20-YEAR STATE INFRASTRUCTURE STRATEGY

RAA SUBMISSION

July 2019

RAA

Introduction

RAA welcomes the opportunity to provide comment on the Infrastructure SA 20-Year State Infrastructure Strategy.

RAA is South Australia's largest member organisation representing the interest of more than 750,000 South Australians. Through our diverse range of motor, home and travel products and services, we interact with our members in a range of ways that provide unique insight into the government services and public policy settings South Australians want and need.

Our members look to RAA to represent their interests on a broad range of motoring and mobility-related topics. RAA consults with industry and government to advocate for the right investment in the right transport solutions, and promote safer mobility options.

RAA undertakes a range of activities to identify, report on and advocate for improvements to the road network to facilitate safer, more effective mobility for all road users and pedestrians. Our priorities are based on information that we derive from surveys of our members, analysis of open source data, and on-site investigations.

RAA's mobility public policy is underpinned by our three overarching priorities to help keep our members moving safely, accessibly and sustainably:

> **Safe:** We advocate for a mobility system that not only achieves, but outperforms, national and international safety benchmarks. It encompasses safer drivers, in safer transport, on safer roads, at safer speeds.
>
> **Accessible**: We advocate for a cost efficient, convenient and reliable transport network as an essential part of personal mobility.
>
> **Sustainable**: We advocate for the mobility needs of current and future generations, encompassing financial, societal and environmental factors.

RAA welcomes the opportunity to provide comment on Infrastructure SA's 20 year strategy. Our submission is categorised under the following themes:

Road and freight infrastructure

- Metropolitan roads
- Regional roads
- Freight
- Road safety

Energy infrastructure

- Renewable energy
- Hydrogen
- Electric vehicle batteries

Mobility for all South Australians

- Public transport
- Active transport
- Regional connectivity

Technology support and development

Environmental considerations

Further detail in response to the questions posed in the consultation paper can be found in *Appendix 1*.

Road and Freight Infrastructure

RAA is of the view that investment in maintaining and upgrading transport infrastructure is crucial to prevent worsening congestion, reduce vehicle emissions, address road safety risks, and prevent further deterioration of our state highways and freight routes.

Improving land transport infrastructure should be a priority of all levels of government, with investment in early planning and securing transport corridors needed to help keep pace with the increasing demands placed on South Australia's road network. Ongoing investment in the progressive removal of congestion points, grade separation of level crossings in the metropolitan area, and removal of redundant rail crossings on the regional road network will ensure the existing road network is operating effectively.

Metropolitan roads

Delivery of a non-stop North-South Corridor is vital for the South Australian economy and is the top infrastructure priority for RAA members. Whilst full funding for the completion of the most complex section has now been provided for by the state and federal governments, it is critical that this project is now delivered in a timely manner.

Further economic growth may be realised through an eastern link from the completed North-South Corridor to the South Eastern Freeway. The GlobeLink plan aims to provide a suitable alternative to the ongoing use of the existing route through the Adelaide Hills. However, it should be noted that this may not offer a feasible return on investment in the short to medium term, but may offer a viable longer term option to existing routes. Options, such as upgrades to the Cross Road corridor, may provide the shortest link between Adelaide's east and the North-South Corridor and should be explored.

Urban consolidation will have a significant impact on inner and outer city ring routes. Whilst increased delays due to congestion may encourage uptake of alternate means of transport, further enhancements such as road widening and intersection upgrades, will be necessary to accommodate future population growth. Further development of the AddInsight Bluetooth network may encourage drivers to explore alternate routes and unlock opportunities to provide targeted efficiency improvements to the existing road network.

Road space is in limited supply, and there will need to be trade-offs to accommodate future active transport and public transport corridors, particularly in metropolitan Adelaide. Efficient use of transport can be encouraged through the provision of dedicated public transport and high-occupancy vehicle lanes where possible, which can provide both environmental and economic benefits. Any compromises made must not reduce public safety, and by adhering to a safe system framework, this can be ensured.

When making these decisions there are always 'winners' and 'losers', so transparency in the decision-making process is vital to demonstrate that decisions are being made for the greater good and that a clear, logical process is being followed.

RAA recommends:

- Timely delivery of a non-stop North-South Corridor.
- Exploring feasibility of an eastern link to the completed North-South Corridor.

