THE ABC PARKING RAMPS IN MINNEAPOLIS

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16. Abstract (Limit: 250 words)
In 1992 the ABC Ramps were completed in downtown Minneapolis as part of the I-394 construction project. The purpose of the ramps is to have programs that support efforts to reduce congestion and improve air quality by reducing SOV trips from the I-394 corridor. At the time the ramps were built, the ramp goals were aligned with the city of Minneapolis’ parking system goals and the I-394 Corridor Management Plan. Since that time, however, the transportation modes, technologies, and plans surrounding the ramps have changed as well as the travel behaviors of the users. As the ramps reach the midpoint of their design life, this study examined the programs, policies, and goals developed for the ramps to ensure they continue to address current transportation challenges and align with regional stakeholder’s goals and emerging trends, behaviors, and technology. The project culminated in a series of recommendations with implementation strategies for the ABC ramp management to improve its practice towards reducing congestion and improving air quality in downtown Minneapolis through innovative programming and marketing.

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ABC Parking Ramps: Past, Present, Future

Transportation is about more than just getting from point A to point B—efficiency matters, too. Greater transportation efficiency lowers travel time and the costs of goods and services. It reduces air pollution and emissions, lessening health impacts to the local population and to the planet at large. In essence, the more efficient the traffic flow, the greater the benefit to our economy, environment, and quality of life.

Today, achieving efficiency and its related benefits must involve passenger vehicles. Studies show that more than 90 percent of commuters in the United States take this mode of travel\(^1\). Those cars must be somewhere when not in use—which is why parking availability, cost, and convenience can influence transportation choice and efficiency.

A Unique Past

These facts guide the specific, and somewhat unusual, purpose of the ABC Parking Ramps\(^2\) on the fringe of downtown Minneapolis. Contrary to most other parking facilities, the defined purpose of the ABC Ramps is to reduce congestion and improve air quality. Completed more than 25 years ago, these large parking structures contain bus terminals to support transit and intermodal transfer. These features, together with pricing that favors carpooling over single-occupancy vehicles (SOVs), have helped the ABC Ramps reduce congestion along I-394 and in the core of downtown by capturing vehicles as they enter the area.

Present Challenges

Since the ramps’ start of operations, mass transit options and shared-mode transportation have increased in the area, two positive developments. However, the ramps face some challenges to their mission, chief among them that carpools are declining in popularity and SOV use is rising. At the same time, the equity of transportation infrastructure for different populations is a growing priority for the metro area.

Finally, trends toward ride sharing and vehicle sharing, along with the advent of electric vehicles and other new technologies, may require infrastructure modifications. The ramps themselves may need more charging stations, space for pick-up and drop-off for first- and last-miles of trips, and possibly even staging areas for mobility service or ride-hailing providers.

On the Horizon

On the horizon, significant shifts loom. One involves the changing demands of commuters and the employers who offer transportation-related benefits; both want more flexibility in parking and transit (or a combination of the two), plus the ability to use products that leverage new technology.

An impending transformation is the implementation of “smart city” technology, which could equip parking garages with vehicle-monitoring sensors and the means to share data about parking availability (and much more) with other systems. This capability, along with connected vehicles, could enable parking supply management through congestion pricing, thereby playing a part in transportation demand management (TDM).

And a true game-changer—connected and automated vehicles (CAVs)—could soon be deployed in the mass market. Combined with ride sharing and hailing and mobile applications, CAVs could flip the traditional usage model and keep vehicles on the road most of the time. Such a scenario might decrease the need for parking.

Such issues raise questions about how the parking ramps can best achieve their mission of managing SOV use and travel demand on I-394 and through downtown Minneapolis, now and in the future. Any changes must be consistent with governing legislation and regulations that define what can be done and how the ramps must operate.

Forward Vision

Given these uncertainties, the Minnesota Department of Transportation (MnDOT) sponsored an 18-month project to study the situation and plan the next quarter century of the ABC Parking Ramps. Components of the project were split among University of Minnesota researchers and several transportation consulting firms. The team examined how the ramps functioned in the past, detailed how they work today, and forecasted how they might operate in the future. This research resulted in multiple task reports (see page 17) that sought to answer two main questions:

1. How can the ramps better meet the purpose of reducing congestion and promoting non-SOV transportation, particularly during peak periods?
2. What new programs and innovations can be put in place to reduce SOV usage?

This summary synthesizes these research results and supplies resources for those wanting to dig deeper.
Before covering the ramp’s present and future, a look back is helpful. Located on the northwest side of downtown Minneapolis, the ABC Parking Ramps were built from 1989 to 1992 as part of the construction of I-394. Their express purpose is to reduce congestion and air pollution on I-394 by promoting the use of high-occupancy vehicles (HOVs). They also are intended to lessen travel and congestion through downtown Minneapolis.

The parking ramps and their operational target are the result of decades-long planning. This started with a proposal in the 1950s for a freeway to connect downtown with the western suburbs of Minneapolis; projections at that time were for a significant increase in population and cars. A conceptual solution was to place parking structures strategically on the periphery of downtown. In the 1960s and 1970s, the requirement for environmental impact studies and the need to improve air quality downtown prompted changes to the planning, as did calls for light-rail transit. After years of effort, what emerged in the 1980s was a final compromise that focused on HOVs to reduce congestion and air pollution in the downtown area.

I-394 and the ABC Ramps are notable among interstate projects for their use of HOV lanes and parking facilities to achieve higher freeway-carrying capacity. The ramps were built with direct connections from the HOV lanes, and their defined purpose was to give convenient access and reduced-price parking to carpoolers. Indeed, the ABC Ramps are the only federally funded project of this kind. Another distinction is that unlike most other parking facilities, the parking ramps’ primary purpose is not to maximize revenue. Instead, their aim is to reduce congestion and improve air quality.

