



ADAPTING TODAY
FOR A NEW TOMORROW

MIND THE GAP

THE FUTURE OF MASS TRANSIT SYSTEMS

As coronavirus-related government restrictions ease and people's ability to travel increases, a reduced willingness to travel combined with social distancing requirements poses enormous challenges for the operators of mass transit systems, many of whom have also seen a huge drop in farebox revenue. Given the critical importance of public transport in enabling accessible, equitable, and sustainable cities, AECOM's **Veronica Siranosian** and **Joe Seymour** says proactive action is needed to support its long-term resiliency.

Transit agencies across the world are facing unprecedented challenges due to the coronavirus pandemic. Operators must schedule for new and uncertain travel demand while winning back riders and getting them to where they need to go, safely. That's no easy task given that most mass transit systems were designed in direct opposition to the tenets of social distancing. Typically, transit operators' mandates are to

increase ridership by moving people as efficiently and compactly as possible.

This challenge is coupled with the related issue of the financial sustainability of those transit agencies that rely most heavily on farebox revenues, given the drastic falls in ridership due to the economic shutdown and health concerns. Even agencies that get a more significant portion of their funding from other sources such as taxes are impacted by the economic slowdown.

Looking ahead, agencies will have difficult choices to make in adapting services to an uncertain future. What short, medium and long-term strategies are needed for the safe return to operations? And in the longer term, what sort of a service will populations require?

This article discusses the immediate challenges of post lockdown, and the longer-term role and response of transit agencies as the lifeblood of cities. ➔



FOR DENSE URBAN CENTRES TO RECOVER AND RECLAIM THEIR ROLES AS HUBS OF ECONOMIC ACTIVITY, CULTURE, AND EDUCATION, THEY WILL NEED PUBLIC TRANSPORT SYSTEMS TO BE SUSTAINED AND KEPT HEALTHY.

The role of mass transit

The stakes are high, economically, socially and environmentally. Historically, the development of cities has been intertwined with the development of their mass transit systems. For dense urban centers to recover and reclaim their roles as hubs of economic activity, culture, and education, they will need public transport systems to be sustained and kept healthy. There are important equity considerations too: without public transportation, many will be simply shut out of opportunities. While the challenges are complex, inaction now could reshape demand for travel in unsustainable ways. Large-scale mode shifts from transit to personal vehicles would aggravate the climate crisis and, in many cities, negatively impact the quality of life in the public realm — not to mention the fact that the downtown core of many cities simply can't absorb significant increases in personal vehicle traffic.

As worrying as this scenario may seem, it doesn't need to be this way. On the flipside, there is also an opportunity to use this enforced moment of pause to shape a more sustainable transport system that is even more integrated with the life of the city.

The scale of the challenge

In the short-term, public health considerations are impacting capacity and operations. Shelter-in-place or stay-at-home requirements caused unprecedented reductions in ridership, nearly overnight. Patronage reductions of up to 90 per cent were seen in China and the United States, with similar trends seen elsewhere.

Even as workplaces start to open again, ridership will not rebound to pre-coronavirus levels until people

feel safe using public transit. For the foreseeable future, those who are able to work remotely are likely to do so, denting peak hour travel. This has major implications for scheduling, which has traditionally been geared around the rush-hour commute. Meanwhile, transit must continue to serve those who don't have the ability to work from home and don't have other options for getting to work, including many essential workers.

In the meantime, new social distancing standards mean services must operate at reduced levels. In the UK, for example, the six-foot spacing government recommendation, assuming it could be enforced, would reduce London Underground's service capacity to 15 per cent of normal rush hour levels¹. Getting passengers on and off trains and buses while adhering to social distance recommendations raises its own challenges, as will managing the entry into stations. Face masks, gloves, and even in some places no-talking rules² may become standard requirements — for passengers as well as staff. Transit agencies from Los Angeles to South Korea are already instituting new behavior protocols for passengers.

In addition to serving commuters, public transit helps people get to a wide range of destinations, from cultural events to educational institutions, entertainment, retail, food and beverage, health care and sports. In some places, despite no reputable studies linking public transit to the transmission of the virus, official guidance to avoid public transport may dissuade people from non-essential activities, further delaying the return of the city's economy.

At the same time, the financial outlook for transit agencies is

uncertain. Farebox revenue, along with dedicated taxes, has fallen steeply, with less people travelling due to the economic shutdown. Some transit agencies have been allowing free rides to remove interactions with ticket vending booths and operators. To make up for this, some transit operators may require more financial assistance from governments or alternative funding strategies — at a time when there are many demands on the public purse.

There are also environmental implications to consider. In China, reports from the major city of Guangzhou found public transport usage had recovered to one third of pre-pandemic rates during March. Another third of users turned to private vehicle use, which is seen as safer, resulting in an uptick in car sales³, while the remaining third turned to active transport such as walking or cycling. If a trend towards replacing public transit with more private automobile use were to continue, it would have major implications for pollution and air quality in cities. As traffic levels increase and roadway capacity is exceeded, shifting transit trips to driving trips would be unsustainable. The pandemic has highlighted the link between air quality and health and few of us would wish to return to pre-pandemic emissions levels.