Regional roads

There must be a focus on better road safety outcomes as part of any future infrastructure planning, and RAA supports the application of the 'Safe Systems' approach to road safety. As such, we believe a key priority is to achieve a minimum 3 star AusRAP rating across the regional road network. In working towards a consistent safe road network, RAA recommends that the Department of Planning, Transport and Infrastructure (DPTI) release star ratings of the regional road network to provide greater transparency on the current safety performance and assist in identifying priority areas for future upgrades.

In the short term, regional road upgrades such as the planned Eyre Peninsula package, will continue to improve safety and productivity on our regional road network. RAA welcomes the 2019/20 State Budget allocation of $125 million to upgrade Eyre Highway, which includes $32 million to upgrade other Eyre Peninsula roads.

State government agencies must continue to work with the federal government to secure a commitment to an ongoing program of duplication across the national highway network. This will improve road safety outcomes for all road users and create operational efficiencies which support increasing freight, agribusiness and tourism activity.

RAA recommends:

- The achievement of a minimum 3 star rating across South Australia's regional road network.
- An ongoing program to duplicate the national highway network to improve road safety outcomes and operational efficiency.

Freight

Research undertaken by Deloitte Access Economics for the Australasian Railways Association (November 2017) reported a potential increase of 88% in road freight kilometres by 2050, and an increase of 40% in private vehicle travel in the same period. Greater uptake of the rail network to reduce road freight movements would ease congestion on both metropolitan and regional roads. Furthermore, the social benefits of rail transport includes less noise and air pollution, and reduced community concern over the safety risks posed by trucks passing through regional townships.

Rail and road interoperability options should be explored to capitalise on the respective efficiencies of these transport modes and to reduce, where practicable, the reliance on the road network for the movement of freight and agribusiness. Successful examples include Bowmans Rail's intermodal facility and the recent growth undertaken at the Bordertown facility.

RAA recommends that a state-wide rail assessment is undertaken to identify whether opportunities exist for rail to play a larger role in freight movement across the state, and to identify sections of rail infrastructure that should be retained. If growth opportunities for rail transport are limited, an ongoing program of road assessments must be implemented to ensure the state's road network is fit for purpose.

To properly address the increase in freight and tourism requirements across the state's road network, RAA is calling for the development of a regional transport plan that supports regional development. This would enable the medium and longer term road, sea and rail transport requirements to be identified for future funding to support regional growth.

RAA recommends:

- Undertaking a state-wide rail assessment to identify whether opportunities exist for rail to play a larger role in freight movement.
- Developing a regional transport plan to identify funding requirements for medium and longer-term road, sea and rail projects that are required to support regional growth.

Road safety

Road trauma costs the South Australian economy up to $1 billion each year. Infrastructure targeted at reducing road trauma can provide significant economic benefits, in addition to social and community benefits. With the recent establishment of the federal Office of Road Safety to provide national leadership in eliminating road trauma, it is an opportune time for South Australia to set achievable road safety targets and show leadership at a state level.

RAA supports the 'Safe Systems' approach to road safety which consists of five key pillars – safe drivers, safe vehicles, safe speeds, safe roads, and post-crash care. Infrastructure is a vital pillar of a safe system which delivers safer roads, however it is only one part of the overall solution to road safety and cannot be used in isolation.

Continuing upgrades of South Australia's regional road corridors is vital to ensure safety and productivity on the regional road network. Dangerous roads and long journeys can be a substantial detractor to living in the regions, and vital services must also be accessible to residents to reduce strain on inter and intra region connections.

RAA recommends:

- Continuing upgrades of South Australia's regional road corridors to ensure safety across the network.

Energy Infrastructure

South Australia's climate provides a number of opportunities for establishing renewable energy infrastructure, which may offer a key growth industry for regional areas. South Australia has already been pro-active in the implementation of renewable energy and has one of the highest percentage mixes of renewable energy in the country. This progression needs to continue and the current government's target of achieving net 100% renewable energy by 2030 must be delivered. The state's infrastructure plan must also accommodate changes arising from the electrification of public transport and motor vehicles.