The ABC Ramps are large: Ramp A has more than 3,500 stalls, Ramp B over 1,600, and Ramp C nearly 1,500. Together, they total more than 6,500 stalls and account for almost 40.9 percent of the off-street structured parking owned or managed by the city of Minneapolis’s parking division.

The construction cost for the garages was $111 million. Of that, the Federal Highway Administration (FHWA) funded 90 percent. The rest was split between MnDOT and the city of Minneapolis. Federal laws, state statutes, and a maintenance and operations plan with the FHWA guide how the parking ramps operate. In 1989, MnDOT executed a 50-year agreement with the city of Minneapolis to manage and operate the ramps. The structures must serve a transportation purpose, as they were constructed and are regulated as bridges and must always, but not exclusively, benefit I-394.

While it is generally accepted that parking ramps and similar structures have a 50-year lifespan, the actual operating life of the ABC Ramps could vary from that depending on a wide variety of conditions such as parking demand or cost and quality of maintenance. These factors could affect whether the ramps continue to serve a transportation purpose and when they will reach the end of their useful life.

Early Years of Operation

According to the MnDOT system management plan for I-394, the top operational priorities for the ramps were HOV monthly parking contracts, with I-394 commuters favored over those from other highways. Next in priority were SOV commuters, with those from I-394 again given precedence. All other daily and hourly users were at the bottom of the operational priority list (although hourly HOVs are charged a reduced rate).

Per guiding legislation, the fees charged for SOVs must be market rate. The legislation also requires the ramps to promote alternative transportation modes; this is defined as the use of HOVs to replace the need for additional capacity. (Governing statutes also require that non-transportation applications must not interfere with transportation uses and must be priced at fair market value.) If an HOV is a passenger vehicle, it must be occupied by two or more people.
The ratio of carpool contracts to SOV contracts declined from 1:2 in 2005 to 1:4 in 2015.

The parking ramp operator cannot charge more than the market rate for SOVs but may charge less for those carrying enough people to qualify as an HOV.

An HOV can also be a bus or other mass transit. The ramps have six bus lobbies and serve as intermodal transfer facilities. Express buses from park-and-ride locations stop at the ramps, allowing commuters to transfer to local routes. HOV and SOV parking stall users can also transfer to local buses at the parking ramps. This transit and intermodal transfer approach reduces congestion and SOV use.

Selective pricing helped achieve the ramp’s mission. The cost of a carpool parking spot was set much lower than the cost for an SOV. (Today, a carpooler may pay as low as $20 a month while a solo driver pays the market rate of $130 to $150.) That pricing also gave the most favorable treatment to HOV commuters using I-394.

The ramps were successful financially. From 1997 on, the garages made enough money to cover mandatory expenses, reimburse Minneapolis for incurred expenses, and start funding discretionary operating expenses. Earnings were initially kept in two city of Minneapolis municipal accounts, one for maintenance and another for operations.

Initially MnDOT Metro District had oversight of the ABC Ramps. Today, all revenues from the ABC Ramps are deposited in state accounts and managed by the Office of Transit and Active Transportation in MnDOT’s Central Office. The same office has control and oversight of the program.

This switch to move the funds from city to state accounts was done to bring ramp operations into compliance with statutes.

**Developments in Later Years**

The HOV and SOV parking situation changed beginning in 2002. Reports of misuse led to a study that indicated a widespread problem: about half the 2,200 cars entering the ramp with a discounted monthly carpool contract were arriving as single-occupant vehicles. This suggested that many of these drivers were gaming an honor system that lacked enforcement (although some drivers had dropped off their carpool partner before arrival).

In response, personnel started monitoring ramp entrances at peak commute times. Vehicles entering the ABC Ramps with just one person were required to pay the daily SOV rate. To offset the disincentive of the extra verification, MnDOT cut the price for HOV stalls in half to the current low of $20 a month. Other incentives were also put into place and a marketing campaign was launched to encourage carpooling.

After the implementation of these enforcement measures, the number of HOV contracts declined almost immediately. In 2005 there were about 1,200 carpool contracts and 2,400 SOV contracts, a ratio of 1:2. By 2015, there were about 750 HOV and 3,000 SOV contracts, a ratio of 1:4.
This shift can be attributed, in part, to a general national trend away from carpooling and high-occupancy vehicles. Nationally, carpooling has grown less popular after peaking at 20 percent of vehicles during the 1970s. Carpooling began to decline after 1980 and stood at 12 percent by 2000. By 2010, it had fallen to less than 10 percent, a drop of more than half from its high point.

Economic considerations played a role in these changes. Gas prices fell during the 1980s and remained low, in inflation-adjusted terms, well past 2000. This is in contrast to the high fuel prices (adjusted for the cost-of-living) during most of the 1970s. These trends and economic factors were evident in Minneapolis. For example, high gas prices tracked with more carpool contracts at the ABC Parking Ramps and higher transit ridership.

A New Ballgame

Other factors triggered changes to ramp parking usage patterns. For example, event revenue rose, largely because of the development of Target Field and the move by the Minnesota Twins baseball team there in 2010. MnDOT made improvements to the parking ramps and associated structures in response to this downtown development. For a cost of $17 million, which came from parking revenues, MnDOT added new street-level entrances, constructed a skyway connecting Ramp B to Target Field, enhanced signage to help game-day visitors, added bathrooms and other amenities for transit and bike users, and installed automated parking-revenue collection equipment. The last enabled the use of credit cards and allowed parking facility personnel to quit handling cash. After the baseball team’s arrival, event revenue grew from about 17 percent to 35 percent of the parking ramps’ total take. The rest of the ramps’ income, from monthly contracts as well as from daily and hourly parking, remained fairly constant.

The increase in event parking allowed underutilized ramp space to be put to use. Most baseball games are played on weekends and evenings, when most downtown workers are not using the parking ramps. Plenty of space is unused at those times, so these games present little capacity concerns.

