



ENVISIONING THE ROAD TO RECOVERY FOR PUBLIC TRANSPORT

Planning a Better Future for Cities, Towns and Communities

Introduction

by David McAlister, Global Director of Transport & Infrastructure

Due to COVID-19, the public transport sector has recently been faced with steep ridership declines and major health and safety considerations. This pandemic has forced transit agencies, local governments and related stakeholders to urgently rethink how to address mobility needs in our cities. Far-reaching challenges lie ahead, but opportunity exists for public transport to evolve and once again connect people to each other and destinations both in and beyond their communities.

Ridership will resume when the traveling public feels safe and regains peace of mind. As cities adapt in this transitional period, they can become better prepared to deal with sudden future events. Today's decisions can also advance the development of integrated, efficient and accessible public transport systems.

The following article offers global strategic insight from WSP's advisors and technical experts to support the public transport sector as it manages the current pandemic environment and gets ready for a busy future.



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STRATEGIC PLANNING AND RESILIENCE

Cliff Henke - Managing Director, Transit and Rail Technical Excellence Center, United States

Even prior to the COVID-19 outbreak, a growing number of agencies were fundamentally rethinking their bus and rail networks to address declining ridership, changed demographics and shifting settlement patterns within their service areas since the last time the bus or rail network was configured. The pandemic has accelerated that rethinking. Once the catastrophic short-term and medium-term economic consequences of

The terms "public transport" and "public transit" are used interchangeably in this article.

COVID-19 can be addressed—not easy or inexpensive by any means—public transport will have to address long-term implications wrought by this and similar diseases that might outbreak in the future; and as consequences of increasing population growth, globalization of travel, climate change, urbanization and other features of our modern world, such pandemics are more likely, experts tell us. Public transport authorities will need to be prepared.

But how? The answer will be varied. Most will incorporate the emergency measures that they have had to implement in the current pandemic into their risk management plans, combined with risk reserves and layers of reinsurance designed to cushion the economic blows. For example, bus and rail operators are learning that implementing fog-type disinfectant applications and UV light-based treatment systems may have a role in preventing the spread of pathogens. However, there are cost and potential health implications, respectively, that need to be considered.

Long-term, time will only tell whether some service reductions implemented during COVID-19's spread are part of a larger ridership trend or merely pre-planned temporary mitigation protocols that must be implemented to address not-infrequent disease outbreaks and other emergencies. Regardless, strategic planning in public transport must contain much more robust what-if scenario planning to address such possible risks.

***Dr. Christian Roberts - Senior Vice President
Business Line Director, Asset Management and Business Advisory, Advisory Services, United States***

The world was not prepared for the COVID-19 pandemic. Critical infrastructure has had to rapidly move to new ways of management and delivery of essential functions to continue to provide vital services.

In many instances, existing continuity of operations plans (COOPs) have failed to provide the direction and guidance necessary to respond to the pandemic. The reason? Most critical infrastructure COOPs focus on response, recovery and restoring service following natural disasters. In the case of natural disasters, the predominant impact is on the organization's assets. Floods, fire, earthquakes and even terrorism typically impact an organization's ability to continue to provide services due to fleet, facilities and infrastructure being disabled. This is not the case with pandemics, where it is the organization's asset management capability—its people—that is significantly impacted. Without clear management controls, processes and policies in place, the organization lacks resilience if it is impacted through temporary loss of staff, or worse if the staff loss is permanent.

Healthcare experts agree that the world can expect a second wave of COVID-19 and possibly more, until a vaccine is developed. To better prepare organizations for future events, it is critical to establish a robust asset management program. At its heart

asset management is about establishing controls to reduce risk and deliver critical services safely, efficiently and effectively. In this context, asset management supports continuity of service beyond the normal operating situation—including both degraded and stress conditions (due to asset and operational performance) and exceptional events (including events impacting assets—e.g. natural disasters; and impacting the organization’s ability to manage assets—e.g. pandemics).

During the response phase of an exceptional event—such as the current COVID-19 pandemic—having a clear program of how to manage critical infrastructure and an established support capability is essential to continued response capability. A pandemic outbreak puts both the society and the response teams at risk. Establishing controls and having clear management plans are essential.

John Gasparine - Assistant Vice President, Northeast Transit and Rail Market, United States

Transit agencies swiftly modified their operations in response to COVID-19 to implement social-distancing measures, disinfection of frequently touched surfaces and other best practices.¹ This is just the first step on the public transport industry’s road to recovery.