Renewable energy

Renewable energy generation technology is constantly evolving and improving, therefore an approach to supporting renewable electricity projects should remain technology agnostic, allow for future disruptions and focus on outcomes that deliver reliability and maximum financial and environmental outcomes for the state. There are a range of methods such as floating and terrestrial solar photovoltaic, concentrated solar thermal, ocean and terrestrial wind power, and wave power, which can take advantage of the abundance of natural resources available in South Australia.

Managing demand on current infrastructure and supporting reliable renewable energy for the state will depend on energy storage facilities and other grid firming infrastructure. More of these projects, such as pumped hydro, compressed air energy storage, large scale battery, molten salt and other gravitational potential methods are required. The state government's $50 million Grid Scale Storage Fund is a step in the right direction, and whilst the total amount of storage required is unknown, securing more storage is critical. Complementary infrastructure such as synchronous condensers, whilst costly, will also benefit the increased adoption of renewable energy.

Any new electrical infrastructure will need to consider the role a virtual grid will play in the storage of renewable energy. Projects such as the Tesla Virtual Power Plant and AGL's program, which involves interconnected residential batteries and roof top solar systems, help manage demand on the grid and reduce costs for residents. Future phases of these programs should be supported to encourage uptake, as should the subsidy to purchase residential batteries. To further the benefits to the grid and increase the use of renewable energy, changes to development plans should be considered which mandate energy generation and battery storage for large residential and commercial developments.

Renewable energy projects and transmission infrastructure are already driven by a combination of private investment and government funding, and the provision of attractive operating conditions will continue to attract investment into energy infrastructure. Regional developments in renewable energy generation and large scale remote mines can also leverage private investment into infrastructure, such is the case with Olympic Dam and Prominent Hill transmission lines.

There are also potential economic benefits to be realised through exporting electricity, e.g. projects such as the NSW interconnector, renewable hydrogen, or ammonia production, in addition to the ongoing employment provided through design, construction, maintenance and operation of renewable energy

projects. The generation of renewable energy is predicted to have benefits for residents due to cheaper electricity prices, thus also making it more attractive for industry to do business in the state.

The environmental benefits of renewable energy are well known for air quality and mitigating climate change by decarbonising our electricity. This has a flow on effect for improving quality of life for South Australia's growing population, and will enable truly low emission transport with the eventual adoption of electric vehicle variants.

RAA recommends:

- Exploring reliable renewable energy opportunities for the state, including energy storage facilities and other grid firming infrastructure.
- Considering changes to development plans which mandate energy generation and battery storage for large residential and commercial developments.

Hydrogen

Hydrogen manufacture and use as a fuel has potential economic, environmental, health and energy security benefits for South Australia. Establishing a hydrogen generation industry would complement the already thriving renewable energy industry in the state, providing a clean source of hydrogen for sale and grid firming characteristics. RAA supports recent papers produced by CSIRO (*The National Hydrogen Roadmap, 2018*), the South Australian Government (*The South Australian Green Hydrogen Study, 2017*), and the COAG Energy Council (*Hydrogen for Australia's Future, 2018*) which provide significant detail on how investment into hydrogen infrastructure could proceed.

In the short term, investment in a small number of hydrogen refuelling stations and participation by government in hydrogen vehicle trials (including buses and waste collection vehicles, which are well suited being return to base fleet) will introduce the technology to South Australia and provide learnings about its use in transport.

Hydrogen fuel cell buses are already being manufactured in Japan, and as such, RAA recommends that the recent South Australian Government tender for hydrogen fuel cell buses be reviewed and reopened. Hydrogen as a fuel would also suit interstate rail transport, based on current examples of hydrogen-powered trains in Germany. Established hydrogen production programs within the state (e.g. AGIG at Tonsley and H2U on the Eyre Peninsula) are available to supply locally made hydrogen to the required refuelling stations.

Locally made hydrogen should be trialled in South Australia's gas network at a low percentage, such as not to effect existing gas appliances. Small scale export programs of hydrogen or ammonia to emerging importers such as Japan and South Korea would assist South Australia to establish a foothold in the market. The recent acceptance of H2U into the 'Green Ammonia Consortium' shows the promise for large scale export of ammonia as a hydrogen carrier in the future.

In the mid to long term, hydrogen infrastructure investment should focus on four key areas:

- Expanding hydrogen manufacture;
- Broadening the network of refuelling stations to accommodate hydrogen vehicles becoming commercially available;
- Establishing large scale export facilities; and
- Replacing natural gas completely with hydrogen for South Australia's heating requirements.

