situations where government intervention is considered necessary to encourage and shape the introduction of innovative services and safeguard the interests of our customers and the community.

An example of government creating a more contestable market is its response to the emergence of rideshare companies. Many customers were quick to embrace ridesharing but regulation did not reflect the 'shared economy' approach, meaning rideshare companies were unable to operate legally. Similar services like taxis and hire cars were able to operate legally but were heavily regulated in a way that hampered innovation and created unnecessary barriers to new market entrants.

Some of the adjustments the NSW Government has made to create the right environment for innovation include:

› removed 50 unnecessary regulations on the point to point industry and allowed rideshare companies to operate legally, while continuing to regulate on issues in the public interest, such as safety and consumer protection, and establishing the Point to Point Transport Commission

› introduced legislation to enable automated vehicle trials to ensure new technologies are properly assessed to meet safety, service and customer outcomes. Since the introduction of this legislation, trials commenced in Sydney Olympic Park, Armidale and Coffs Harbour, and a further trial in planned for the Dubbo area

› established the Open Data Hub and Developer Portal to make Transport's extensive data sets available to developers, entrepreneurs and data analysts, to create innovative solutions for our customers

› created Opal Connect, providing a new ticketing solution that enables customers to move across the transport network, modes and providers with a single digital account

› supporting the National Policy Framework for Land Transport Technology and delivery of the National Land Transport Technology Action Plan 2020-23

Future directions to investigate

› continue conducting and facilitating pilots of new service models, including Mobility as a Service (MaaS) and on-demand services

› support industry partners in service delivery and engage communities by involving them early in transport and land use planning processes

› when reviewing regulation governing the transport system, consider arrangements that could pre-empt or adjust quickly to market disruptions

› investigate the long-term potential for innovative technologies and service models to transform the future sustainability, performance and customer experience of mobility and place making, with improved data insights allowing for innovation in service provision
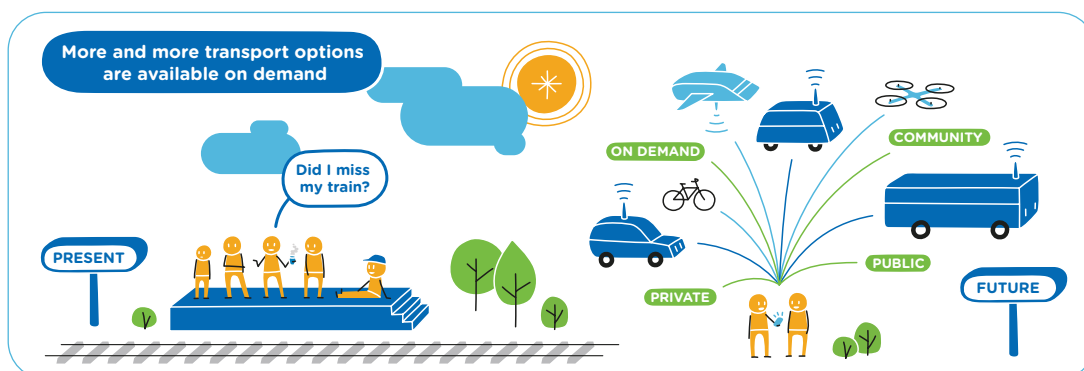
More and more transport options are available

Introducing an element of competition to smaller markets

The NSW Government takes an integrated approach to services, where the customer outcome drives delivery choice regardless of organisational boundaries and constraints. Where government has traditionally had to directly provide public services to meet its obligations to the community, it is now able to play a more sophisticated role in developing a marketplace for, or purchasing, high-quality innovative services, where these deliver better outcomes for customers.

In markets with lower contestability, such as some areas in regional and outer metropolitan NSW and customer segments where disadvantage exists, we will need to look to more innovative procurement practices, where services that better respond to customer needs and deliver better value for money for government are purchased.

An example of a new procurement approach in an outer metropolitan area is Newcastle Transport, a private entity awarded the contract to operate bus, ferry and light rail services, and manage interchanges in the Newcastle area. The contract is outcomes-based, and sets minimum service levels while providing a greater level of autonomy to the service provider to plan and reshape the network. The contract also contains provisions for incentive payments for patronage growth above the base contract rate.

This approach has introduced a level of competition in transport service markets that has not existed before, as the government went out to competitive tender before appointing the service provider. The new network is expected to increase the quantity and quality of services within a more efficient cost structure for government.

Future directions to investigate

› go to open market tenders when procuring services, to introduce competition in markets with low contestability and drive customer outcomes

› include arrangements that reward innovation and patronage growth into service contracts

› continue creating a workplace culture where Transport for NSW is equipped to achieve the best value-for-money outcomes from private sector providers

Newcastle light rail

A focus on service outcomes for customers

New services should improve the customer experience and help us achieve our vision

Traditionally, transport services were strictly defined as the operation of transport infrastructure and fleets. This meant that service providers were dependent on their control or ownership of the physical assets or network. Today, mobile technology is increasingly enabling customer value by connecting providers directly to customers.
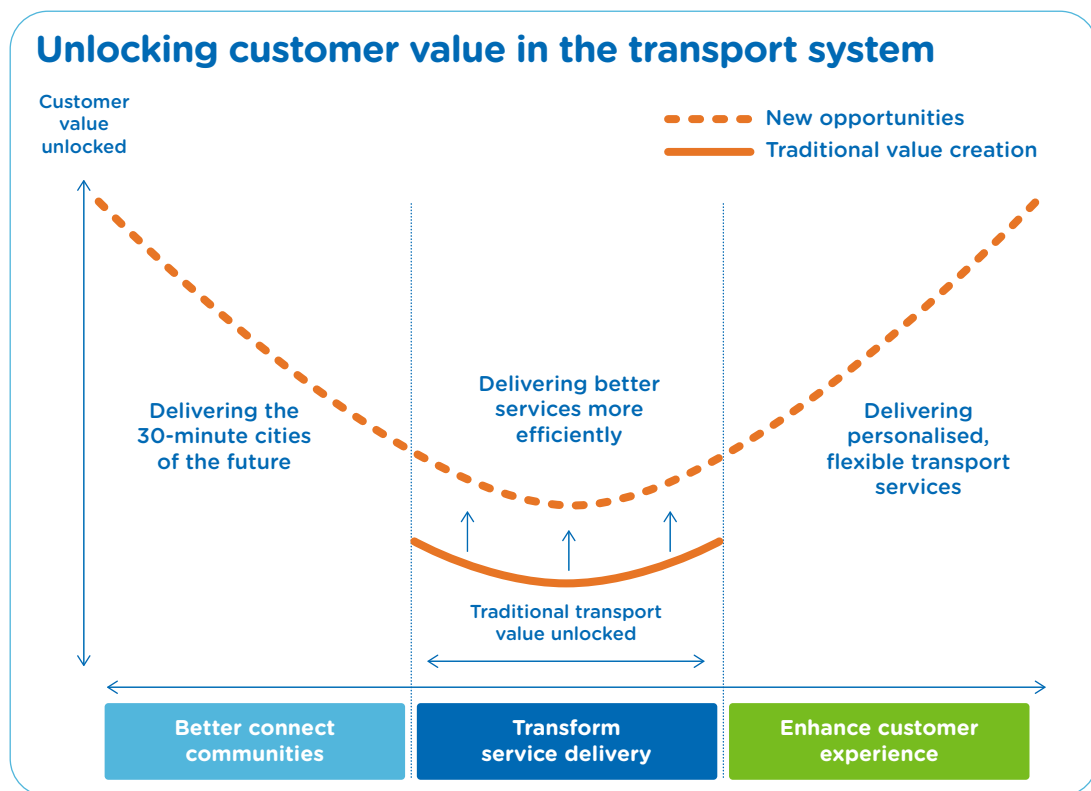
The emergence of rideshare companies has significantly changed the point-to-point market, with new online service providers emerging and being embraced by customers. The NSW Government has harnessed the potential of new point-to-point models through changes to legislation. However, this experience has taught us that the pace of change can be swift and unpredictable.

Today, we are at a 'tipping point', with more companies developing or operating innovative transport services, and increasing access to funding from investors who see major opportunities to create value from overcoming transport inefficiencies and customer pain points. Unlocking the potential of new services for the benefit of customers requires us to set clear customer outcomes for transport services, engage closely with industry and the community, appropriately exchange data and ensure our infrastructure can support new services.

A marketplace for innovation

The emergence of new services enabled by technology has a number of significant implications for government. It places greater importance on the availability and sharing of data, as markets operate most efficiently and deliver better customer outcomes when people and service providers have access to information.

A new market for service providers requires clear information to be made available to customers in real time so that the transport system is simple to understand, easy to use and can deliver personalised services relevant to individual needs and preferences. For transport customers, this means being able to compare travel times and prices across different transport modes in real time to make the best choice about how to reach their destination. It also means that in times of disruption or major incidents, we are able to communicate proactively and re-route customers to minimise impacts on the network and the customer experience.

Unlocking customer value in the transport system

Customer value unlocked

- - - - New opportunities
——— Traditional value creation

Delivering the 30-minute cities of the future

Delivering better services more efficiently

Delivering personalised, flexible transport services

Traditional transport value unlocked

Better connect communities

Transform service delivery

Enhance customer experience

New ways of unlocking customer value

Customers influencing service provision

Personalisation of many transport services means customers will have more choice about where services go, their price and even how they are packaged with other services, such as events and shopping.

The emergence of on-demand bus and ferry services and other forms of shared transport are demonstrating this by allowing customers to directly influence where their local services travel on a day-to-day basis. Transport for NSW also seeks to manage demand on transport networks through combinations of behaviour change, capacity creation and service optimisation.

As technology unlocks new service possibilities, transport will increasingly resemble a retail industry, where individual service providers can tailor offerings to individual customer needs. This presents an opportunity for customers to have unprecedented input into how transport services are delivered.

As technology unlocks new service possibilities, transport will increasingly resemble a retail industry, where individual service providers can tailor offerings to individual customer needs.

Future directions to investigate

> transform the customer experience and service interface with digital engagement channels for our customers to enable personalised, two-way interactions, flexible mobility options and customer-centric information services

> continue to roll out flexible payment models, such as contactless payments and the digital Opal card, to provide seamless mobility as a service for commuters, as well as easy-to-access travel options for visitors

> develop and introduce personalised service models, shared services and on-demand models, with priority roll-out in regional centres and for people who find it harder to access other transport services
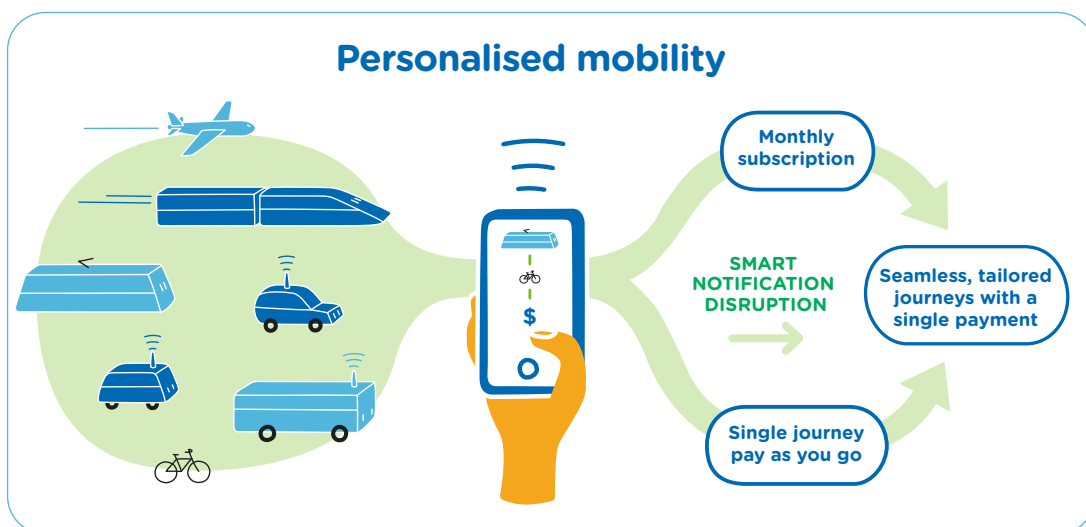
Smartphone technology supporting transport

Enabling places through transport technology

Transport for NSW adopts a place-based approach to the planning, design, delivery, and operation of transport networks. This means putting our customers and the community at the centre of transport planning and delivery, and offers a common language and core process of collaboration to support meaningful discussions with communities about how to address our future transport challenges.

Digital, technology and data analytics advances are going to underpin places for the future. The NSW Government's Smart Places Strategy supports integration of technologies into the built environment to capture and convey data and insights.

The embedded technology in places helps to capture information on the asset or local environment. The data is analysed to help people and governments make better, evidence-based decisions about how to improve the productivity, liveability and resilience of cities, towns and communities. An example of how this is being put into action is the development of Transports Spatial Digital Twin – a digital real-world model of cities and communities that uses a four-dimensional model (3D spatial information and time information), allowing visualisation of the physical environment and future scenarios to test plans, designs and 'what if' scenarios to optimise outcomes for customers, communities and places.

The data and digital infrastructure in places can also support future transport options, such as on-demand, Mobility as a Service (MaaS) and point-to-point services, to provide convenient access to great places.

Integration of MaaS and on-demand services with future 'smart city' systems and real-time data analytics can enable adjustment to service availability in real-time, based on measured usage across the city. MaaS, if successfully integrated with great places, can free up roadside space for pedestrians, bike riders and future transport modes.

The Future Transport Technology Roadmap

Transport for NSW has an ambitious vision for a major uplift in the use of technology and innovation, to enable a better experience for all our passenger and freight customers, and to support better places, in all parts of NSW, on all modes, for the greater benefit of the wider NSW community.

We will create well-connected communities linked by integrated and innovative public transport networks and safer roads, offering a range of mobility services and real-time information to give customers the freedom to choose how and when they want to get around. We will also help create successful and healthy places, so the liveability, amenity and economic success of communities and places are enhanced by transport.

The updated Future Transport Technology Roadmap provides transport professionals and our partners in communities and industry with our plan for the next three years to deliver on our vision as a technology business.

We plan to use technologies and innovations to deliver on our objectives for our regional and outer metropolitan customers as much as for our city customers, and for freight, just as much as for public transport, walking, cycling and emerging mobility services.

Technology is unlocking new service models

Mobility as a Service gives customers access to integrated journey information and provides greater choices in how they travel

Mobility as a Service (MaaS) is a service model that enables customers to plan and pay for their journeys using a range of services via a single customer interface, such as a mobile phone app. MaaS will enable customers to access integrated, easy-to-understand journeys in a broad market of transport services that gives them more choice in how they travel.

MaaS relies on sharing real-time information across different transport service providers to help customers optimise their journeys. It enables customers to plan and purchase their end-to-end journey from a retailer (most likely via an app) choosing from a range of travel options, such as travelling by public transport, rideshare or bike hire. In real time, the app then guides the customer through their journey.

Data drawn from customers via a MaaS platform helps providers offer more personalised services and can also link customers to non-travel related products, such as restaurant delivery, event ticketing and retail. MaaS provides customers with a single view – supporting a personalised, integrated transport network for each customer.
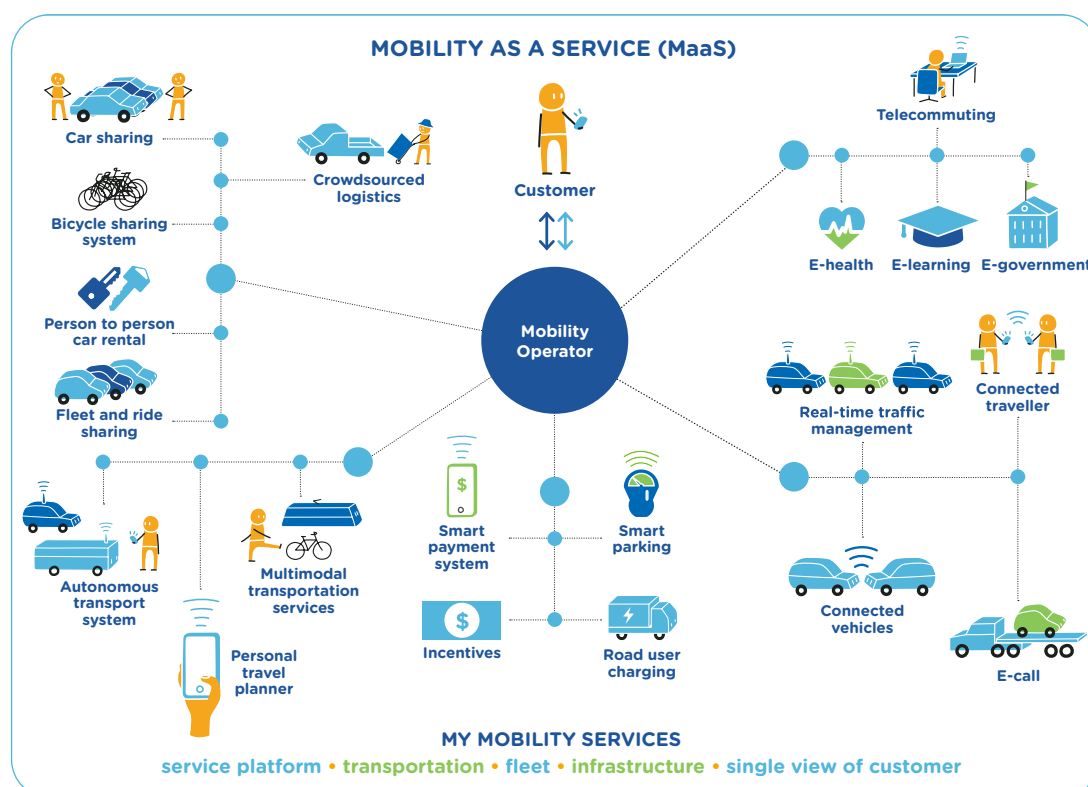
MaaS platforms are already being used in other countries, such as Finland, Sweden and the UK. Under the Finish MaaS system Whim, passenger journeys increased by 20 per cent and 98 per cent of surveyed customers said the attractiveness of public transport had improved. The system also engaged new customers, with 9 per cent of customers on regional lines reporting they had not previously considered themselves to be public transport users.

A trial of MaaS in Sweden also indicated positive results for public transport use, with patronage increasing from 35 per cent before the trial to 45 per cent during the trial.

In 2019, NSW launched a MaaS Innovation Challenge, seeking expressions of interest from industry to pilot innovative MaaS solutions in a trial program. Five industry partners were selected to take part in the trial. Through collaborative co-design, the Innovation Challenge delivered pilot trials of MaaS products including the Uber FerryConnect, integration of Public Transport into the Uber app, and development of the data sharing specification. The next phase of the program is focused on the implementation of a third-party MaaS app in collaboration with Waverly Council.

Future directions to investigate

> expand open data and data exchange initiatives to improve customisation of services and journey planning across providers

> identify opportunities to link transport activities to broader NSW Government services, including supporting data platforms for MaaS models

> resolve issues relating to privacy, data protection and liability, and adopt a set of principles to ensure any data collected from customers will be appropriately used to benefit the transport network

> lead innovation nationally, with a Data Science Incubator and open data policies across public and private services, to enable safe and effective use of technology

> continue to work with other governments in Australia to implement the National Technology Action Plan 2020-23, including investigating the role of governments in MaaS, and identifying priorities and enablers to support its effective development and deployment

MOBILITY AS A SERVICE (MaaS)

Car sharing

Crowdsourced logistics

Customer

Telecommuting

E-health E-learning E-government

Bicycle sharing system

Person to person car rental

Mobility Operator

Real-time traffic management

Connected traveller

Fleet and ride sharing

Autonomous transport system

Multimodal transportation services

Smart payment system

Smart parking

Connected vehicles

Personal travel planner

Incentives

Road user charging

E-call

MY MOBILITY SERVICES
service platform • transportation • fleet • infrastructure • single view of customer

Mobility as a Service

World-class mass transit

Real-time connectivity and automation makes the emergence of more responsive, capable, 'smart' systems possible

Customers can already use apps to receive information in real time and plan their trips. Within Greater Sydney they can also use electronic ticketing via the Opal card and now their credit or debit card, to provide a seamless journey across transport modes.

While the network will continue to require employees to physically manage and attend systems and deliver customer services, greater automation will deliver safety benefits by reducing the risk of human error, and using computerised failure detection and response systems. Automated systems also offer more predictable running times and energy optimisation.

Transport's intelligent systems and decision engines will support the connected and automated transit system by investing in a multi-mode Intelligent Congestion Management Program, predicting anomalies and customer movements across the day, and shaping how services are delivered to provide a better customer experience. These decision engines use artificial intelligence and machine learning to immediately provide the most relevant and actionable insights, and to focus on optimising service delivery and network management.

The Sydney Metro North West – opened in May 2019 – is Australia's first fully-automated rail network, reflecting global trends. Its turn-up-and-go services run from Rouse Hill in Sydney's north-west to Chatswood, using a new generation of fully-automated metro trains that run every four minutes during the peak. Customers were quick to embrace Sydney Metro North West, with more than 12 million customer journeys in its first six months of operation.

The Sydney Metro network will eventually extend all the way from the north-west, under Sydney Harbour, through new underground stations in the CBD and beyond to the south-west, known as the Sydney Metro City & South West, as well as extending west to Parramatta. Known as Sydney Metro West. Six metro stations have also been confirmed for construction on the Sydney Metro - Western Sydney Airport Line.

Advances in communication and control systems will create opportunities to further improve capacity on our existing network; an approach expected to be more cost effective than building additional infrastructure.

We need to ensure the safe and effective adoption of new technologies, ensuring they contribute to our overall vision for transport.

Using technology also allows us to get more out of existing assets. To improve efficiency and reduce travel times on the road network, we are investing in 'smart motorways', which use complementary technologies to monitor traffic conditions, manage congestion and respond to incidents in real time. The NSW Government is investing $600 million to build the M4 Smart Motorway, which introduces intelligent technology to the M4 Motorway between Pitt Street in Mays Hill and Mulgoa Road in Penrith, with a view to rolling out smart networks on all NSW

motorways in the future. The M4 Motorway began a trial period in November 2020, with all parts of the Intelligent Transport System (ITS) switched on in stages to allow motorists time to get familiar with the new driving conditions.

NSW has also adopted new light rail technology to reduce the impact of trams in Newcastle and Sydney city centres, with battery powered trams in Newcastle and third-rail trams on the CBD sections of Sydney's new lines.

We are working with industry partners to test technologies, to understand their risks and benefits, better engage with customers on understanding what these technologies will mean for how they use the network, and to learn how we can harness technology to improve customer outcomes in Greater Sydney and regional communities.

Future directions to investigate

NSW will continue to explore automation to achieve safety and efficiency benefits and service improvements for customers. We will:

› enable new and upgraded physical and digital assets to support new technologies and adapt to future developments

› continue to consider opportunities for the latest public transport automation advancements in NSW

› implement intelligent traffic management methods to improve road network efficiency

› deliver 'smart motorways' on all NSW motorways

› continuing to advocate for adoption of the latest life-saving vehicle safety technologies in Australia, within the same timeframe as Europe

› continue to implement multi-modal intelligent congestion management capabilities

Connected and automated vehicles

The automation of light passenger vehicles is the next big game-changer in terms of safety and efficiency, and unlocking new service models

Connected and automated vehicles (CAVs) are exciting technologies that could help us address current and future challenges around the safe and efficient movement of people and freight, improve transport services and experiences for customers, and achieve better outcomes for citizens and places.

In the coming years, CAV technologies will support a growing variety of passenger and freight vehicles of all sizes to serve different customer needs in different places. CAVs have the potential to offer our customers a broader range of flexible travel options and safer, smoother and faster journeys. CAVs can also be used for certain freight operations, for example in first- and last-mile delivery applications.

CAVs may change the way our centres operate, as they require fewer traffic signals, signage, kerbs and lines to guide their movement, potentially reducing unnecessary 'street clutter'. As CAVs require less parking infrastructure, extra space could also be made available for trees, cycleways and wider footpaths.

The expected major benefits of CAVs include safety and network efficiency.
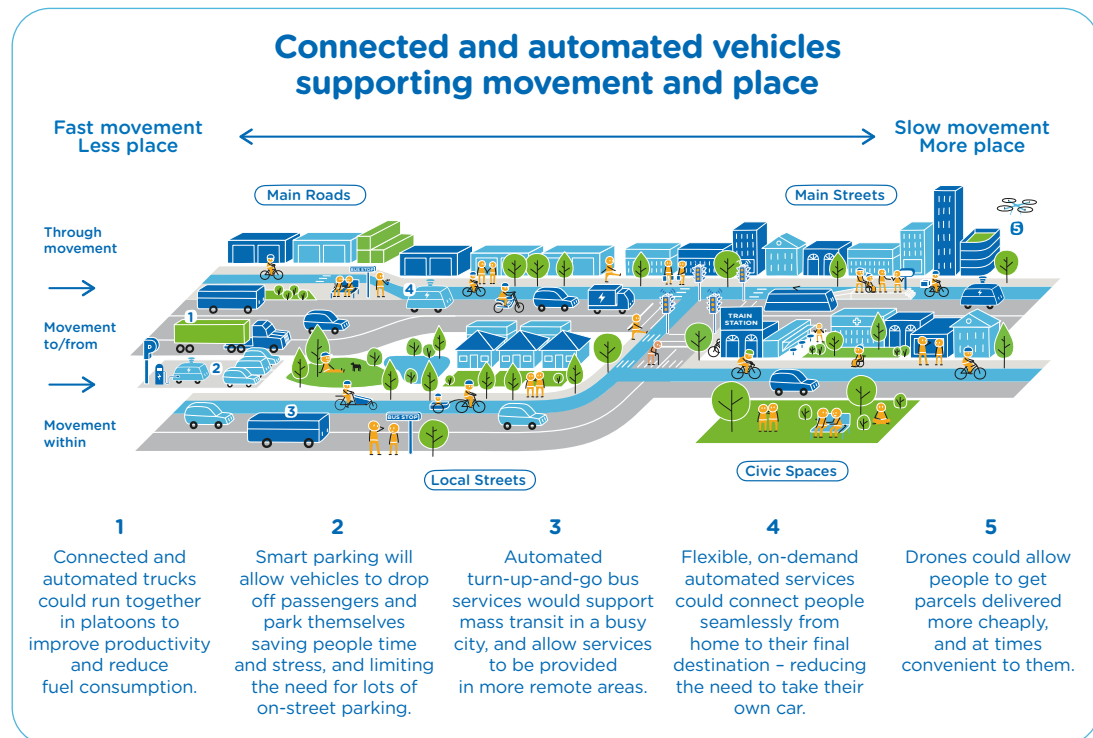
A wholly automated vehicle fleet could dramatically improve safety on our network by removing the risk of human error, which is estimated to be a contributing factor in 90 per cent of vehicle crashes, together with a lack of vehicle and road protections that would prevent trauma.

In terms of network efficiency, being 'connected' will likely allow CAVs to safely travel closer together, behave cooperatively and avoid incidents that often disrupt traffic flow. This could result in faster and more reliable journeys for customers and reduced congestion.

The benefits promised by CAVs are highly dependent on the progression of the technology and the value of the use cases that the technology can deliver. Transport for NSW is working closely with industry to be at the leading edge of this technology, in order to fast track its adoption where it will help us deliver outcomes for our customers in areas like safety, mobility and productivity.

Further benefits include supporting flexible, affordable journey options for customers, enhancing connections between people and places, reducing the need for parking, and improving the efficiency of freight movements. CAVs will also enhance accessibility and social inclusion for transport customers, and reduce fuel consumption and emissions.

Our Connected and Automated Vehicles Plan builds on these opportunities and outlines how we will achieve the customer, community, productivity and place outcomes that may be delivered by CAVs.'

