

TASK 10: LONG RANGE TRANSPORTATION TRENDS

INTRODUCTION

The ABC Ramps, opened in 1992, recently began the second half of their assumed fifty-year lifespan.¹ This report considers the role the ramps may play over the next 25 years. Many innovations in transportation technology have been introduced in recent years, or are expected to become available in the near future. These innovations—such as mobility-as-a-service (MaaS), the electrification of vehicles and autonomous vehicles (AVs)—will affect the role of the ABC Ramps and how people use them.

Apart from transportation innovations, other societal and policy changes are expected to affect travel behavior and parking demand in the coming decades. For example, advancements in information technology may encourage more telework and utilization of coworking spaces located closer to people's homes than conventional office spaces. Changes to transportation finance policies may alter the financial incentives that influence how people travel. Changes to local parking and land use ordinances may affect vehicle use and parking consumption. All of these ongoing and future changes will shape the role the ABC Ramps play and the strategies the ramps employ to maximize their benefits and preserve their viability as a transportation resource in downtown Minneapolis.

This report will examine different plausible trajectories for the ABC Ramps over the next 25 years based on changes in the technological, market and policy forces that act upon the ramps. It will begin with a review of technological shifts that are likely to alter the future of parking in central business districts in major U.S. cities like Minneapolis. It will then present a scenario matrix that conceptualizes possible changes in the technological, market and policy environments that may alter the nature, supply and demand for parking in downtown Minneapolis. The matrix will consider strategies that the ABC Ramps can employ to adapt to external changes, such as programmatic offerings, reuse of space and integration with different transportation modes and services. The report will conclude with recommendations of proactive measures that the Minnesota Department of Transportation (MnDOT) can adopt today to prepare the ABC Ramps for the expected changes and uncertainties of the future.

TECHNOLOGICAL AND POLICY SHIFTS AND THE FUTURE OF PARKING IN DOWNTOWN CORES

"The Transportation Futures Project: Planning for Technology Changes," an expansive 2016 MnDOT-sponsored report by four researchers at the University of Minnesota, offers a comprehensive review of

¹ While it is commonly accepted that the useful life of a structured parking facility is 50 years, the actual lifespan of the ABC Ramps may be longer, depending on external and internal factors considered in this report.

impending technological and policy shifts that are expected to reshape transportation in Minnesota. Many of the shifts examined in the Transportation Futures Project—particularly autonomous vehicles, mobility-as-a-service, road pricing and electrification of vehicles—have the potential to change how people use the ABC Ramps.

Mobility-as-a-Service

Today, the typical personal automobile is unused 22 or 23 hours a day. The idea underlying MaaS is that vehicles can be shared, and thus can spend significantly more time serving a transportation purpose rather than sitting idle.² MaaS is already transforming travel behavior due to the availability of ride hailing services like Uber and Lyft, and also increasingly common bike sharing services. Coupled with AV technology, MaaS has the potential to dramatically reduce vehicle ownership rates, as people might increasingly eschew the fixed costs of vehicle ownership and rely on MaaS and other transportation modes to satisfy their transportation needs.³ A reduction in vehicle ownership rate would likely reduce parking demand in dense urban cores.

Transportation Finance and Road Pricing

The growing inadequacy of state and federal gas taxes to ensure sufficient funding for transportation infrastructure may lead policymakers to put a price on using roads, such as through a mileage-based fee or cordon pricing. The ability of road pricing to reduce congestion is another feature of this policy tool that may favor its adoption. Road pricing could affect demand for parking in the ABC Ramps by causing some single occupancy vehicle (SOV) travelers to shift to other modes such as transit, carpooling, biking or walking. It could also encourage people with flexible schedules to shift their travel from peak to non-peak times.⁴

Electrification of Vehicles

An increasing share of passenger vehicles are powered by electricity, a trend that is expected to continue as battery technology and charging infrastructure improve and governments encourage adoption of electric vehicle technology to reduce greenhouse gas emissions. Plug-in hybrid electric vehicles (PHEVs) and electric vehicles (EVs) are expected to represent 16% of new vehicle sales in

² David M Levinson, Adam Boies, Jason Cao and Yingling Fan. *The Transportation Futures Project: Planning for Technology Change*. Report no. MnDOT 2016-02. January 2016, p. 37.

³ Levinson et al., p. 47.

⁴ Levinson et al., p. 73-74.

Minnesota in 2035. That figure is anticipated to rise to 56% by 2050.⁵ As electricity-powered vehicles gradually gain market share, the ABC Ramps may need to add charging stations to retain the patronage of PHEV and EV users. The proliferation of non-gasoline vehicles may also indirectly affect the ABC Ramps by putting pressure on policymakers to hasten the deployment of road pricing to offset declining gasoline tax revenues. PHEVs and EVs may also encourage the development of other alternative transportation revenue streams, such as mileage-based road user fees, that discourage driving and reduce demand for downtown parking.