There is also the potential for hydrogen to be used in large scale fuel cells and hydrogen-powered turbines to provide stable electricity to the grid.

Hydrogen manufacturing techniques are improving and new methods are being developed, which have shown this technology to be as environmentally friendly as the electrolysis of water using renewable energy (including high temperature electrolysis and methane cracking). Driving pilot programs in South Australia can establish the industry and allow for greater uptake of these technologies as they come to market.

Hydrogen transport technology is also improving, which will make hydrogen fuel cell vehicles less costly (e.g. high capacity, low pressure hydrogen tanks being developed by Kubagen). If South Australia can establish a hydrogen manufacturing industry while the technology is still in its infancy, the state will be well positioned to capitalise on the increased uptake of hydrogen that will arise in the future.

RAA recommends:

- Exploring opportunities for establishing a hydrogen manufacturing industry in South Australia, including investment in hydrogen refuelling stations and hydrogen vehicle trials.

Electric vehicle batteries

Electric vehicle (EV) batteries have a similar, or often greater, electrical storage capacity than a typical household battery pack (e.g. the Tesla Wall), and have the capacity to supply power back to the grid when needed. This technology is already realised in the recently released Nissan Leaf.

Any future energy management strategies should include the dual role of EVs and fuel cell electric vehicles (FCEVs), acting as both chargers at home using smart metering and also delivering power into the home or grid. Modelling for increased EV uptake in specific suburbs will be needed to better understand the effect on the local energy grid and to ensure that the infrastructure can cope, along with trials of vehicle to grid power transfers and remote EV charging demand management to minimise peak demand problems.

Mobility for all South Australians

Research has shown that a loss of mobility, especially for older people, leads to a decrease in both quality and longevity of life. As older people transition out of car ownership and less younger people take up driving, more flexible mobility options will be needed.

This will require the frequency and cost of public transport to improve and to become the base transport method to which other first and last mile mobility solutions connect. Future public transport scheduling should consider 'on demand' and dynamic flexible scheduling to encourage uptake and meet user needs.

Public transport

Metropolitan growth needs to be constrained within the current boundaries of Adelaide to achieve a critical mass of population density, preferably in close proximity to existing public transport routes, to reduce reliance on private car use. Similarly, any new greenfield developments must include public transport and (ideally) separated cycling opportunities.

While the public transport system is generally quite good at getting people into and out of the city during business hours, it is poor at providing a reasonable level of cross country service. The adoption of more flexible public transport options could address this limitation, which is frequently cited as the major reason for the continually high level of private vehicle usage across metropolitan Adelaide.

Major investment in public transport will be needed to provide an appealing, efficient and effective mode of transport for the growing population, with dedicated bus and rail corridors being continually enhanced.

A recent RAA member panel survey on active transport, conducted in May 2019, found that 61% of respondents who catch public transport accessed the stops by walking, 36% by private vehicle, and only 2% by bicycle. This survey also showed a high level of community support for investing in public transport infrastructure to ease congestion on roads (68%), improve public health (60%), and encourage public transport use (58%).

The collection and analysis of passenger data by operators will ensure transport resources can be directed to where they are most effective, e.g. the current Metrocard system could be expanded to require tap-off to collect information on journey durations.

In the short to mid-term, electric rail extensions of the Seaford line (to Aldinga) and the Gawler line (to Roseworthy) must be considered to accommodate the expected population increases in these areas.

When surveyed in March 2019, RAA members indicated support for increased park-and-ride facilities (67% would support), expansion of the bus network (55% support), and expansion of the train network (50% support), all of which could be considered by the government to increase patronage.

Public transport infrastructure needs to leverage mobility as a service (MaaS), including increasing the mobility options available for the disabled and elderly. The use of autonomous vehicles (AVs) has a role in future public transport, as either a connecting first-last mile solution or as public transport in its own right. The government should continue to support MaaS development by funding research and development, and assisting with the start-up business model to monetise these services and technologies. If done right, the greater use of technology in public transport will assist in easing the demand on existing road infrastructure.

Transport hubs that bring people to South Australia and generate economic activity, such as airports and ports, are essential considerations in strategic infrastructure planning. RAA believes these developments should include sufficient provision of public transport options to reduce the reliance on private vehicle use. The integration of technologies such as ride sharing and AVs as a means of addressing last mile issues should be considered where appropriate.