Connected and automated vehicles supporting movement and place

**Fast movement
Less place** ←——————————→ **Slow movement
More place**

Main Roads

Through movement →

Movement to/from →

Movement within →

Main Streets

Local Streets

Civic Spaces

1	2	3	4	5
Connected and automated trucks could run together in platoons to improve productivity and reduce fuel consumption.	Smart parking will allow vehicles to drop off passengers and park themselves saving people time and stress, and limiting the need for lots of on-street parking.	Automated turn-up-and-go bus services would support mass transit in a busy city, and allow services to be provided in more remote areas.	Flexible, on-demand automated services could connect people seamlessly from home to their final destination – reducing the need to take their own car.	Drones could allow people to get parcels delivered more cheaply, and at times convenient to them.

Connected and automated vehicles can support different customer needs in different places

In focus

NSW automated vehicle trials

The NSW Government is partnering with industry, customers and communities on autonomous vehicle trials in Sydney and regional areas.

Smart Shuttle trial at Sydney Olympic Park

NSW's first connected and highly automated Smart Shuttle trial at Sydney Olympic Park, has transported over 4,500 passengers. In an Australian first, two automated shuttles integrated with traffic lights and four digital bus stops, provided a regular turn-up-and-go shuttle service. Successful traffic light integration of two shuttles laid the foundation for V2I (Vehicle to Infrastructure) connectivity.

Connected and automated vehicle trials in Armidale and Coffs Harbour

Transport is partnering with industry, researchers, local councils and businesses to co-deliver CAV trials in Armidale and Coffs Harbour to test emerging technologies in regional settings, assess the potential for these vehicles to improve road safety outcomes, and provide more flexible services for regional communities.

In Dubbo we are retrofitting an off the shelf ute with self-driving capabilities, and exploring on-demand and connected technology features.

Continue collaboration with the industry

We are working with the University of Sydney to conduct on-road research and development of technologies. The trial will help Transport for NSW better understand how CAVs will interact with their environment in the future, and how vehicle systems can be developed to safely deploy CAVs onto our road network.

Trials such as these will provide sound evidence to enable government to consider the associated benefits and risks of CAVs, including the cost of transitioning to automated systems, cyber security and upskilling our workforce. Trials can also help us understand how CAVs will interact with other precinct users, such as pedestrians and bike riders, and the broader transport network.

NSW Connected and Automated Vehicles Plan

In January 2019, the NSW Government launched a Connected and Automated Vehicles Plan, setting out our priorities and actions for the next five years to enable and prepare for the introduction of connected and automated vehicles and ensure the predicted community benefits from these new technologies, and the new services they support, are realised.

The Road Safety Plan 2021 includes actions to support the development and uptake of new and emerging vehicles and other road safety technologies. To help deliver these actions, the NSW Government has established a new facility in Central Western NSW at Cudal, to test new and emerging vehicle technologies, such as autonomous emergency braking, speed assist systems, communication between cars and traffic infrastructure, and the development of smart highways.

The new facility at Cudal, about 30 minutes from Orange, is NSW's newest five-star safety testing facility in addition to the established CrashLab facility at Huntingwood. Facilities at Cudal include extensive workshops, world-class test track and equipment, and also scope to expand operations further. Future plans for the facility will allow technicians to test and refine emerging technologies, such as vehicle-to-traffic signal communications and complex vehicle-to-vehicle systems.

Future directions to investigate

› continue to conduct passenger and freight CAV trials across NSW to test possible uses and benefits from immediate applications and service trials, and investigate longer-term uses in challenging operating environments

› adopt a strategic approach to preparing for and accelerating the adoption of CAVs for new services, improved safety and network performance, reduced congestion and better incident management

› identify infrastructure enhancements needed to support CAV operations, including appropriate road infrastructure and CAV drop-off facilities at centres and interchanges

› work with other jurisdictions to identify and implement the digital and physical infrastructure needed to support CAVs

› continue to work with governments in Australia to develop a national regulatory framework for the safe deployment of CAVs.

› continue working with industry and universities to help us guide and manage the transition to CAVs

› engage and educate the public on CAVs

› develop a NSW Freight CAV policy

› develop a NSW Electric Freight Vehicle Policy and encourage the greater use of electric vehicles in the freight task.

› establish pipelines for industry development and upskilling the workforce

› identify appropriate policy and regulatory mechanisms to ensure CAVs support Future Transport principles and NSW Government priorities

› support the NSW Innovation Strategy to manage workforce transition as automation increases

Micromobility devices for short trips

Transforming personal mobility

The NSW Government is investigating the benefits and issues around emerging micromobility devices such as e-bikes, personal mobility devices (PMDs) and motorised scooters, with a specific focus on safety for riders and other road users, as well as the infrastructure and regulatory frameworks that would be needed to support their use.

NSW Road Transport Law prohibits the use of certain micromobility devices on public roads, cycling paths and footpaths, with these devices not meeting current safety standards for vehicles. For example in NSW, e-scooters can only be used on private land. The safe use of new micromobility devices on the road network is dependent on both appropriate infrastructure and a contemporary regulatory framework that is fit for purpose and ensures safety for both operators of the devices and other road users.

The National Transport Commission is working with jurisdictions to develop revised Australian Road Rules for the use of certain devices in jurisdictions with adequate infrastructure. The model Australian Road Rules provide a regulatory framework for NSW to enable Personal Mobility Devices (PMDs) and motorised scooters once safety risks and competing demands for infrastructure have been adequately addressed.

Micromobility devices have the potential to expand catchments to public transport, improve access to centres and key destinations, and shift people out of cars, particularly for short trips and international and Australian evidence shows that the use of personal mobility or micromobility devices is increasing.

The cost of the devices also makes them appealing with upfront and operating costs significantly lower than owning and operating private vehicles. Costs can be even further reduced when sharing schemes are available.

Sharing of micromobility devices at interchanges also has the potential to grow public transport use by better connecting people to the mass transit network. The NSW Government is working in partnership with local government to plan and deliver a network of protected cycleways and micromobility lanes linking major strategic centres and local neighbourhood centres.

Future directions to investigate

› deliver complete micromobility networks, pedestrian space and interchanges that safely support a wider range of devices

› enable shared use service models in key centres

› develop and adopt safety standards for new devices entering the market and review existing regulatory frameworks

› investigate the potential of micromobility infrastructure for use by a range of human and electric powered mobility devices, such as bicycles, e-bikes, cargo bikes, e-scooters, assisted mobility devices and delivery robots, and look into relevant policy updates

› consider lessons learnt from overseas adoption to grow understanding of benefits and management requirements

Emerging aviation technologies

Rapid point-to-point services that could transform emergency services and deliveries

The increasing capability and deployment of drones is providing opportunities and innovations that could provide benefits across a range of areas including: customer mobility; last-mile delivery for freight customers and operators; efficient and effective management of built assets; and rapid deployment of emergency personnel, maintenance crews and equipment.

The NSW Government is already trialling the use of urban air mobility devices (UAMs), commonly referred to as drones, to assist with infrastructure maintenance, congestion management, environmental and land use management, disaster site management, and data collection. For example, Transport for NSW's Transport Management Centre (TMC) is exploring the use of drones to improve incident management and situational awareness, while Sydney Trains is using drones to safely check overhead wires and inspect tracks, reducing disruption to services.

With numerous companies in Australia and other locations around the world actively exploring the potential for drones to be used for small parcel freight delivery and point-to-point transport for people, there is likely to be competition for air and landing spaces for drones and other aviation technologies in the future. Transport for NSW is investigating various aerial mobility strategies to help guide this.

The future use of drones and other aviation technologies should consider potential customer benefits, community impacts (such as noise pollution), access arrangements for multiple operators, supporting infrastructure requirements and safety. We are engaging with industry to explore the potential benefits and implications of drones for customers and the community.

Australia's current safety laws for drones depend on whether the operator is flying commercially or recreationally, with recreational and very small commercial operations generally exempt as long as they pose no risk or hazard to the public, property or another aircraft. With the use of drones and other new aviation technologies, such as electric vertical take-off and landing vehicles (eVTOLs), expected to grow considerably, a national framework is required to harness the social and economic benefits of aviation technologies, ensure safe, secure and efficient operation, and provide clarity and certainty to industry investors. This includes collaboration at both the State and Federal level to develop Urban Air Traffic Management systems to facilitate the safe movement of high UAM traffic densities.

The Australian Government has released a discussion paper on Emerging Aviation Technologies as the first step in developing a national framework that considers issues such as airspace integration, safety, security, noise, environment, privacy, infrastructure, technology trials, and coordinating regulation across jurisdictions. The NSW Government will continue to work with the Commonwealth and other states and territories to capitalise on these new technologies to deliver economic and social benefits.

Freight drones

Future directions to investigate

› continue to work with the Australian Government and other jurisdictions on a national regulatory framework for emerging aviation technologies

› investigate the role drones may play in improving real-time information, the efficient management of networks, assets, and incidents and emergency response

› investigate the role drones may play in improving first- and last-mile freight delivery and passenger mobility services and outcomes

› work with councils and the Australian Government to develop a common framework to identify safe locations for larger drone landing pads and operations in built up areas

› investigate future land use options for take-off and landing infrastructure in line with the National Airports Safeguarding Framework

Transport powered by alternative fuels

Leading the transition towards clean and quiet mobility

Low- and zero-emission vehicles include hybrid, plug-in hybrid, battery electric and hydrogen fuel cell vehicles. These vehicles offer major benefits compared to conventional internal combustion engine vehicles. For motorists and fleet operators, there are significantly lower fuel and maintenance costs, and benefits to the community include reduced pollutants and greenhouse gas emissions.

Electric vehicle (EV) charging also has the potential to contribute to wider environmental sustainability benefits in cases where it is feasible to charge using excess power generated from renewables during the day. As battery technology develops, EVs may also provide stored electricity back into homes, businesses or the grid.

Electric vehicles can currently cost more to purchase than a comparable vehicle with an internal combustion engine. However, parity on total costs – purchasing and operating – is close to being achieved for smaller cars and purchase price parity is expected to be reached by 2027. As EVs become more affordable and within reach for more members of the community, we anticipate a much higher take up rate. This is particularly the case if the availability of charging points and customer information continues to grow.

EV per cent of new vehicle sales
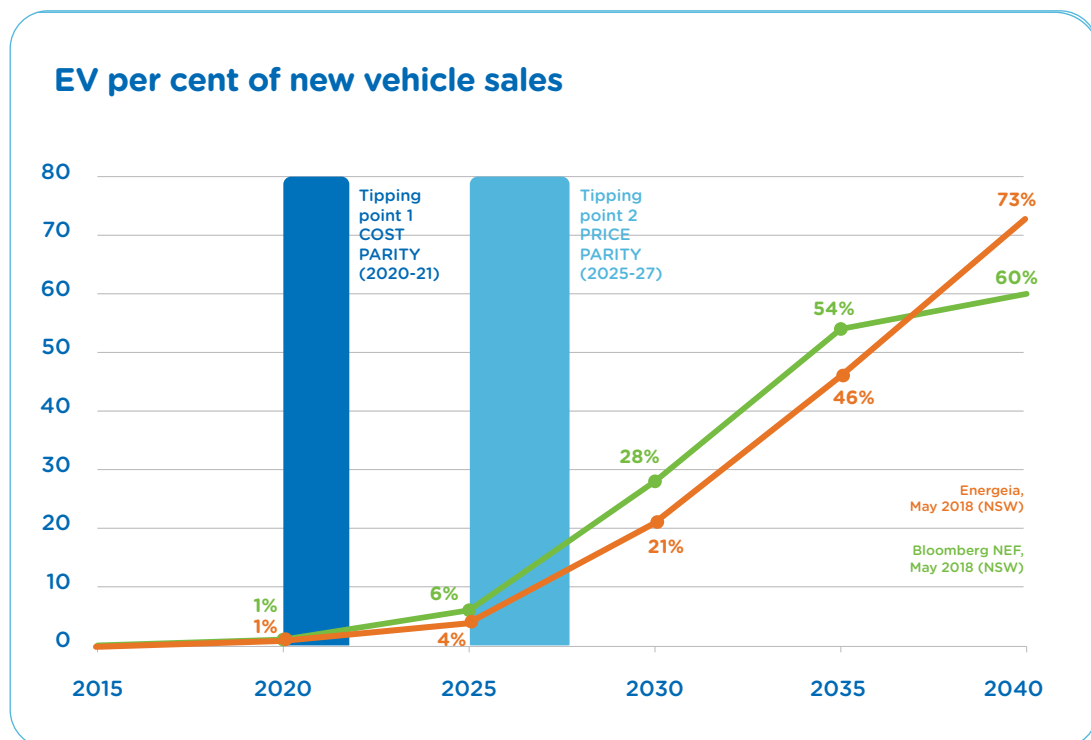
Projected growth of Australian EV market with cost and price parity points Source: Bloomberg NEF; electric vehicle per cent of new vehicle sales, assuming current policy conditions (no purchase subsidies).

The business sector has started transitioning to EVs. Many companies have commenced trialling of electric trucks (such as Woolworths, DHL, and Australia Post), Ikea have committed to a shift to all electric fleet by 2025, and Qube will be using electric driverless straddle carriers at Moorebank.

Transport for NSW supports the NSW Government's plan towards achieving a target of net-zero emissions by 2050. The recently published Net Zero Plan Stage 1: 2020 – 2030 restates the NSW Government's commitment to a net-zero emission future and the first major step in meeting this goal. Two of the four priorities under the plan are to drive uptake of proven emissions reduction technologies, and to ensuring the NSW Government is leading by example.

Transport for NSW is already paving the way for an industry-led and government partnership approach to the development and take up of more fuel efficient vehicles through the NSW Electric and Hybrid Vehicles Plan, including such measures such as:

›   the Zero Emissions Bus Trial to be delivered in Greater Sydney and outer metropolitan areas, and a strategy to transition the entire bus fleet to zero emissions

›   trialling automated, electric smart shuttles in Sydney, Armidale and Coffs Harbour in partnership with industry

›   trialling five fully-electric buses on a regular bus route service in Sydney's Inner West and East

›   partnering with NRMA to deliver additional EV charging stations in regional and outer metropolitan NSW, including at least 20 EV fast chargers, as part of a $3 million co investment

›   investing $2 million to install EV chargers at a number of commuter car parks in Greater Sydney

›   an online Electric Vehicle Guide tool to make it easier for consumers to access information about electric vehicles and the location of charging infrastructure, to encourage EV take-up

›   providing a lower rate of motor vehicle tax for hybrid and electric vehicles in line with the Commonwealth's Green Vehicle Guide

›   including a recommendation for 'conveniently located charging stations' in the Department of Planning, Industry and Environment's Apartment Design Guide

›   setting a 10 per cent government fleet target for new passenger fleet vehicles to be electric or hybrid from 2020-21 – now increased to 30 per cent by 2023 under the NSW Net Zero Plan Stage 1: 2020-2030

›   collaborating with other jurisdictions to explore the potential of alternative fuels, such as hydrogen, as a power source for transport, including through the National Federation Reform Council's Energy Council work, which has led to Australia's National Hydrogen Strategy

For more about how Transport for NSW is planning to promote environmental sustainability for the transport sector, see Delivering Sustainability.

CHAPTER

6

The future network

Planning a more dynamic network

The transport network in NSW is made up of fixed assets and corridors that form the backbone for service provision. The network consists of 185,000 kilometres of road infrastructure, and 9,400km of rail infrastructure for public, private, commercial and freight use, and prior to COVID-19 was supporting annually over:

› 424 million rail trips

› 391 million bus trips

› 16 million ferry trips

› 480 million tonnes of freight

› 11 million light rail trips

› 6,040 ship visits

› 62,590 regulated intrastate air trips and 2.2 million deregulated intrastate air trips

› a substantial number of vehicle trips, including 4.9 billion journeys per year on the Greater Sydney road network (including driver plus passenger and point-to-point total trips and excluding freight)

How has COVID-19 impacted the network?

While the impact of COVID-19 has resulted in changes to mobility patterns, demand pressures on the transport network remain significant, and the State's population is forecast to continue to grow.

In August 2020, almost 50 per cent fewer people were working in the Eastern Harbour City than in January 2020, with more people working from home. This resulted in temporary but major shifts to mobility patterns in response to the pandemic. The closure of international borders also had a severe impact on tourism, and contributed to reduced travel movements, particularly in Sydney's east, but also in the regions. Patronage on NSW Trains' intercity and regional services was close to 25 per cent lower over the twelve months to June 2020, compared with the year before. While there have been some signs of recovery and increasing travel activity, Greater Sydney public transport use remains 30 per cent below levels in January 2020.

Travel demand is expected to return to trend in the medium term, however the reduced activity in the short term provides Transport with the opportunity to deliver services in ways that support its customers through the pandemic and into the future, with pop-up cycle ways, lower speed limits, and touchless pedestrian sensors supporting greater walking and cycling and mobility choice.

Planning for the future network

As travel patterns return to normal, congestion on the network will continue to be a challenge, impacting the productivity of the State and the wellbeing of transport customers. Building our way out of congestion is not a sustainable solution.

Once built, fixed assets are difficult and costly to alter. Large infrastructure projects also have long lead times and can be disruptive to communities during construction. As a result, the infrastructure network has in the past lagged behind the rapidly changing needs of communities.

Planning for a dynamic network that improves customer choices and options is key to the sustainability and resilience to our future network.

Technological advances such as driverless trains and autonomous vehicles will allow these vehicles to safely operate closer together, increasing capacity on the network, and getting the most out of assets and infrastructure. Technologies available today, such as smart motorway systems and Information and Communication Technology (ICT), can also benefit the existing network by improving incident response and managing growing vehicle volumes and congestion.

Our future response to congestion and performance variability requires agile solutions. Where infrastructure solutions are needed, long development times mean these should be designed with flexibility in mind, to allow for adaptation over time to changing customer needs, safety and other technologies and services.

Planning for the future means preserving suitable options for future uses and travel behaviours. It also means improving the way we integrate land use management, demand for travel and utilisation of all transport assets to optimise safety and performance, and maximise carrying capacity as passenger and freight volumes grow.

Walking and cycling will play a key role in reducing congestion and supporting customer journeys. Transport reacted quickly to COVID-19 to encourage walking and cycling and reduce crowding on the transport network. This included speed limit reductions to improve pedestrian and cycling environments, pop-up cycleways, creating public spaces using road space and touchless pedestrian sensors.

Planning tomorrow's networks can also be done more effectively, using new sources of data and digital tools. For example, more sophisticated models and 'digital twins' – virtual models of the real world – can be used to test plans, designs and 'what if' scenarios to optimise outcomes for customers, communities and places. Future Transport introduces an alternative 'vision and validate' approach to planning, considering what customers will need and want to experience tomorrow, and enabling an agile and responsive vision-led, place-based planning approach. This approach also considers how the network will be used by different groups, including those with special accessibility needs.

Figure 34: Capacity on Sydney Harbour Bridge

Applying Movement and Place to support successful places

Communities are complex, multi-layered and diverse environments. Transport solutions need to consider how they best serve communities to support successful places. As NSW continues to grow, more people will be utilising our public spaces and transport services. This is particularly relevant for our major towns and cities where the majority of this growth is expected to occur.

Places occur at a range of geographic scales – they can be as large as a whole city or region, through to a small precinct. Our roads and streets are also public spaces and serve many roles and functions to customers and the community. They can move goods and people on a variety of modes and provide spaces for people to enjoy the environment, contribute to the economy and engage with the community.

Movement that is planned, designed, delivered, and managed to support safety and enhance places can make positive contributions to the environmental, social and economic value of those places. In addition, through moving people and goods on the most efficient modes of transport, the transport network assets can be maximised and contribute to enhanced place qualities by reallocating road space.
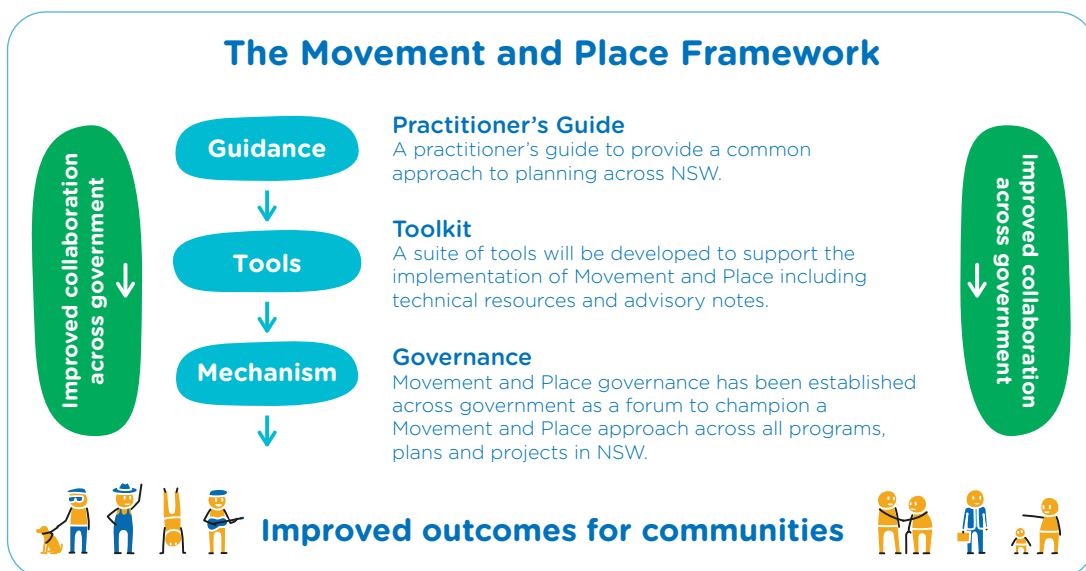
The concept of 'Movement and Place' underpins Future Transport 2056. It is a planning framework that ensures 'movement' and 'place' are considered together as part of a 'place-based' approach to the planning, design, delivery and operation of transport networks. Movement and Place puts our customers and the community at the centre of transport planning and delivery. It offers a common language and core process of collaboration to support meaningful discussions about how to address our future transport challenges.

Movement and Place supports Transport's 'vision and validate' approach by considering what customers will need and want to experience tomorrow, and enabling agile, responsive vision-led, place-based planning. Vision and validate, partnered with planning for places, takes a collaborative, spatial, long-term approach to develop contextual responses that better meet the needs of local people and their environment in a defined geographic location.

Movement and Place aims to:

> support places and local community outcomes

> move people and goods to, through and within places in a way that is safe, sensitive and complementary to the surrounding street environment

> produce more consistent, higher quality outcomes by asking professionals to think differently about their role in creating successful places

The NSW Movement and Place Framework consists of guidance and a supporting toolkit for those responsible for planning, design, delivery or operation of transport networks, and evaluating transport opportunities for government, as well as overarching governance forums comprised of senior planning and transport executives from across the NSW Government. It has been prepared collaboratively by Transport and the Government Architect NSW, with input from a number of local government representatives and NSW Government agencies such as the Department of Planning, Industry and Environment..
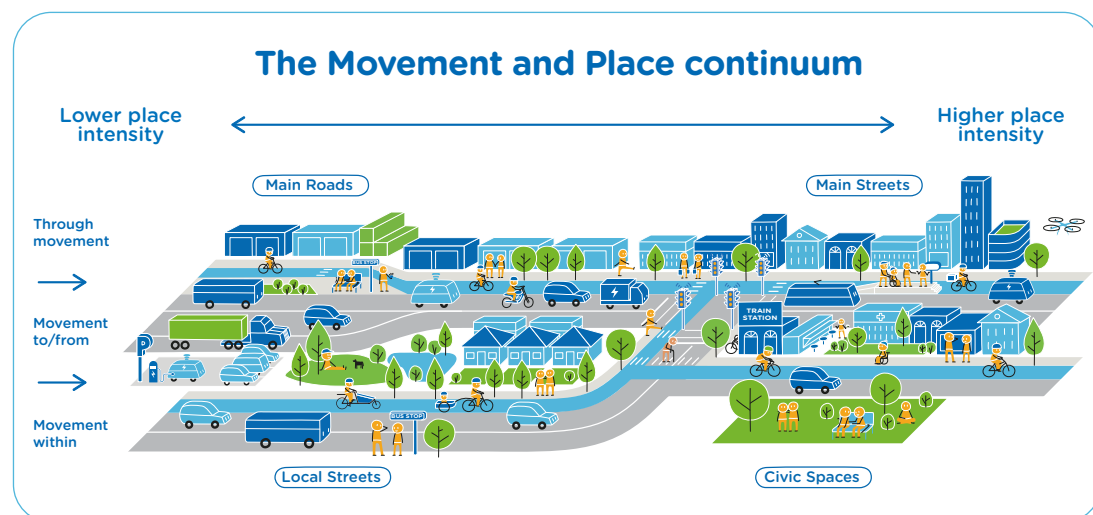
The Movement and Place Framework

Improved collaboration across government

Guidance

Tools

Mechanism

Practitioner's Guide
A practitioner's guide to provide a common approach to planning across NSW.

Toolkit
A suite of tools will be developed to support the implementation of Movement and Place including technical resources and advisory notes.

Governance
Movement and Place governance has been established across government as a forum to champion a Movement and Place approach across all programs, plans and projects in NSW.

Improved collaboration across government

Improved outcomes for communities

Building the Movement and Place Framework

Street environments

Streets and roads can be categorised into the following four broad environments to support the planning process. These help stakeholders and practitioners to understand the characteristics of different streets:

> **civic spaces** are public areas, such as streets, squares and parks at the heart of our communities and have a significant meaning, activity function or built environment. They are often in our major centres, our tourist and leisure destinations, and our community hubs. These spaces are often prioritised for pedestrians

> **local streets** are the majority of streets within our transport networks and often have important local place qualities. Activity levels are less intense; however, these streets can have significant meaning for local communities

> **main streets** have both significant movement functions and place qualities. Balancing the functions of these streets is a common challenge

> **main roads** are routes central to the efficient movement of people and freight. They include motorways, primary freight corridors, major public transport routes, the connected metropolitan bicycle network, and key urban pedestrian corridors. Place activity levels are less intense, however, these roads and routes can have significant meaning to local communities

The Movement and Place continuum

Expanding public transport networks

In Greater Sydney, transport networks and public transport services will be enhanced by establishing efficient and reliable corridors:

› **city-shaping corridors** – highest speed and capacity corridors providing connections between our cities and centres that shape the decisions of residents and businesses on where to locate – typically mass transit rail services, motorways and highways

› **city-serving corridors** – higher capacity corridors providing fast, high-frequency and reliable access to cities and centres – typically rapid bus, light rail and ferry services, and main roads

› **centre-serving corridors** – corridors that support local access and connect people with their nearest centre, or city-shaping or city-serving interchange. They support buses, on-demand, walking and cycling and enable the delivery of goods

› **outer metro and regional corridors** – connecting Greater Sydney with outer metropolitan areas and regional NSW

In regional and outer metropolitan NSW, the transport network will enable seamless, safe and affordable inter- and intra-regional and cross-border travel. The emphasis for the future regional network will be creating an equitable transport system that provides greater coverage across NSW and gives customers more travel options, for both local and longer distance trips. This includes day-return regional centre connectivity for an expanded geographical catchment and same day connectivity to global gateway cities or capital cities for all locations in NSW, either directly by air or rail services, or indirectly by bus, coach, air or rail. This will reduce isolation and increase the liveability of regional centres and towns by providing regional customers with the option to undertake employment, education, leisure and health activities locally.

In focus

Planning for the future network through corridor preservation

In early 2014, Western Sydney corridors were identified across the Western Parkland City to support the new economic and social opportunities for the Western Sydney International (Nancy-Bird Walton) Airport, Aerotropolis and surrounding employment lands along with Sydney's south-west and north-west priority growth areas.

The NSW Government announced and subsequently gazetted in June 2020, the following Western Sydney future transport corridors:

› **North South Rail Line** – providing for a passenger rail connecting St Marys and Macarthur via Western Sydney Airport, Oran Park and Narellan. In April 2020, the NSW Government announced the corridor between St Marys and the Western Sydney Airport will be used for the Sydney Metro – Western Sydney Airport Line.