In the months to come, the industry will build robust plans for restoring confidence in the safe use of transit, and ultimately

restore ridership. What must come next in the industry is an infusion of resilience planning into the design, construction, operation and maintenance of public transport/transit systems. Also in order is a rethink of transit policies related to insurance, administrative leave, return-to-work programs and required personal protective equipment by employee classification.

What is possible? —the evolution of vehicle design to enable one-way passenger flow through a vehicle; the ability to isolate operators/drivers from the main passenger cabin; heating, ventilation and air conditioning (HVAC) enhancements; and on-board vehicle disinfection technology and anti-viral surfaces. It is also important to drive the evolution of transit facility and station design to enable one-way passenger flow through communal spaces, HVAC enhancements, redesign of workstations, breakrooms, and locker rooms for social distancing and touchless surfaces.

Securing the future of the public transport industry and communities will depend on continuous collaboration between the public sector and private sector, along with academia and government leaders and global partners.

Ulf Larsson - Director, Nordic Rail Advisory, Nordics/Sweden

Experts warned about a pandemic and the world is now living through one. It is having

¹ WSP recently led the development of a [COVID-19 operational Guide](#) in partnership with the American Public Transportation Association (APTA) and the Johns Hopkins Bloomberg School of Public Health. It was designed to distill

the latest Centers for Disease Control and Prevention (CDC) guidance into strategies and tactical actions for transit and rail agencies across the United States.

devastating impacts on lives and secondary effects on the economy. The economic halt around the globe demonstrates how quickly worldwide measures can result in a reduced climate footprint. It is naïve though to think that society can and will tolerate sustained isolation, mass unemployment and increased poverty; while improving the ecological dimension, current restrictions are hardly socially, culturally or economically sustainable.

Still, society will change some behaviors permanently and find new preferred alternatives. While public transport ridership has typically dropped by 50-80 percent around the world, it may be wise to plan for long-term reductions in the range of 10-20 percent. This change would be due to more digital meetings, more home office working and some people preferring bikes, e-scooters and private cars.

For the environmentally friendly mass transit to avoid permanent association with health risks and to increase attractiveness, measures need to be taken by governments, authorities, traffic operators and equipment suppliers. Time during the forced traffic slowdown should be used to reflect on current and longer-term plans and policies. It is an excellent opportunity to increase public spending on priority investments in infrastructure to resolve some of its quality problems owing to decades of underinvesting, while also stimulating economic growth.

Restart traffic gradually, plan carefully. Take safety measures, such as crowd control, robot disinfection of stations/trains, use of

masks and technical aids: app-payment, passenger temperature detection, virus-resistant design and digitalization to eliminate human factors.

OPTIMIZING OPERATIONS

Jeffrey Seider - Vice President, Global Advisory, Canada; Gera Taubkin -Transit and Analytics Lead, Canada; and Anaïssia Franca -Transit Electrification Specialist, Canada

The profound disruption foisted upon the world by COVID-19 has also provided opportunity to the public transport sector to change the path of development from sweating legacy assets to efficiently implementing new technologies and systems.

Here are eight actions to help transit agencies bounce back from this crisis and challenge the status-quo:

Gain rider trust back

Be transparent on the measures implemented to protect the community. Examples include adding digital message display boards to identify vehicle cleaning schedules, and providing predictive analysis to address potential crowding between passengers in transit stations and transit vehicles.

Encourage multimodal and active transportation

Improve multimodal connections before service is back at full speed, allowing more flexibility.

Implement mobility-on-request (MOR) for the population at risk

Repurpose paratransit and MOR services to prioritize the elderly population and others most at risk.

Drive the new mobility change

Pilot battery electric and hydrogen fuel cell technologies on current networks to learn from real-life operations, and plan for a phased integration into the network.

Prepare to meet the new needs of the workforce

A new passenger demand—driven by agile work practices, rather than highly populated offices—could be served by smart, fixed and dynamic route planning.

Rethink how to improve system efficiencies

Comb through internal and external processes to identify which ones could be left behind and what new measures adopted during COVID-19 can be carried forward to improve system efficiencies.

Engage with the community

Gather transit riders' feedback and partner with local research labs to foster innovative technical solutions and system-wide redesign as well as improve commuting journeys.