RAA recommends:

- A focus on increasing population density in metropolitan areas, ideally in close proximity to existing public transport routes.
- Adopting flexible public transport options, including the development of mobility as a service (MaaS).
- Collecting and analysing passenger data to enhance passenger transport resources.
- Electric rail extensions to the Seaford and Gawler train lines to accommodate expected population increases.
- The state government supports research and development of autonomous transport trials.

Active transport

Infrastructure investment needs to complement modes of transport other than private vehicles, and achieve enhanced accessibility for all forms of mobility as well as community benefits.

Further investment into active transport corridors can encourage cycling and walking as an appealing and efficient means of transport. Connectivity between public and active transport needs to be further developed to address last mile access issues. Incorporating devices (e.g. e-scooters and e-bikes) for hire into public transport services may deliver enhanced connectivity and encourage greater uptake of public transport.

Further investment in cycling infrastructure should be focussed on delivering separated infrastructure to encourage cycling as a means of commuting, rather than just for recreation. To achieve this, connected cycling infrastructure is essential despite requiring a reallocation of road space to achieve in some cases.

Priority must be given to the completion of the east-west cycling routes in Adelaide's CBD. A recent RAA survey on active transport, conducted in May 2019, found that when participants were asked about improvements that could encourage greater uptake of cycling, separation between on-road bike lanes and parked vehicles (63%), connectivity between bike routes (63%), and improved road/path surface (53%) were the most favoured options.

A national approach is required to help make local streets more pedestrian and cycle friendly, and RAA recommends that the federal government establish a funding scheme to assist local government to redevelop residential streets to accommodate greater pedestrian and cycling activity, thus reducing reliance on private vehicles for short journeys.

Active street frontages should be encouraged to create visual engagement with patrons, whilst allowing easy access to the precinct for all modes of transport. Appealing and well-maintained public infrastructure is important to the appeal of an area, and to encourage multi-purpose trips.

Demonstration projects should also be undertaken to show what best practice could look like in terms of providing 'car free' or 'car as a guest' precincts, which encourage walking and help to activate local businesses. As part of this, interstate and international examples of vibrant and economically productive communities should be reviewed to ensure similar precincts are supported in South Australia.

South Australia's functional road hierarchy should also be reviewed, and in doing so, identify which road corridors can accommodate separated cycling and public transport infrastructure.

RAA recommends:

- Further investment in cycling infrastructure, with priority given to the completion of east-west cycling routes in the Adelaide CBD.
- A funding scheme to assist local government to redevelop residential streets to accommodate pedestrian and cycling activity.
- Demonstration projects to show what 'car free' or 'car as a guest' precincts can look like that encourage walking and help activate local businesses.
- A review of South Australia's functional road hierarchy.

Regional connectivity

Meeting the mobility needs of people living in regional South Australia poses a challenge due to low population density. However, efficient, flexible and accessible options must be provided to ensure regional residents are connected with health, education and other services. The population in regional South Australia is currently growing at a slower rate than metropolitan areas (~0.2%), however sections of the Yorke and Fleurieu Peninsula regions are expected to see growth greater than 1% in the near future, mostly due to increasing numbers of retirees moving to these areas.

In 2017/18, patronage on regional bus services decreased by 6%. This follows a 13% decrease in regional bus patronage for the year prior. Decreasing regional bus patronage has in part been attributed to cheaper regional airfares, increased access to services/shops in regional towns, online shopping/banking services, and people choosing to use cars for travelling long distances. However, for some residents in regional areas, this is their only mode of transport and the government must work to ensure the viability and continuity of services.

Opportunities to grow regional centres should be explored and invested in, whilst maintaining and improving connectivity to Adelaide. RAA recommends that an audit of infrastructure capacity of our regional centres be undertaken, with an investment plan developed to address identified gaps. As a result, investment can be prioritised, and also take into account the respective Regional Development Authority plans. Opportunities to work with federal and local government should be explored to establish funding streams, which could include private investment that supports the delivery of key projects across the regions.

The footprint of metropolitan Adelaide must be consolidated, with regional centres clearly defined and accessible by multiple modes of transport through enhancements to existing infrastructure. High growth in areas such as Mount Barker and Gawler should be supported through provision of sufficient infrastructure to deal with increasing population, reducing the need on residents travelling to inner metropolitan Adelaide.