› **South West Rail Link Extension** – providing for passenger rail connecting Leppington Station and the Aerotropolis for connections to the North South Rail Line corridor.

› **Western Sydney Freight Line (stage 1)** – providing for a dedicated freight rail connection to the future Outer Sydney Orbital near Luddenham. An Intermodal Terminal (IMT) site has also been confirmed for the Mamre Road precinct in Western Sydney, which will effectively leverage the surrounding industrial development in the area and the dedicated freight line.

Preserving these transport corridors now ensures future transport links can be provided for growing communities. It also gives certainty to residents in the Western Parkland City that future infrastructure and place making is being thoughtfully considered as the region continues to grow.

More information about future transport corridors is available at transport.nsw.gov.au/corridors

Integrating walking and cycling networks

Walking and cycling have significant benefits for customers and the wider city. As well as supporting active and healthy lifestyles that prevent chronic illnesses, walking and cycling are efficient and community-centred ways to travel that can extend public transport catchments, reduce congestion, and lower carbon emissions and air pollutants, while being affordable and accessible.

We are already working with local governments and other stakeholders to develop a connected metropolitan bicycle network, which will provide a safe, connected cycling network and grow the cycling mode share in the Greater Sydney area from 1 per cent in 2016 to 5 per cent in 2056. This network is also a step towards creating around 6,000 kilometres of cycling routes across Greater Sydney, Newcastle, Gosford and Wollongong, with a mix of cycleway types appropriate to the location, including protected cycleways, shared paths, and bicycle boulevards (low-speed, local-traffic only local streets that prioritise bicycle access).

A safe, connected metropolitan bicycle network could also act as a broader 'micromobility lane' to enable and support emerging and future forms of approved micromobility devices that travel at speeds of up to 25 kilometres an hour, such as e-bikes and e-scooters.

For regional areas, the development of infrastructure for cycling tourism, such as safe networks in regional towns, rail trails and coastal routes, will present 'transport as tourism' opportunities that attract visitors to towns and villages, bringing job opportunities and economic benefits.

Walking and cycling around and between centres will be supported by the establishment of a 'green grid' – a connection of green corridors and spaces to support compact development across the city and promote a more resilient urban environment. Transport for NSW has produced a guide on integrating green infrastructure that helps identify opportunities for green space during planning and design of assets and promotes green infrastructure at interchanges.

Planning for future walking and cycling networks

Transport for NSW has reshaped its Walking and Cycling Program towards the delivery of walking and cycling outcomes across the whole State. The key objectives of the 2020/21 Walking and Cycling Program are to:

> ensure walking and cycling are the most convenient option for short trips to key destinations and within centres

> reduce congestion on our roads and public transport networks by delivering projects that encourage a shift to walking and cycling

> enable efficient, safe and reliable journey times by prioritising infrastructure that supports pedestrian or cycling movement on certain corridors, consistent with the Movement and Place Framework

> deliver projects that make walking and cycling safe, comfortable and convenient transport modes that are accessible to a wide range of users

> enable positive health, wellbeing, social and environmental outcomes

Further information on the Walking and Cycling Program.

Walking and cycling design principles

Transport delivers its walking and cycling network with clear design principles that prioritise customer outcomes and integration with the existing network.

Transport encourages walking through compact, dense, mixed-use areas that are safe, pleasant and interesting, with appropriate pedestrian infrastructure, well-designed public spaces, and access to green space and public transport.

Transport aims to support a culture of walking by considering the variety, richness, vitality and vibrancy of the place, including the sense of place and accessibility to public transport and micromobility.

For cycling, Transport's cycleway design toolbox provides guidance on best practice infrastructure outcomes. It reflects design principles that ensure the cycling network is safe, coherent, attractive and comfortable, and considers not only traffic speed and volume, and pedestrian volume, but also the movement and place classification of the street environment.

Developing the digital network

Transport services in the future will require an extensive and increasingly sophisticated technology-enabled network.

As technology evolves, we will continue to adapt and respond to deliver exceptional mobility for our customers by ensuring transport technology is inclusive and provides solutions for all customers, on all modes across NSW.

Harnessing the combined power of connected devices, sensor technologies, wireless communications and the rollout of the 5G network as well asadvanced data analytics using artificial intelligence and machine learning, will generate rich real-time information on how our networks and services are performing. This will allow us to keep networks flowing smoothly, identify and tackle problems as – or even before – they occur, and deliver better, faster information to our customers.

The Transport Management Centre is currently developing a system under the Intelligent Congestion Management Program that will use the most up-to-date and predictive data to monitor and manage performance and maintenance requirements in real time across all modes.

Embedding sensors and intelligent transport system technologies across key assets, such as bridges, cameras, car parks, streets, traffic lights and toll payment infrastructure, and ensuring their ability to ingest third-party data, will generate enormous volumes of new data on road conditions and traffic patterns. This information will be conveyed in real time to serve the customer and help personalise their journey.

Digital technology will be particularly important for city-shaping corridors, including motorways, where 'smart' technology will be built into the network. The NSW Government is investing $600 million to build the M4 Smart Motorway, which introduces intelligent technology to the M4 Motorway between Pitt Street, Mays Hill and Mulgoa Road, Penrith to reduce stop-start traffic and improve travel times. We will continue to roll out smart motorway technology on key road corridors.

New vehicle safety technology will be put to the test at higher speeds and over longer distances at Australia's first ever, 5-star safety testing facility in Cudal in the state's central west. The facility has the capability to test new and emerging vehicle technologies, such as autonomous emergency braking, speed-assist systems, communication between cars and traffic infrastructure, and the development of smart highways.

As vehicles become increasingly connected and automated, we will develop even greater means to manage our networks more safely, efficiently and dynamically without the need for investment in fixed roadside infrastructure.

Increasing automation at warehousing and distribution centres and intermodal terminals will help freight customers by reducing dwell times in the supply chain. As technologies evolve, the freight industry will also be able to leverage advancements, such as robotics and drone delivery, reorganise their businesses to provide customers quicker and more convenient deliveries matched to their individual needs, and harness data and analytics to improve safety and productivity.

Rapid technological innovation and big data has the potential to deliver much broader digital applications for customers. New developments in artificial intelligence and machine learning are likely to emerge in the near term and NSW will need to be ready to incubate new applications, trial new uses and become early adopters of technology.

We are not only implementing technology on our physical network. The NSW Government is developing a 'spatial digital twin' – a digital real-world model of cities and communities that facilitates better planning, design and modelling for NSW's future needs. This will enable data-driven precinct planning, using eye-level mapping and visualisation to help customers spend less time getting in and out of stations, buses and ferries.

The digital twin will provide a state-wide real-time view of all freight, roads and public transport, mapped to associated infrastructure, and will be able to visualise current and proposed transport scenarios for improving place based design, customer experience and network efficiency.

A crucial part of harnessing this potential is ensuring we manage the growing volumes and complexity of data, in line with the NSW Government's Digital Strategy.

For more information on our technology initiatives and future directions, please see the Future Transport Technology Roadmap.

Future directions to investigate

›   embed flexibility and optionality into network design to support changes in technology systems and improved connectivity, particularly with the new 5G network

›   work with industry partners and technology companies to incubate and trial new technologies

›   identify new ways for intelligent systems to bring together services and assets on the network, to deliver better connections and integration between services

›   embed sensors into new and existing infrastructure to increase data richness

›   support the development, prototyping and deployment of 'smart networks', including a road network that connects to smart vehicles including EVs and CAVs

›   apply the NSW Government's Digital Strategy

›   apply the updated Future Transport Technology Roadmap.

NSW Transport Management Centre

Enabling a safe network

Our customers and the community, regardless of transport mode or location, should be able to enjoy safe and protected door-to-door journeys across our network. Transport for NSW is proactively looking for ways to reduce and ultimately eliminate risk and trauma across our network and transition to a transport network free from death and serious injury.

NSW has set a target of zero trauma on the transport system by 2056, committing to significant reductions in absolute and per capita rates of trauma across road, rail, waterway and air transport infrastructure and service delivery.

Applying the Towards Zero vision across all transport modes and functions allows us to deliver safe outcomes for customers across the whole transport system. It also ensures we are working towards a safely integrated and connected network.

We are currently prioritising a set of public safety performance measures that will track the level of risk in our system across our fixed infrastructure (vehicles, vessels and rolling stock); operators and controllers; and customers and the community. By developing a set of mandatory safety and protective security standards that everyone must meet, our customers, staff and the community can be assured that we are operating in a consistent and safe manner, and working on improving the safety of the entire network over time.

A key initiative in reducing trauma on the transport system is the implementation of the Road Safety Plan 2021. The plan outlines our commitment to working toward zero trauma using a 'safe systems' approach and introduces a target to reduce fatalities on our roads by at least 30 per cent on 2008 to 2010 levels by 2021.

There are several guiding principles to the safe systems approach:

> all parts of the system must be strengthened, so if one part fails, transport users are still protected

> the transport system must be designed to account for human error

> the human body has limited ability to tolerate crash forces

> transport planners, designers and users must all contribute to safe networks – there must be shared responsibility for preventing crashes and incidents

A safe transport system has important benefits to the overall performance of the network. In particular, it minimises disruptions caused by incidents, improves the wellbeing of the broader community, and protects people who operate and maintain services.

Since the Road Safety Plan was announced in February 2018, a wide range of key actions and reforms have been completed or are well underway to save lives across NSW, including:

> more life-saving road safety infrastructure across the State

> significant enhancements to the Mobile Speed Camera Program

> improved drink and drug driving laws to ensure swift and certain penalties and a new combined drink and drug driving offence which is being developed to increase deterrence.

> world-first camera detection of illegal mobile phone use

> more of the safest cars on our roads through the enhanced NSW Government Fleet Policy.

> more highway patrol police on country roads to remind everyone to use the roads safely.

Transport for NSW is also implementing the Maritime Safety Plan 2017-2021, which aims to reduce fatalities and serious injuries on NSW waterways by 30 per cent by the end of 2021 and towards zero over time.

Key initiatives delivered under the plan to date include:

> a retail partnership program and online resources to promote correct lifejacket wear

> an integrated communications and marketing program to target key audiences on priority maritime safety issues

> the Maritime Enhanced Enforcement Program, a partnership with NSW Police Marine Area Command to conduct on-water alcohol, drug testing and other safety-related enforcement

> collaborating with NSW Health to develop a data sharing capability to gain a better understanding of trauma on waterways

Results achieved over the past few years include raising the lifejacket wear rate from nine per cent in 2007 to 43 per cent in 2017-2018.

In focus

Road Safety Plan 2021

The NSW Government, through the Road Safety Plan 2021, has set a target to reduce road trauma by 30 per cent by 2021, compared to 2011 levels, and a long-term aspirational goal of zero deaths and serious injuries on NSW roads.

NSW's Road Safety Plan 2021 sets new road safety priorities and uses national and international evidence to prioritise high-benefit initiatives based on the trauma profile.

To deliver the plan, the NSW Government is investing a record $648 million this year, this includes a significant increase in investment through the Safer Roads Program targeting high risk areas with a regional focus. The Plan also delivers enhanced enforcement, including 50 additional highway patrol officers in regional areas, increased roadside alcohol testing and a doubling of mobile drug testing.

Since the plan was launched, we have introduced immediate three-month licence suspensions and fines for lower range drink drivers and drug presence first offenders, introduced mandatory alcohol interlocks for all middle-range drink drivers, commenced the operation of mobile phone detection cameras, rolled out additional life-saving infrastructure across the NSW road network, employed additional highway patrol officers, enhanced the Mobile Speed Camera Program, and launched NSW's newest 5-star safety testing facility at Cudal.

Learn more about the NSW Road Safety Plan 2021.

Safety technology

Safety is one of the key factors that can influence technology take up. Technology has the potential to significantly enhance safety, through measures such as advanced safety systems, removal of roadside and trackside equipment, and the rollout of equipment that uses 'self-healing' materials such as polymers and composites.

It will be particularly important to implement safety technology and 'safe system' principles in regional and outer metropolitan NSW, which accounts for 40 per cent of the state's population, but experiences two-thirds of fatalities each year – a person is around four times more likely to lose their life on a country road than on a metropolitan road.

To improve road safety, Transport for NSW ensures that vehicle safety technologies are taken up as quickly as possible to improve outcomes for customers. World-class products are sourced against national and international industry benchmarks to obtain best practice. Consequently, industry is becoming more willing to use these technologies and is also able to better innovate towards safe and efficient outcomes.

A number of individual automated vehicle safety technologies are already available or being developed, which can deliver safety benefits in the immediate term. These technologies include electronic stability control, lane keep assist, intelligent speed adaptation and adaptive cruise control; as well as autonomous emergency braking, collision avoidance and hazard protection systems, road signage detection, vehicle-to-infrastructure communication, post-crash notification systems, fatigue and distraction detection, and blind spot monitoring.

Technology will also play an increasing role in network security, particularly in relation to cyber security and data authentication within the safety system and best-practice frameworks, to better predict and manage tension across the network.

Transport for NSW's Centre for Road Safety has successfully trialled Artificial Intelligence-based technology, leading to the world's first automated enforcement program of illegal mobile phone use while driving. It is developing and researching emerging road safety technologies, including intelligent safety systems such as GPS, wireless communications and video detection systems.

The Centre for Road Safety also considers ideas from the public for new road safety concepts and evaluates the potential of safety systems to reduce road trauma.

The safety of our customers is our highest priority

Future directions to investigate

› continue progressing towards zero trauma on all parts of the transport system, by delivering safe systems, supported by technology built into all networks

› continue implementing the Road Safety Plan 2021 and the Maritime Safety Plan 2017-2021, develop the next five-year plans, and work with the Australian Government to develop an updated National Road Safety Strategy and Action Plan, to reduce fatalities and trauma experienced on the NSW road network

› develop a set of public safety performance measures to track improvements in the transport network over time

› set ambitious but achievable trauma targets to help guide our investment and reflect the NSW government's commitment to make NSW roads the safest in the country. Deliver a 30 per cent reduction in road fatalities and serious injuries by 2021, compared to 2008 levels and continue to move towards the target of zero road trauma on our roads by 2056

› conduct safe system assessments, and incorporate safety measures at the design and construction stages of all new and renewed transport assets and infrastructure

› ensure infrastructure supports fully-automated vehicles on high-volume corridors, including connected vehicle technology options to support safe travel for all user groups including working with the Australian Government to develop a national approach to regulating automated vehicles (AVs) when they are commercially deployed on our roads

› incorporate safety technologies on shared road space and interchanges for pedestrians and bike riders, and on waterways

› prioritise separation of road users where possible, to reduce risk, including median barrier separation on all key road corridors with high traffic volumes

> continue leading safety improvements on the network through the NSW Government's fleet purchasing policy, which requires all vehicles to have a 5-star Australasian New Car Assessment Program (ANCAP) rating

> ensure all new passenger vehicles are fitted with advanced safety features, such as lane keep assist, auto emergency braking, intelligent speed adaptation and driver monitoring systems

> ensure all new state roads are designed to 4- or 5-star standard

> continue to have an evolving and robust research program that includes research into new vehicle technologies, behavioural and policy reform, trials of road and roadside safety products, and program evaluation and 'safe system' analysis

> continue priority actions to build a safer community culture and accelerate innovative solutions to move Towards Zero with the aim for everyone to adopt ways of making every journey a safe journey

> continue to work with NSW Police to delivery optimal enforcement levels to deter risky behaviour among motorists

> deliver integrated and connected transport interchanges that cater for all users and provide safe access to and from the existing network and surrounding environments

> continue to work with the Australian Government to develop the National Road Safety Strategy and Action Plan

> continue providing education campaigns for drivers, people on our waterways, public transport users, bike riders and pedestrians

> investigate and assess technology solutions that increase the safety of bike rider interactions with on-street running light rail networks and associated infrastructure.

Road trauma on NSW roads – 2019

Fatalities

119

233

Serious injuries

2,933

2,049

● Regional roads   ● Metro roads

Road trauma on NSW roads - 2019
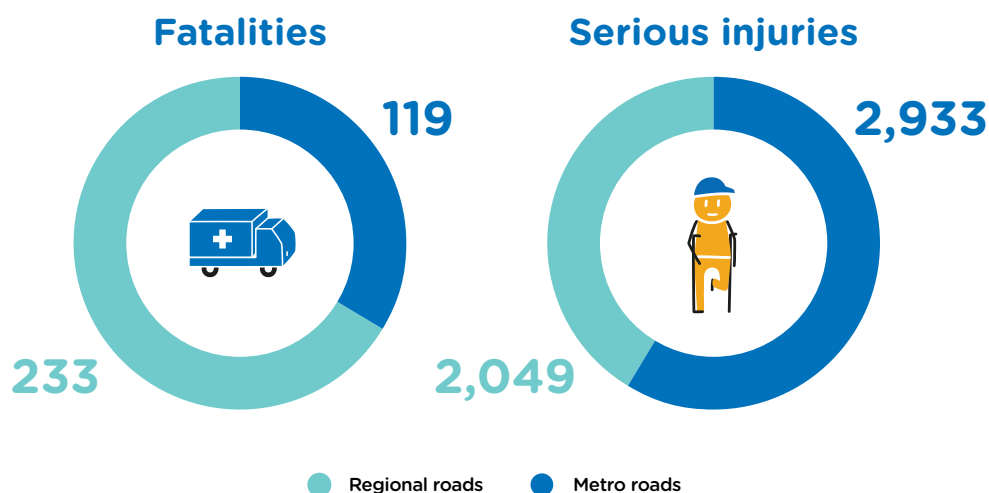
Optimising the network

Network optimisation through travel demand management initiatives, such as behaviour change, new technology, more responsive services, and road space reallocation, can improve connectivity, sustainability, safety and place making for the people of NSW. These initiatives are also less expensive than delivering new infrastructure and are flexible to changes in urban form, society and technology.

A major focus when planning the network is mitigating the costs and impacts of congestion. Congestion and crowding occur when demand for travel reaches or exceeds capacity, resulting in increased travel times, reduced reliability and a poorer customer experience.

While congestion is a major driver of new investment, particularly in metropolitan and outer metropolitan areas, its concentration in relatively short peak periods conceals significant capacity and underuse in off-peak hours, or in the counter-peak direction.

Optimising the network means maximising the benefit derived from the assets we have.

At times this may require adding infrastructure or services, but alternatives could include allocating space differently to prioritise modes with higher carrying capacities. For example, a standard bus carrying 60 passengers uses one-twentieth of the road space of the cars needed to carry the same number of people. A double decker bus increases efficiency even further by carrying 90 passengers in the same road space.

Other measures may include changing the way the network is used throughout the day based on demand or dynamically adjusting signal settings as modal priorities change. Another approach could be introducing initiatives to change customer behaviour, for example by travelling outside peak periods, so that network demand does not exceed capacity.

Some regional areas set mode share targets that represent the extent to which they hope to see shifts in customer behaviours, moving towards a greater share of walking and cycling, or public transport use. Newcastle, for example, has a mode share target of 17 per cent walking and cycling, and 7.55 per cent for public transport by 2056.

While the COVID-19 pandemic has brought about many challenges, the need to limit travel and provide sufficient capacity for social distancing on the transport network has provided a number of insights on how we could manage the network in the future to avoid congestion, based on the success of our immediate responses. Potential initiatives may include further encouraging customers to travel outside the peak, providing 'pop-up' cycleways to encourage mode shift, providing customers with real-time information on service capacity, and supporting a more flexible workforce through a 24-hour network.

The NSW Government is currently addressing road congestion through a number of programs, including:

› travel Choices – a tool to help people avoid delays when navigating the network by choosing the most efficient transport modes, routes and travel times.

› the Intelligent Congestion Management Program – a program that integrates business processes and systems that support data gathering, analysis, decision support and information exchange around congestion management.

› easing Sydney's Congestion Program – a program to deliver improvements to tackle congestion in Sydney, incorporating several initiatives relating to bus priority, pinch points, 'smart motorways' and clearways.

› introducing more all-day networks – this includes adding more than 2,000 additional weekly bus services in Sydney's Northern Beaches and Lower North Shore in December 2020, including overnight B-Line services for the first time

› opal off-peak fares – providing discounted fares for travel outside of peak times on the Opal network to spread travel demand throughout the day

Transport for NSW has also adopted the Travel Demand Management (TDM) framework for new projects. TDM is the application of a focused, data-led strategy to change demand on transport networks by redistributing journeys to other modes, times of the day or routes, or removing the journey altogether where the task can be done remotely, such as working from home or accessing eHealth services.

TDM targets behaviour change strategies and the provision of design and/or infrastructure elements that encourage desirable transport outcomes, such as pedestrian amenity or accessibility, real-time public transport information, cycling infrastructure, end-of-trip facilitates and bicycle parking. Depending on the project, consideration could also be given to whether service changes or capacity creation on public transport may be required to meet or influence demand.

Transport has also developed a road user space allocation policy, which considers how physical and temporal road user space is allocated safely and equitably to support the movement of people and goods and place objectives.

Future directions to investigate

› continue Travel Choices Program, the Transport for NSW travel demand management behaviour change program, to encourage large and medium employers and universities develop travel plans that support sustainable travel behaviour, workplaces and education campuses

› continue the Transport for NSW Travel Demand Program to deliver precinct-based travel demand strategies, in partnership with large employers, educational institutions, local governments and NSW Government agencies, to support sustainable travel behaviour within the community

› develop a concept of operations for the Sydney road network that identifies priority users of the transport network (including pedestrians and bike riders) by time of day and day of week, allowing for better customer outcomes and better places

> Enhance our capability for dynamic, real-time management of the network to improve performance and reduce the impact of incidents, events and planned maintenance.

> provide new walking, cycling and public transport networks and services to meet customer needs and reduce car dependency, not only to major centres, but to more dispersed locations

> plan and manage transport networks for the best use and optimum movement of people and goods along and across transport corridors and within precincts, while creating better places and amenity for communities

> progressively review road space allocation to achieve better customer outcomes and better places, activating a rapid bus network to support fast, frequent and reliable bus services across Sydney

> encourage customers to use the transport system differently, by shifting to walking, cycling or public transport through increased investment and use of travel demand management techniques to reduce congestion in peak periods; to improve network efficiency and deliver long-term sustainable travel behaviour change

> continue to manage private vehicle congestion in high-demand areas through appropriate policy measures, such as the parking space levy

> preserve corridors for strategically important infrastructure early in the planning process, to avoid cost overruns, delays and community disruption during the project delivery phase

> work with planning authorities to ensure developments encourage trips to be made by sustainable modes of transport

> investigate the opportunity to provide more all day and night public transport services across the network
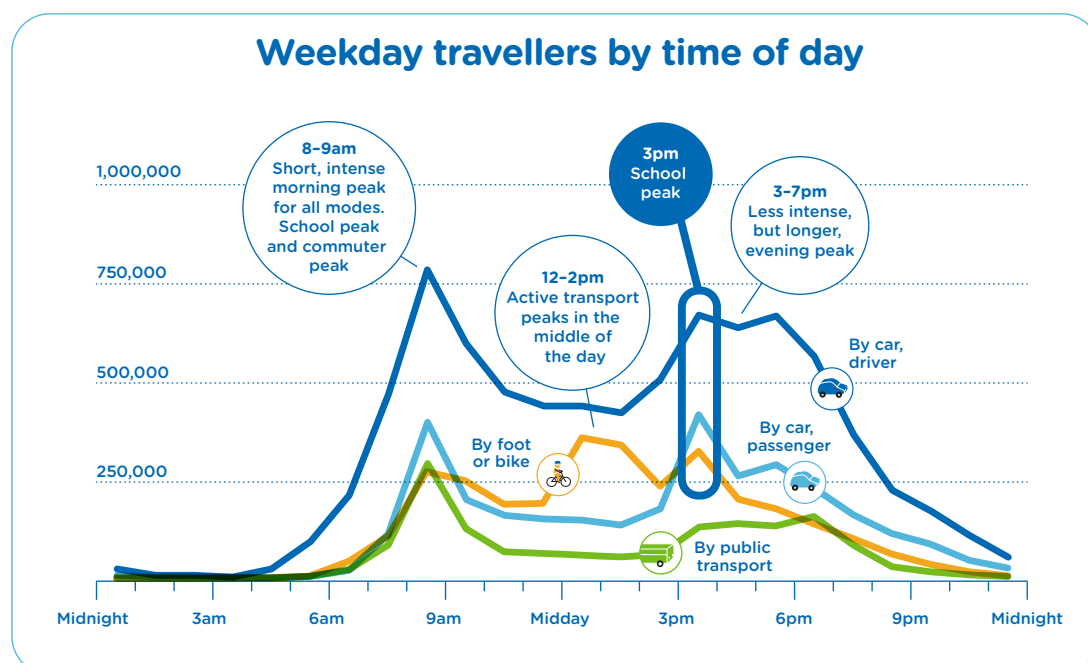
Weekday peaks

A service hierarchy for the future

A legible and efficient network

The emergence of new service types will result in customers having more choice than ever. However, it is important that the transport system remains easy to understand.

Metropolitan areas, such as Sydney, Newcastle, Gosford and Wollongong, will be provided with frequent, high-capacity, city-shaping corridors to move people to and from high-demand areas. With transport becoming increasingly technology led, customers will navigate different modes and travel options to best suit their needs, accessing information on train and bus times, congestion and ridesharing. This will be complemented by city-serving corridors and more flexible or on-demand services on centre-serving corridors, along with walking and cycling infrastructure.

In regional NSW, the focus is on services that improve local connectivity to, from, between and within regional centres. A 'hub and spoke' network comprises a hierarchy of services and modes based on factors such as demand, distance, settlement patterns and time of day. The network is intended to provide integrated services that respond to the needs of our customers for seamless door-to-door journeys.

In addition to scheduled public transport services, such as in-town bus services, and rail and coach services connecting towns and cities, communities will also be supported by flexible or on-demand services tailored to customer demand providing personalised journeys in specified service areas.

The service hierarchy in NSW will evolve towards:

› **'turn-up-and-go' rapid public transport services on city-shaping and city-serving corridors.** These include services operating on corridors in Greater Sydney and outer metropolitan areas of Greater Newcastle, Central Coast and Illawarra, with turn-up-and-go services already provided as part of Sydney Metro. Services carry large numbers of customers on fast, frequent and reliable services – customers simply 'turn up and go'

› **frequent and reliable local services.** In metropolitan areas, centre-serving networks operate local public transport services with frequencies and capacities to match demand to connect to city-shaping and city-serving networks. In regional areas, services operate on a 'hub and spoke' network, with more frequent services on higher demand routes, and reliable services for same day returns between regional cities and centres – together offering regional customers more frequent, reliable, affordable and sustainable connections.

› **flexible or on-demand services.** These services support both metropolitan and regional services. They operate as on-demand services on centre-serving corridors in metropolitan areas, such as between local train stations and residential areas, and in less densely populated areas where customers' travel patterns are more disperse. Flexible services include point-to-point services, allowing customers to travel the route they choose, at a time that suits, for a fare

In regional NSW, they provide more personalised, end-to-end journeys by connecting smaller towns and villages to larger centres and cities, providing efficient transport to areas that traditionally have had few or no services. On demand is also replacing fixed-route buses in some regional centres to deliver better value-for-money services and increase public transport patronage.

Future directions to investigate

› prioritise investment in city-shaping and city-serving corridors, including automated systems to support turn-up-and-go rapid public transport services in high-demand areas, supported by a network of frequent and reliable local services

› analyse pilot programs of flexible services in rural and regional areas to inform future planning, provision and government support

› move towards dynamic scheduling for high-demand transport services, so frequency and capacity can match demand

› improve multimodal interchanges, particularly in regional and outer metropolitan NSW, so customers can more easily connect to flexible services and experience seamless and reliable journeys

CHAPTER

7

Regional and outer metropolitan NSW

Supporting transport access

Transport for NSW is committed to equitable access to transport services for every community that we serve, including regional and outer metropolitan NSW, which plays a vibrant role in the culture and economy of NSW.