Keep the supply chain in mind

To pursue alternate technologies such as electrification, commence discussions early with OEMs to ensure that needs are slotted into production lines to meet delivery times.

Rail & Transit Canada: Jennifer Verellen - Vice President, Rail & Transit; Peter Paravalos - Director, Transit Oriented Development; Arash Aziminejad - Chief Engineer, Telecommunications; Yan He - International Technical Director; Mustafa Mirza - Director, Rail & Transit; Michael Law - Manager, Rail & Transit; Ricky Emery - Technical Director, Rail & Transit

Transit agencies and related stakeholders can use this temporary pause as an opportunity to rethink the way people will utilize rail and transit services in the future, and to organize workforces to focus long-needed attention on the state of good repair for aging public transit infrastructure.

In view of COVID-19 and a growing desire to achieve and maintain work-life balance, working from home may become the norm rather than an experiment, and traveling five days per week to work at an office may not be a necessity. Transit agencies may be forced to prepare for flexible working patterns and prolonged peak-travel times to avoid or minimize close physical proximity among their ridership. In addition, they may need to extend moderate and sustained ridership throughout the morning, afternoon and well into the evening. Perhaps Saturdays will become a workweek day for some, while Monday will become the new weekend day for others.

What is clear is that transit agencies and related stakeholders may now need to move away from established predictive ridership models, patterns, and farebox revenues,

and reorientate themselves toward learning new and updated transportation patterns. This shift should enable modification of business models for application in the short and long term—perhaps eventually maintaining pre-COVID-19 ridership numbers, though at a lower density at any single given time. Potential solutions could bring integration of existing lower-density transportation modes, including ridesharing and active transportation.

Malcolm Thomas - Technical Director & Technical Discipline Lead, Systems Engineering, United Kingdom

While COVID-19 has presented the transport industry with many problems, there have been areas where systems integration (SI) has come to the fore in preparing for recovery. In the United Kingdom, there is more emphasis on SI, particularly on rail programs that have suffered delays in the past and now see a more structured approach as key to mitigating many of the issues caused by the lockdown. This attention has manifested itself particularly in the later project lifecycle stages where the focus is on completing integration testing and compiling the assurance required to put the system into operation.

There is now more attention on the whole system rather than on individual contract delivery and on identification of system-level mitigations for shortfalls at the contract level. Individual contracts are still expected to deliver to their contracted scope; but to keep a program moving, consideration is also given to the safety, operability and

maintainability implications at the program and/or system level. There is also opportunity to challenge requirements at both a program level and a contract level. A whole-system approach allows assessment of the effects of potential changes to the overall delivery of system capability and the realisation of program benefits. So, when thinking about getting back to completing construction and testing, SI is already targeting those areas that will deliver the capability needed to progress to the next program stage, keeping to a minimum any delays to achieving entry into service.

MEASURES - TODAY AND FOR TOMORROW

Silas Li - Vice President, Technical Fellow, Tunnel Systems, United States

In March 2020, ridership fell 87 percent on the New York City Subway, more than 70 percent on buses and as much as 94 percent on commuter railways. For ridership to resume and increase, it is essential for passengers to feel safe in traveling. To that end, broad collaboration and practical steps are needed to provide and demonstrate an environment supportive of health and safety for riders and people working in the public transportation system.

Safeguarding riders and agencies' employees in public transportation requires a holistic approach to reduce transmission of airborne infectious disease. Measures include administrative controls, such as stay-at-home orders, social distancing, facility cleaning and temperature screening at selected stations; personal protection

equipment including face masks, gloves and eye protection; and environmental infection controls, such as increasing air changes for dilution ventilation, filtration to remove infectious particles, and ultraviolet (UV-C) lights as germicidal technology.

Innovative technologies and equipment have been developed to protect riders and employees. Robots have been deployed recently for automatic deep cleaning and disinfection in train compartments in Hong Kong. A vendor has claimed that UV-C lights can disinfect over 50 airplane seats in just a minute. New York Metropolitan Transportation Authority has announced plans to use powerful ultraviolet lamps to disinfect the agency's trains, buses and work areas. The benefits, effectiveness and potential risks to people and the costs of new technologies should be properly evaluated.

The world will recover from COVID-19 over time. What lessons can be learned from the experience? Is public transportation resilient-ready for a future pandemic? Transportation agencies urgently need strategies and guidelines for environmental infection controls in transportation systems. Ventilation engineers should collaborate with multidisciplinary teams of facility operators, infection prevention specialists and others to achieve transportation resilience for possible future pandemics.