Continued investment in passenger transport infrastructure and services throughout South Australia, including increased access for regional residents and capacity on public transport services, will be required to keep up with the needs of a growing population. The regional transport network should remain flexible, with services delivered according to the current and future needs of regional communities, and be responsive to new mobility opportunities.

An agile transport system should facilitate the visitor economy, connecting communities and businesses conveniently, efficiently and safely to regional centres. Also, a program of upgrades to improve the amenity and safety of public transport stops, stations and interchanges is essential.

RAA recommends:

- Undertaking an audit of infrastructure capacity in regional centres, with an investment plan developed to address identified gaps.
- Providing flexible and accessible transport options to ensure regional residents are connected with essential services.

Technology Support and Development

Investment in telecommunications is required to future-proof the transport network, as it is a fundamental requirement for the advancement of innovative deployments and applications, including the development of autonomous vehicles. Attention must be given to ensuring a consistent level of reliable mobile data coverage is maintained along our transport corridors, with communications technology incorporated to support safe operation along the route.

Mobile blackspots along transport corridors need to be identified, and while preference should be given to ensuring a consistent mobile network, conventional telecommunications should be considered where this cannot be achieved. It is important to consider improvements in technology that could assist with incident prevention/management communications.

Uptake of intelligent transport systems (ITS) technology in the road system is essential for the efficient use of existing infrastructure. Specific projects to consider include:

- The use of 'vehicle to everything' (V2X) technologies for creating green wave traffic conditioning, especially on significant areas of the road network such as the Adelaide CBD inner ring route.
- Expansion of the AddInsight system to provide live updates for satnav directions or variable speed changes. The government should leverage the expertise of local leaders in this area (e.g. Cohda Wireless and SAGE Automation). AddInsight data can also assist in managing better traffic flow and traffic light management and provide smart route calculation around the CBD for drivers.
- Support for infrastructure to enable the operation of 5G communication technology for the development of ITS and connected car technology.

To help support the uptake of electric vehicles (EVs), RAA believes a comprehensive network of fast chargers with standardised fittings is needed in country towns and along highways. RAA supports the rollout of charging infrastructure currently being undertaken by Chargefox. Government support of a program which encourages uptake of EVs by companies (e.g. government departments, ride-share companies, taxi operators) could be beneficial in exposing both their staff and customers to the benefits of EVs.

Dukes Highway provides a vital link between Adelaide and Victoria and is South Australia's busiest regional freight corridor, with most sections carrying over 1100 commercial vehicles (almost one third of all traffic). The highway also looms as a major strategic route for future autonomous freight operations, which will require at least two lanes in each direction.

The future uptake of electric air taxis and drones has the potential to alleviate congestion by removing numerous delivery and passenger vehicles from the state's road network. Electric drones will also reduce emissions and could benefit the tourist economy. The future long range drone network may also connect Adelaide to regional areas, helping businesses overcome the issue of distance and isolation, e.g. country residents who require medical treatment in the city, but are unable to drive could also benefit from this technology.

Autonomous air flight control for drones would have less complexity than it does for road based vehicles and could potentially evolve at a faster pace. Uber Air has indicated that it will be conducting trials in Melbourne in the next few years, and trials will also begin in Dubai shortly.

Digital infrastructure investments are required in the short term, principally development of a system for virtual highways in the sky, along with a reliable communications network to efficiently manage the schedule of taxi and delivery services.

Development of these capabilities in South Australia could potentially involve partnerships with the National Space Agency, and will require regulatory framework to support the vehicle operation and air space control, along with investment into launching pads and infrastructure.

In the United States, Uber Air has already begun work on developing such a network with NASA. An infrastructure development plan should include a provision for launch pad allowances, as seen with the Tasker residential development in North Fremantle.

RAA recommends:

- The maintenance of a consistent level of reliable mobile data coverage is along the state's transport corridors.
- Providing a comprehensive network of fast chargers in regional towns and along highways.
- Upgrading Dukes Highway to accommodate autonomous freight transport.
- Investigating the implementation of intelligent transport systems (ITS) technology in the road system.