Future transport investment in regional and outer metropolitan NSW will deliver a 'hub and spoke' network to improve access to regional cities and centres through connected multi modal service plans. This will connect customers and communities to each other and to jobs, schools, hospitals and services, as well as to cultural, social and recreational opportunities.

Improved connectivity will also be a key enabler of regional freight economic development, providing businesses, manufacturers and producers with the opportunity to participate in the global economy by connecting them to domestic and international markets.

The provision of day-return services in regional areas is a key indicator of how we are progressing towards hub and spoke connectivity. Since March 2018, Transport has been trialling new NSW TrainLink coach services, regional on-demand services and better integrated timetables to increase day-return availability between cities and towns in regional areas.

Transport is creating active places through planning for places in partnership with local areas and other government agencies, with place plans being developed across seven regional areas. This includes the Greater Newcastle Future Transport Plan and transport plans for the Central West & Orana, Illawarra-Shoalhaven (draft currently available), Gosford, Maitland and Tweed Shire.

Find out more about services and infrastructure initiatives for regional NSW.

The 'hub and spoke' model

The future regional transport network will be planned around a 'hub and spoke' model within a strategic framework of services being supported by appropriate infrastructure investment, allowing for local adaptation and interpretation. Principles of the 'hub and spoke' model include connectivity, flexibility and efficiency, access and equity, timeliness, provision of accurate information, and safety. The hub and spoke model applies to planning for places across regional and outer metropolitan NSW, including very remote areas.

The 'hub and spoke' network focuses on connections radiating to the catchment areas of regional cities and centres, which serve as important hubs for their surrounding catchment areas. This will capitalise on the role that regional cities and centres play as hubs for employment and services, as well as capitalise on the NSW Government's investment in economic infrastructure like Special Activation Precincts. It also acknowledges the importance of national and State-significant transport links (or spokes) that pass through regions.
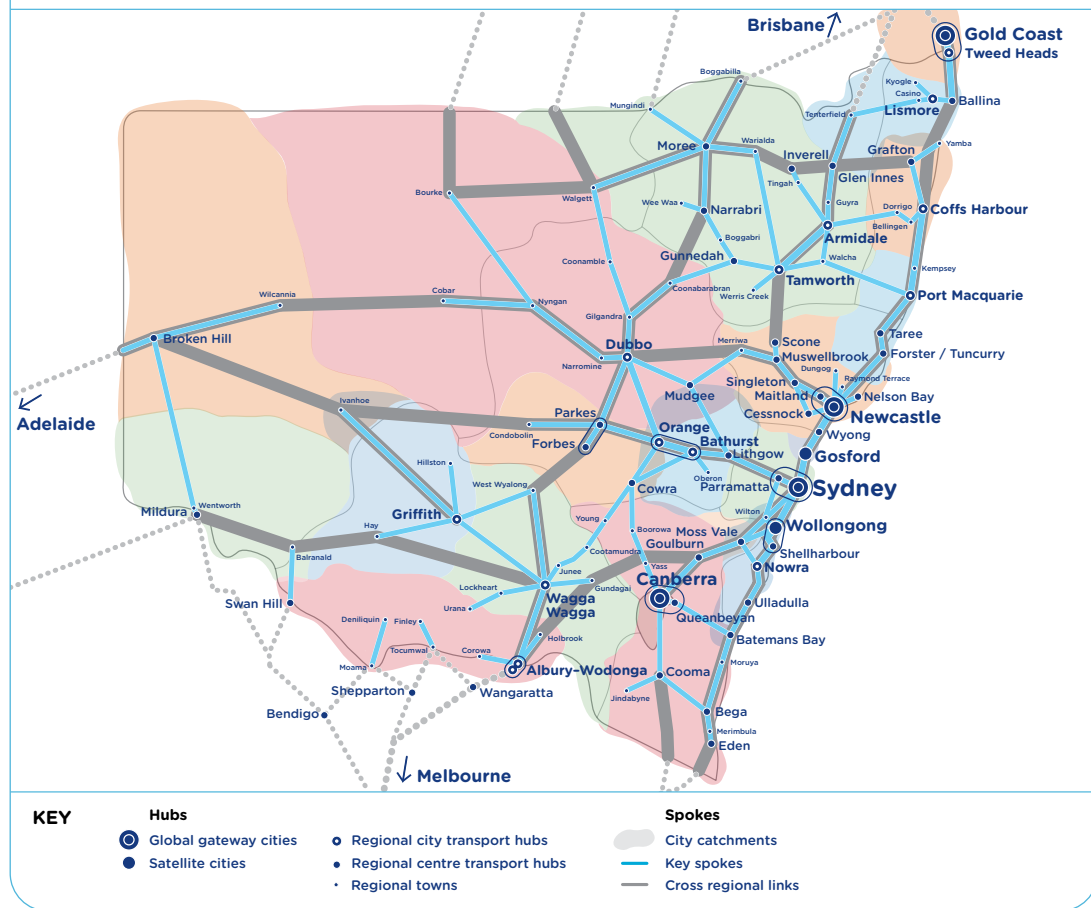
The 'hub and spoke' network is about creating seamless and connected journeys, matching the right mode of travel for the type of trip – depending on length and number of people or volume of goods being transported, and supporting people to travel within cities, between cities and between regions. Any mode could form part of an end-to-end journey for a customer using the 'hub and spoke' network, from walking and cycling for short trips into town to private cars,

point-to-point transport and buses for trips within the town's catchment, and trains, coaches and aviation for longer distance trips. Transport will enable connectivity between these modes by providing supporting infrastructure at hubs or points of interchange.

Further detailed 'hub and spoke' networks will be outlined in regional transport plans for each of the nine regions outside Greater Sydney.

Hub and spoke
Moving away from a Sydney-centric transport system to one which reflects how people move around in regional NSW

KEY

Hubs
- ◎ Global gateway cities
- ● Satellite cities
- ◉ Regional city transport hubs
- ● Regional centre transport hubs
- · Regional towns

Spokes
- ▨ City catchments
- ━ Key spokes
- ━ Cross regional links

Hub and spoke

The regions of NSW

The nine distinct regions across NSW demonstrate that regional and outer metropolitan NSW is diverse and changing. The Transport vision for regional and outer metropolitan NSW is to improve local connections for our communities and customers within, to and from their region. A key pillar of this is to facilitate a 'hub and spoke' network across NSW, to enable local access for communities to central hubs that provide services, employment and social interaction.

Infrastructure and services have historically focused on north-south transport connections in regional NSW. Future Transport seeks to improve east-west connectivity, capacity and safety between coastal and inland and remote populations, as well as freight linkages such as Inland Rail and inland ports. This will help cater for the forecast 12 per cent growth in the freight task between 2016 and 2036 – from 255 million to 286 million tonnes.

Other major initiatives across regional and outer metropolitan NSW seek to improve journeys for all customers. These include the Fast Rail Strategy, New Intercity Fleet and Regional Rail Fleet and Connecting 44 Communities. Within regional cities and centres, we are improving transport and delivering place outcomes by improving bus services in 16 regional cities, as well as delivering place plans that seek to implement the Movement and Place Framework.

Regional and outer metropolitan NSW is also home to four commercial ports: Newcastle, Port Kembla, Eden and Yamba. Of these, Newcastle and Port Kembla are responsible for the greatest trade volumes. Port Kembla is currently seen as the 'second' container port for NSW. However this will not occur until around 2045 when Port Botany reaches its maximum capacity of 7 mmillion TEU[2] per annum.

2   20-foot equivalent units
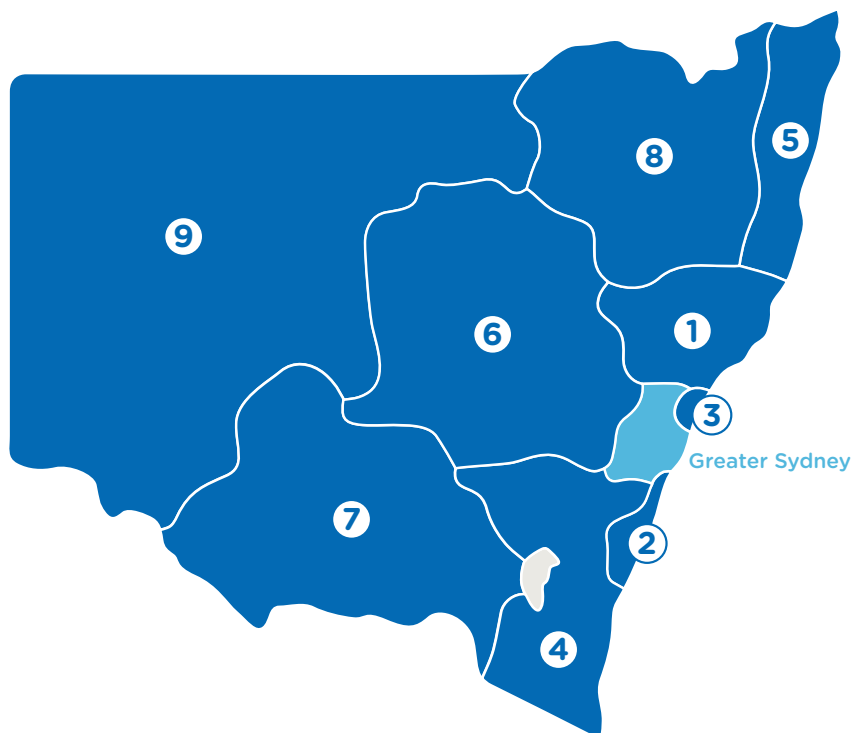
The regions of NSW

1 Hunter	**4** South East and Tablelands	**7** Riverina Murray
2 Illawarra–Shoalhaven	**5** North Coast	**8** New England North West
3 Central Coast	**6** Central West and Orana	**9** Far West

The regions of NSW

An initiative of Future Transport is to deliver regional transport plans for each of the nine regions, with the Draft Illawarra-Shoalhaven Regional Transport Plan currently available online.

A snapshot of each region in regional and outer metropolitan NSW, and key transport initiatives underway or identified for investigation, is provided below.

Hunter

The Hunter includes the global gateway city of Newcastle, which supports a large population to the north and west. Local connections will be improved with faster rail connections between Newcastle and Sydney, road upgrades to facilitate safer and more efficient connections, and improved efficiency, reliability and capacity for passenger and freight customers.

The planned protection of a Lower Hunter Freight Corridor will provide for a dedicated freight rail bypass of the Newcastle passenger rail system, which will free up space for more passenger services and improve freight efficiency. Investigations are underway and community engagement on alignment options is expected to occur in 2021.

Illawarra-Shoalhaven

The region of Illawarra-Shoalhaven is located approximately 70 minutes south of Sydney. The region will benefit from improved connections between the city of Wollongong and the three cities of Greater Sydney, as well as expanding the 30-minute catchment for public transport to facilitate local trips. Transport initiatives, such as a potential Fast Rail between Sydney and Nowra, will also enable more people to live and work within the region and support local growth with integrated walking, cycling and public transport networks to facilitate local trips.

Central Coast

The Central Coast is identified as a satellite city due to its proximity to Sydney. Transport initiatives seek to build on its proximity to the global gateway cities of both Sydney and Newcastle by investigating fast rail connections between the three cities. Transport initiatives will also enable more people to live and work within the region and support local growth with integrated walking, cycling and public transport networks to facilitate local trips.

South East and Tablelands

The diverse coastal, hinterland and alpine landscapes of this region present transport challenges, due to the varying topography, natural environments, weather and climate, and pressures from tourism demand across the year. Transport planning and initiatives seek to address these challenges while enabling seamless cross-border travel to Australia's capital the global gateway of Canberra, including investigating fast rail connections between Canberra and Sydney.

North Coast

The North Coast is strategically located between the global gateway cities of the Gold Coast and Newcastle. The strong relationship with South-East Queensland will be supported by improved cross-border travel. With strong existing north-south connections supported by the investigation of higher speed connections along the east coast, initiatives will also look at improving east-west connections to New England.

Central West and Orana

The vision outlined by the Department of Planning, Industry and Environment is for the Central West and Orana to be 'the most diverse regional economy in NSW.' Located at the heart of NSW and the junction of important north-south and east-west connections, transport initiatives seek to leverage this strategic location through improving rail and road connections and intermodal facilities associated with Inland Rail.

Riverina Murray

The Riverina Murray region in southern NSW is known as 'the food bowl of NSW' and includes the regional cities of Albury, Griffith and Wagga Wagga. Transport initiatives focus on delivering seamless cross-border travel to Victoria, particularly for those living in the integrated city of Albury-Wodonga, as well as improving rail and road connections to Inland Rail.

New England North West

The New England North West region is strategically well placed on important regional road and rail routes, about halfway between Sydney and Brisbane. Improving connections to Inland Rail and facilitating new intermodal facilities, as well as improving east-west connections across the Great Dividing Range, will open new opportunities for the region.

Far West

The large and remote region of the Far West covers 40 per cent of NSW, with a dispersed population. Communities rely on adjoining regions and cities to access businesses and services, including Dubbo in Central NSW, Mildura and Melbourne to the south, and Adelaide to the south-west. Transport initiatives focus on improving cross-regional and cross-border travel. Transport is committed to providing improved transport services for isolated and remote communities through initiatives such as On Demand transport solutions connecting people to the centres they want to visit and providing appropriately timed day return services.

Learn more about the Services and Infrastructure Plan for regional NSW.

In focus:

NSW TrainLink hub and spoke coach trials

NSW TrainLink has established a number of trial services in addition to its existing train and coach services across NSW. These trials aim to provide new connections for regional communities for commuting, attending medical or business appointments, shopping, recreational activities, and visiting family and friends. Each trial follows extensive community engagement, which helps understand community needs. Following the trial period, reviews are undertaken to determine if services should continue permanently.

Additionally, the NSW Government announced 13 new trial services connecting 44 rural and regional towns across the State. The trial services will provide day-return services from these isolated communities to nearby regional hubs. These trials build on the success of previous trials such as Tottenham to Dubbo and Tamworth to Dubbo.

NSW TrainLink hub and spoke coach trials

In focus:

Newell Highway Corridor Strategy

The Newell Highway is the longest highway in NSW, running south to north through the State and providing an essential road connection for central western NSW. The Newell Highway Corridor Strategy sets out how the NSW Government will manage road transport along the Newell Highway (A39) in the long-term – from Tocumwal on the Victorian border to Goondiwindi on the Queensland border.

The corridor strategy will be delivered over a 20-year timeframe, and will provide freight, road users and local communities with a safer, more reliable and accessible road. The strategy was released in 2015 and sets the direction for managing the Newell Highway into the future. Many of the initiatives within the Strategy have already been delivered or are underway, including intersection improvements, road shoulder widening and new overtaking lanes.

Read more about the Newell Highway Corridor strategy.

Investing in the network

The 16 Regional Cities program

The NSW Government has a multimodal services planning program, committed to improving bus services in regional cities by making improvements to routes, timetables and the customer experience. The 16 Regional Cities program aims to identify gaps and opportunities with current transport services, deliver improvements to better meet customer needs, and increase patronage and mode share through the provision of bus services that deliver customers to health and education, as well as provide trips to and from work, and support social access, amenity and the local economy.

Service corridors will be straighter, more direct and efficient. Designed around the spoke, hub and corridor, these bus services may require increased interchange but will include better connections and shorter wait times.

The Program is being delivered in three phases. The first phase provided a holistic network change to services in Tweed Heads and Wagga Wagga (delivered as early pilot projects in December 2019 and March 2020). The second phase delivered over 813 top priority services across all cities between July and November 2020 taking the total number of new services delivered by the program in its first year to 1,538. The final phase is the development of holistic network plans for the remaining 14 Cities. Planning has been completed for Bathurst and Orange and has commenced in Nowra Bomaderry.

Improving regional and outer metropolitan public transport networks

Regional and outer metropolitan NSW has a multimodal public transport network, including bus, rail, light rail, coach and on demand. Access to the public transport network is provided through road, walking and cycling connections that together make up the end-to-end journey for customers. Many regional and outer metropolitan services are provided by bus and coach, however services will continue to expand across modes.

Future Transport identifies a strategic commitment to Greater Newcastle, Central Coast and Wollongong with a rapid bus package and an extension to Newcastle Light Rail.

In Greater Newcastle, Transport for NSW confirmed the preferred extension to Newcastle Light Rail as Newcastle Interchange to John Hunter Hospital via Broadmeadow, recognising that further detailed investigations are required. The strategic need for rapid bus services on priority corridors will be investigated, including Broadmeadow to John Hunter Hospital in support of a future light rail extension, as well to Charlestown, Wallsend, Mayfield and the University of Newcastle.

On the Central Coast and Wollongong, Transport for NSW will investigate rapid buses to connect customers to rail services and key shopping, health and education facilities.

A Bus Headstart Program will be developed for Greater Newcastle, Central Coast and Wollongong, to identify additional bus services to encourage early public transport use between new growth areas and their nearest strategic centres and transport hubs, to expand 30-minute catchments.

On the North Coast, Transport for NSW has initiated strategic planning to extend the Gold Coast light rail to Tweed Heads, with a multimodal corridor investigation commencing in late 2020. The investigation of a light rail connection from Queanbeyan to the Canberra light rail network was identified in Future Transport for investigation within the zero- to 10-year timeframe.

For outer regional and very remote areas, Transport is continuing to investigate opportunities to keep delivering transport services. Transport has recently extended its coach and bus trial in Broken Hill, providing improved coach services from Broken Hill to Mildura and Adelaide.

Transport is also currently investigating fast rail connections across four corridors, including to Port Macquarie, Canberra, Nowra and the central west. The vision for the fast rail network is to support growth in NSW's regions, generating job opportunities and attract skilled workers. This will provide more choice for people to live and work in regional NSW, with improved connectivity between regional centres, and from cities and international gateways.

Transport mode options will increase in the future, with services such as mobility as a service, carsharing, ridesharing, on-demand services, and connected and automated shuttle services emerging.

On demand provides more personalised, end-to-end journeys by connecting smaller towns and villages to larger centres and cities, providing efficient transport to areas that traditionally have had few or no services. On demand is also replacing fixed-route buses in some regional centres to deliver better value-for-money services and increasing public transport patronage.

On demand services began in Moree in 2018, with a twice a day, daily route service. This allows customers to be picked up at or near their home and dropped off at a desired destination within Moree. Other regional and outer metropolitan locations with on demand services include trials in Coffs Harbour, Northern Rivers, Albury, Burrumbuttock, Walla Walla and Jindera, and from Mudgee to Dubbo.

Improving bus services in regional cities

Walking and cycling networks in regional and outer metropolitan NSW

A key to supporting the growth and vibrancy of our regional cities, centres and towns through transport is making them places where people want to walk and cycle.

Future Transport 2056 aims to capitalise on the opportunity to increase the use of public transport and walking and cycling in regional NSW for all trips, improving levels of social inclusion and bringing flow on health benefits. Our aspiration over the next 10 years is to increase public transport and walking and cycling across regional NSW – with the target for walking to increase from 4% to 8%, and cycling from 2% to 5% of all trips.

To support the achievement of these targets, transport is working with local communities and local government areas to design places that incorporate walking and cycling within the transport network. This includes ensuring walking and cycling are the most convenient option for short trips to key destinations and within centres, enabling efficient, safe, and reliable journey times by prioritising infrastructure that supports pedestrian or cycling movements, consistent with the movement and place framework.

Walking and cycling initiatives in regional and outer metropolitan NSW include the development of rail trails across regional NSW, including the Rosewood to Tumbarumba pilot and the Northern Rivers rail trail, which is in the early stages of planning and repurposing of the rail corridor. Transport is also investigating regional cycling networks, including for tourism, connectedbicycle networks and supporting strategic centres, and is currently working with Newcastle, Lake Macquarie, and the Lower Hunter to investigate a principal bike network. Cycleways are also being delivered, including at Goulburn and Wollongong, as part of Transport's response to COVID-19 to ensure people have a safe alternative to catching public transport or driving.

In focus:

Completing the cycleway and shared path network in Wagga Wagga

The NSW Government is funding the delivery of stage 1 of Wagga Wagga City Council's Active Transport Plan which includes a 45-kilometre cycleway and shared pedestrian path network. The cycleway and shared path network will link residential areas with key destinations such as the Central Business District and Charles Sturt University campus. These links will assist in reaching Wagga Wagga's target of 5% mode shift towards cycling by 2041.

Stage 1 of the cycleway is expected to be completed by mid-2021. Stage 2, which will provide further connectivity to Bomen Estate and other suburbs of Wagga Wagga, is currently under investigation.

Technology initiatives in regional and outer metropolitan NSW

Future Transport 2056 commits to extend the trials and testing of connected and automated vehicles (CAVs) in regional areas of NSW. We have partnered with industry, researchers, local governments and businesses on trials in Armidale and Coffs Harbour.

Road testing will soon commence for the world's first automated ute. A 'smart ute', retrofitted with automated technology will be trialled between Dubbo CBD, Dubbo Regional Airport and Taronga Western Plains Zoo. The trial will also explore the capability of automated vehicles to detect and react to the unpredictable movements of kangaroos on the road.

Find out more about regional CAV trials.

The Transport Connected Bus (TCB) Program is delivering state-of-the-art vehicle tracking and automatic passenger counting technology across the rural and regional NSW bus network. This provides customers the information they need to make more informed travel choices via TfNSW digital customer channels and third-party public transport apps. It is also providing TfNSW and regional bus operators access to more accurate data and tools to improve services and keep buses running on time.

Phase 1 of the program went live in July 2020, delivering around 300 connected buses for over 430 regular and school services across Bega, Dubbo and Coffs Harbour. Phase two has commenced and will see the Program rolled out to around 1,000 vehicles covering approximately 1,500 services across an additional 14 regional cities consisting of Albury, Armidale, Bathurst, Bomaderry-Nowra, Grafton, Griffith, Lismore, Orange, Parkes, Port Macquarie, Queanbeyan, Tamworth, Tweed Heads, and Wagga Wagga.

Read more about the Transport Connected Bus Program.

Freight networks connecting regional and outer metropolitan NSW

Economic growth in regional NSW relies on the movement of goods through efficient and effective transport networks. The ability of NSW producers to move agricultural and industrial products and natural resources to domestic and export markets in a timely and efficient manner directly impacts on productivity and competitiveness, and is a major factor driving economic performance in regional NSW.

Regional NSW's freight task is forecast to grow by around 12 per cent by 2036, from 255 million to 286 million tonnes. In regional NSW, the dominant commodities are coal, grain and steel, and forestry and other agricultural produce. The forecast growth in the freight task will require a higher capacity and efficient freight network.

Heavy vehicles will have a significant ongoing role in delivering the growing freight task. One way of reducing overall truck movements is to increase the volume of freight carried per trip. The implementation of the NSW Heavy Vehicle Access Policy Framework (HVAPF), which outlines a strategic approach to heavy vehicle access in NSW for both state and council roads, will aim to achieve safe and efficient movement of road freight in NSW now and into the future.

The framework will establish networks for modern high-productivity vehicles (HPVs) - these are vehicles that can carry more payload than a B-double, such as Performance Based Standards (PBS) vehicles, road trains, and other restricted access vehicles including those operating at higher mass limits.

In regional NSW, the government will continue regulatory reforms to ensure the efficient working of supply chains from farms, mines and processing plants to trading ports and domestic markets; and plan and prioritise key infrastructure upgrades, including access to the 'last mile' of local road and bridge networks for heavy vehicles.

Inland Rail will provide an enhanced link to enable freight travelling from Melbourne to Brisbane to bypass the busy Sydney metropolitan rail network and travel through regional NSW. It will open up new routes and increase the demand for rail freight paths on a range of corridors.

Ports play a significant role in the NSW freight task, with four commercial ports across regional and outer metropolitan NSW: Newcastle, Port Kembla, Eden and Yamba.

Regional and outer metropolitan NSW freight rail network
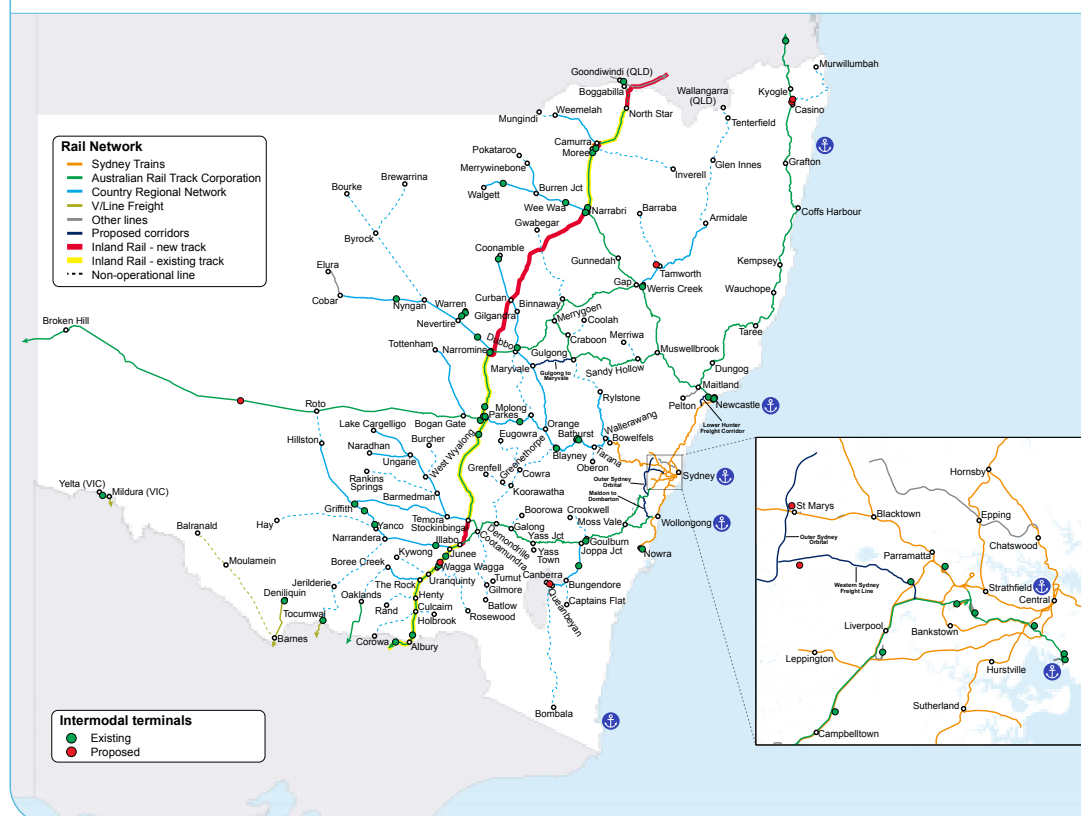
Regional and outer metropolitan NSW freight rail network

Staged investments that develop economic centres and corridors in regional and outer metropolitan NSW

The NSW Government is developing a long-term vision for a safe and productive regional transport network that delivers the 'hub and spoke' model. This long-term vision will guide investments in rail upgrades, road upgrades and bypasses, to improve liveability and road safety, and expand the regional walking, cycling and public transport networks.