The eight weekday daytime games, however, can cause all of the ramps to fill completely and are more of a challenge. Demand for Ramp C also rose when surface parking lots in downtown Minneapolis were developed and repurposed, including those near Ramp C.

To minimize capacity issues, rates were adjusted between the three ramps to rebalance demand. The cost was raised in C and lowered in A, encouraging commuters to move their vehicles from C and B to A.

The ramps’ increased usage was also due in part to the repurposing of about 40 percent of Minneapolis’ downtown industrial and vacant space to retail, mixed commercial, multifamily housing, mixed residential, office, institutional, and other uses from 2000 to 2016. This conversion, which took some surface parking out of service, contributed to the changing mix of parking ramp users and further increased demand for the available structured parking stalls.

Even with these conditions, however, adjustments in operations and fees have improved the efficiency of the parking ramps, and the structures are still able to achieve their primary mission of reducing congestion, SOV use, and emissions.

A skyway was added to connect Ramp B to Target Field.
Currently, the ABC Parking Ramps need updates in operations, services, products, and appearance. Several key factors drive these needs: declining carpool usage, a growing downtown, changing travel behaviors, and evolving technology. Other motivators include empty and unused space in the ramps, an outdated look, and safety concerns in nearby neighborhoods.

This section covers research into these motivators. It also discusses user demographics and preferences, equity, and the attitudes of employers, stakeholders, and key groups whose buy-in is important for the ramps to achieve their mission.

Drivers for Change

As noted, carpools are declining and SOV use is rising. The latest data reveal a rapid increase in SOVs, with the ratio of HOVs to SOVs now approaching 1:50. One result is that the ABC Ramps fill up more now than in the past. In particular, Ramps B and C can, at times, be almost full. This drives demand for SOV contracts, which are the only way to guarantee a parking spot. Users who previously paid the daily rate some days and used transit on other days now purchase a monthly contract and drive every day. Correcting this underlying situation is one reason to update operations and products for using the ramps.

A growing downtown also forced and continues to compel ramp changes. The opening of Target Field, redevelopment in the area, and the launch of light rail increased ramp usage. Appropriate adjustments were made to accommodate these changes while ensuring space for commuters. More adjustments will be made as redevelopment continues.

Changing travel behaviors are additional reasons to update the ramps. Today, Uber, Lyft, and other transportation network companies (TNCs) enable ride-hailing, a concept that is gaining in popularity. Using TNCs and related services requires drop-off and pick-up locations. Ideally, these should be located off busy city streets in locations that minimize congestion. TNCs have come up with their own spots to do this, but these are not consistent for all ride-hailing uses. Thus, incorporating such locations is another reason to update the ABC Parking Ramps, a task that stakeholders and studies identified as useful.

This rise in the sharing economy is challenging some basic concepts and assumptions, such as the ratio of car ownership in a population, and the impact on congestion is unclear. If more people are traveling long distances with ride-hailing services and not carpooling or using transit, congestion could increase. Similarly, converting a transit or SOV trip to ride-hailing adds to congestion because miles are added by the driver to pick up and drop off the passenger. Ride-hailing services can, however, be an important part of mobility, especially for first- and last-mile travel. Any ramp updates to enable ride-hailing should be done with care so that they do not conflict with the purpose of the ramps to reduce congestion.

Other triggers for updating the ramps involve technology changes—some already here, others coming soon. Electric vehicles can use charging stations now in the ramps, but more stations may be needed if the number of electric vehicles grows large enough. Prototype connected vehicles—cars that communicate with nearby and remote systems—are rolling out daily and offer increasingly sophisticated connectivity. For the parking ramps, making the most of connected cars will require the installation of sensors, networks, and other infrastructure. Doing so will allow automated entry and exit and enable real-time updates of parking availability. This can improve parking flexibility and potentially lead to demand pricing for parking.

A consequence of this connectivity and other new infrastructure will be big data, with copious information generated by connected cars, smart city technology, and the networking of the two. For the ramps, big data analytics will provide insights into users’ behavior, making it possible to increase usage and better fulfill the parking ramps’ mission—reasons to invest in the infrastructure needed to support big data.

Smart phones and mobile applications are still more examples of technology change. Transportation network companies, for example, depend on such technologies for their user experience. What’s more, commuters and other users increasingly expect familiar interfaces and the associated ease of use that arise from mobile technology. This may require some updating of ramp facilities and
The ramps were first put into service more than 25 years ago and some components have an outdated look, while buildings around the ramps are being updated and renovated. The ramps may appear unsafe, which could reduce activity within the space.

The ramps, however, could contribute to the vibrancy, economic development, and feeling of safety in the area if they are updated, lighting is improved, pedestrian connections added, and more purposeful activity occurs in the space. Improvements that enhance perceptions of security increase the odds that drivers will opt to use the ramps to connect to transportation services or parking. Achieving this outcome through modifications to the physical plant is a final inducement to make changes to the ramps.

A related group of changes revolve around both physical and operational aspects of the ramps. There are about 48,000 square feet of empty and unused areas in the finished building space in the parking structures. This space includes unused offices, passenger waiting areas in unused transit lobbies, and warehouse space that can be remodeled for other uses. In addition, there are opportunities to activate the public space in the skyways. Other uses could include retail, community meeting rooms, offices for transportation services, or other use of the space.

Extra space in the ramps could be put to use.

User Demographics and Preferences

Any changes to the ramps or their operation must not only conform to the ramps’ mission, but also keep in mind the needs of commuters and other users of the facilities. This should include current and prospective ramp customers.

A study based on three months of sample GPS vehicle trip data and employer information showed that more than 8,200 jobs were within two blocks of the parking ramps. Expanding the boundary to four blocks pushes the total jobs to almost 57,000. These last figures can be thought of as the potential customer pool that the ramps could draw from, while the first could be considered the area where current commuters and users most likely work.