Environmental Considerations

As we move towards a fully automated and electric future, smart infrastructure will not only have the potential to keep people safe on our roads and improve commuter journeys, but also reduce congestion and emissions. Green belts with road infrastructure will assist with improving air quality and help to decrease urban temperatures.

RAA is currently calling on the federal government to fund a real-world vehicle emissions test program in Australia to measure the emissions performance and fuel consumption of new vehicles in real-world conditions. This testing should be publicly available through the Green Vehicle Guide website.

RAA recommends:

- The state government support a federal government-funded real-world vehicle emissions test program.

RAA would welcome further opportunities to engage with Infrastructure SA on its 20-Year Infrastructure Strategy and its implementation, and appreciates the opportunity to provide comment at this time.

Appendix 1: Infrastructure SA discussion paper questions addressed in the RAA submission

	Consultation question	5 year planning	10 year planning	20 year planning
1	*What infrastructure investment would make the biggest impact to unlocking economic growth in South Australia in the next 0-5, 5-10 and 10-20 years?*	• Road infrastructure – North-South Corridor • Public transport • Regional road safety upgrades • Active transport • Energy infrastructure • Hydrogen manufacturing • Renewable energy	• Freight link from east e.g. Globelink • Hydrogen refuelling infrastructure • Hydrogen and ammonia export • Hydrogen in the gas network	• 100% renewable for energy consumption and gas network • AusRAP – minimum 3 star across SA road network • Hydrogen fuel cells and turbines
2	*How can South Australia better manage demand on current infrastructure?*	• Strategic intersection capacity upgrades • Urban consolidation • Regional transport plan • Safe Systems approach to road safety • State-wide rail assessment and intermodal facilities • Use of V2X technologies for green wave traffic conditioning trials • Virtual grid development • Car to grid trials • AddInsight expansion • Development plans that mandate provisions for active transport • Development plans that mandate battery storage for large residential developments • Energy storage • Smart metering and EV charging for homes • Synchronous condensers • Investigate existing infrastructure for hydrogen or ammonia export potential • Modelling increased EV uptake to better understand effect on local grid • Government funding scheme to assist local government redevelop residential streets	• 'Vehicle to Everything' (V2X) technology • Vehicle to grid • AVs for better traffic flow • House battery and EV connections • Smart charging network to support EVs • Planning for air taxi and drone virtual airspace highway design, control systems • Planning for hydrogen refilling network • Locally produced hydrogen for transport • Ongoing highway duplication program	• Air taxis and drone delivery • Widespread residential and commercial batteries or alternative energy storage and solar • Daytime charging infrastructure for EVs • Hydrogen vehicle refilling network • Robust grid firming infrastructure
3	*What opportunities are there to better leverage private investment to drive public infrastructure development?*	• EV charging infrastructure • Hydrogen infrastructure • Power lines to renewable energy production	• Drone delivery traffic control	• Air taxi launching pads and digital / air control infrastructure

	Consultation question	5 year planning	10 year planning	20 year planning
4	*How would Adelaide's infrastructure need to change if its population hit two million?*	• Urban consolidation • Major investment in public transport together with connection to cycling and walking links	• Optimise inner and outer ring routes • Road upgrades to improve efficiency and overall capacity • Investment in regions to support growing population	• 100% renewable for energy consumption and gas network
5	*What challenges and opportunities does SA have in supporting our cultural, sporting and tourism activities to ensure our global competitiveness and vibrancy as a location?*	• Address regional telecommunications black spots • Address gaps in key regional infrastructure • Ensure regional development plans are current	• Implementation of key actions identified by Regional Development Australia	• Implementation of key actions identified by Regional Development Australia
6	*What strategies should be adopted to ensure Adelaide maintains its liveability as it grows?*	• Improved public transport • Regional transport plan • Consider road user charging schemes • Decongestion of transport around CBD • Active transport considerations • Renewables and EVs/FCEV for air quality • Active street frontages	• Extend tram and train network • Encourage urban infill where active transport to CBD is feasible • Fully grade separated rail corridors • Separated cycling corridors to provide connected network • 'Car free' precincts	• AusRAP – minimum 3 star across state road network
7	*How can technology and data be embraced to improve quality of life?*	• Collection and analysis of public transport customer data • More smart/connected bus and train stops • Enhanced Bluetooth network • Upgrade AddInsight • Smart route calculation for the CBD • Dynamic flexible scheduling, Mobility as a Service and on demand public transport • Air quality improvements and reduced noise through EV/FCEV	• AVs providing better mobility for disabled/elderly	• Uber-air style flights to CBD as per Melbourne trial (2023)
8	*What services are we likely to use in the future that will require supporting digital infrastructure?*	• 5G needed for ITS advances • Dynamic flexible scheduling, mobility as a service and on demand public transport • Shared vehicles	• AVs • Delivery drones • Road user charging	• Taxi drones • Uber-air style flights to CBD as per Melbourne trial (2023)