The recent investments in north-south highway connections (Pacific and Hume Highways, as well as Princes and Newell Highway upgrades now underway) have created significant benefits for the State in terms of safety, travel-time savings and productivity. This is complemented by Inland Rail, which will create a strong north-south freight link between Melbourne and Brisbane through the heart of the regional and outer metropolitan NSW.
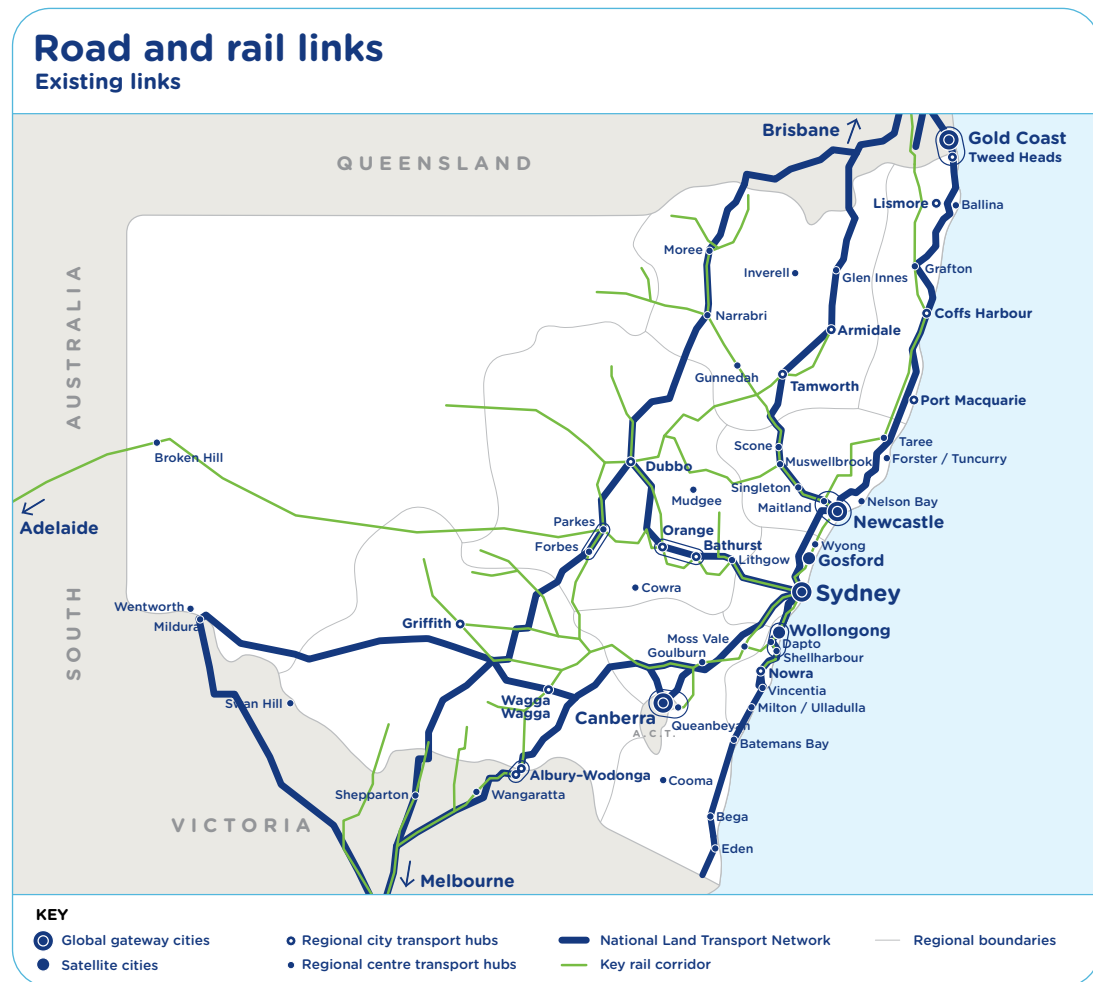
A focus on east-west connectivity is now essential to create a truly connected transport network, with initiatives for investigation including the Oxley Highway, Waterfall Way corridor, Bruxner Highway, Sturt Highway, Great Western Highway and Gwydir Highway improvements; each providing improved movement, road safety and/or travel time and reliability on key east-west corridors.

Investigations are also underway into a NSW Fast Rail network, which will catalyse regional growth through improved connectivity. Four corridors are being investigated for the future Fast Rail network – a northern corridor, a western corridor, a southern inland corridor, and a southern coastal corridor.

There is an increasing need for regional and outer metropolitan transport network planning to consider resilience, ensuring the safety and accessibility of the transport network for all of our customers. A resilient transport network is based on the principles of knowing the risks to the network, planning for disruption and taking action to minimise risk and improve recovery. For example, ensuring multiple access points for towns and regional centres, structuring service contracts to enable dynamic responses to any events and replacing wooden culverts with fire resistant materials.

Following the 2019/20 bushfires, Transport has considered additional measures to be in place for the future which will:

> improve evacuation routes and support access for emergency services

> improve the resilience of strategic transport corridors so that operations can return as quickly as possible.

Road and rail links
Existing links

KEY

- ◎ Global gateway cities
- • Satellite cities
- ◦ Regional city transport hubs
- • Regional centre transport hubs
- — National Land Transport Network
- — Key rail corridor
- — Regional boundaries

Existing road and rail links

New/improved regional links
Road, rail and higher speed corridors

QUEENSLAND

Brisbane

Gold Coast
Tweed Heads
Lismore
Ballina
Moree
Inverell
Glen Innes
Grafton
Narrabri
Coffs Harbour
Armidale
Gunnedah
Tamworth
Port Macquarie
Bourke
Scone
Taree
Dubbo
Muswellbrook
Forster / Tuncurry
Wilcannia
Cobar
Mudgee
Singleton
Nelson Bay
Broken Hill
Maitland
Newcastle
Parkes
Orange
Wyong
Ivanhoe
Forbes
Lithgow
Gosford
Bathurst
Adelaide
Cowra
Sydney
Griffith
Moss Vale
Wollongong
Wentworth
Goulburn
Dapto
Mildura
Shellharbour
Balranald
Hay
Nowra
Vincentia
Swan Hill
Wagga Wagga
Milton / Ulladulla
Canberra
Queanbeyan
A.C.T.
Batemans Bay
Shepparton
Albury–Wodonga
Cooma
Wangaratta

VICTORIA

Bega
Eden

Melbourne

AUSTRALIA
SOUTH

KEY

- ◎ Global gateway cities
- ● Satellite cities
- ◉ Regional city transport hubs
- • Regional centre transport hubs

- ━━ National Land Transport Network
- ━━ New/improved road corridor
- ━━ Key rail corridor
- ••••• New/improved rail corridor

- ━━ Potential higher speed connection
- ━━ Regional boundaries
- ━━ Fast rail
- ━━ Inland rail

New and improved regional links

CHAPTER

8

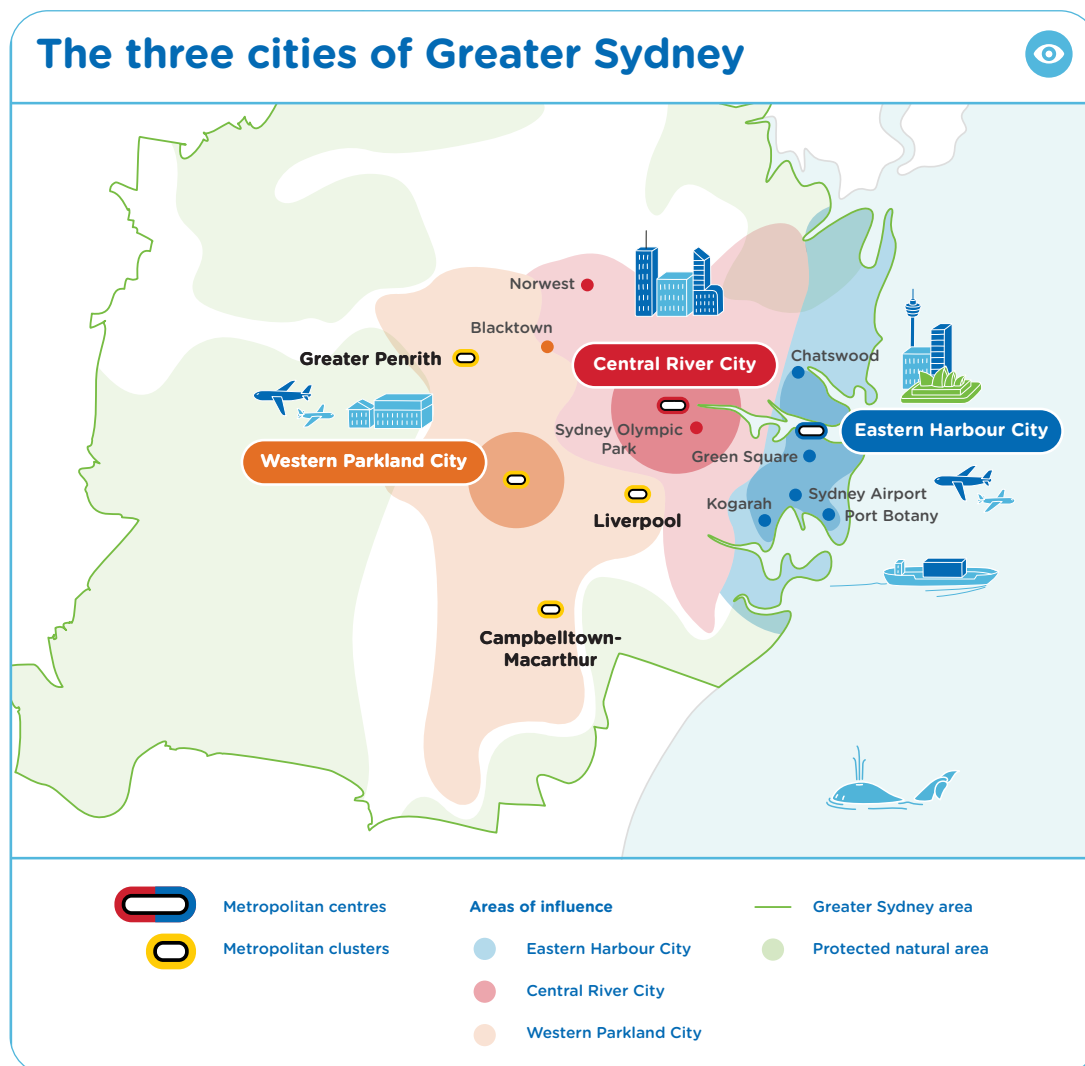## Greater Sydney network

A metropolis of three cities

The *Greater Sydney Region Plan: a metropolis of three cities* is built on a vision of three cities in Greater Sydney – the Western Parkland City, the Central River City and the Eastern Harbour City.


The three cities of Greater Sydney

Transport networks will need to expand to provide improved access to each metropolitan centre. These networks will be progressively developed through a range of infrastructure investments that will make key improvements to the city-shaping and city-serving corridors, as well as upgrade local roads, and walking and bicycle paths.

A 30-minute city

Living in a '30-minute city' will mean residents can access jobs and services in their nearest metropolitan or strategic centre within 30 minutes by public transport, walking and/or cycling, seven days a week. This will give people better access to jobs, education and essential services and give people more time back in their days.

Initial transport and land use modelling of the potential 2056 transport network shows that 76 per cent of the population will be within 30 minutes travel of their nearest city or city cluster, by public transport, as shown in the following figure.
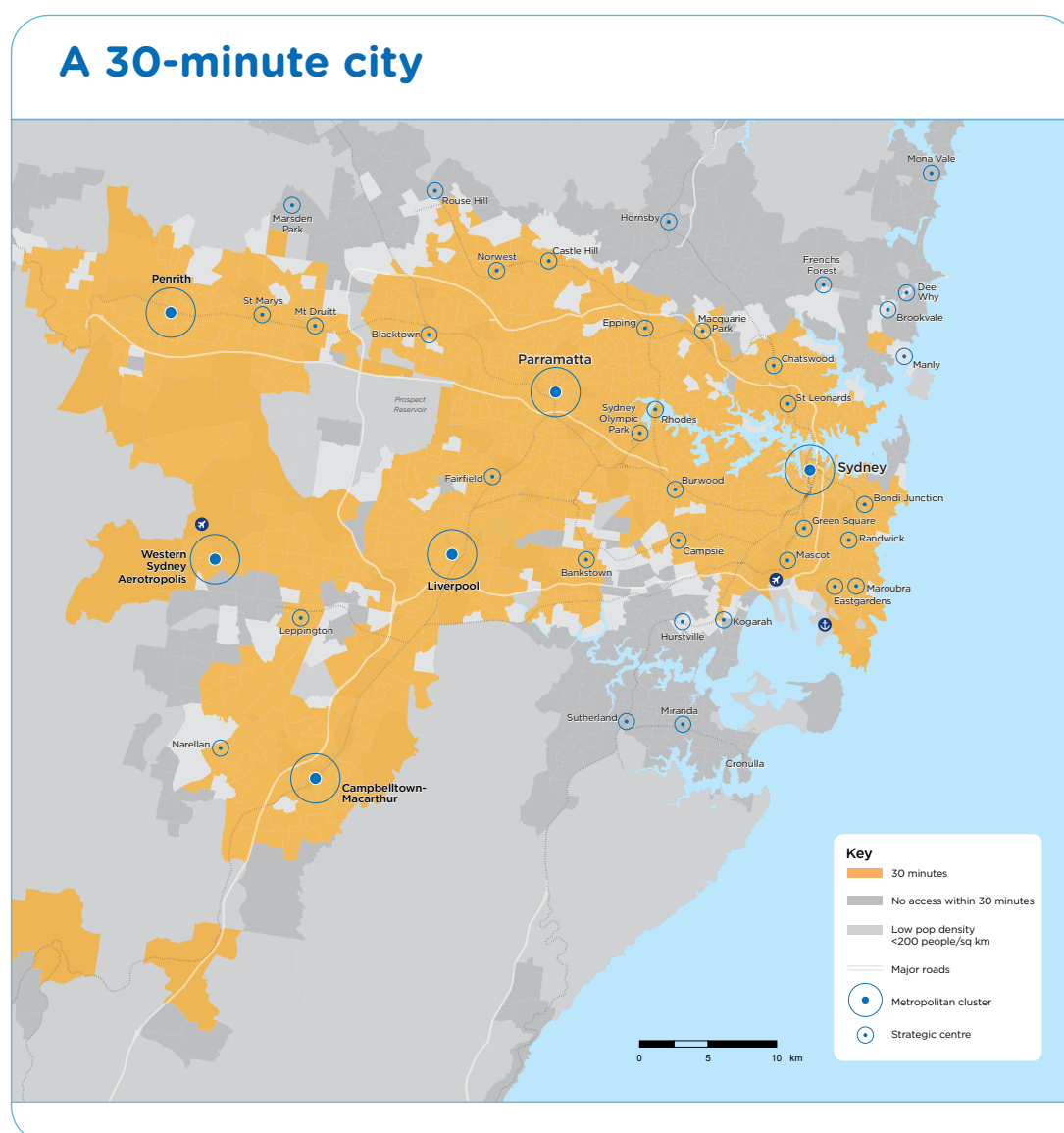
30-minute access map

The 30-minute city will be supported by strong walking and cycling connections to increase mode-share and improve sustainability and health outcomes.

Realising the 30-minute city will require a sustained and staged investment program to protect corridors and then develop an integrated transport system that includes city-shaping, city-serving and centre-serving corridors and strategic freight networks. It will also require more efficient use of the current network to reduce travel times and meet customer demand.

An integrated network of corridors will support the efficient movement of people and goods throughout Greater Sydney. Future Transport 2056 is focused on ensuring movement corridors are aligned with the land use vision and help to guide service levels and infrastructure investment. Find out more about the service and infrastructure initiatives for Greater Sydney.

Transport is also developing a place plans that will support the achievement of the 30-minute city, and recently published its first, the South East Sydney Transport Strategy.

Eastern Harbour City

Current investments are focused on city-shaping and radial connections to centres in the Eastern Harbour City. These support improved public transport, congestion management and urban renewal outcomes, unlocking capacity on existing road and rail corridors, and supporting renewal and walkability by drawing vehicle traffic away from centres. Sydney Metro City & Southwest and Sydney Metro West will build on improvements made by Sydney Metro North West, and provide much needed capacity across the metropolitan rail network to support patronage growth and urban renewal opportunities, such as Waterloo and The Bays.

Central River City

The development of the Central River City will require improved 30-minute public transport access to Greater Parramatta. To support this, the focus will be on new city-shaping connections, particularly from the north and south. New transport connections for Greater Parramatta, including light rail, will support local access and urban renewal, with improved mass transit connectivity via Sydney Metro West.

Western Parkland City

The developing Western Parkland City will require investment in the mass transit network to shape a sustainable urban form and grow jobs, and support 30-minute access to centres by public transport. To support this, north-south connections through the Western Sydney International Airport and the Aerotropolis are committed for delivery, along with investigation of expanded northern, southern and east-west rail connections, in collaboration with Australian and local governments. This includes protection of the Western Sydney Freight Line, a dedicated freight rail connection between Port Botany and the Western Parkland City.

In focus

Smart Western Sydney

In March 2018, the Western Sydney City Deal (the City Deal) was announced. It is an agreement to undertake a coordinated approach to strategic planning and delivery for the Western Parkland City, with an emphasis on optimising place-based infrastructure delivery. This is a vision for Western Sydney designed in partnership with the NSW and Australian Governments and the local governments of the Blue Mountains, Camden, Campbelltown, Fairfield, Hawkesbury, Liverpool, Penrith and Wollondilly.

The City Deal will help all tiers of government coordinate investment across transport, health and education, and create 200,000 new jobs across a wide range of industries over the next 20 years. The new Western Sydney International (Nancy-Bird Walton) Airport will attract infrastructure, investment and knowledge-intensive jobs, with benefits flowing into health and education, retail, hospitality, and industrial activities that will power the city.

The City Deal reinforces the goal of realising the 30-minute city and includes 38 transformative commitments. This means the Western Parkland City will be a region with world-class internet connectivity, integrating 'smart' concepts with its public spaces, transport, health and wellbeing solutions, planning and management.

What is 'smart infrastructure'?

Smart infrastructure, such as smart transport, public spaces, health and wellbeing solutions planning and management, uses data gathered through a network of sensors and technologies embedded in the built and natural environment. Emerging initiatives like the Smart Western City Program are designed to support place-based smart interventions.

For transport this will mean a fully connected and integrated multi-modal network supporting connected and automated vehicles, electric vehicles, data-driven planning and digitally supported customer channels.

Transport projects under the City Deal include:

› sydney Metro Western Sydney Airport (from St Marys to the Aerotropolis via Western Sydney Airport)

› rapid bus services linking Liverpool, Penrith and Campbelltown with the Aerotropolis

Find out more about the Western Sydney City Deal.
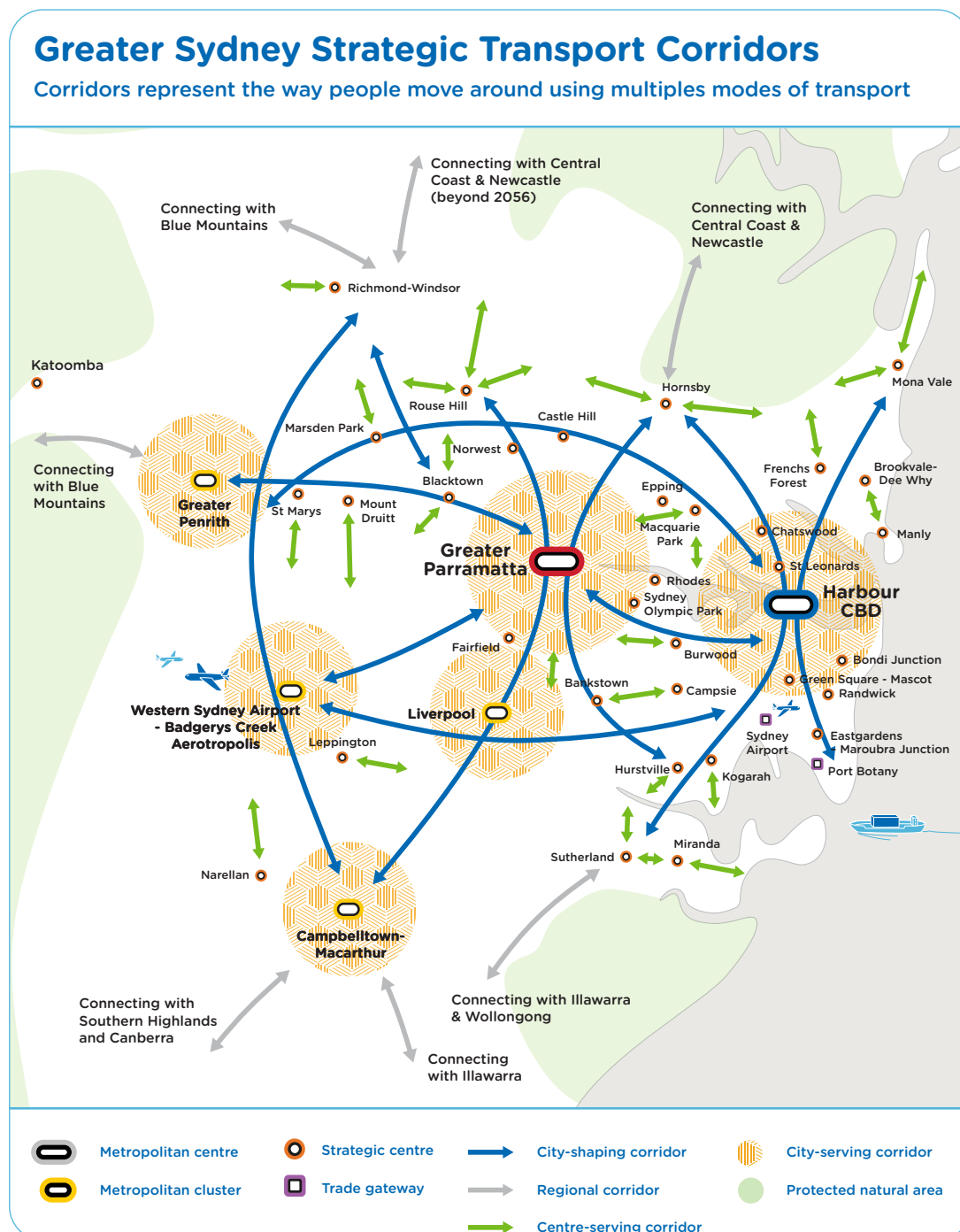
The Greater Sydney Network refinement

Future Transport 2056 sets the vision for the future transport network through the establishment of Greater Sydney Strategic Transport Corridors. It outlines, for future investigation, the city-shaping, city-serving, strategic road, freight and cycling networks that people will use to move around on multiple modes of transport.

Future Transport leaves open a more detailed pathway to implementing its vision. For example, the projects identified in Future Transport's Greater Sydney Services and Infrastructure Plan are predicated on the timing of when these projects should be further investigated, leaving flexibility for decisions about when or if to deliver to achieve our long-term vision for the network.

Since the release of Future Transport 2056 in 2018, Transport for NSW and land use agencies have been working to further develop Future Transport's 2056 network. The Greater Sydney Network Corridors outlined in Future Transport have been analysed in more detail, with potential transport solutions examined to ascertain the best fit for the city-shaping and city-serving corridors. Corridor preservation will ensure transport links can be provided for growing communities well into the future, and support further development of the road and freight corridors and the connected metropolitan bicycle network.

Since the release of Future Transport 2056 in 2018, Transport for NSW and land use agencies have been working to further develop Future Transport's 2056 network.

Greater Sydney Strategic Transport Corridors

Corridors represent the way people move around using multiples modes of transport

Connecting with Central Coast & Newcastle (beyond 2056)

Connecting with Blue Mountains

Connecting with Central Coast & Newcastle

Richmond-Windsor

Katoomba

Connecting with Blue Mountains

Rouse Hill

Castle Hill

Mona Vale

Marsden Park

Norwest

Hornsby

Greater Penrith

Blacktown

Frenchs Forest

Brookvale-Dee Why

St Marys

Mount Druitt

Epping

Macquarie Park

Chatswood

Manly

Greater Parramatta

Rhodes

St Leonards

Harbour CBD

Sydney Olympic Park

Western Sydney Airport - Badgerys Creek Aerotropolis

Fairfield

Burwood

Bondi Junction

Liverpool

Bankstown

Campsie

Green Square - Mascot

Randwick

Leppington

Sydney Airport

Eastgardens
Maroubra Junction

Hurstville

Kogarah

Port Botany

Narellan

Sutherland

Miranda

Campbelltown-Macarthur

Connecting with Southern Highlands and Canberra

Connecting with Illawarra & Wollongong

Connecting with Illawarra

Metropolitan centre	Strategic centre	City-shaping corridor		City-serving corridor
Metropolitan cluster	Trade gateway	Regional corridor		Protected natural area
		Centre-serving corridor		

Greater Sydney strategic transport corridors

Refining the vision and examining the future mix of potential modal solutions in more detail is helping develop a preferred network for 2056. This means we can start coordinating long-term plans with Australian, NSW and local government agencies, as well as communities, customers and industry.

Indicative 2056 modal networks developed by Transport for NSW and land use agencies outlined below are subject to further investigation and business case analysis, but provide an indication of future network options to inform place planning currently being undertaken with NSW and local governments.

Road network

The road network carries, and will continue to carry, the vast majority of trips made across Greater Sydney. Buses, cars, bikes, pedestrians, light rail, service vehicles and trucks use, at least in some part, the road network. It also provides access for non-road based transport modes such as planes, ferries, trains and metro. The importance of a safe road network for Sydney cannot be understated. As Sydney grows, it is essential the efficiency of the road network is increased through the application of technologies and more efficient utilisation of the available road space.

The strategic road network includes motorways and key arterial routes (shown below). An arterial road network performs a critical role in linking communities and providing important connections to dispersed employment areas that are more difficult for customers to reach using public transport, walking and cycling.