***Craig Wright - Managing Director,
Transport Planning, China Region***

Shanghai, at only 600 kilometres from the epicenter of the COVID-19 outbreak, was

quick to respond with a complete lockdown, enforced quarantine and mandatory use of face masks. Over the last month or so, Shanghai has quietly returned to pre-COVID-19 levels of activity with most offices fully open and with comparatively few reported cases.

The metro system, being the longest in the world, provides the pulse to the city, and the city's public transport system is a mainstay for daily commuters. There are fewer passengers on the subway, but that is now changing as Shanghai returns to peak levels, growing from 30 percent to 75 percent of pre-pandemic levels in the last two months. The current reduced volume, which is still eight million to nine million journeys per day, is largely due to the removal of non-essential journeys; and office workers are encouraged to stagger office hours to avoid peak hour overcrowding.

Measures are limited to a mandatory use of face masks when using public transport, with the start and end-point of the journey taking on the role of temperature/health checks, which helps to remove the direct disruption to public transport.

Recent national guidance in China allows the implementation of less disruptive measures for cities classified as lower risk, such as Shanghai. The guidance aims to allow a quick return to greater public transport use by enforcing basic hygiene and passenger utilization of face masks; adopting non-invasive measures at the start and end of the journey to control and detect high-risk passengers; and make full use of

big data and mobile tracing to locate high-risk individuals.

Thomas Goodyer - Assistant Vice President, Asset Management & Business Analysis, Advisory Services, United States

On-board HVAC systems must evolve in response to COVID-19. In the short-term flow rates will be maximized, and finer filters will be used, both of which will increase power demands. But what are the longer-term asset management impacts?

More frequent, basic, planned maintenance activities such as filter and refrigerant changes will be needed. The increased workload will likely lead to lower reliability, resulting in unplanned corrective maintenance activities. Maintenance facility design may have to change to accommodate this situation. More inspections and/or preventive maintenance may catch some emerging issues in advance, but either way more frequent access will be required. In the longer-term it may be necessary to undertake fleetwide upgrades of the HVAC units, to meet more robust specifications for higher reliability and therefore reduced operational disturbances.

Perhaps airflow patterns will need to change to emulate commercial-grade manufacturing “clean rooms.” Such clean rooms bring in filtered air through the ceiling and vent it out of the floors, without horizontal circulation, so that particles from people or their work get swept straight down, assisted by gravity, rather than being projected onto other

workstations or people. This concept may not be applicable to or practical for all vehicles, but this flow pattern would be more attractive than current circulatory flows. Compromises may need to be made on heating or cooling for the sake of airflow, since heaters are often at or under the floor. Passengers would likely feel more protected and thus happier in public transport vehicles with the knowledge that any virus-carrying droplets are being vented down and out before reaching their airways.

Accommodating and implementing these changes means more on-board weight, volume and auxiliary power demand, which will reduce efficiency and passenger capacity, the two priorities that have shaped vehicle design and procurement for as long as transit has existed. Notwithstanding major innovations, these priorities may have to take a back seat for a while to create healthier conditions, vital to attract passengers back to the services they should be able to depend upon once again.

FLEXIBILITY AND SUSTAINABILITY

Daniel Firth - Principal Consultant, Canada

With so much uncertainty, moving to recovery will require flexible policies and tools. Prices are a flexible tool designed to respond to changing demand—cities have cut parking prices or made public transport fare-free, while London and Singapore have adjusted their congestion charges. These cities will be able to use prices flexibly to respond as new travel patterns emerge.

Cities all over the world are showing they can adapt in ways that can also bring lasting benefits for all their citizens. They have built temporary cycle lanes and widened sidewalks to make safe space for physical distancing. With such steps, could governments also review the rules and regulations of streets and traffic to enable for the long term more pedestrian-friendly and cycle-friendly environments—in line with Vision Zero?

COVID-19 has called attention to the link between transportation and public health. A recovery plan for public transport should include making streets work better for everyone. There is an opportunity to integrate Vision Zero into the rebuilding of our transport systems. Road traffic fatalities and injuries represent a major global public health issue; Vision Zero does not accept fatality or serious injury on the world's roads.

What might a more flexible transport system underpinned by Vision Zero look like when applied to recovery and the new equilibrium? How can we make sure costs and benefits of mobility are distributed more equitably? What can we do to prevent a return to the problems we had before?