The same mapping technology also tracked the origin zip codes of those drivers whose trips ended up near the parking ramps. The two techniques did not replicate each other’s results exactly, in part because the employer dataset included where people worked but not where they parked. Also, the GPS data did not pinpoint exactly where a car parked. Even so, the two datasets showed that the likely origins for current ramp customers are to the north and west of downtown Minneapolis. Drivers coming from the south and east represent more than 30 percent of traffic.

This was confirmed by surveys of general ramp users conducted in March and April 2016 and in February and May 2017. Similar data were gathered from carpoolers in 2016 and 2017. These studies collected information on daily travel, transportation mode, reasons behind transportation choices, family size, income, and other demographic information. The general ramp user survey had twice the respondents of the carpool survey (not surprisingly, given HOV contracts and use are only a fraction of those for SOVs).

Interestingly, for general ramp users these surveys revealed that two out of three SOV travelers are using something other than their ideal mode of transportation. Most users—some 80 percent—do not plan to change, with five out of six citing the convenience of their current transportation choice as the reason not to. Two out of three said the reason not to change was cost.

Digging deeper into these responses shows an underlying factor: with current products, commuters must choose between parking or transit. If commuters must drive some days but not others, they usually choose parking, and driving becomes the default daily option. These results indicate that the right product and financial or cost incentive might modify commuting behavior.
Ramp users (2017 general customer survey)
• 94% white
• 72% had household income above $100,000
• 52% drove to the ramps alone
• 66% are not using their ideal modes

Ramp carpoolers (2017 carpooler survey)
• 78% white
• 63% had household income above $100,000
• 83% carpool to the ramps five days a week
• 60% use the HOV lanes
• 32.5% say cost is a factor for choosing to carpool
• 26.1% say convenience is a factor
• 92% say carpooling is their ideal form of commuting

Unlike those who drive alone to the ramps, carpoolers reported being highly satisfied with their choice, with 92 percent saying they were using their ideal mode of transportation. Seventy-five percent of carpoolers travel with only one other person; 54 percent reported they were in the same household as their carpool partner.

Surveys and outreach events found that the parking ramps could attract potential users from different areas of the metro. These potential users are located, for the most part, south and east of downtown. Currently, such travelers account for about 30 percent of trips ending near the ramps⁹. If the geographic restriction on the carpool parking discount were lifted, there is potential to reduce overall congestion on other interstates in the region and through the core of downtown. One of the issues confronting these possible ramp users is the layout of the road network; they probably would prefer to use I-35W (which travels north and south) and State Highway 65, and would likely have to drive through downtown. Providing a carpool incentive for these commuters from the south and east could reduce travel demand through downtown.

Users who would like alternatives to driving alone also want flexibility and options. They might, for instance, want some combination of carpooling, driving alone, and transit, with the ability to switch seamlessly between these as needed. Indeed, about 4 percent of the general ramp users surveyed indicated they prefer to be dropped off. They essentially want the ability to travel by car for most of the trip and have mobility choices at the end of the inbound trip and the beginning of the outbound trip of their journey.

Given this desire for flexibility, several new trends and emerging technologies could play a role, such as vehicle sharing (which can involve cars, bikes, or scooters) and ride hailing using Uber, Lyft, or other commercial transportation network companies. Waze and others are developing apps and tools to facilitate ride sharing or carpooling on-the-fly. Peer-to-peer applications could also make it easier to arrange connections on an ad hoc basis.

There seems to be a natural fit between what some users want and what is, or could soon be, available. Transportation network companies could act as a first-mile/last-mile option. Designated and consistent drop-off and pick-up spots within or near the ramps would help ensure a smooth traffic flow and minimize any safety issues. The ramps have ample space for bike and scooter storage, and more is being added. These travel options can extend the reach of the ABC Ramps by making it easier and more practical for people to reach destinations that are further away from their parking spot.

At the same time, the impact of any incentives or changes on traffic patterns and flow must be carefully evaluated. The city of Minneapolis and MnDOT are concerned with congestion in the city’s core. Also, the effect on revenue required to maintain the ramps must be monitored, as well as the result of any changes on enforcement and adherence to existing laws. Any changes also should not create a transit disincentive and have other unintended consequences.

**Employer and Stakeholder Goals**

Employee transportation choices are not made in a vacuum— incentives from employers and other stakeholders often have a significant impact.

**Travel demand management plans**

As part of the approval process for projects in downtown Minneapolis, developers or other interested parties submit a travel demand management plan (TDMP¹⁰). Between 2005 and 2016, 34 different developments required a TDMP; just under half were for mixed residential and commercial developments. More than half of the employers involved in a TDMP connected to the ABC Ramps via the Minneapolis Skyway System.

Of the plans submitted, on average the goal was for 50 percent travel by automobile in a mix of single- and high-occupancy vehicles, 35 percent travel by transit, and 15 percent by walking or biking. Some of the strategies employed included encouraging deliveries at off-peak times and using carpools or ride sharing, as well as facilitating the sale of transit cards and otherwise discouraging SOV trips. About 90 percent of the plans included secure and
accessible bike storage and on-site showers as ways to encourage an alternative to SOVs.

The TDM plans are written at the time of development, an important time to incorporate multimodal access and features such as bike parking and showers for bicyclists. However, after a building is developed, there is not a good method for handing off the plan to the building occupant or employer. Contacts provided in the TDM plans are no longer associated with the project, and employers and building occupants are not aware of the programmatic goals outlined in the plan. Therefore, it is difficult to assess how well the plans are being implemented. The city ordinance requiring the plans does not include a mechanism to report progress toward goals.

In surveys of downtown employees and employers, half of the workers reported that their company promoted transportation options. About a third said their employer had a designated transportation coordinator, someone tasked with helping the organization achieve TDMP goals. The responses showed that 60 percent of employees drive alone to work, with 27 percent taking transit and 4.6 percent carpooling. Walking and biking were an even smaller share of the transportation modes.

Employer incentives have a significant impact on transportation choices.