As well as providing key connections for people, the road network provides the primary connections to enable road-based freight movements. All freight uses the road network at some point in the supply chain. An efficient road network is therefore critical to ensuring the economic growth of Greater Sydney.
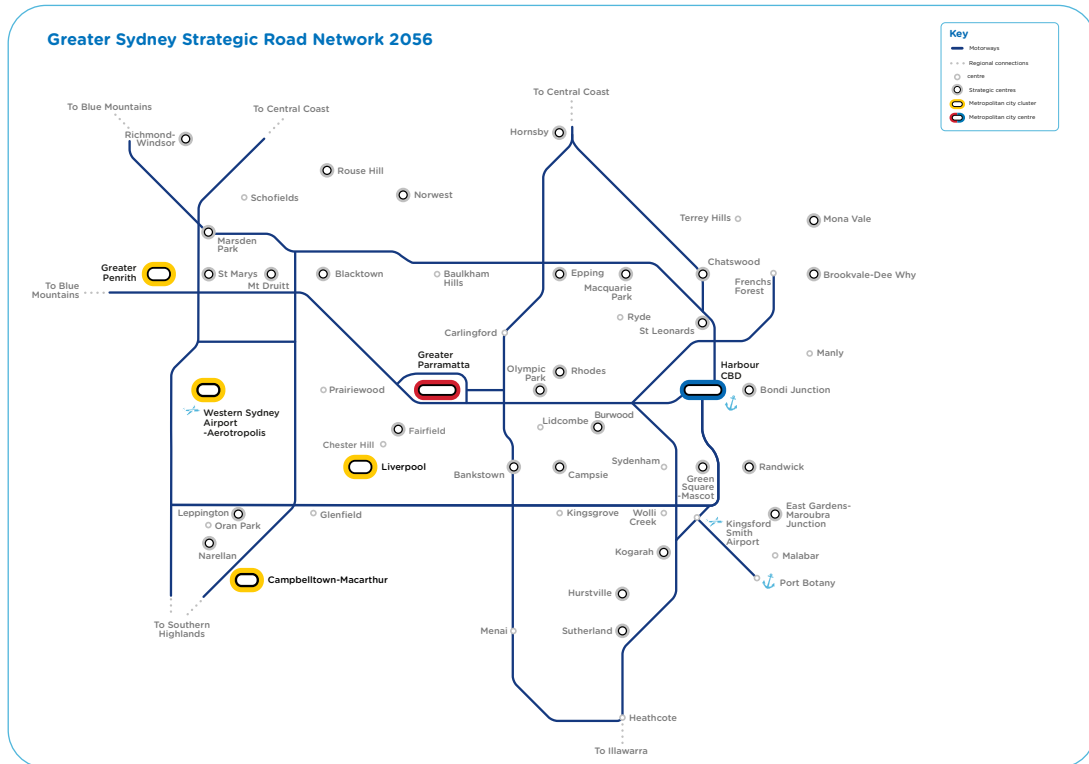
Greater Sydney strategic road network 2056

The above map represents a vision for how a future road network could look. The concept is not committed, and its assumptions are subject to further investigation and refinement, as more detailed assessments take place.
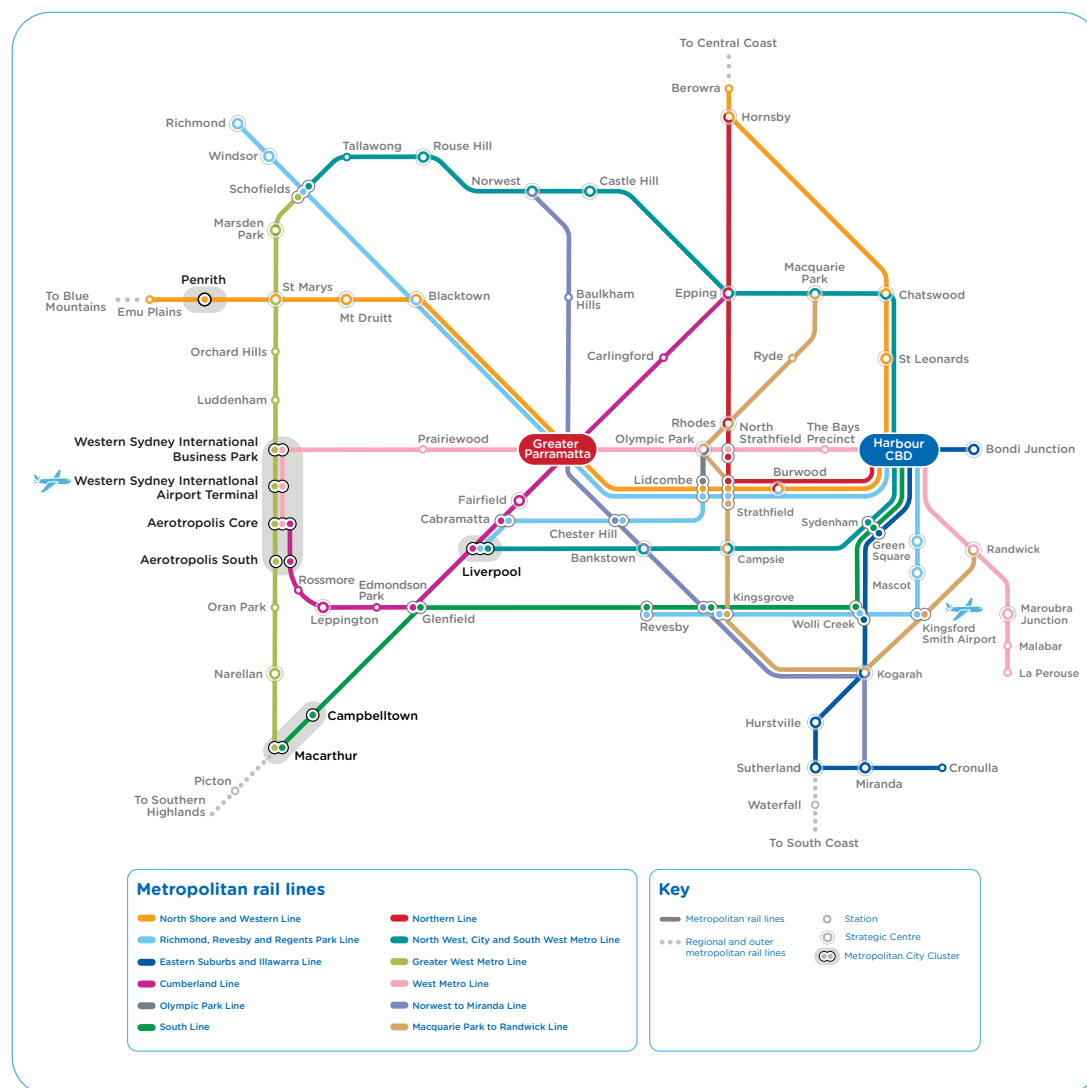
Rail network

The rail network forms the backbone of Greater Sydney's high-capacity mass transit system. It is anticipated that residents and visitors will become increasingly reliant on rail services as Greater Sydney grows to a population of more than eight million by 2056, similar in size to that of New York or London today.

The rail network may encompass a range of product types in the future, which include potential fast rail services linking Greater Sydney to the regions, metro trains, suburban trains, 'mini' or 'light' metros, and intercity and regional trains.

Maintaining train paths on the shared metropolitan network for freight trains is critical to moving more freight on rail. The network supports the movement of containerised imports, regional exports, waste, manufactured goods, construction materials, steel and coal.

The image below illustrates a developing vision for the 2056 rail network. It builds on Future Transport's predominantly city-shaping network, and includes further detail on the operating concepts, indicative alignments and key interchange locations.

Greater Sydney 2056 indicative future rail network

The above map represents a vision for how future rail services could be operated. The concept is not committed, and its assumptions are subject to further investigation and refinement, as more detailed assessments take place.

The next step in the development of the 2056 vision for the rail network is to integrate these changes with planned fast rail, intercity and rail freight services within Greater Sydney. This includes determining the alignment and servicing of corridors approaching Greater Sydney from regional and outer metropolitan NSW, drawing on long-term metropolitan rail network planning, freight and fast rail project assumptions.

Rapid bus network

The rapid bus network supports Greater Sydney's integrated public transport system by offering customers a fast, frequent and reliable moderate- to high-capacity option serving city-shaping and city-serving corridors.

As illustrated below, the 2056 Future Rapid Bus Network vision consists of an extensive set of rapid bus lines, which are intended to operate in a similar manner to the existing Northern Beaches B-Line. The rapid bus lines will be supported by dedicated bus lanes, bus priority technology and high-quality bus stop infrastructure. The fleet will respond to customer needs and consider zero-emission technology.

The 2056 Future Rapid Bus Network Vision proposes 39 rapid bus lines across Greater Sydney that link metropolitan city centres, metropolitan city clusters and strategic centres with the broader Greater Sydney population. Local buses and on-demand transport services will integrate with rapid buses, enabling customers to reach their nearest cities and centres within 30 minutes.
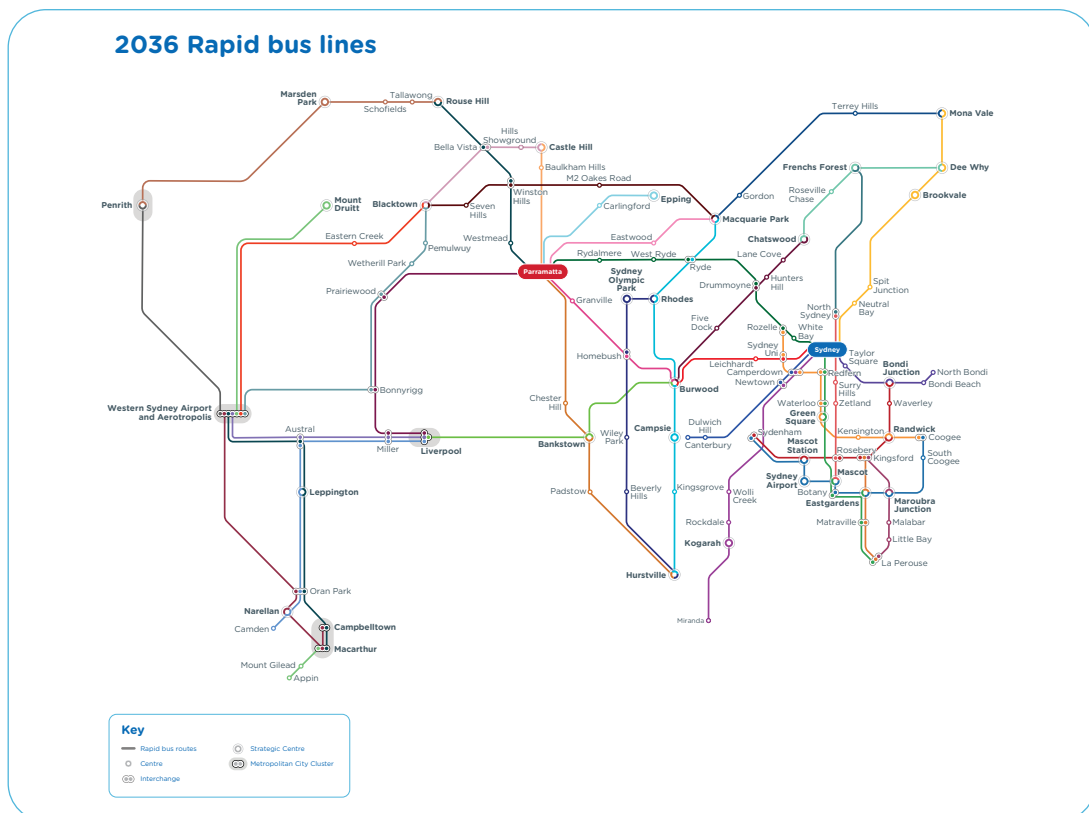
Greater Sydney 2056 indicative future rapid bus network

The above map represents a vision for how future bus services could be operated. The concept is not committed, and its assumptions are subject to further investigation and refinement, as more detailed assessments take place.

Ferry network

The Circular Quay to Manly ferry service provides a city-serving ferry corridor, recognising the volume of customers and frequency of service now and into the future. The remainder of Sydney's ferry network predominantly plays a centre-serving or local transport function.

A long-term ferry strategy will be developed covering Sydney Ferries and will identify the future direction within Greater Sydney, including potential service and technology changes. For example, the first 6 month stage of an on-demand ferry trial has been conducted in The Bays area, connecting Glebe, Pyrmont and Barangaroo, to assess the potential of this new type of service. The trial is currently on hold while initial results are analysed.

A long-term ferry strategy will be developed covering Sydney Ferries and will identify the future direction within Greater Sydney

Light rail network

In 2018, Future Transport 2056 identified light rail corridors as part of the city-serving and centre-serving network. Services were introduced on the L2 Randwick Line in December 2019 and on the L3 Kingsford Line in April 2020. Delivery of Parramatta Light Rail is well underway, with passenger services expected to begin in 2023.

Potential light rail lines and extensions will be considered part of multimodal public transport planning as appropriate. The South East Sydney Transport Strategy has also considered a light rail extension to Maroubra Junction and identified prioritising the delivery of metro to La Perouse to provide the higher capacity needed to meet expected demand in the medium and longer term.
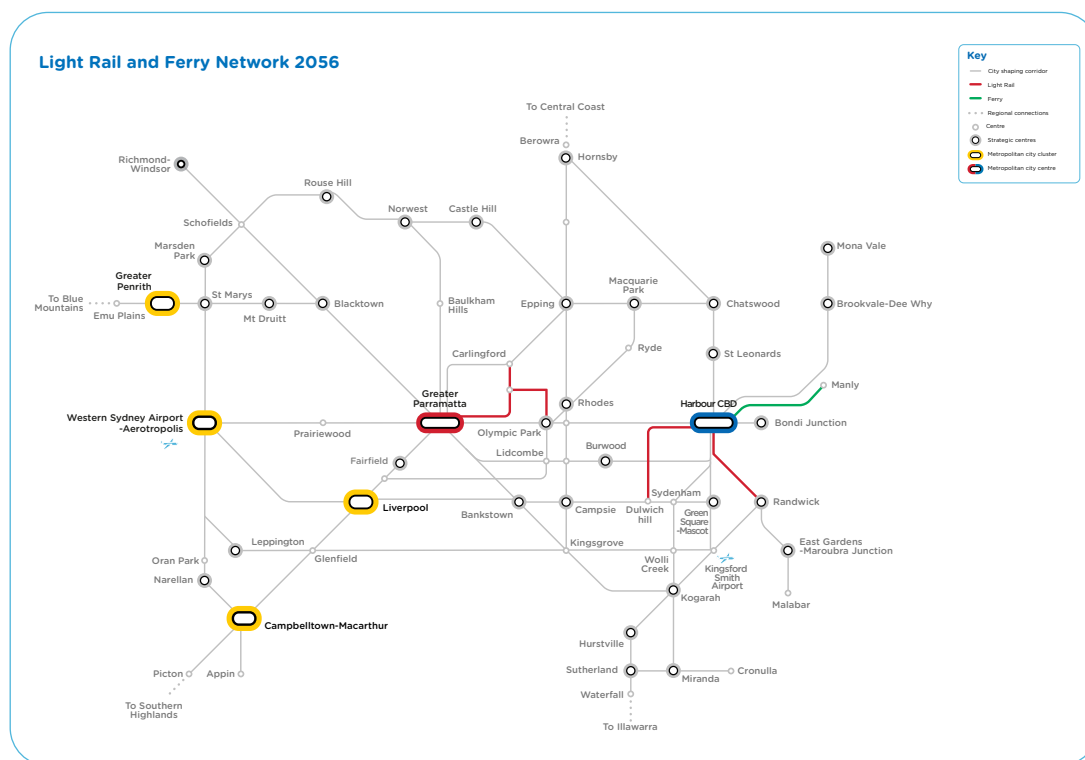
Greater Sydney 2056 indicative future light rail and ferry network

The above map represents a vision for how future light rail and ferry services could be operated. The concept is not committed, and its assumptions are subject to further investigation and refinement, as more detailed assessments take place.

Freight network

With Greater Sydney's freight task forecast to more than double in the next 40 years, the freight network needs to be able to support this future demand. This requires a strategic focus to ensure policy, infrastructure and land-use planning initiatives deliver a freight network where capacity and performance can meet demand. This will allow for movements that deliver a diverse range of products and services, and provide the construction materials required to build the growing city.

Providing for a growing Greater Sydney and a growing freight task requires an efficient and effective road and rail freight network integrated with ports, airports, intermodal terminals and key freight precincts and centres. This needs a network that efficiently supports this projected growth, while balancing freight needs with those of the broader community and the environment.

Opportunities exist to shift more freight onto rail and this remains an important priority for the NSW Government.

Increasing the rail mode share of containers to and from Port Botany will have significant benefits, particularly in the face of growing road congestion. Intermodal terminals within Greater Sydney are critical for increasing the utilisation of the rail freight network, particularly containers to and from Port Botany. Greater separation of passenger and freight movement on the rail network will provide a 24/7 dedicated rail freight link between Port Botany and intermodal terminals. TfNSW is also leading the Empty Container Working Group, a committee made up of key stakeholders in the empty container supply chain, to identify challenges and industry led voluntary opportunities to improve the efficiency and resilience of the broader container supply chain.

A key action for achieving ongoing productivity improvements for the movement of road freight is to increase the use of safer and more productive vehicles, known as High Productivity Vehicles (HPVs) around intermodal terminals and other key freight precincts. Modern HPVs fitted with best practice safety technologies are safer, and can carry more freight, putting downward pressure on the number of trucks in operation and leading to fewer trucks on the road.

In NSW, the freight task is mainly undertaken on a shared transport network where the movement of freight and the movement of people compete for network capacity, whether it be heavy and light vehicles on motorways, or freight and passenger trains on the shared rail network. Increased freight access on the shared network will be vital as the freight task continues to grow. The provision of dedicated freight infrastructure will separate freight and passenger movements and increase access for freight across the road and rail network.

There is an increasing importance placed on 24/7 supply chain operations to maintain Greater Sydney's global competitiveness. It is important that locations around key freight networks and precincts are not adversely affected by traffic patterns or increased congestion, creating barriers to 24/7 freight operations. The land-use planning system needs to recognise the importance of freight, and retain and protect existing and future freight corridors, industrial land and freight precincts from encroachment by sensitive land uses.

The land-use planning system can also ensure places such as precincts, streets and major buildings are designed for freight. Incorporating spaces for freight in land-use planning is a key priority to drive more efficient last-mile outcomes. Increases in population density, especially around key urban centres in major cities, drive corresponding increases in freight and servicing demand.

New technology will play a significant role in improving the efficiency of existing infrastructure and transport. The NSW Government is facilitating trials of emerging technology by industry as well as exploring opportunities to apply new technology to manage its network. Technology will also continue to play a role in improving safety, sustainability, and the data to inform decision making..

Greater Sydney Strategic Freight Network 2056
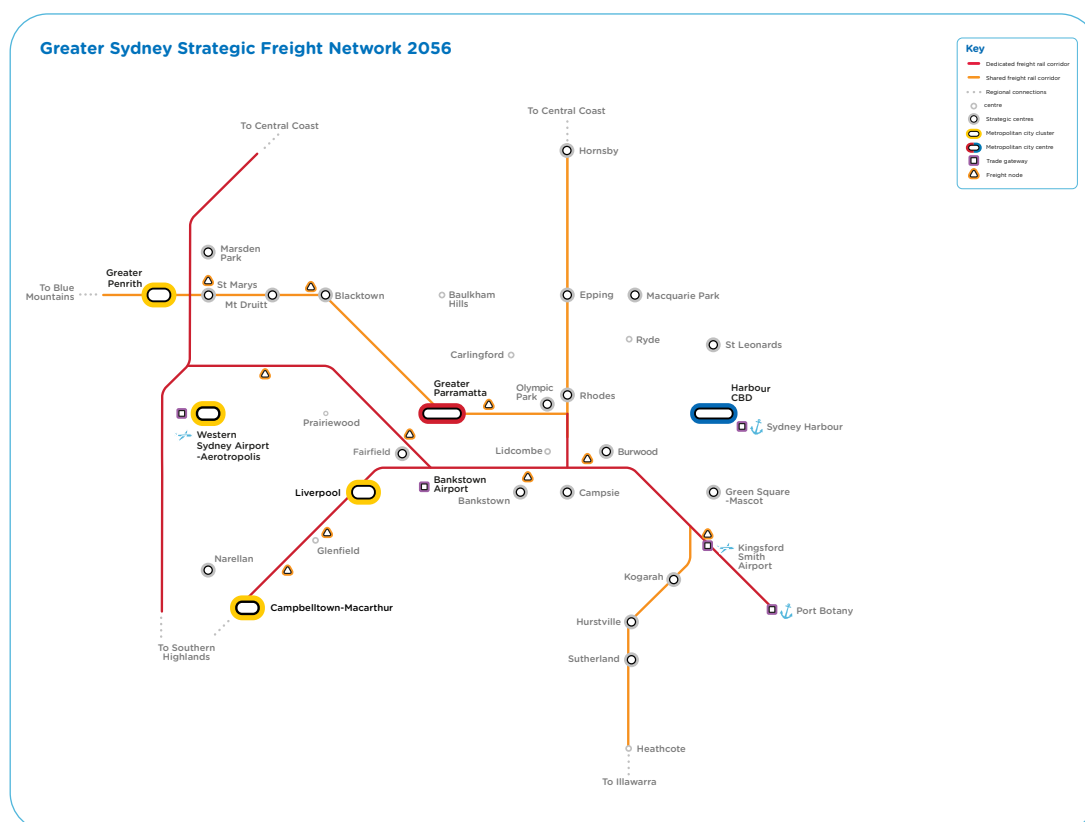
Greater Sydney 2056 indicative future freight network

The above map represents a vision for how future freight services could be operated. The concept is not committed, and its assumptions are subject to further investigation and refinement, as more detailed assessments take place.

Principal Bicycle Network

Connected metropolitan bicycle networkMore than 11 million weekday car trips in Greater Sydney are less than 10 kilometres. These short trips contribute to congestion on already constrained parts of the transport network.

Cycling requires safe and connected cycling infrastructure to enable customers to ride more often. Appropriate cycling infrastructure linking communities to everyday destinations, such as centres, jobs, services, schools, public transport and parks, can support more short trips taken by bicycle or other forms of approved micromobility devices, such as e-bikes.

Encouraging cycling could help relieve congestion and could more than double the number of people who can reach our three cities within 30 minutes.

Cycling also has a health payback by preventing chronic disease through increased physical activity and improved wellbeing. It creates better places, lowers carbon emissions and improves access to public transport services.

In the future, the connected metropolitan bicycle network will enable people to travel safely between centres across Greater Sydney.
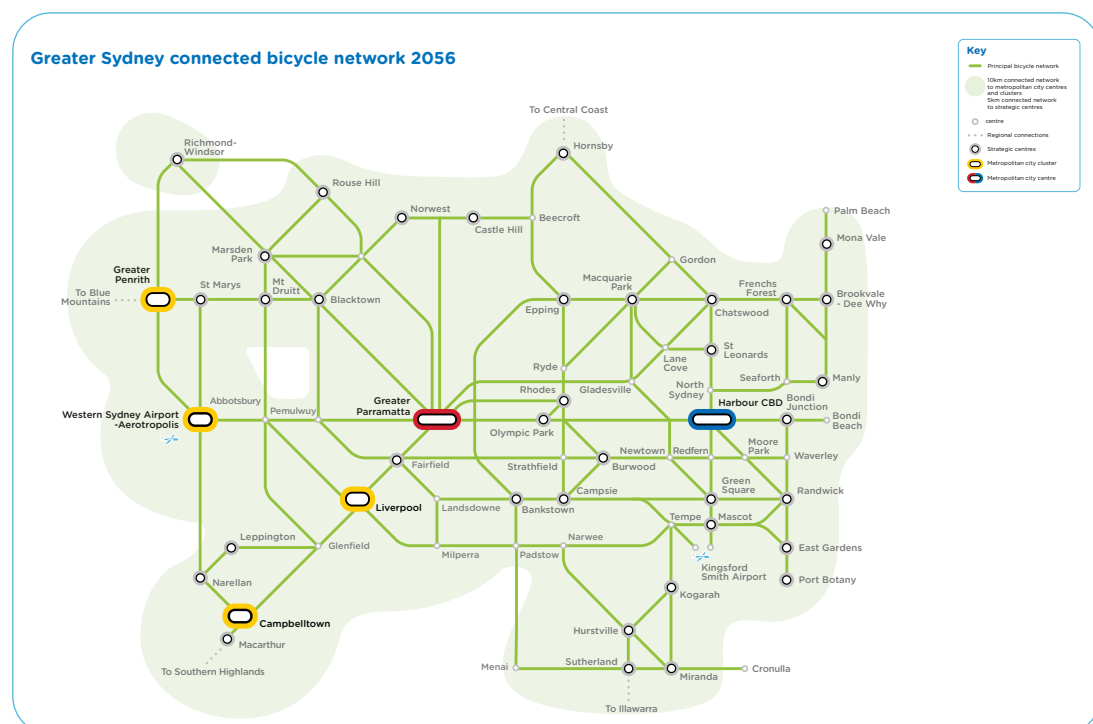
Greater Sydney 2056 indicative future connected metropolitan bicycle network

The above map represents a vision for how future bicycle networks could be operated. The concept is not committed, and its assumptions are subject to further investigation and refinement, as more detailed assessments take place.

Potential staging options

The next step in refining the future network is for Transport for NSW and land use agencies to investigate potential staging plans to reach the 2056 vision.

Options for the staging of infrastructure identified in Future Transport 2056 will be progressively assessed to identify decade-by-decade investments that have the best potential to service the government's three-cities vision. This will inform coordinated planning between State government agencies and local governments to maximise the benefits of these investments, and locate the right land uses and services around the transport network.

Find out more about service and infrastructure initiatives for Greater Sydney.

The next step in refining the future network is for Transport for NSW and land use agencies to investigate potential staging plans to reach the 2056 vision.

CHAPTER

9

Delivering sustainability

Defining sustainability for transport

Sustainability means meeting the needs of the present without compromising the ability of future generations to meet their own needs. Addressing the three pillars of sustainability: environmental, economic and social, as well as making fiscally responsible decisions today, will build a future transport system for our customers, communities and for the greater good, supporting the liveability and sustainability of NSW.

Transport for NSW has a duty to ensure that what we build and the way we operate is in the interest of the greater good, moving beyond compliance and being a leader in sustainability to create enduring benefits for current and future generations.

Transport is a key enabler of economic and social activity and is committed to delivering transport that contributes to economic prosperity and social inclusion in an environmentally responsible and sustainable manner.

Sustainable leadership means being leaders in environmental protection, energy and carbon, resilience, sustainable procurement, whole-of-life asset management, and social sustainability. It also means raising awareness across our workforce and contractors that they are accountable for enhanced environmental outcomes and driving a culture of environmental responsibility.

Future directions to investigate:

Develop the Transport Sustainability Plan, which provides a road map for the Transport cluster's longer term sustainability actions.

In focus

United Nations Sustainable Development Goals

Transport for NSW is committed to delivering a transport system in an environmentally, economically and socially sustainable manner. This approach aligns with Australia's commitment to the United Nations Sustainable Development Goals, which cover areas such as:

› developing quality, reliable, sustainable and resilient infrastructure

› providing access to safe, affordable, accessible and sustainable transport

› taking action to reduce emissions, support climate change science research, build resilience, and reduce additional pressures on systems affected by climate change

› considering the risks arising from climate change and natural disaster

Environmental sustainability

Transport for NSW is committed to being a leader in environmental and sustainability performance. It seeks to minimise the environmental impacts of our transport system across all stages of the asset lifecycle, and to identify innovative ways to assess and realise the environmental and social benefits of our Transport networks.

Addressing the environmental sustainability of the transport system is essential to minimise direct and indirect impacts on the natural environment and communities. Direct impacts include air pollution and emissions, noise, waste, water management, biodiversity, heritage and social impacts; indirect impacts are caused by energy and resources used by the transport system.

Climate change

The NSW Government is working towards achieving a target of net-zero emissions by 2050. It is investigating how to embed emissions savings and climate change adaptation in its decision making to meet the requirements of the NSW Climate Change Policy Framework. The Net Zero Plan Stage 1: 2020 – 2030 restates the NSW Government's commitment to a net-zero emission future and the first major step in meeting this goal will be the delivery of a 35 per cent cut in emissions by 2030, compared to 2005 levels.

Going forward, Transport for NSW will consider resilience, including climate resilience, in the planning and design of all assets and services. A climate change risk assessment will be developed for assets as part of the whole-of-life impact assessment when developing projects. Transport for NSW also participates in the Cross Dependency Initiative project (XDI), which is led by Climate Risk Engines and the NSW Department of Planning, Industry and Environment, and models various climate change risks to infrastructure. To date, the model has been applied to estimate risks for major intersections in the Greater Sydney area, as well as on local government roads.

To achieve net-zero emissions, it is vital to minimise the impact of running the NSW transport network by reducing all three of the following scopes of emissions associated with it.

Scope 1 – Direct greenhouse gas emissions from the transport sector, such as emissions from vehicle fuels

Cleaner and fuel-efficient vehicles

Transport for NSW supports the State-wide uptake of cleaner and fuel-efficient vehicles powered by renewable energy sources, and has already achieved more than 30 per cent of its new fleet vehicles being electric or hybrid as at October 2020, well above its target of 10 per cent. Transport is also working towards its own target of 70 per cent of new passenger vehicles purchased or leased being low emission vehicles by 2025 (where fit for purpose), with at least 20 per cent battery electric. This target builds towards the medium-term target of 100 per cent low emission vehicles by 2030.

Replacing on-road vehicles that run on internal combustion engines with battery or fuel cell powered vehicles could cut up to 85 per cent of total transport emissions in NSW[3].

The Electric and Hybrid Vehicle Plan, released in 2019, sets out Transport for NSW's approach in preparing for a transition to more energy efficient vehicles in terms of vehicle availability, charging points and customer information. The plan includes a $3 million co-investment in fast charging points for electric and hybrid vehicles on major regional corridors and $2 million for new charging points in commuter car parks. It will also be supported by the Department of Planning, Industry and Environment's Net Zero Plan Stage 1: 2020 – 2030, which includes actions to support charging infrastructure, such as ensuring new buildings are electric vehicle ready.