***Laura Callaghan - Consultant,
Sustainable Places, Energy and Waste,
United Kingdom***

This pandemic has brought a variety of changes in the way people travel. To avoid the spread of the virus, many commuters across the United Kingdom shifted from public transport to unsustainable means of

travelling, such as private (mainly fossil-fuel based) cars and driving alone rather than carpooling. At the same time, there has been an increase in sustainable travel, such as walking and cycling, whether that be for essential journeys or purely for health benefits.

Public transportation is set to face many challenges when the lockdown lifts, particularly if social distancing is to continue; therefore it is imperative to take this opportunity to advance the prioritisation of cycle lanes and walking routes and low or zero-carbon alternatives, and understand how the sector can adapt post-lockdown.

Moving forward, transportation organisations will need to build trust by prioritizing the creation and maintenance of environments where passengers and workers feel safeguarded. Trains, trams and buses will need to be cleaned on a more regular basis, contactless payments must be guaranteed, and, where possible, busier routes may need to consider having an increased fleet available to ensure a safe passenger limit is in place so that social distancing can continue.

To counteract the impact from those who continue to drive rather than take public transport, more investment to develop a widespread electric-vehicle charging network is needed alongside higher subsidies for the transition from petrol and diesel vehicles to electric.

USING DATA AND GOING DIGITAL

Ian Patey - Head of Profession, Intelligent Transport, United Kingdom

The current restrictions have resulted in significant reductions in the use of public transport—an 80-percent decline recorded in the United Kingdom. Various studies indicate that public perception of the risks involved in travelling in close proximity to others is likely to suppress the desire to use public transport for some time.

This time of reduced demand provides opportunities to challenge traditional methods of planning routes, timetables and schedules and to scenario test different operating models that match the potential new demands. New operating models will have impacts on operating costs, how customers perceive the value of the offering and the price that customers are willing or able to pay.

A current opportunity is to use the low levels of utilisation to trial different forms of social distancing on buses and trains—such as blocking alternate seats and applying floor markings for queuing. Removing the need for direct interaction with the driver, for example by using contactless payments, creates a more efficient service and reduces the risk of infection. Another opportunity is to consider the practicalities involved in shifting to an operating model where every seat must be booked in advance using combinations of websites, apps, payment systems and telephony (ensuring inclusion for those without internet access). Trusted and accessible information provides the

foundation for such a change. Taking this proactive approach would enable social distancing by preventing over-crowding, improve customer confidence and encourage moves back to transit systems. It is essential that these changes are inclusive and do not inadvertently exclude anyone due to lack of access to the right technology; a well considered and user-centric design will deliver the best outcomes for all.

Desmond A. Wright - Digitalization Lead, Advisory, Sweden

To strengthen public transportation as the backbone of mobility systems in cities around the world, the sector must address a range of issues emerging amid the COVID-19 pandemic.

Upfront are health-related considerations relating to the spread of viruses through limited ventilation and confined spaces within vehicles. Another issue is the need to restore trust in public transportation so that it continues to be a viable mode and an attractive alternative to private vehicles. This effort requires management teams of public transportation authorities to revisit their current business models and seize the opportunity to accelerate their digital transformation journeys. Digital advancement, through adopting cloud solutions, data analytics and predictive maintenance, will increase the efficiency and flexibility of operations; and further, offering digital services such as apps with real-time passenger load information will enable better planning with a view of the whole journey, including an understanding

of station populations to avoid queues outside of the station.

Authorities should also start thinking about the design of the next generation of public transportation vehicles, putting ‘building trust’ as the main design criteria while still fulfilling the function of moving a lot of people efficiently around cities. A near-term consideration is reviewing how long-term assets such as trains and buses can be temporarily reused because of the service reductions. An example is conversion of trains to medical facilities to ease the pressure on hospitals.

An essential ongoing action is protecting the staff and people currently using public transportation, through increasing the cleaning of touch surfaces and ventilation; the use of physical barriers; and reducing the passenger load. These and other measures should be taken with a view toward incorporating them into permanent organizational processes.

***Kenneth Cobb – Associate Director,
Public Transport, Middle East***

With passengers and fare revenue now only a fraction of pre-COVID-19 levels, essential resource metrics of public transport operations, such as scheduling and duty allocation efficiency, take on even higher importance. With changing levels of service being provided to the public and specific client groups, agile adjustment of staffing and vehicle plans is key. Very often it is not the technical process that takes the most time but the approval and communication of changes; so, short-term revisions to

processes may be required to support operational needs.