Regional stakeholder goals

A final part of the present picture involves regional transportation stakeholders—not just MnDOT and the city of Minneapolis but also the Minneapolis Downtown Council and Move Minneapolis, a transportation management organization that promotes sustainable transportation. Interviews and research of these and other groups—including neighborhood associations and business organizations, businesses, and the local transit authority—brought to light their transportation goals. In all, researchers investigated 11 organizations that are key transportation stakeholders. These studies showed how Excerpts from some stakeholder plans:

- Minneapolis Sustainability Plan: “...increase the use of alternative transportation modes in downtown to 67 percent by 2013.”
- Access Minneapolis Plan: “Access Minneapolis will result in a citywide transportation system that is multi-modal (pedestrian, bicycle, transit, automobile, freight), providing good transportation choices to people, including people with disabilities.”
- Downtown Council 2025 Plan: “Increase transit mode share for daytime commuters from 40 percent to 60 percent.”

Employer incentives have a significant impact on transportation choices. Regional stakeholder goals

A common objective of all the regional stakeholders is a desire to promote transportation choices. For neighborhood and business associations, the limited amount of parking near the ramps leads them to support having fewer SOVs on the road, as this both reduces congestion and the demand for parking. Another theme that runs through the stakeholders’ wishes is for sustainable transportation, which aligns with the ABC Ramps’ offering of services to cyclists, pedestrians, and transit riders as well as drop-off and pick-up points for ride sharing. Another aspect of this is the desire by government entities to give users flexibility in transportation methods, which users have expressed interest in.

Equity

The city and state are working to advance transportation equity. MnDOT launched its Advancing Transportation Equity initiative in 2017 to better understand how transportation systems, services, and processes help or hinder the lives of underserved or underrepresented communities. Minneapolis has revamped policies to adopt transportation projects that are equitable. It is important that any shift in ramp fees collected or any new services and products offered consider equitable outcomes and the needs of all commuters, examine unintended consequences, and avoid providing additional advantages to already privileged populations or adding burdens to those currently underserved.
Lessons Learned Elsewhere

A look at how these and other options have been implemented in selected U.S. urban areas is the subject of this section. Some of these lessons involve government initiatives, while others include businesses.

Coast to Coast

Arlington County, Virginia, implemented a long-term TDM program that involves cooperation with 241 employers, multi-family residential communities, and schools. This long-term plan is carried out, in part, by a series of short-term programs such as National Walking Day or Bike-to-Work Day. These short-term efforts increase awareness and use of non-SOV options. As a result of these programs, the employer participation rate climbed from 3 percent to 12.2 percent over a three-year period, at which point Arlington County had the lowest drive-alone rate in Virginia. A similar tactic could be employed by the ABC Ramps.

New York State offers many carpool rider-matching programs, both for individual counties and for the entire state. Such an approach could be implemented for the ABC Ramps through a website or a mobile app, with the ramps themselves as either the destination or origin of the trip.

On the West Coast, the Los Angeles-located Warner Center is home to hundreds of companies. Its transportation management organization discourages SOV driving. Over a 25-year period, the Warner Center organization saw a decline in SOV use from 85 percent to 68 percent, a carpooling increase from 10 percent to 23 percent, and a rise in bus ridership from 0.4 percent to 5 percent. In that same time frame, bicycling and walking rose from 0.5 percent to 2 percent. Being a master-planned community may explain part of the Warner Center’s success, but another reason is that the organization collects data on carpooling and other aspects of transportation and uses the data to influence behavior. The ABC Ramps can benefit from this lesson about the power of data.

To the north, a focus of Seattle’s Children’s Hospital is on expanding a bike-share service. Part of this is a program called Company Bikes, which offers free bicycles to employees committed to cycling at least two days per week. The hospital also invests in bike and pedestrian improvements in surrounding areas as well as onsite enhancements.

Seattle deserves a special mention in the area of lessons learned, as noted at an August 2018 symposium held as part of the ABC Ramps study. In recent years Seattle has experienced the strongest population growth, on a percentage basis, among the 50 largest U.S. cities. In a symposium presentation, Jonathan Hopkins of Commute Seattle (downtown Seattle’s transportation management organization) put the growth at 18.7 percent, with 60,000 jobs added to the city’s downtown between 2010 and 2017. Yet for all this increase in people, the number of SOVs decreased by 4,500 and the percentage of people who drive alone fell from 35.2 percent at the beginning of the decade to 25.4 percent seven years later. About half of commuters reach downtown via transit and a tenth through ride sharing. The increase in jobs and people without an increase in SOVs arises from a “virtuous cycle,” Hopkins said. Transit incentives by businesses lead to more riders, which leads to more investment and improved transit infrastructure, which leads to more companies providing incentives.

Seattle’s success hinges to some degree on the state statutes and city ordinances that require and support employers to encourage fewer drive-alone trips. The Washington State Legislature adopted a growth management act in 1990 and passed a law in 1991 requiring employers to work with employees to reduce the number and length of drive-alone commute trips. The commute-trip reduction legislation passed by the state and supplemented by city ordinance affects 270 companies in Seattle and mandates measurement of its impact every other year. It covers nearly three out of five downtown employers, 95 percent of which offer transit benefits. The incentives are designed in consultation with Commute Seattle. For example, a company may subsidize 60 percent of the fare of a bulk transit pass offered to employees. The result has been a growth in business-subsidized boardings of some 70,000, part of a doubling of transit ridership over the last 25 years. Today, more than 60 percent of Seattle’s transit boardings are via a pass subsidized by business.
A key lesson from this part of the Seattle story is that similar measures were considered in Minnesota and in some cases implemented, but the actions were voluntary or were otherwise less strict. This raises the question of whether more strict regulations would achieve similar results.