Autonomous Vehicles

The uptake of AV technology, expected to occur over the coming decades, is anticipated to reduce the amount of urban space needed for parking. AVs are expected to drop passengers off at their destinations, then park outside of high value real estate locations such as downtowns. This will require the development of drop-off and pick-up areas tailored to the behaviors of AV users. AVs will also support more compact parking stalls, since people moving in and out of parked vehicles will not need to be accommodated.⁶ Furthermore, AVs are expected to come in more shapes and sizes than today's automobiles, including small vehicles designed to accommodate as few as one passenger.⁷ These smaller vehicles will require less parking space than even the smallest automobiles available today. While some research studies have predicted a 90% reduction in parking demand due to adoption of autonomous vehicles, an analysis by parking consultancy Walker Consultants concluded that a 10% to 40% drop in parking demand by 2050 is more realistic. The Walker Consultants analysis states that "the impact at a specific site will likely vary by geographic location, land use and density; it will likely be greater in the urban core," a projection that suggests the area around the ABC Ramps will experience a large drop in parking demand. The report also emphasizes that AV adoption and the corresponding reduction in parking demand will occur gradually, as the country's fleet of 256 million conventional vehicles will require decades to turn over.⁸

Recent Innovations in Structured Urban Parking

There is already evidence that urban structured parking facilities are undergoing changes in response to ongoing and expected technological shifts. A mixed-use development in downtown Los Angeles' Arts

⁵ Levinson et al., p. 64.

⁶ Levinson et al., p. 9.

⁷ Levinson et al., p. 8.

⁸ Walker Consultants. *The 90% Fallacy*. January 2018. <<http://walkerconsultants.com/wp-content/uploads/2018/01/90-Percent-Fallacy-1.pdf>>

District that will create 475 homes and almost 50,000 square feet of retail space will be built with nearly 1,000 parking stalls at street level and underground.⁹ While intended to satisfy contemporary demand for parking, the parking component of the development is designed to be adapted to serve other uses in the future. Level floors are among the key design elements that will facilitate reuse of the facility for purposes including retail and entertainment. Other design features favorable to reuse include higher-than-normal ceilings, elevators and stairs located in the middle of the facility (rather than on the perimeter) and wall spaces where windows can be easily added.¹⁰

While the ABC Ramps were not built to facilitate adaptive reuse, there may still be opportunities to adapt them to serve new uses. Ramp A has level floors, which make it the best candidate among the three ramps for commercial or residential reuse. Ramps Ramps B and C would be more difficult to repurpose because they have sloped floors, but these facilities may be candidates for such uses as AV operations or fleet servicing. Apart from floors, other potential obstacles to repurposing the ABC Ramps include drainage, short ceiling heights and insufficient load capacity to support activities with higher load demands than parking.¹¹ Since the ABC Ramps have been maintained better than many other parking structures in the downtown Minneapolis market, it may make more sense to keep their focus on parking and to instead repurpose other parking facilities in downtown Minneapolis.¹²

The “Out” and the “Up” Scenario

The Transportation Futures Study refers to new technologies complementing each other to reduce motor vehicle travel and parking demand as the “up” scenario. In an “up” scenario future, MaaS is a way of life and vehicle ownership rates are so low that urban land currently dedicated to parking can be redeveloped to support more productive uses such as housing and offices, boosting urban density and further reducing the hegemony of private automobiles in urban areas.¹³ The ABC Ramps would be expected to be affected profoundly by the “up” scenario, owing to their location in a downtown core with a strong real estate market. Already, densification near the ABC Ramps (for example, development of nearby hotels, apartments and stadiums) has increased demand for parking in this ramps.

⁹ Allison Nagel. *New Projects Are Reshaping DTLA's Arts District*. Bisnow. November 2017. <<https://www.bisnow.com/los-angeles/news/neighborhood/new-projects-are-reshaping-dtlas-arts-district-81920>>

¹⁰ Roger Vincent. *When car ownership fades, this parking garage will be ready for its next life*. Los Angeles Times. April 2017. <<http://www.latimes.com/business/la-fi-car-future-real-estate-20170405-story.html>>

¹¹ Written communication with Carl Schneeman, Walker Consultants, 4/12/18.

¹² Mike Mulcahy and Jo Erickson. *How will driverless cars change our cities?* Minnesota Public Radio. March 2018. <<https://www.mprnews.org/story/2018/03/20/driverless-cars-change-our-lives>>

¹³ Levinson et al., p. 47.