Meanwhile, public transport planners have the task of using all possible emerging and potential new sources of data to inform their work; given the enormously reduced ridership and current abnormal passenger travel patterns, these sources are likely to be external to the operation. Such data (e.g. from traffic apps) could help determine how individual services and the network as a whole will develop progressively as public health directives are updated. For example, given that office jobs will see more remote working, a revised public transport network could become more valuable within the overall transport mix if it can safely and hygienically capture a higher percentage of peak-time and overall trips. Similarly, key public transport market segments such as health facilities are likely to have a higher public profile for the foreseeable future; the need for continuity of access will open up opportunities to create better conditions for operations, e.g. improving traffic management and public transport infrastructure at hospitals.

SEIZING OPPORTUNITIES

***James Smithers - National Executive
Infrastructure Investment Decisions,
Advisory, Australia***

The COVID-19 pandemic is forcing governments across the world to adopt stimulus packages of all forms to get their economies going again. Advancing planning-stage projects will help maintain project flow through the construction

pipeline; and 'shovel-ready' projects are prime candidates to be brought forward for any stimulus package. Experience from responding to natural disasters provides insights—regarding selection, procurement, consultation and risk management—into what is possible when normal protocols need to be flexed.

Projects in the next-works program are often at variable stages of development, with some projects still facing many obstacles before construction. Some obstacles can be overcome, but a contractor needs a design and an approval. Before selecting projects, it is essential to have clarity regarding the objectives of the program or package and determine high-level criteria to guide the selection. For example, if an objective is to have construction commence in three months, then rapid due diligence should be undertaken to understand the level of design development and approvals, the complexity of the project and any other critical obstacles.

If projects are to be accelerated, consideration should be given to the key development steps that need to be skipped. Approaches exist that can provide reasonable certainty to many of these steps without following the normal process; for example, a rapid project appraisal can substitute a business case and apply proxies to assess the benefits of different options for the project.

Consideration should also be given to capacity in the market to ensure the appropriate tier within the contractor market has the availability and appetite at this time.

Naeem Farooqi - Principal Consultant, Advisory, Canada

As public transit agencies around the world face new and difficult challenges in response to the COVID-19 global pandemic, it is important to recognize the broader opportunities of rebuilding our city fleets, buses and private vehicles using zero emission electric technology.

Developing electrification solutions for green transportation requires upfront capital planning and organizational changes as well as understanding the intersection of utility infrastructure and charging and vehicle manufacturers to achieve electrification. Each of these stakeholders are critical in assessing the potential of electrification for public and private fleet adoption. Engaging early on with these stakeholders and understanding their supply chain, lead times and impacts due to COVID-19 will help prepare cities and transit agencies to make the transition to a cleaner transportation future. In certain cases, infrastructure upgrade costs and lead time of hardware can delay project execution by two to three years. Investing in the right projects and taking the time to do the upfront due diligence can help improve positioning of green technology within cities.

Leila Sadeghi - Senior Water Resources Engineer, New Zealand

Due to current circumstances, many streets and roads are seeing a significant drop in traffic.

Emerging from lockdown, as transport agencies set priorities of health and safety and economic stimulus, they should consider how to advance concepts of eco-design and environmentally friendly roads and streets in their strategies for transport infrastructure development.

The benefits of developing eco-design and environmentally friendly roads and streets include efficient land-use, habitat preservation and restoration, effective transport management and energy efficiency, efficient use of resources, emissions and pollution control and enhanced quality of life.

Road development can affect terrestrial and aquatic ecosystems in a number of ways. Typical impacts to the wildlife and surrounding environment include habitat fragmentation and modification, restriction of animal movements, injury and mortality of wildlife species, soil erosion, hydrological alterations and environmental contamination. By planning for adoption of good practices for environmentally friendly roads, transport agencies could pursue the goal of eliminating and minimizing the negative impacts of transport infrastructure on the ecosystem and environment, and thereby also improve regional sustainability.

Efficient use of resources and energy efficiency could be addressed by planning for reducing the energy consumption of transport infrastructure equipment through energy-efficient street lighting, motors, pumps, etc. Efficient transportation management includes increasing opportunities for bicycling and encouraging

a pedestrian-friendly network; favouring public transportation and reducing the number of automobile trips; and using electric vehicles to address issues such as fossil-fuel consumption and associated emissions.