**Mobility Hub Lessons**

Other lessons come from examining intermodal transfer facilities, or “mobility hubs.” This approach has attracted attention in Minneapolis and elsewhere. For example, the Boulder, Colorado, Transportation Master Plan contains a strategy to develop and operate mobility hubs. These encourage multimodal travel through multiple shared mobility services, along with integrated technology consisting of mobility kiosks and reader boards. All of this is designed to make it easier for commuters to use parking facilities and finish journeys without taking automobiles for the entire trip.

At the August symposium, representatives from the public sector and private companies discussed what it would take to turn the ABC Parking Ramps into complete mobility hubs. Such hubs can reduce SOV usage by eliminating trips and facilitating transfer from one mode to another—which may or may not include parking. For instance, having access to non-car transportation, such as transit or a bike, may mean that a car parked at a location (like the ABC Ramps) is not used for short trips during the work day. Alternatively, mobility options can be a way to expand the zone that can be serviced by the ABC Ramps. This means that a larger pool of employers and a greater number of employees could be potential ABC Ramp customers, driving up the usage rate while enabling the ramps to address their core mission of decreasing SOV usage.

Transportation network companies are getting into bike and scooter sharing. Symposium panelists noted that some of the most well-known ride-hailing companies are buying bike-sharing firms. Thus, these and other TNCs in the private sector may play a role in achieving public goals, such as the development and implementation of mobility hubs within the ABC Parking Ramps. Such mobility hubs could include pick-up/drop-off points for TNCs and transfer capabilities to bus and other transit options, as well as bike and scooter sharing.

Any actions must be implemented with equity in mind. This means that all commuters must be able to take advantage of mobility hubs. Access cannot be restricted to those who have a smartphone and a credit card and who are not disabled.

One way this might be handled is through common fare media, with one panelist noting an implementation of this approach in Finland. The idea is that a single medium—such as a chip-bearing, secure smart card—would store the information needed to pay for parking; a bus, train, or car ride; and bike or scooter rental. Agencies could load these cards with funds, and different people could pay different fees. The access cards would give no visual indicator that any holder differed from any other. A combination of these and other measures could be used to ensure equity.

At the close of the panel discussion, participants recalled their personal favorites among all the mobility hubs they had seen, including examples from around the world. One common characteristic was mixed use, such as living spaces above a ground-level bus terminal or trains running under an airport. Other common attributes were a feeling of safety and invitation, and being a place where people want to be. These mobility hub templates, according to the panelists, were great places for people—not merely spots to switch from one mode of transport to another.

One key to the success of any mobility hub strategy will be the deployment of new technologies. Some of the advances in these areas could have profound infrastructure impacts, which is discussed in the next section.
Destinations Near and Far

The path forward for the ramps should reflect the experiences of programs at other locales as well as the current situation of the ABC Parking Ramps and users’ attitudes toward them. It should also accommodate the changing transportation landscape being shaped by mobile apps, smart cities, mobility-as-a-service, connected and automated vehicles, and other technologies.

This gives rise to a series of opportunities and recommendations. An initial investigation by researchers at the University of Minnesota grouped program and service recommendations into four general areas:

• Modify the price structure. Possibilities include flexible parking contracts, contracts for occasional carpoolers and transit riders, or a carpool bundle with occasional free SOV parking and a transit pass.

• Integrate technology. One example is a total access app or card that offers trip planning and a single mechanism to pay for parking, transit, bike-share, car-share, and ride-hailing services. Other ideas include displaying parking prices in navigation apps to fully inform commuters considering SOV use of the cost, or serving as an operations hub for automated vehicles offering a last-mile service.

• Improve benefits and amenities. Opportunities here include an expanded ramp-ride-rail program; greater biking amenities for occasional users such as a bicycle fix-it shop and information center, or preferential parking spaces for car- and vanpools; and enhancing the ramps as mobility hubs.

• Expand outreach efforts. This includes advertising, employer outreach, new employee programs, and targeted marketing.

These programs and services are not mutually exclusive, and many possible variations exist within each broad category. For example, in addition to the ones outlined above, pricing structure modifications could include occasional-use parking passes for carpoolers and transit riders, flat carpool rates that apply to all regions, or a daily carpool rate for all vehicles that enter with multiple passengers. Rate adjustments can also change driving incentives or optimize capacity; an example of the latter approach would involve setting the rates of the three ramps so that usage is more equal. An operations strategy could limit the number—or even eliminate—SOV contracts and make the mode of travel a daily choice.

All or some of the recommendations for each of the four areas could be deployed to help reduce SOV use and downtown congestion. Some changes, such as preferential parking spaces for van- and carpoolers, can be put into service solely at the discretion of the ramp management, if it is consistent with governing legislation. Other recommendations require outside assistance and coordination, such as a total access card or app. A final set of recommendations need that and more. For instance, implementing a pilot automated vehicle hub requires the deployment of enough automated vehicles to make this a viable evaluation for last-mile travel.

Looking forward, the Minneapolis metropolitan area is projected to grow by more than a half million people by 2030, which will mean more than 400,000 new cars on the road if current rates of vehicle ownership hold. Helping reduce the burden on roadways may require changing the programs in the ABC Ramps to encourage more transit or carpooling. Thus, there is a real need to put into practice some of these recommendations. The questions then become which ones to implement, when, and how to do so.
Developing a Strategy

The next step in the project was devising a transportation options implementation plan to answer such questions. To do so, the results from the ramp research and the list of recommendations were reviewed. Users were surveyed electronically via quick in-person questions and through a more in-depth, focus-group-like approach. Input came from more than 380 individuals, 10 employers, and 5 downtown organizations.

About half of the respondents to the intercept and online surveys reported driving alone. While many would like to try other options that leverage new technology, they want to do so flexibly, such as being able to change transportation modes daily. When asked if they had any additional comments, many stated that they are concerned with safety and security in the ramps and desire better pedestrian connections to the surrounding neighborhoods. (The ramps and I-394 serve as a barrier between downtown and the emerging neighborhood in the North Loop.)