The NSW Government is also collaborating with other jurisdictions to explore the potential of hydrogen as a power source for transport, through the National Federation Reform Council's Energy Council work, which has led to Australia's National Hydrogen Strategy. The government is actively participating in developing a program of work to address the barriers and challenges impeding the uptake of Low and Zero Emissions Vehicles (LZEVs) as part of the National Land Transport Technology Action Plan 2020-2023.

Air quality and health impacts

Air quality affects our health, the liveability of our cities and towns, and our environment. Even short-term exposure to air pollution can cause health problems. Children, the elderly and people with existing heart and lung conditions are particularly susceptible to the health impacts of air pollution.

Even when air pollution levels are below national standards, further reductions will provide public health benefits, including improved cardiovascular and respiratory health, and reduced rates of some cancers.

Ambient levels of ozone and particles can exceed national standards in the Sydney region, with no definite downward trend.

3   AdaptNSW (2017)

Reductions in vehicle emissions have been significant over the last decade due to improved fuel quality and more stringent vehicle emission standards. Despite reductions in vehicle emissions, road transport remains a significant source of human-generated air pollution in Sydney, contributing 13 per cent of $PM_{2.5}$ emissions, 55 per cent of oxides of nitrogen (NOx) emissions and 13 per cent of volatile organic compound (VOC) emissions during 2013.

Oxides of nitrogen and volatile organic compound emissions contribute to photochemical smog (as ozone). Department of Planning, Industry and Environment's regional modelling for Sydney has indicated that the pattern of motor vehicle emissions is a significant factor determining the timing and peak of ozone concentrations in the region.

Levels of motor vehicle pollution are higher near busy roads, but decrease rapidly – with levels typically reducing to background within one to two hundred meters. Living near busy roads may be associated with a range of adverse health outcomes ranging from learning difficulties in children, decreased lung function, and increased risk of dementia.

Heavy vehicles such as trucks and buses are disproportionally high emitters of NOx and particles.

Zero tail-pipe emission vehicles (battery and fuel cell powered) will have significant benefits in reducing traffic-related air pollution. However, they will not eliminate it. A significant amount of particle emissions do not come from the tail-pipe, but rather are the result of road, brake and tyre wear – which will not be eliminated by the transition to zero tail-pipe emission vehicles.

Transport considers the air quality and health impacts from the delivery and operation of the transport network. We design and construct our transport projects to minimise operational air quality emissions, such as diverting traffic away from local roads and by reducing congestion.

Walking, cycling and public transport lower environmental impacts

Transport for NSW has a significant role in contributing to a more environmentally sustainable community. It does this by providing travel that is more effective in moving large numbers of people, compared with private car use and by encouraging a mode shift to walking cycling and public transport, which are some of the lowest producers of greenhouse gas per person per kilometre.

To encourage more people out of their cars we we need to continue to make walking and public transport more attractive options. This will involve designing infrastructure that is safe and better caters to customers' needs, and ensuring fast and frequent connections to the places people want to go. Initiatives, such as the zero emissions bus trial, will ensure our future carbon footprint is minimised.
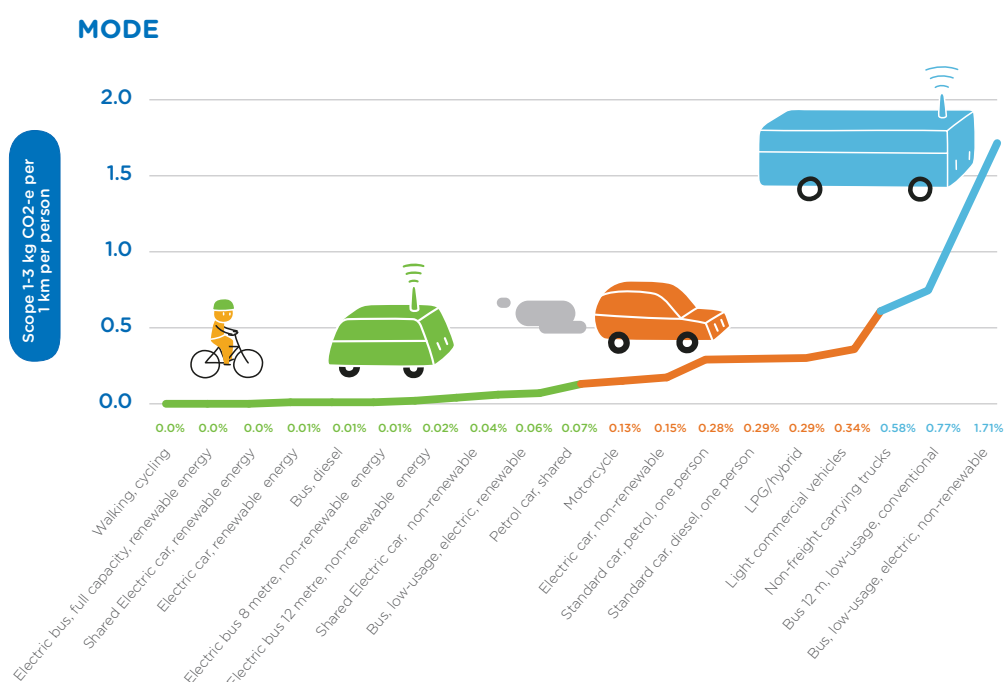
We are already working with local governments and other stakeholders to develop a safe, connected metropolitan bicycle network of around 6,000 kilometres of cycling routes across Greater Sydney, Newcastle, Gosford and Wollongong.

Transport for NSW aims to increase the mode share of public transport services and reduce the use of single-occupancy vehicles. This includes the Travel Choices Program and travel demand management measures. Apart from reducing emissions through more efficient shared vehicles, this will also have a positive impact on congestion.

Increasing the mode share of walking and cycling for short trips will deliver substantial emissions reduction, while alleviating pressure on the road network and reducing congestion. Travelling by bicycle can also be faster than car or public transport for trips up to five kilometres. The use of electric bikes could further increase the distances and speeds that could be comfortably cycled

New and emerging service models, such as mobility as a service, carsharing, ridesharing, on-demand services, and connected and automated shuttle services are effective in moving people from private, single-occupancy car use to shared transport modes. At the same time, these services can help reduce the need for private car ownership, and discourage driving for trips that could easily be avoided or replaced with walking or cycling.

Active and public transport lowers environmental impacts

MODE

Scope 1-3 kg CO2-e per 1 km per person

| 2.0 |
| 1.5 |
| 1.0 |
| 0.5 |
| 0.0 |

0.0% 0.0% 0.0% 0.01% 0.01% 0.01% 0.02% 0.04% 0.06% 0.07% 0.13% 0.15% 0.28% 0.29% 0.29% 0.34% 0.58% 0.77% 1.71%

Walking, cycling
Electric bus, full capacity, renewable energy
Shared Electric car, renewable energy
Electric car, renewable energy
Bus, diesel
Electric bus 8 metre, non-renewable energy
Electric bus 12 metre, non-renewable energy
Shared Electric car, non-renewable
Bus, low-usage, electric, renewable
Petrol car, shared
Motorcycle
Electric car, non-renewable
Standard car, petrol, one person
Standard car, diesel, one person
LPG/hybrid
Light commercial vehicles
Non-freight carrying trucks
Bus 12 m, low-usage, conventional
Bus, low-usage, electric, non-renewable

Environmental impact of transport modes

Scope 2 – Indirect emissions associated with energy use, such as emissions from fossil fuel power plants

Renewable energy

Today, Transport for NSW's energy consumption is primarily sourced from non-renewable electricity – coal-fired power plants and petroleum based fuels – which produce one of the largest volumes of greenhouse gas emissions. As our energy requirements continue to grow, without changes to the sources of energy, our greenhouse gas emissions will also continue to increase.

An additional consequence of a reliance on petroleum-based fuels is an exposure to any significant or unexpected changes in oil price and availability. Global oil prices experienced significant volatility during 2020 and this remains a risk to the future financial sustainability of transport services that are heavily dependent on oil. A shift towards a low-emission transport system, which is less reliant on fossil fuels and fuelled by domestically-sourced renewable energy sources, would reduce the reliance on imported fuels and enhance security of supply.

Managing the transition to a low-emission transport system means we not only need to shift to reliable and cost-effective, low- or zero-carbon energy sources, but also minimise energy use and maximise energy efficiency.

In focus

Sydney Metro – 100 per cent renewable energy offset in NSW

The Sydney Metro North West included offsetting 100 per cent of electricity needs during the operational phase of the project and 20 per cent during the construction phase. This was achieved by a new 145-hectare solar farm at Beryl, north of Mudgee.

The maintenance building roof of the Sydney Metro Trains facility in Rouse Hill houses a 3,287 panel solar array. The electricity generated by the panels is used to power the maintenance facility and some Sydney Metro stations.

Find out more about Sydney Metro sustainability.

Energy savings

A key focus in reducing our operational energy consumption is the application of new and innovative technologies. We seek to embed best-practice, energy-efficient design principles across all stages of the asset lifecycle and to identify opportunities for energy reductions. This will help us meet our obligation to deliver under the NSW Government Resource Efficiency Policy.

One example is the conversion of all of our 4,000 traffic signals to high-efficiency LED lamps. The result was savings of 72 per cent of electricity consumption (or over 25,000 megawatt hours per year), lower maintenance costs and increased public safety through more reliable operation.

Another example includes intelligent transport systems (ITS), which play a valuable role in improving energy efficiency of roads, rail and other transport infrastructure. ITS includes a number of technologies, such as advanced traffic management, vehicle-to-vehicle and vehicle-to-infrastructure communication, in-vehicle telematics, driver information and GPS, and rail management. These technologies have significant potential to reduce fuel consumption and vehicle emissions by improving traffic flow efficiency. For instance, the provision of real-time information to drivers can help them avoid potential delays and therefore reduce the time they are stuck in traffic.

Our Rooty Hill Station upgrade and commuter carpark, which was awarded a 'leading' design rating by the Infrastructure Sustainability Council of Australia (ISCA) was another initiative to reduce energy consumption. The installation of 938 photovoltaic panels on the car park roof, with eight Tesla batteries, generates 412 megawatt hours per year. This and other sustainability initiatives provide an estimated 47 per cent reduction in lifecycle greenhouse gas emissions.

Scope 3 – Emissions from a third party, such as emissions arising from the extraction and transportation of materials used by Transport

As a large consumer of resources for construction and operational and maintenance activities, Transport has significant opportunities and obligations under the NSW Government Resource Efficiency Policy to avoid or minimise our resource footprint and ensure that waste is reused, recycled or disposed of sustainably.

We consider material efficiency in the planning and design of projects, to ensure we minimise the consumption of resources, use recycled materials where possible, select new materials with low embodied energy and maximise the recycling opportunities for our excess materials. We have been an active participant in completing national guidelines for the use of recyclable materials in road construction, in support of the National Federation Reform Council Export Ban and National Waste Policy Action Plan.

Transport is undertaking trials of geopolymer concrete in non-structural duties. These have the potential to save up to 70 per cent of the greenhouse gas emissions associated with the cement component. The trials will use recycled glass sand and key waste products such as fly ash and/or steel slag.

Lifecycle assessment

Transport for NSW recognises the need for a lifecycle assessment approach, as a valuable decision-support tool to assess the impacts of new and upgraded transport assets.

Lifecycle assessment is the analysis of the entire lifecycle and assessment of potential impacts on the environment. Taking a lifecycle assessment approach means viewing carbon across the asset and services' lifecycle to enhance our actions with those involved in the lifespan of all transport products, digital systems and construction materials. Lifecycle assessments during the development phase will help ensure that we are delivering the right assets and services to NSW while providing value and delivering sustainable outcomes.

Lifecycle costing, which means including the environmental cost of greenhouse gas emissions in costing for projects, programs and initiatives, is another tool to assist Transport for NSW to quantify the impact of greenhouse gas emissions in its planning.

Future Energy Strategy and Action Plan

In order to support the NSW Government's target to achieve net zero emissions by 2050, Transport for NSW has developed a Future Energy Strategy and Action Plan, which aims to position the transport sector to take advantage of rapidly developing technology, secure transport energy needs, and manage energy supply climate risk.

As part of this plan, Transport for NSW is transitioning its entire public transport bus fleet to zero emission, targeting net-zero electricity for light rail, rail and metro systems, and developing initiatives to support NSW's uptake of lower- or zero-emission vehicles. This includes more than 50 new electric buses that are being rolled out across Sydney in 2021.

Read more about the Future Energy Strategy and Action Plan.

Future directions to investigate:

›   develop programs to encourage a shift from private car use to walking, cycling, ridesharing and public transport

›   work with industry partners on new low- or zero emissions vehicle technologies and support the transition to low-emission heavy and commercial vehicles as well as passenger vehicle fleet

›   transition to a cost-effective, low-emission energy supply for the public transport system and its operators, using power purchase procurement to increase renewable energy mix

›   develop and implement a Future Energy Strategy and Action Plan to support the transition to net-zero emissions by 2050

›   explore opportunities to improve the energy efficiency of transport operations

›   investigate options to leverage power purchase agreements to support the transition towards a cost-effective, low-emission energy supply for the Transport network (including heavy rail, metro rail, light rail and other infrastructure)

›   develop a lifecycle assessment approach as a valuable decision-support tool in assessing the impacts of new and upgraded Transport assets

›   educate and raise awareness in our staff and customers regarding the importance of energy efficiency and reduction of greenhouse gas emissions

Climate change adaptation and resilience

Transport for NSW is committed to embedding climate risk and resilience considerations in our activities to improve the resilience of our transport network, communities and our organisation. Our approach is driven by a need to protect the network from various disturbances, shocks and stressors that can impact the transport sector, our customers and the community.

Climate change is highly likely to affect both the reliability and service life of Transport's assets (roads, rail, freight rail, light rail, ferries and wharves) and the services we provide to the communities we serve throughout NSW. The most significant impacts will be associated with drought and sea level rise, salinity, and changes in water run-off, as well as increased frequency and severity of extreme weather events, such as heat waves, strong winds, lightning strikes, bushfires, rainfall and flash flooding.

Embedding resilience

It is clearly recognised that certain trends are disrupting the industry sector and transport in a way that we have never experienced in the past. Various shocks and stresses can have an impact on the transport sector, our customers and the community, and climate change as well as natural disasters are among the top risks.

Transport for NSW seeks to plan, develop and manage a resilient and reliable network, and services that are responsive to the requirements of customers. It will do this by addressing the challenges of extreme weather and physical impacts caused by climate change, incorporating climate change risk assessment in the early stages of all projects and managing identified risks throughout the asset project lifecycle.

We also seek to ensure an integrated approach to resilience that not only improves our transport network and asset resilience to climate change but also to other shocks and stressors, for example pandemics or social instability.

We aim to address three types of resilience: place-based (community and environmental), resilience of our assets, and resilience of our organisation, which aligns with the key outcomes identified in the NSW Critical Infrastructure Resilience Strategy. The relationship between these three components of resilience is complex, and we aim to develop an integrated approach involving both government and industry partners.

Our resilience task is consistent with the NSW Climate Change Policy Framework long term aspirational objective NSW is more resilient to a changing climate. Ensuring all of our assets can be progressively made climate change resilient is an integral part of the overall asset resilience task. Transport for NSW aims to investigate the resilience of our existing assets to climate changes, as well as the impact on communities and vulnerable groups.

Designs of older road and rail assets may not cater for future climate impacts and therefore, some of these are under a significant risk of damage and failure with changes in climate. There is also a need to develop and implement identified adaptation measures in the design and construction of our new assets.

In order to improve asset resilience, consistent methods for both data collection and lessons learnt are essential. We aim to ensure that we incorporate the most up-to-date information into climate change risk analysis and identify both direct and indirect risks at the early stage of all our projects and during construction of new assets, when the success of implementation of adaptation measures is the highest.

Working together and co-operatively is the centre of overall resilience and the resilience of our organisation. Improved data and information sharing will enable us to ensure an evidence-based approach in decision making for all our projects, and clearly define roles and responsibilities for climate change adaptation planning.

Preventing and minimising pollution

Environmental pollution negatively impacts on ecosystems and human health. Transport for NSW seeks to minimise pollution by implementing pollution prevention measures that are integrated into the design, construction and operation of infrastructure and comply (at a minimum) with relevant environmental regulations. We apply rigorous processes to identify and minimise environmental risks and comply with relevant environmental regulations

Biodiversity and enriching urban nature

Protecting and enhancing biodiversity

Transport for NSW continues to be a recognised Australia-wide leader in biodiversity offsetting and strategically plans for its offset obligations as early as possible in the project development lifecycle, making use of its own land portfolio to source biodiversity credits. We support a whole-of-government approach to building ecologically sensitive infrastructure and achieving no net loss to biodiversity.

Transport for NSW is already a leader in the provision of ecologically sensitive infrastructure particularly in regional areas of NSW. A range of approaches are used, including actions to augment habitat lost from development (such as by building bat habitat into bridge design and installing artificial hollows and nest boxes) and maintaining ecological connectivity across landscapes (such as through the provision of fish friendly culverts, rope bridges, glider poles and dedicated fauna underpasses and overpasses).

Enriching urban nature

Transport for NSW is committed to improving the liveability and urban ecology of our towns and cities by integrating and prioritising green infrastructure in Transport projects through tree planting, open space creation and transport landscape programs, in line with the NSW Premier's Priorities Greener Public Spaces and Greening our City.

Transport for NSW will work to enrich our cities with nature through maintaining and improving existing high-quality transport landscapes or transforming underutilised transport land into a valued component of our State's green infrastructure system.

Transport for NSW has successfully integrated green urban spaces in urban design for a number of new infrastructure projects (such as WestConnex Stage 1, Stage 2 and Stage 3 projects). Current major urban infrastructure projects are delivering significant gains for local amenity and the landscape, through the creation of parklands associated with infrastructure, enhancing the transport soft estate and implementing street tree planting.

Cyber security

Cyber security plays an important part of the overall resilience of Transport for NSW.

Strong cyber security is an important component of the NSW Government's Beyond Digital Strategy, enabling the effective use of emerging technologies and ensuring confidence in the services provided by the NSW Government. Cyber security covers all measures used to protect systems – and information processed, stored or communicated on these systems – from compromises of confidentiality, integrity and availability.

Cyber security is becoming more important for Transport for NSW as cyber risks continue to evolve. There are three significant drivers for a focus on cyber security in Transport for NSW:

> an increasing reliance on available and reliable data for decisions at all levels, from operational to strategic decisions

> the increasing reliance on connected technologies (such as smart freight networks, and smart motorways)

> increasing reliance on third parties and industry for transport services

Transport for NSW is implementing the NSW Cyber Security Policy and will continue to improve its capability and policies, as cyber security requires continued effort and improvements to tackle evolving threats.

Future directions to investigate:

› as part of Transport for NSW's asset management framework, determine a significant climate change risk profile for existing and planned infrastructure assets and identify the most efficient and effective adaptation strategies over time

› continue to investigate and invest in tools to manage and respond to shocks when they occur, such as new live traffic monitors to give real time information

› conduct a resilience assessment for all communities and places that interact with transport activities

› support NSW Government initiatives to determine and visualise the effects of climate change, including extreme weather events

› identify infrastructure and service sector interdependencies during significant climatic events, to inform future asset management, operational delivery and emergency response

› adopt reporting systems to track and integrate extreme weather data and associated impacts

› investigate new design methodologies, materials and technologies for infrastructure maintenance and construction, to enhance climate change resilience

› continue to work with the Office of Emergency Management (OEM) on State-level emergency risk assessments, as well as mitigation, prevention, preparedness, response and recovery activities

› address climate change adaptation within corporate planning and business planning processes

› contribute to the NSW Government's climate change actions

› continue to develop Transport for NSW's Climate Change Risk Assessment Framework

› influence contractors, sub-contractors and material suppliers to develop and implement climate change resilient designs

› conduct a resilience assessment for all communities and places that interact with transport activities

› implement the NSW Cyber Security Policy and continue to improve Transport for NSW's cyber security capabilities

Economic sustainability

Transport plays a significant role in building a strong economy and improving quality of life for our customers, communities and the people of NSW. It increases the productivity and global competitiveness of the NSW economy and makes a long-term, positive contribution to the social, environmental and cultural elements of our community.

Economic activity generated from new transport projects creates economic and social value for local communities and businesses in urban and regional areas, through jobs, training and partnerships that promote social inclusion, reduce disadvantage, and enhance community health and social wellbeing, particularly for under-represented, vulnerable communities.

Circular economy

In line with the NSW Government's Circular Economy Policy Statement 2019, Transport for NSW recognises the importance of adopting lifecycle assessment as a valuable decision-making tool in assessing the economic, environmental and social impacts of its activities as an agency, as well as impacts of new and upgraded Transport assets. Taking this whole-of-life approach requires us to consider future needs, challenges and opportunities, and to seek integration into design, planning, financing and governance decisions now, in the context of future decision making, risks and uncertainty.

Some of the initiatives Transport for NSW has undertaken include recycling all spoil from tunnelling as construction material for Sydney Metro North West, and using recycled glass in the concrete mix for the Woolgoolga to Ballina upgrade and other infrastructure projects.

Future directions to investigate:

› undertake further technical investigation into the use of more recycled materials in construction and infrastructure projects

› plan for guidelines to promote the use of recycled materials in construction and infrastructure projects for Transport for NSW

› enhance links to circular economy objectives in procurement of goods, services and construction activities

› investigate how Transport can further contribute to the objectives of the NSW Government's Circular Economy Policy Statement 2019

Moving towards financial sustainability

The NSW Government is investing more than ever in infrastructure programs, committing to a record spend to deliver road and public transport projects over the next four years. While this investment means we can deliver better services and increase customer satisfaction, it also leads to higher whole-of-life costs to operate and maintain the Transport network.

Delivering a modern transport system that improves services, is affordable for both customers and taxpayers, can respond to technological disruption, and meet the challenges of a complex and aging network, requires greater financial sustainability.

To achieve this we need to factor critical whole-of-life considerations into all our decisions. This includes: the balance of investment and cost recovery; access, affordability and equity; better land use outcomes; and reduced impact on the environment. Delivering sustained improvements for customers also requires a strong focus on operational efficiencies and identifying new revenue sources. We will also evaluate and prioritise initiatives that are for the greater good of our customers and communities.

Transport's Financial Sustainability Program

Financial sustainability is a key part of Transport's priorities, seeking to transform our business to deliver for customers now and in the future. This will be achieved through a culture of striving to get the best value possible from taxpayers' dollars and ensuring our investments are prioritised to services, infrastructure and technology that will sustainably deliver for our customers and the broader community. Over the past decade, Transport has achieved significant savings from various initiatives – a significant achievement and a strong foundation for future reform.

Transport is committed to undertaking ongoing reform to pursue opportunities that leverage our assets and new technologies to deliver better cost recovery.

Transport is continuing to improve customer outcomes, through better use of its resources. This is supported through building employee skills and capabilities, setting up a transformation hub to drive reforms, planning responses to emerging trends, such as increased automation and digitalisation, and pursuing its 'people at the heart' organisational strategy.

The cost to the community is growing

Over the past few years, the level of new investment in projects across Transport has increased significantly, to fund network enhancements to improve services for our customers.

The scale of investment to expand and enhance the network means that whole-of-life lifecycle costs are rising at almost double the rate of transport revenues.

Transport's operational expenses are projected to be the third largest component of the growth in the NSW Government's expenditure for services. Even with efficiency initiatives, which have already reduced annual operating costs, the gap between costs and revenues continues to grow.

COVID-19 restrictions have impacted patronage and passenger revenue, putting further pressure on the State to subsidise travel while maintaining service levels. There will be a significant shift in the way offices operate in future, with more people encouraged to work from home and adopt flexible working locations, which may impact farebox revenue in future years.
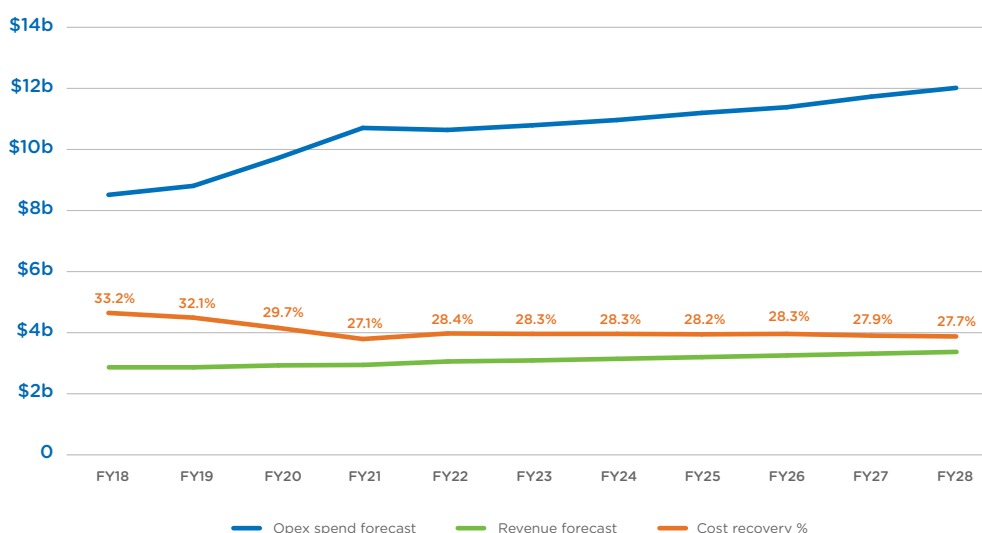
To maintain current levels of transport investment and reduce the gap between costs and revenues, we will need to make greater efficiency savings and identify new revenue sources.

Across the Transport network, overall cost recovery is reducing. In the absence of intervention, cost recovery is forecast to reduce further resulting in additional taxpayer funding to support the provision of transport services.

Existing sources of revenue from roads may be impacted in the future, with the introduction of new technologies. Improvements in automated, electric and hybrid vehicle technology and a move to ridesharing may encourage customers away from public transport services and reduce revenues from driver licences, vehicle registrations, fees and stamp duty.

A growing financial burden on the NSW taxpayer means the transport system will need to be funded in a more efficient, sustainable and equitable way, to ensure our investments provide value for money and deliver customer and community outcomes. This includes exploring alternative sources of revenue and approaches to service delivery, such as Public Private Partnerships, as part of a sustainable funding model.

The cost to the community is growing

The cost of transport (includes public transport and road maintenance)

Pursuing new sources of revenue

To maintain current levels of transport investment and reduce the gap between costs and revenues we will need to make additional savings and identify new revenue sources.

Globally, transport authorities are seeking to leverage their diverse and unique assets for opportunities to supplement fare revenues. Cities like Hong Kong and Tokyo are leading the way, with over 100 per cent cost recovery.

Transport for NSW is working to grow revenue from third-party sources, such as advertising on Transport assets, retail leasing and customised number plates. These activities provide a useful supplement that can offset operating costs, and they will increasingly be applied across the transport portfolio.

In focus:

Development contributions

Ensuring new growth makes a contribution to infrastructure is a key concept of the planning system in NSW. The development contributions framework under the planning legislation recognises different types of contribution mechanisms for infrastructure, including Special Infrastructure Contributions (SICs) and Voluntary Planning Agreements (VPAs), which operate under the *Environmental Planning and Assessment Act 1979*.

Considering the opportunities for development contributions related to some of the initiatives and planning decisions outlined in Future Transport 2056 has the potential to deliver the following benefits:

> unlocking new funding and financing options to make economically beneficial infrastructure more affordable

> spreading the costs of new infrastructure more equitably among its beneficiaries

> providing the opportunity to secure funding that contributes to the protection of long-term major infrastructure corridors

A continued focus on spending efficiency

We are constantly improving the network for our customers, with public transport capital investment growing at 13 per cent each year on average since 2012. Operational and maintenance costs are continuing to grow as the Transport network expands and becomes safer and more efficient.

We are continuing to drive efficiencies across the cluster when it comes to operating practices. However, service levels are increasing and new assets are being delivered, such as Sydney Metro City & South West and Parramatta Light Rail.