SUPPORTING FUTURE COMMUNITIES

***Eleanor Short - Senior Principal,
Transport Advisory, Planning & Mobility,
Australia***

As public transport organizations enter a transition from response to recovery, it is essential to get services right so that they remain at the heart of transport systems—supporting successful cities and thriving places.

Several distancing scenarios can be applied to a range of public transport modes during the transition phase. In Australia, even with relaxed distancing, public transport may be required to operate at most between 30 percent and 50 percent of total capacity. In busy metropolitan areas which currently operate with standing-room-only at peak times, this situation will create significant challenges, with both demand and supply-side measures likely to be needed to promote a safe return of passengers. A coordinated approach involving different levels and agencies of government, operators and businesses will be essential to safely and effectively balance public transport capacity and demand during transition.

COVID-19 has changed many people's attitudes towards using public transport.

Understanding how, where, when and why people will want to travel in the future will be fundamental in planning for an effective economic recovery, where people feel safe using public transport and which delivers on cities' visions for their future.

If people's new travel needs are not met, they could make long-term switches to private cars, abandoning public transport. This shift would increase road congestion and emissions, as well as reduce the commercial viability of public transport. Considered steps now are needed to help authorities and transport operators get transport services right in the transition. Accessibility planning and analysis tools can be applied to help understand potential issues and target additional services. In addition, wider changes—such as tactical infrastructure upgrades, active travel initiatives and shifting societal norms around accessing work and services remotely—offer huge potential to transform our cities and regions faster than we previously thought possible.

Giles Perkins - Head of Mobility, United Kingdom

There is no magic mobility bullet to address how we all emerge from the Covid-19 crisis. There are, though, important considerations and observations to embrace, to help the public transport ecosystem transition into a better future, one which balances the need to travel with sustainable aims and outcomes.

A reliable public transport network is essential across cities, towns and

communities. The sector must understand that rising demand may be slow to return and that the attitudes and behaviours of customers play an important part in the rebound. Decisions must ultimately be for the passenger's benefit (be that for the commute or ultimately leisure) and, critically, for the health and safety of transit workers. Local needs, specific priorities and appropriate assets should always drive decision-making.

Close collaboration between transit authorities, operational professionals, healthcare professionals and those who understand human factors and behaviour such as psychology professionals is paramount to finding systemic solutions to inspire confidence and meet socio-economic needs.

An evidence-based approach that is agile and able to adapt to change, clear and unambiguous in its intentions, and transparent in the way it is presented to passengers, workers and the industry at large will best drive plans for a return to what could be a very different 'normal'. Whilst the impact of this pandemic is highly disruptive and obviously unwelcomed, the sector must find a way to capture effective data, process human perspectives and technological opportunities, forecast the consequences (intended and otherwise), and then use all of these elements to create plausible scenarios to advance toward a better future.

The Public Realm

Rachel Skinner - Head of Transport, United Kingdom

Until the COVID-19 shock, cities, towns and rural centres took pride in thriving public realms. Busy-ness and dense levels of use were unchallenged indicators of success around the world, translating across culture and language. It was unimaginable that our world's streets could simply empty themselves of people—leaving high streets nearly abandoned, splendid landmarks in isolation, and pavements, parks and paths idle. It is now unimaginable that we will use our public realm spaces—beautiful, valuable spaces that enable movement, social connection and, crucially, economic productivity—in the same way as we did before COVID-19.

This means that urban strategists and transport planners across the world have an urgent task—to breathe new life into the public realm and figure out two things: how people can return in a practical sense and how to encourage us all to feel comfortable and safe when we choose to return. Cities and towns will need everyday resilience plans to address social-distancing rules that will vary over time and across many contexts—for people walking along footways or pavements and through the parks ... for people travelling on buses, metros or trains ... for cyclists ... for early adopters of new micro-mobility modes ... for those in their cars.

Rapid change lies ahead, but the long-run goals for our public realm remain the same:

cleaner air, lower-carbon living, safer streets, reduced congestion, healthier places and more liveable neighbourhoods. The effects are not uniform, and good responses to meet these goals will be varied. The key in each place will be to home in on the latest world-wide learning, to help us all breathe life back into our public realm whilst locking-in and accelerating progress towards long-run goals.

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