9	*How can South Australia best prepare its infrastructure to be able to adapt to and embrace future technological disruptions?*	• Review interstate/international trials • Mobile blackspots identified and reliable mobile coverage delivered • Flexibility of road lanes. e.g. AV only lanes • Housing developments designed for shared vehicle/AVs • Air taxi development planning • Grid upgrade for uptake of EVs and residential charging	• Gas appliance regulations to take into consideration hydrogen concentrations up to 100% in gas network	• 100% renewable for energy consumption and gas network
10	*How will changing delivery models in education and training impact infrastructure requirements?*	***Not addressed in RAA submission***		
11	*What complementary infrastructure can be built to support better health outcomes across the population?*	• Completion of east-west cycling corridors in Adelaide CBD • Green belts with road infrastructure • EV/FCEV charging/refuelling networks	• Dedicated active transport corridors, grade separated where possible	
12	*How should infrastructure be planned in increasingly urban environments with ageing populations?*	• Higher number of accessible spaces on public transport • AV corridors to allow mobility for seniors • Dynamic flexible scheduling, mobility as a service and on demand public transport	• 'Car free' precincts • Investment fund for local government to address active transport connections	
13	*What infrastructure is required to support our justice system and emergency services across the state?*	***Not addressed in RAA submission***		
14	*How can infrastructure provide resilience against bushfires, drought, flooding, sea level rises and the like?*	***Not addressed in RAA submission***		
15	*How will technology change the transport system in SA?*	• V2X, enhanced signal operation • AV / MaaS / EV /FCEV • Potential to increase or reduce congestion • Road safety outcomes		• Electric air taxis • Electric delivery drones • Uber-air style flights to CBD as per Melbourne trial (2023)
16	*What strategies should the Government adopt to ensure the necessary infrastructure is in place so our regions can thrive?*	• Continuing upgrade of regional corridors • Reliable digital services in regional areas • AV corridors • Regional transport plan • Audit of regional infrastructure capacity • Ensure transport meets the needs of the visitor economy	• Air taxi/delivery networks • Implementation of key actions identified by Regional Development Australia	• AusRAP – minimum 3 star across state road network

17	*How can South Australia take the lead on reducing emissions from transport?*	• Connected, separate cycling/walking infrastructure • Decarbonising of the energy network • Incentivising EVs, increase state govt purchases of EVs • Hydrogen production pilots and explore ammonia production capability • Electrification of public transport and motor vehicles • Dynamic public transport scheduling	• Locally produced hydrogen used for domestic transport • EV/FCEV incentives • Promote road user charging to replace fuel excise	• Electric air taxis • Electric delivery drones • Uber-air style flights to CBD as per Melbourne trial (2023)
18	*What factors should be considered when making inevitable trade-offs about investment in public infrastructure in the context of funding constraints?*	• Public safety (foremost) • Patronage (and projected patronage) • Net benefit to community (even those not directly using the service) • Design protecting for future advances or expansion in current designs		
19	*What options are there to establish a reliable, affordable, decarbonised energy system in SA?*	• Prolific energy storage projects (large scale and residential and commercially distributed) • Incentives to increase uptake of residential batteries and roof top solar systems	• Clean/renewable hydrogen production and use in gas network	• 100% renewable for energy consumption and gas network
20	*How can we best plan and accommodate the infrastructure needed to create vibrant and economically productive precincts?*	• Review interstate and overseas examples of best practice • Review road hierarchy plan to establish which corridors can accommodate separate cycling and public transport infrastructure • Easily accessible corridors for all modes of transport • Appealing and well maintained infrastructure • Public amenities and mixed land use to encourage multi-purpose trips to a precinct	• Implement demonstration projects • Focus on completing active transport corridors • 'Car free' precincts	