Survey results fell into four broad categories of program opportunities:
- Flexible parking
- Employer programs
- Mobile applications
- Mobility hub

Flexible parking

For this category, one opportunity is to make the monthly carpool contract rate available to all commuters. Currently, those carpools arriving by I-394 and I-94 pay the lowest rate while all other HOV commuters pay a higher rate. The difference between SOV parking and the least expensive HOV contracts is more than $100 a month, but the difference between SOV parking and the highest rate HOV contracts runs about $50 a month. Making the lowest rate available to every carpooler regardless of origin changes this calculation, and the difference could alter behavior and induce some people out of a drive-alone choice and into an HOV one.

A similar change in transportation modes could happen with a daily carpool option, which would be set with a daily rate. This could be implemented in a pilot program for one ramp and select I-394 entrances, with the fully established program applying to all ramps and entrances. Existing staff at the entrances could handle verification to ensure that entering cars did indeed qualify for a daily HOV rate. Discounted daily carpool rates could be offered without registration or geographic restrictions. This would be marketed as being available to early birds from 6 to 9 a.m.

Pricing to encourage non-SOV driving, promotion through employers, and other marketing. The FlexPass could be offered as a key card, a mobile app, or both.

Transfer between modes must be as seamless and easy as possible.

Employer programs

Of employers who responded to the survey, 70 percent subsidize parking or allow pre-tax purchase of parking spaces as part of a benefit program, and 80 percent subsidize or allow pre-tax purchase of transit passes. Employer programs are key to any transportation changes because they offer transportation perks as benefits and thereby influence commuter choices. Currently, most of these benefits target either parking or transit.

For any flexible parking program that is created, employers need to have a way to offer it to their employees. Programs could involve in-house champions and coordination with benefits administrators. In-house champions would ensure promotion of transportation options. This could happen within the context of a transportation management organization, which
would provide training, encouragement, competitions, information, relocation services, and more to help employers work with their employees on commute options.

**Mobile applications**

Mobile applications, the third category, could involve developing and deploying a transportation app. Capabilities might include multimodal trip planning, which would make it easier for commuters unfamiliar with all the transportation options to map out how to reach a destination by new or little-used means. The mobile application could also provide a nudge toward desired behaviors through rewards for non-SOV trip choices.

The same or perhaps another mobile application could function as a carpool matchmaker. This could be particularly useful for commuters who do not carpool regularly. The app could also provide regional ride-matching support, making it easier for occasional carpoolers to find and contact potential ride partners.

An app also could offer additional features, such as payment splitting between passengers, the ability to reserve a parking space, and a way to rate drivers and riders. These capabilities could provide incentives for drivers to choose HOV over drive-alone transportation. This type of information and ease of use would make daily and intermittent carpooling more attractive and more likely to be used.

Developing a regional transportation mobile app or partnering with a commercial carpooling app could help discourage SOV travel. An app could display the cost of and time to use transit, parking for both SOV and HOV options, and other modes, further influencing driving choices.

**Mobility hub**

The fourth and final opportunity involves mobility hubs, locations with several transportation options such as car and bike parking, transit, ride sharing, and more. The ABC Ramps were built as intermodal transfer facilities and today include parking, bus terminals, bike storage, and other features.

According to the recommendations and surveys, ways to expand the ramps’ usefulness as mobility hubs include improved wayfinding, additional transportation services and information, and programming to activate the space. The need is to make the mobility hubs easy to use and beneficial to commuters familiar with the hubs as well as to those seeing them for the first time. The mobility hubs might have the added benefit of making the ramps feel safer, with more people in and around the ramps and more activity.

As currently configured, the ABC Ramps already have many components of a mobility hub. In addition to parking for standard vehicles and bicycles, there are recharging stations for electric vehicles and showers for bicyclists. There are also transit stations with connections to light rail, passenger rail, inter- and intra-city bus, skyways, and bike trails. Building upon this can lead to a complete mobility hub over several stages. The short term could involve improved wayfinding and secure bike parking. Long-term implementation ideas include combined car and bike sharing, remodeling to enhance mobility hub functions, and more.

All told, the ABC Parking Ramps are already great spots for mobility hubs. They have parking—an important part of the mix in multimodal and intercity connections—and they can serve as a location for vehicle sharing and ride hailing. An added benefit from any mobility hub physical upgrades could be improved feelings of security, along with access to nearby and adjacent land.

Travelers using mobility hubs will need information through signage and a mobile app to be able to make transportation choices. Transfer between transit, parking, biking, walking, and shared mobility options must be seamless and as easy as possible. Finally, there must be pedestrian-friendly connections to nearby areas.

**Steps to Deployment**

Overall, developing and deploying these solutions involves first creating a product, such as daily carpool parking or parking–transit options. This must consider what customers want as well as available technology and how to leverage it.

For the second step, employers must be involved. In surveys, employers express a desire to be downtown because of the amenities and location. To do so, though, they often offer transportation as part of a pre-tax benefits package. If a flexible product is created—something surveys reveal commuters want—then there must be a way for employers to present it to employees, preferably in as easy a way as possible. Having that in place will maximize the impact.

However, as shown in the lessons learned from other cities, the greatest effect of such changes happens when ordinances and laws are combined with enforcement.
These can take various forms. Regulations may, for example, require employers to offer transportation options and grade how effective these efforts are. Alternatively, there could be stricter enforcement of laws already on the books.

The future of the ABC Parking Ramps could entail flexible programs, a mobile app, and mobility hubs that encourage people either to not drive alone or to minimize their SOV trips. These developments are needed and would be beneficial. However, to maximize the impact, employer participation is critical. This could come in the form of statutes and ordinances that require fewer drive-alone trips along with support and encouragement for employers and commuters that make this choice.