The Transportation Futures Report, however, also entertains the possibility that upcoming transportation shifts will induce demand for motor vehicle travel, which may allow current parking demand to persist (or even increase it). The pricing environment in which AV technology proliferates might result in what the report labels the “‘out’ scenario.” In this scenario, personal ownership of AVs is sufficiently attractive from a financial standpoint that most households own rather than share AVs. Mass AV ownership makes exurban living relatively more attractive, as AVs offer people a faster, more relaxing and more reliable commute from the exurbs to jobs in the urban core. This could result in more suburbanization, more automobile use and more parking demand in job-rich areas like downtown Minneapolis.¹⁴

The “out” and “up” scenarios, the Transportation Futures Report notes, are in fact not mutually exclusive. New transportation technologies in the coming decades could simultaneously increase the attractiveness of exurban living for some households, while enabling higher urban densities that benefit other households.¹⁵ These changes could have contradictory effects on downtown Minneapolis parking and the ABC Ramps and speak for the need for the ABC Ramps to prepare for divergent future scenarios.

ABC RAMPS SCENARIO MATRIX

Because of uncertainty regarding the future of transportation in metropolitan areas and how changes in transportation behavior and technology will affect the ABC Ramps, we have developed a matrix to examine possible scenarios the ramps will encounter over the next 25 years. The scenarios are organized into three categories:

- *Parking Supply Scenarios*: Possible policy and market changes that could affect the supply of parking available in the downtown Minneapolis market in which the ABC Ramps compete.
- *Parking Demand Scenarios*: Technological and market changes that may affect the demand for parking in downtown Minneapolis.
- *Pricing Scenarios*: Pricing policies that may be implemented to fund transportation infrastructure and influence travel behavior.

¹⁴ Levinson et al., p. 12-13.

¹⁵ Levinson et al., p. 48.

This remainder of this section will describe each scenario included in the three categories, paying close attention to the likely implications for the ABC Ramps under each scenario. For the purpose of this analysis, scenarios are described as if other market and policy forces are held constant. In reality, various scenarios are likely to play out simultaneously with interrelated causes and effects. Additional information on each scenario—such as behaviors encouraged and discourages and impacts on social equity—can be found in the matrix.

Parking Supply Scenarios

Parking Supply Scenario 1: Repurposing of other parking facilities in downtown Minneapolis.

Other parking facilities throughout downtown are reused or redeveloped for residential, office, retail and other non-parking uses. Demand for parking at the ABC Ramps increases as downtown’s overall parking supply shrinks and downtown draws more residents, employees and visitors, some of whom need a place to park. Single occupancy vehicle (SOV) use is discouraged because the tight supply of parking raises its price. The ABC Ramps generate more revenue thanks to higher market prices for parking and higher utilization rates.

Parking Supply Scenario 2: Repurposing of curbside parking.

Curbside on-street parking in downtown Minneapolis is repurposed for other uses, such as pick-up and drop-off zones, wider sidewalks and bicycle facilities. The reduction in on-street parking supply increases demand for short-term parking in structured parking facilities, including the ABC Ramps.

Parking Supply Scenario 3: Parking supply status quo.

The ratio of downtown parking spaces to residents, employees and visitors remains relatively constant compared to today. Existing parking facilities remain in operation and new parking is produced to accompany new development. Curbside parking is preserved. In this scenario, demand for parking in the ABC Ramps does not increase and SOV usage is not discouraged compared to today. ABC Ramps’ revenues and role are largely unchanged.

Parking Supply Scenario 4: Return of minimum parking requirements.

The City of Minneapolis revives its requirement that new developments downtown be accompanied by an ample amount of parking. Demand for parking at the ABC Ramps declines as new developments produce little parking spillover. The abundant supply of downtown parking encourages SOV travel. ABC Ramps’ revenues are largely unchanged.

Parking Demand Scenarios

Parking Demand Scenario 1: High downtown employee population growth.

A booming population of downtown employees increases demand for parking in the ABC Ramps. Parking prices and roadway congestion increase, discouraging SOV travel. ABC Ramps generate more revenue due to higher market prices for parking and higher utilization rates.

Parking Demand Scenario 2: Decreased downtown employee population.

Sluggish or nonexistent growth in the downtown employee population keeps parking demand largely unchanged compared to today. Travel behaviors in and out of downtown Minneapolis hold steady, keeping ABC Ramps' revenues similar to current levels. SOV travel remains a viable option for many downtown Minneapolis commuters.

Parking Demand Scenario 3: Fleet-based adoption of AVs (high adoption of MaaS).

Personal ownership of automobiles plummets as AVs are mostly utilized as MaaS, much like Uber and Lyft today; instead of owning AVs, people hail them for rides when needed. Since few people own vehicles and fleet vehicles spend a high proportion of their time in service rather than parked, demand for parking in the ABC Ramps falls and the ABC Ramps must be retooled to serve needs other than parking for privately-owned vehicles. Parking structures located directly in the downtown core fare better than the ABC Ramps and serve the parking demand that persists in spite of fleet-based AVs, but parking facilities on the fringe of downtown must reinvent themselves. One way the ABC Ramps could do this is by providing a low-cost place for MaaS vehicles to layover during non-peak travel times.