A safe return and a better future

The difficulties of retrofitting a system designed for mass use for social distancing requirements, may mean the return to service is marginal for some time. However, the societal and equity costs of inaction are too high. As transit agencies develop plans to shape a safe return, there are several important considerations: ➔

15%

Enforcing the UK's social distancing measures on the London Underground would reduce rush hour capacity to 15%

33%

In Guangzhou, China, public transport usage has recovered to one third of pre-pandemic rates during March



1/

SAFEGUARDING CUSTOMERS AND TRANSIT EMPLOYEES IS KEY

This entails collaborating with experts in public health and industrial hygiene to implement more stringent disinfection, cleaning, and operational safety protocols. Importantly, communicating these measures to the public strengthens confidence in the system. To help Southeastern Pennsylvania Transportation Authority (SEPTA) implement a safe return to service, AECOM developed a toolkit for employee and passenger safeguarding, including vehicle, transit facility, and office cleaning and disinfection procedures; evaluated station passenger flows and developed templates for passenger flow management within select stations in line with social distancing; and provided lessons-learned and global best practices on transit service planning, safety, and communication procedures.

2/

UNDERSTANDING AND RESPONDING TO PASSENGER NEEDS IS ALSO CRITICAL

Traditional approaches to service planning using travel demand models do not accurately depict riders' needs during this unpredictable time. Near-real time data (big data, for example from cellular phones, satellites, credit card transactions, turnstile counts, or movement recognition devices) can be leveraged and combined with scenario planning tools that allow transit operators to make faster and better-informed decisions on where service is needed most, while respecting the rights of privacy of individuals. For example, AECOM is supporting the New Jersey Transit Corporation's use of big data to understand and respond to pandemic-related changes in travel patterns to help inform return-to-service planning.

Using a scenario planning approach such as AECOM's *Mobilitics*⁴, combined with near real-time data, enables transit agencies to adjust and evaluate multiple assumptions simultaneously. That allows them to better understand potential future transport conditions and make informed decisions today. *Mobilitics* is based on travel demand forecasting theory in which individuals make the travel decisions that are best for them based on a combination of time, cost, comfort, and convenience. *Mobilitics* assumes that people in the future will continue to make their choices in that way — but that they will have new options and considerations related to the pandemic. *Mobilitics* isn't about predicting the future: instead it provides a range of possible outcomes to make informed planning and investment decisions.

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INTEGRATED TECHNOLOGY SOLUTIONS

Looking ahead, agencies will have to build upon their existing systems and integrate new solutions to manage safety and a quality experience at every step of the customer journey — from providing riders with real-time information for trip-planning options, to managing congestion at station platforms, to controlling boarding and alighting to maintain social distancing on vehicles, and finally to enabling safe alighting at passengers' destinations. Many of the technologies and solutions needed to enable this already exist and can be leveraged, such as automatic passenger counting, cameras, and touchless fare payment systems. However, an integrated and intelligent solution can make this process easier to manage and safer.

AECOM's Transportation Resilient Integrated Passenger Solution (TRIPS) is an integrated approach to support safety by conducting a gap analysis of existing technologies while identifying additional solutions that are needed. This information is key to creating a system architecture that encompasses the entire passenger journey, including fare payment, crowd monitoring and control, and systems engineering. Implementation of this type of system could build upon work already done to advance Mobility as a Service, such as the system employed in Dublin, where a new platform called My Mobility Hub encourages people to make greener and healthier choices. The platform — designed by AECOM for Smart Dublin, Dublin City Council, Dun Laoghaire-Rathdown County Council and Enterprise Ireland — also allows users to track their travel behaviors and record their sustainability score. Existing passenger apps can be evolved to include real-time information on train and station occupancies, to check the system for capacity and control station arrival, boarding and alighting processes to promote safety and distancing. ➔



Philadelphia, PA, U.S.

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ALLOCATION OF SPACE

Finally, there is an opportunity to rethink the allocation of space in cities, recognizing the value that public transit could bring to the public realm if it was more integrated into the urban environment and more connected with the full spectrum of other modes of transportation. With fewer vehicles on the streets, shelter-in-place requirements have made it abundantly clear how much space is dedicated to private vehicle movement and parking. Increases in walking, rollerblading, and biking while maintaining social distancing illustrate that a rebalancing of space from cars to people and transit is needed. Every public transit user is also a user of the public realm, and a higher quality, more accessible environment at transit stops will provide a higher quality experience for transit customers. The investments in public transit required to address the public health crises can be leveraged to improve the public realm while adding value to associated communities. For example, the need to social distance has seen cities all over the world take over some road space for active public use. Transport for London (TfL) and several other cities across the UK have commissioned AECOM to engineer temporary cycle lanes to support flexible and dynamic use of infrastructure to enable social distancing, use of active transportation and reduce pressure on public transit systems. If cities jump on this now, before cars come back, there is an opportunity to both make the way we travel more sustainable and equitable, while simultaneously improving the quality of urban life.



Cycle lanes, UK

Next steps

We don't know what the demands on future mass transit systems will be, but if we act now, we have an opportunity to shape them. Transit authorities should take this opportunity to consider different potential scenarios of what the future could look like in order to inform policies, investments, and services today.

Getting back to normal — whatever that may be — is only part of the challenge. In many ways, the old normal left much to be desired. We now have a unique opportunity to realign the way we design cities and services to be more in line with our values and priorities around providing equitable access to resources and opportunities, a sustainable environment and a quality public realm — shaping a better normal.

To meet these goals, we can provide and incentivize more options. Nobody misses the crowded commute, and

policies to increase flexibility around travel time and frequency, such as teleworking or shift work schedules, could make public transport more attractive. Closely integrating public transit with other travel modes would improve the service, as would strategies to increase mass transit capacity, such as London's Crossrail 2. Overall, a reprioritization in use of our streets is needed that favors people and transit, not personal vehicles.

We can't predict the future, but we can identify the options to inform decisions today. Using scenario planning and near real-time big data to dynamically understand and react quickly to our fast-changing world, new technologies offer the opportunity to enhance transit's critical role of providing a safe, efficient, sustainable and equitable service. The future health of our cities — economically, socially and environmentally — depends upon it. **WU**