It is important that Transport seeks to embed best-practice, and cost- and energy-efficient design principles across all stages of the asset lifecycle and continues to identify opportunities for energy reductions in line with the NSW Government Resource Efficiency Policy. Fuel is a significant portion of the cost of operating transport services. This means we will have to continue evaluating the fleet – seeking alternatives that are more environmentally and financially sustainable.

Future directions to investigate

› identify opportunities for development contributions related to some of the initiatives and planning decisions outlined in Future Transport 2056 Services and Infrastructure Plans

› investigate road network access charges for commercial users, with revenue reserved for related network improvements

› identify supplementary sources of revenue across the portfolio, including commercial revenues through internal advertising, commercial leasing and airspace use, particularly at new interchanges

› identify areas for commercialising intellectual property within the cluster to help offset operating costs

› explore opportunities to leverage data and analytics to drive improvements in network and asset performance and potentially provide new revenue sources

› optimise capital investment and upgrading practices to reduce whole-of-life costs

Social sustainability

Social sustainability seeks to improve quality of life, health and social wellbeing for current and future generations[4] and promotes the principles of equity, diversity, connectedness, democracy and participation. Ensuring transport contributes positively to society, the environment and the economy is fundamental to our social licence to operate.

Accessible transport

One of the key means of achieving social sustainability, and one of the six State-wide guiding principles for Future Transport 2056, is the provision of accessible transport that is safe and promotes mobility and accessibility for all, particularly the vulnerable and disadvantaged, to increase inclusion, participation, health and social wellbeing.

Transport has developed a number of plans to assist us in achieving this outcome including the Disability Inclusion Action Plan 2018 – 2022 and the Older Person's Transport and Mobility Plan. Accessibility is also being improved through programs such as the Transport Access Program which delivers accessible transport interchanges for people with disability or limited mobility.

Technology that provides customer information, travel planning and wayfinding, such as websites, real-time information at transport facilities, onboard trains, buses and ferries, and via trip planning apps, is progressively becoming more accessible. In particular, there have been significant advances in smart phone apps that provide specialised assistance for people with disability.

An accessible network will mean more choice for people with mobility constraints and will make travel easier for everyone, whatever their age, ability or personal circumstances. For example, there will be dedicated space for wheelchairs and accessible toilets on the New Intercity Fleet; we are continuing with our Transport Access Program to provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport infrastructure; and our new, integrated signage provides consistent and easy-to-follow visual messages to make public transport easier for customers to use.

Transport planning for social access

The establishment of the '30 minute city' concept in Greater Sydney, and the hub and spoke network in regional and outer metropolitan NSW, is vital to a socially sustainable network, to connect people to jobs, education and training, health and essential services. Better connected networks enable our customers and communities to connect, strengthen social networks and develop a sense of community and belonging.

Place making, integrated land use and transport planning that is co-designed with communities will also help enhance the quality of places by improving amenity and liveability, reflecting the identity of local people and cultures, and promoting sustainable transport, including public transport, walking and cycling. Working with communities when planning for places helps us embrace community diversity and ensures transport meets the diverse needs of our customers and communities.

Social, environmental, sustainable and ethical procurement

Our new Transport Procurement Policy 2020 (the Policy) and Transport Environment and Sustainable Policy, underpinned by NSW Government Procurement Policy Framework, establishes a consistent Transport cluster procurement framework that promotes sound commercial decisions based on integrity and risk principles. It achieves this by applying high standards of ethics and probity while driving sustainability and social outcomes.

The Policy supports the delivery of safe, sustainable, customer-centred transport infrastructure and services, and uses our procurement to support economic participation and social outcomes, develop skills, and create jobs for the citizens of NSW.

We are committed to building a diverse supply base to support businesses of all types, which includes small- and medium-sized businesses, Aboriginal-owned businesses, regional businesses and disability enterprises.

Social procurement is an important lever for Transport to improve social sustainability outcomes, by using its purchasing power to deliver value for money on a whole-of-life basis, and create social, economic and environmental value for the greater good of NSW through jobs, training and partnerships for groups that are otherwise marginalised or precluded from these opportunities.

Transport for NSW is committed to continuously improving and innovating across the procurement lifecycle to maximise value for money, while fostering a viable market for sustainable goods and services by supporting businesses that demonstrate innovation in sustainability and comply with socially responsible and ethical practices.

This is supported through a number of key initiatives:

> Premier's Memorandum M2014-11: Workforce Criteria for Procurement of Major Projects +$100 million

> Premier's 12 Priorities for NSW

> NSW Government Aboriginal Procurement Policy (APP) 2021 for goods, services and construction

> NSW Procurement Board Direction PBD-2017-05 Construction Training and Skills Development

> Infrastructure Skills Legacy Program (ISLP)

> Small to Medium Enterprises and Regional Procurement Policy

> the NSW Government has committed $15.5 million a year to a five-point plan that will improve point-to-point transport services for customers with disability. Wheelchair Accessible Taxi (WAT) licence fees in metro areas have been reduced to zero, in line with the rest of NSW

> Transport provides funding to community transport operators to provide services under the Commonwealth Home Support Program, Community Transport Program, and Transport for NSW National Disability Insurance Scheme Residual Transport Subsidy for the community

Social workforce procurement and Aboriginal participation

We work with our transport contractors delivering broader social workforce procurement initiatives. For example, the delivery of Sydney Metro is providing a significant opportunity to support jobs and skills for a more diverse and inclusive workforce and supply chain, while also addressing key issues currently experienced across industry. Other major transport infrastructure programs, including Parramatta Light Rail, Regional Rail, the Transport Access Program 3, and More Trains More Services, are also addressing workforce development and industry participation.

In 2018, the NSW Government introduced the Aboriginal Procurement Policy, which aims for Aboriginal-owned businesses to be awarded at least three per cent of the total number of domestic contracts for goods and services issued by NSW Government agencies by 2021. The Aboriginal Procurement Policy seeks to support greater participation of Aboriginal people in government construction projects across NSW. This policy aims to create an estimated 3,000 full-time equivalent employment opportunities for Aboriginal people, many of them in transport infrastructure projects. The Aboriginal Procurement Policy supports and aligns to Transport's Aboriginal Participation Strategy.

Through the Transport Reconciliation Action Plan 2019-2022 and the Transport Aboriginal Participation Strategy, are committed to working collaboratively with NSW Aboriginal communities to respectfully leverage the wisdom of cultural knowledge and increase visibility of traditional knowledge and local Aboriginal languages as we undertake our core business. This plan outlines our cluster-wide approach, recognising and acknowledging Aboriginal and Torres Strait Islander peoples through a range of practical activities that span three pillars – relationships, respect and opportunities.

Our actions are underpinned by the OCHRE plan – opportunity, choice, healing, responsibility and empowerment. The plan sets out a new way for the NSW Government to work with Aboriginal communities, by building strong working partnerships that have at their heart respect for local Aboriginal culture, leadership and decision making.

Future directions to investigate

> develop a Transport cluster-wide implementation plan for the Transport Procurement Policy 2020

> develop a Transport cluster-wide implementation plan to deliver the key objectives of the Transport Reconciliation Action Plan 2019-2022 and the Transport Aboriginal Participation Strategy

> improve understanding of social impacts and benefits from new and upgraded transport infrastructure and services, and distribute the impacts and opportunities fairly

> continue to work with Aboriginal communities and traditional custodians/owners to identify opportunities for community-based place making

Frequently used terms

Term	Definition
30 minute city	A planning concept for a city in which people can easily access the places they need to visit on a daily basis within 30 minutes travel from where they live. In the Greater Sydney context, the focus is on access to the nearest centre within 30 minutes by public transport, walking or cycling.
Accessibility	The ability for everyone, regardless of ability, personal circumstances, or where they live, to use and benefit from the transport system.
Adaptive cruise control	An electronic control system in a vehicle that makes sure that the vehicle keeps a safe distance from vehicles in front.
Aerial mobility technology	The use of aerial technology, such as drones for transport. These may be used to deliver emergency transport services, disaster responses or last-mile freight.
Aerotropolis	A metropolitan subregion where the layout, infrastructure, and economy are centred on an airport that serves as a multimodal 'airport city' commercial core. It is similar in form to a traditional metropolis, which contains a central city commercial core and commuter-linked suburbs. The area around Western Sydney Airport is envisaged to perform this role.
Alternative fuels	Fuels derived from sources other than petroleum (such as petrol or diesel). Examples of alternative fuels include ethanol, electricity, hydrogen, biodiesel and natural gas.
Amenity	The extent to which a place, experience or service is pleasant, attractive or comfortable. Improved features, facilities or services may contribute to increased amenity.
Apps	Refers to computer software-based applications that are available across a wide range of devices, which can provide information and service features directly to users
Artificial intelligence (AI)	A type of computer technology which is concerned with making machines work in an intelligent way, similar to the way that the human mind works.

Term	Definition
Asset management	End-to-end accountability for the management and performance of assets (including asset, condition and risk information, configuration and reporting) to achieve agreed customer and community outcomes.
Assisted mobility devices	Forms of transport that facilitate individual personal transportation. Examples include powered wheelchairs, scooters, segways, bicycles (e-bikes) and unicycles. Although many such devices are used by people with activity or mobility restrictions, mobility aids can be employed generally, such as for transportation in place of private vehicles.
Audio tactile line markings	Road lines that aim to reduce run-off-road crashes in rural areas, by providing a noise and vibratory warning to road users who may stray due to fatigue or poor visibility
Augmented and virtual reality	A virtual experience of a real-world environment where an image incorporates both real world elements and virtual elements
Automation	Use of control systems, such as computers, robots or artificial intelligence, to undertake processes previously done by humans. Transport technology may be fully or partially automated, with the latter involving some form of human input to, or management of, the technology.
Big data	Describes high volumes of data obtained from the transport network that when analysed, can provide travel patterns and trends.
Car share	A model of car rental, with the ability to rent a car for a short period of time, often by the hour.
Cargo bike	A bicycle that is designed to carry a load, commonly used for last-mile freight deliveries.
Catchment	The area from which a location or service attracts people.
Central River City	One of the three cities of the Greater Sydney metropolis, anchored by Greater Parramatta in the Central City District.

Term	Definition
Centre-serving	Corridors that support local access and connect people with their nearest centre, or city-shaping or city-serving interchange. These support buses, on demand, walking and cycling, and enable the delivery of goods.
City-shaping	Highest speed and capacity corridors providing connections between our cities and centres that shape the decisions of residents and businesses on where to locate – typically mass transit rail services, motorways and highways.
City-serving	Higher capacity corridors providing fast, high-frequency and reliable access to cities and centres – typically rapid bus, light rail and ferry services, and main roads.
Congestion	When demand for a part of the transport network during a particular time nears its capacity, resulting in lower average speed, increased delay and unreliable journeys.
Consumer Price Index (CPI)	The standard measure of inflation is the Consumer Price Index (CPI). CPI is a measure of changes, over time, in retail prices of a constant basket of goods and services representative of consumption expenditure by resident households in Australian metropolitan areas.
Connected and automated vehicle (CAV)	A connected vehicle is able to communicate wirelessly with other vehicles, infrastructure and/or devices. An automated vehicle has one or more element of the driving task that is automated and therefore does not require a human driver for at least part of the driving task. Levels of automation range from assisting the human driver with the driving task, through to fully and highly automated vehicles that can drive themselves. 'Connected and automated vehicle' is widely used as a collective term to refer to the full range of different vehicles equipped with varying ranges and capabilities of connected and/or automated vehicle technologies.
Contactless payments	Method of purchasing goods or services using radio frequency identification (RFID) technology or near-field communication.
Corridor	A broad, linear geographic area between places.

Term	Definition
Customer	Everyone who uses transport services or infrastructure is a customer of the NSW transport system. Whenever a person drives, travels by train, bus or light rail, or walks or cycles they become a customer of the transport system. Our customers also use our transport networks for business purposes, to deliver goods and services, and to move freight across the State and beyond.
Customer interface	Communication channels with customers, such as websites, smart phone apps, call centres, physical signage, ticket booths, etc. 'Digital customer interfaces' generally only refers to websites and smart phone apps.
Customer outcomes	he economic, social and environmental benefits that customers can expect from the transport system. Used by planners to guide investment, policy and service provision.
Customer service	Information and assistance supplied by a service provider to the people who use or purchase their products.
Cyber security	Security or protection against the potential for unauthorised use, disclosure, damage or disruption to assets through the use of technology.
Demand management	Systems, processes and activities that are aimed at efficiently allocating available capacity to meet demand, including by influencing customers' choices about when, where and how they travel.
NSW Department of Planning, Industry & Environment (DPIE)	A department of the NSW Government that aims to deliver well-connected communities, preserve the environment, support industries and contribute to a strong economy.
Digital economy	The digital, computing and technology elements of the economy.
Digital twin	A digital real-world model of cities and communities that facilitates better planning, design and modelling for NSW's future needs.

Term	Definition
Driverless vehicles	Commonly referred to as a 'self-driving vehicle' or 'fully automated vehicle'; is a vehicle with an automated system that can perform all driving tasks, under all conditions, that a human driver could perform.
Developer contributions	Where transport infrastructure is required, the associated development opportunities can be leveraged to contribute towards the costs for that infrastructure.
Drones	A remotely operated aerial vehicle (UAV) that may be remotely controlled or can fly autonomously.
E-bike	An electric bicycle; a standard pedal-powered bicycle with an electric motor built-in to assist the rider with additional propulsion.
Eastern Harbour City	One of the three cities of the Greater Sydney metropolis, anchored by the Harbour CBD in the Eastern City District.
Electronic stability control	A computer-assisted safety technology that helps drivers stay in control and avoid crashes when swerving or skidding. It also assists in correcting understeer and oversteer when cornering.
Energy efficiency	The ratio of transport output to energy input; for example, vehicle kilometres per megajoule (vkm/MJ).
Energy intensity	The ratio of energy input to transport output; for example, megajoules per vehicle kilometre (MJ/vkm). It is the inverse of energy efficiency.
E-scooter	An electric scooter; a standard two-wheeled scooter with an electric motor built in to assist the rider with additional propulsion.
First mile and last mile	A term applied to the first and final stage of the journey in which people or goods travel to a broad range of origins or destinations. An example of a last-mile journey is the trip made between a train station and the final destination of a shopping centre or place of work.
Fleet	A collection of vehicles. This may describe all vehicles within NSW or the vehicles of an organisation, transport company or service.

Term	Definition
Flexible transport	Transport services that are run based on the demands of individual customers, rather than a fixed timetable or route. See also 'on demand'.
Freight	Goods or cargo transported by truck, light commercial vehicles (such as vans and utes), cycle couriers, rail, aircraft or ship.
Freight as a Service	Similar to Mobility as a Service, this is a business model whereby on-demand and ridesharing concepts formulate different procedures for the supply of goods to customers, which is accessed through a single account and booking interface.
Global gateway city	A city that provide state-level services and facilities to support a broad population catchment, while also having international connections through its airport and/or port. Canberra, Greater Sydney, Greater Newcastle and the Gold Coast are global gateway cities that support NSW.
Greater Newcastle	The area comprising five local government areas of Cessnock, Lake Macquarie, Maitland, Newcastle and Port Stephens.
Greater Parramatta	Greater Parramatta is at the core of the Central River City, encompassing Parramatta CBD, North Parramatta and Westmead, connected via Parramatta Park.
Greater Sydney	The 33 local government areas of Bayside, Blacktown, Blue Mountains, Burwood, Camden, Campbelltown, Canada Bay, Canterbury-Bankstown, City of Sydney, Cumberland, Fairfield, Georges River, Hawkesbury, Hornsby, Hunters Hill, Inner West, Ku-ring-gai, Lane Cove, Liverpool, Mosman, Northern Beaches, North Sydney, Parramatta, Penrith, Randwick, Ryde, Strathfield, Sutherland, The Hills, Waverley, Willoughby, Wollondilly and Woollahra.
Greater Sydney Commission	An independent cross-governmental agency responsible for leading the metropolitan planning for the Greater Sydney Region.
Hub and spoke	A transport network model that provides connections (spokes) from and between key centres (hubs). The spokes link to different hubs across an area, rather than focussing on one key hub.

Term	Definition
Independent Pricing and Regulatory Tribunal (IPART)	An independent NSW regulator that reviews and provides advice on the pricing of services, such as water, electricity, gas, local government and public transport. IPART can also investigate both policy and economic matters at the request of the NSW Government.
Infrastructure NSW	An independent statutory agency responsible for assisting the NSW Government with identifying and prioritising the delivery of critical public infrastructure for NSW.
Infrastructure project	Projects that deliver physical infrastructure including roads, bridges, pavements, earthworks, intelligent transport systems (ITS), wharves, light rail, traffic signals and safety improvements.
Initiative	Any action to address a transport problem. It could consist of an investment (capital/infrastructure) option, or a reform (non-investment/non-infrastructure) option. The term 'project' is often used for such actions but is limited by a perceived association with investment or infrastructure.
Inland Rail	A proposed 1,700-kilometre freight rail link between Melbourne and Brisbane via regional Victoria, New South Wales and Queensland.
Intelligent speed adaptation (ISA)	Advanced systems that assist drivers to stick to the speed limit. GPS technology linked to a speed zone database allows the vehicle to 'know' its location and the speed limit on that road. The ISA system provides visual and auditory feedback to the driver if the vehicle exceeds the speed limit.
Intelligent Transport System (ITS)	The application of computing, electronics, information technology and communications to solve transport problems. Transport will review and implement Intelligent Transport Systems for managing connected vehicles and infrastructure, where it is cost effective to do so. An example is Cooperative Intelligent Transport Systems (CITSs). CITSs allow vehicles to communicate with other vehicles and infrastructure, enable greater safety, and can optimise the management of pedestrian movement and vehicle traffic.

Term	Definition
Interchange	A facility to transfer from one mode of transport or one transport service to another. For example, a rail station with an adjoining bus facility.
Intermodal terminal	An intermodal terminal is an area of land used to transfer freight between at least two modes of transport. It is typically used to describe the transfer of international shipping containers from road to rail and vice versa.
Journey	For the purposes of this document, the term journey refers to the door-to-door movements of a customer through the transport system. A journey may include several sections, or trips, and use more than one mode of transport.
Jurisdiction	A state or other area in which a particular court and system of laws has authority
Land use planning	The organisation of land, resources, facilities and services with a view to securing physical and economic efficiency, social inclusion, the protection of environmental values, amenity, and health and wellbeing outcomes, for urban and rural communities.
Light rail	An urban railway transportation system using vehicles that are capable of sharing streets with vehicular traffic and pedestrians, but may also be operating on an exclusive right-of-way, such as a segregated rail corridor, tunnel or elevated structure.
Liveability	The term 'liveability' is used in land use planning to focus on quality of life for people within a given area, considering social, economic and environmental factors. It encompasses the impact of the built environment on human health and community wellbeing.
Machine learning	A form of artificial intelligence in which a computer system is fed a large volume of information about how people move or the transport system operates and then analyses this information to determine patterns. These patterns are then tested against new data to be measured and improved (allowing the machine to 'learn').

Term	Definition
Mass transit	High-capacity public transport services between major centres on fixed routes. Mass transit will typically be used on NSW's busiest public transport corridors to quickly and efficiently move a large number of customers.
Metro	An urban railway transportation system that is associated with high capacity and high frequency (typically turn-up-and-go, rather than timetabled) and greater automation.
Metropolis of three cities	The Greater Sydney Commission's vision for Greater Sydney, as introduced in the Greater Sydney Region Plan: A Metropolis of Three Cities.
Micromobility	Lightweight vehicles such as bicycles, scooters or skateboards, as well as lightweight electric vehicles such as e-bikes or e-scooters.
Mobility	The ability to move or be moved easily and without constraint.
Mobility as a Service (MaaS)	A business model for customers to access transport services in which customers can use a single account and booking interface to access a broad range of transport modes, none of which the customer owns. Examples would be allowing a customer to access public transport, car sharing and bike sharing all using the same system.
Mode	The type of vehicle or method used for a trip. For example train, bus, light rail, car, motorbike, bicycle, ferry or walking.
Mode share	The proportion of overall trips that are taken on a particular mode.
Motorways	Strategically significant multi-lane roads that move people and goods rapidly over long distances.
Movement	The movement of people and goods on the transport network.
Movement and Place Framework	A framework for planning, designing and operating our road network based on a 'one road network' approach. It considers how different parts of the network perform different functions – moving people and goods and being places for people, particularly in centres.

Term	Definition
Movement corridors	Places that provide safe, reliable and efficient movement of people and goods between regions and strategic centres.
Net-zero emissions	The aspirational greenhouse gas emission level that the NSW Government has targeted to achieve by the year 2050. Net-zero emissions means NSW emissions will be balanced by carbon storage and other reduction strategies.
NSW Transport cluster	A group of agencies consisting of Transport for NSW, the operating agencies of Sydney Trains, NSW Trains, and the State Transit Authority, the state's private transport operators, a number of project delivery offices for major transport projects, and the Port Authority of NSW.
On demand	Transport services that are responsive to the demands of individual customers, rather than a fixed timetable or route. They can provide new or improved coverage to areas where traditional public transport is difficult to provide. They may act as feeder services to stronger public transport corridors.
Off-peak	Travel periods outside of the morning or afternoon peak periods.
Open data	Data or information that is provided publicly to be freely accessed, used, shared or modified by anyone, for any use.
Optionality	Factoring variables and different scenarios into project planning and design.
Outer metropolitan	An area encompassing the local government areas of Shellharbour, Wollongong, Central Coast, Lake Macquarie, Cessnock, Maitland, Newcastle and Port Stephens.
Patronage	Number of customers using a transport service during a particular period.
Personal mobility devices	Small, motorised devices designed to transport individuals.
Pinch points	Traffic congestion points, intersections or short lengths of road at which a traffic bottleneck exists slowing down the broader network.

Term	Definition
Place plan	Plan to deliver an integrated transport network to improve access to, from or within key places or centres by all modes.
	It is the aim of the Movement and Place Framework to improve the function of transport corridors to enhance the amenity of places. It will include the development of a walking and cycling network, identifying the missing links and initiatives for behaviour change to support more sustainable travel options.
	Place plans will also include travel demand management policies and tools to support travel, such as car sharing and to assist workers and employers better manage travel demand.
Place making	Refers to the development and management of the built environment to influence the character or experience of places. Successful place making either preserves or enhances the character of our public spaces, making these more accessible, attractive, comfortable and safe.
Point to point	Transport services that go directly from a passenger's origin to their destination. Aside from private cars, taxis and ridesharing services (Uber, Lyft) are the most common point-to-point transport modes.
Precinct	A geographical area with boundaries determined by land use. For example, an area where there is an agglomeration of warehouses may be termed a freight precinct.
Program	A group of related or similar projects managed in a coordinated way to maximise benefits and gain control not available if managing the projects separately.
Project	A temporary organisation of people and resources to deliver a defined set of benefits designed to resolve an identified problem. Projects are typically delivered in a defined time period, on a defined site, in accordance with an agreed business case (including approved asset management plans).
Private vehicles	Passenger vehicles, motorcycles and trucks, owned and operated by those with a driving license and appropriate registration.

Term	Definition
Real time information	Information about the status of the transport network and services that is completely live or has a lag of less than a minute or two. Real-time analytics refers to analysis that is performed on real-time data (generally automatically and without input from a human analyst) and is then used to make decisions or take action immediately.
Regional NSW	The area of NSW outside Greater Sydney. It includes the nine regions of Central Coast, Hunter, North Coast, New England North West, Central West and Orana, Far West, Riverina Murray, South East and Tablelands, and Illawarra-Shoalhaven.
Resilience	The ability of infrastructure systems and services to withstand climate, weather and catastrophic events.
Satellite cities	The cities Wollongong and Gosford that form part of the conurbation of Greater Sydney.
Service (or transport service)	Service refers to transport services, generally public transport services. Examples include trains, buses, light rail and ferries. Services might also include shuttle buses and a range of privately operated but publicly accessible transport types.
Shared vehicles	Vehicles, such as cars or bicycles, made available for shared use to individuals on a very short-term basis.
Sharing schemes	Private transport modes, especially cars and bikes, where the assets are utilised among several users, none of whom solely own the asset.
Smart infrastructure	Infrastructure, such as transport, public spaces or health solutions, which uses data gathered through a network of sensors and technologies embedded in the built and natural environment, designed to support place-based smart interventions.
Smart motorway	Motorways that use embedded sensors, analytics and customer feedback tools, to actively manage congestion and safety and respond to traffic incidents.
Social inclusion	The process of improving the terms on which individuals and groups take part in society – improving the ability, opportunity and dignity of those disadvantaged on the basis of their identity or circumstance.

Term	Definition
State Infrastructure Strategy	The State Infrastructure Strategy, developed by Infrastructure NSW, provides the NSW Government with independent advice on the infrastructure needs of the State over the next 20 years.
Strategic centre	A location that has a high proportion of knowledge-intensive jobs and/or existing or proposed major transport gateways.
Streetscape	A visualisation of a street, including the road, adjoining buildings, footpaths, street furniture, trees and open spaces.
Supporting plans	More detailed issues-based or place-based planning documents that will support the implementation of Future Transport 2056.
Sustainable procurement	A strategic procurement practice to generate environmental and social benefits beyond the goods and services required.
Three cities of Greater Sydney	The three cities envisaged by the Greater Sydney Commission are the established Eastern Harbour City, the developing Central River City and emerging Western Parkland City in and around the new airport. Each of these three cities will have their own unique identity and each must be planned to maximise liveability, productivity and sustainability.
Third-rail trams	Light rail or trams that use a third rail, which provides power to the vehicle as it moves along the light rail line.
Transport disadvantage	Describes a result when certain factors, such as language, age, ability and cost, result in less choice for when, where and how customers travel.
Towards Zero	A vision outlined in the Road Safety Plan 2021 that aims to have a NSW transport network with zero trauma by 2056.
Transport for NSW (Transport)	The statutory authority of the New South Wales Government, responsible for managing transport services in New South Wales.
Transport Reconciliation Action Plan 2019-2022	An inaugural Transport release that acknowledges and pays respect to the role of Aboriginal and Torres Strait Islander peoples as custodians of the lands where we work. The Reconciliation Action Plan demonstrates Transport's commitment to working towards reconciliation both within Transport and in communities across NSW.

Term	Definition
Transport hub	A facility designed for transitioning between different modes, such as a major bus stop or train station. Transport hubs for freight include freight rail yards, intermodal terminals, seaports or truck terminals. Major airports are also considered transport hubs.
Trauma	Physical or mental injuries that require medical attention.
Travel Demand Management (TDM)	A range of initiatives to reduce car dependence and manage travel demand, with the objective of moderating traffic growth by encouraging people to reduce car use and maximise the capacity of the existing road network.
Travel choices	A Transport for NSW behavioural change initiative to help manage demand on the transport network in response to capacity constraints or disruption. It involves helping individuals and organisations prepare for and adapt to changes on the transport network.
Turn-up-and-go	Services with frequency equal to or under five minutes, requiring little to no travel planning.
Urban renewal	A planned approach to the improvement and rehabilitation of city areas with new infrastructure, improved services, and renovation or reconstruction of housing and public works.
Ute	A ute is a vehicle that is designed to travel over rough ground. Ute is an abbreviation for ' utility vehicle'.
Visitor economy	The tourism industry in NSW and the economic activity that it produces.
Western Parkland City	One of the three cities of the Greater Sydney metropolis, anchored by the metropolitan city cluster of Western Sydney Airport, the Aerotropolis, Liverpool, Greater Penrith and Campbelltown-Macarthur in the Western City District.
Western Sydney Airport	The designated and abbreviated name for the second Sydney airport – Western Sydney International (Nancy-Bird Walton) Airport – located in Badgerys Creek.
Whole-of-life costs	The total cost of a particular item or service, from initial conceptualisation through to disposal.

Future Transport Strategy 2056

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