Parking Demand Scenario 4: Ownership-based adoption of AVs (low adoption of MaaS).

Most people purchase and own AVs, just as they own automobiles today. People park their AVs in parking lots or structures near their destinations, just as they park their cars today. Demand for parking does not decrease, and in fact may increase as people who currently cannot obtain drivers' licenses gain access to AVs. The ABC Ramps remain focused on SOV parking.

Parking Demand Scenario 5: High adoption of telework.

Cultural and technological changes lead to more people working from home or from coworking spaces closer to their homes than downtown Minneapolis. This reduces demand for parking in downtown Minneapolis. Utilization of parking facilities on the edge of downtown, like the ABC Ramps, falls more than utilization of parking facilities in the city center.

Parking Demand Scenario 6: Low adoption of telework.

Despite improvements in communication technology, the rate of telework does not increase substantially compared to today. Cultural norms and company policies continue to favor in-person working arrangements. Parking demand in downtown Minneapolis is unchanged.

Pricing Scenarios

Pricing Scenario 1: Gas taxes remain substantial revenue source.

EVs are adopted slowly and widespread use of gasoline-fueled vehicles continues to allow substantial revenues to be generated from state and federal taxes on gasoline. The ABC Ramps may need to provide some EV charging stations, but for the most part, the vehicles parking in the ABC Ramps continue to be fueled by gasoline.

Pricing Scenario 2: High EV adoption spurs need for alternatives to the gas tax.

The widespread adoption of EVs renders the state and federal gas taxes inadequate to address critical transportation infrastructure needs. Sales taxes, property taxes and/or mileage-based fees are implemented to compensate for declining gas tax revenues. While the first two instruments may have little effect on parking, the usage of mileage-based fees encourages people to drive less, carpool more and use sustainable modes of transportation more. In this case, demand for parking in the ABC Ramps could decrease slightly. The ABC Ramps can add EV charging stations to cater to EV users.

Pricing Scenario 3: Implementation of cordon pricing in downtown Minneapolis (ABC Ramps within cordon area).

More and more cities across the world implement cordon pricing in their downtowns, and Minneapolis is one of them. Under this policy, people must pay a fee to enter the downtown area in a vehicle. If the ABC Ramps are within the cordoned zone, demand for parking in them decreases.

Pricing Scenario 4: Implementation of cordon pricing in downtown Minneapolis (ABC Ramps outside cordon area).

If the ABC Ramps are located just outside the cordoned zone, demand for parking in them increases, as motorists park in the ramps and complete their trip on foot to avoid paying the cordon charge. The ABC Ramps' direct highway access positions them to allow drivers to avoid a cordon charge by foregoing city streets.

SYNTHESIS AND RECOMMENDATIONS

The purpose of the ABC Ramps is to discourage SOV travel to downtown Minneapolis. As technological and policy changes occur over the next quarter century, the ABC Ramps will have to adjust their strategies and programs to continue to promote non-SOV travel. There is uncertainty around precisely *how* transportation will change in the coming decades, as outlined in the scenario matrix. The ABC Ramps will have to react nimbly to the policy and technological shifts that will occur during the second half of its presumed lifespan. Most of these changes are out of the control of MnDOT; technological shifts are likely to be driven largely by the market, and policy changes will be made mainly by the Minnesota Legislature and the Minneapolis City Council. MnDOT's lack of control over the forces that act upon the ABC Ramps speaks to the need to monitor changes and adapt to them swiftly.

Despite the uncertainty about the future, the MnDOT and the management of the ABC Ramps should embrace the following recommendations in the near term:

- Organizational recommendations:
 - Foster a management structure for the ABC Ramps that facilitates adaptation to a changing transportation landscape.
 - Monitor parking trends and changes to other parking facilities in downtown Minneapolis. Take note of which are maintained well, which are repurposed and which experience other outcomes, and continually consider the role of the ABC Ramps in relation to other parking facilities in the downtown market.
 - Coordinate with other public agencies in the region that operate parking facilities to establish common practices to discourage SOV travel and adapt to changes in the transportation landscape.
- Programmatic recommendations:
 - Develop a pricing structure for the ABC Ramps that requires the user to make a payment each time the ABC Ramps are used (unlike in the case of monthly contracts) to discourage driving.
- Physical recommendations:
 - Develop pick-up and drop-off areas to accommodate MaaS users.
 - Designate a layover areas for MaaS vehicles to discourage layovers far from the city center.
 - Gradually increase the number of EV charging stations at the ABC Ramps based on the EV adoption rate in the Twin Cities.