**Equity Considerations**

When implementing options such as daily carpooling, flexible programs, and mobility hubs, factoring in equity is important, especially since the right products and programs can improve equity. For example, removing the geographic boundary for the $20 monthly carpool rate is geographically more equitable. Currently the only areas that get the deeply discounted carpool contracts are those that reach the ABC Parking Ramps via I-394 and I-94, but those zip codes have some of the highest incomes in the region. Thus, removing the location restriction improves equity in multiple ways.

Another way that new parking programs could improve equity is by evaluating evening and weekend rates to see if they serve evening workers. Service workers may get off work very late when transit is unavailable or infrequent. Offering such workers access to safe places to wait for ride-hailing services at times when there is no transit service could be a helpful transportation option. Another possibility could be offering parking at some reduced but fair rate in a safe and secure area when transit is not available. This opportunity could even be combined with a flexible park–transit combination product geared specifically toward such workers.

Applying this type of lens toward ramp programs and products could address the need to keep up with changing technology. At the same time, this would be moving the ABC Ramps toward more equitable treatment for all commuters and potential users.

**Twin Cities Shared Mobility Action Plan**

The changes could also help the ramps play a role in the work of the Shared Mobility Collaborative, a public-interest collaborative dedicated to creating a multimodal transportation system that works for all. The group is seeking to implement the Twin Cities Shared Mobility Action Plan; the plan’s goal is to address such pressing challenges as looming congestion issues related to population growth, disparities in transportation access, and intensifying competition with other cities by scaling up shared mobility and public transit. The ABC Ramps can be a place to pilot efforts.

**A Longer View**

The long range includes a wide array of possibilities thanks to technologies enabling mobile apps, smart cities, mobility-as-a-service, and connected and automated vehicles. Of these, CAV technologies may present the biggest unknown in terms of their impact on parking.

With CAVs, the usage and ownership model may change drastically. If these vehicles are shared and not owned by individuals, they would be on the road instead of in a parking spot. CAVs would transport people and goods nearly continuously, an extension of the current trend toward mobility-as-a-service. If this happens, congestion could increase—rather than decrease, as often predicted—and the need for parking could drop dramatically. Studies estimating the parking reduction have come up with figures as high as 90 percent and as low as 10 percent.

Another potential factor is that automated cars may come in a wider variety of sizes than do vehicles today. For dense urban areas where space is at a premium, automated vehicles may only be big enough to accommodate a single passenger. If that happens, they will need smaller parking spaces, potentially lessening the demand for parking. Alternatively, they could be bigger and designed to accommodate multiple passengers, something like today’s vans in terms of size and parking space needs.

There is a possibility, though, that ownership and usage patterns will not change and parking demand per capita would stay the same. Surveys have shown that people view CAVs with some suspicion and are reluctant to give up control. Overcoming that may be hard enough for automakers without the added burden of getting customers to radically change how they use or own vehicles. In this scenario, CAVs simply replace current vehicles. Parking demand could still be dramatically altered because the vehicle could drop off passengers and then navigate to some centralized or lower-cost yet still convenient parking location. There could still be an effect on congestion, although what this will be is unclear.

Another conundrum: A selling point for CAVs is that they reduce crashes, a major cause of congestion. However, if
cars are dropping off and picking up people, they will be traveling more—perhaps increasing congestion.

Even with these uncertainties, it’s possible that leveraging CAV technology could help the ABC Parking Ramps reduce congestion and encourage non-SOV use. The ramps could act as pick-up/drop-off locations for automated vehicles, with these vehicles serving as last-mile transportation options for commuters. More might then choose to carpool, knowing that CAVs have expanded the area conveniently and cost-effectively reachable from the ramps. In this case, demand for pick-up and drop-off space could greatly increase, and there still may be a need for off-peak storage of CAVs and perhaps even a need for areas for routine maintenance of such vehicles.

Thus, CAVs could have a profound impact on the ABC Parking Ramps. As a result, there is a need for continued awareness and monitoring of changing travel behaviors. There also is a need to look for and take advantage of opportunities to put the new technology to use—the ramps could serve as a pilot CAV hub, for example.
Conclusions

Constructed and placed into service more than a quarter century ago as part of the HOV lanes on I-394, the ABC Parking Ramps aim to reduce congestion on I-394 and into downtown Minneapolis. To do this, the ramps discourage commuters from driving alone through reduced monthly rates for carpooling and convenient transit. These favorable rates are only for those users arriving via I-394 and I-94, or largely from areas north and northwest of downtown.

Shifts in user preferences, however, make this less effective now than in the past. The ratio of high-occupancy to single-occupancy vehicles now runs 1-to-4, compared to 1-to-2 in earlier years. The trend is clearly toward drive-alone and away from carpool transportation.

Surveys clearly show users want flexibility, and many who drive alone want to take transit at least some days. In addition, the shared economy is growing, evident in such areas as car and bike sharing, ride hailing, and the rise of transportation network companies.

In response, the ABC Ramps should design products and programs that are more flexible. Possibilities include daily carpooling, flexible programs that allow parking some days and transit on others, and mobility hubs that enable commuters to easily switch between transportation choices. These products and programs could allow the parking ramps to better encourage something other than single-occupancy vehicles, which would help reduce congestion and create other benefits such as improved air quality. If done in the right way, these new products and programs could also help achieve a more equitable outcome.

In addition, new technology—such as mobile applications—offer the opportunity to connect people to transportation options and devise new products and programs for the ABC Parking Ramps. Best practices from metropolitan areas around the world show that laws calling for all actors to increase non-SOV travel and address equity issues can significantly increase the impact of these programs and products.

In the long term, several unknowns could affect parking. CAV technology, for instance, could sharply cut parking demand or dramatically change the ways the ramps could continue their mission.

As the parking ramps enter the next phase of their operational lifespan, continued assessment of the changing transportation landscape is needed. The ramps can continue to fulfill their original function for years to come, but doing so will require continued attention to changing circumstances, ongoing adjustments, and the rollout of new programs and products.

KEY FINDINGS:

About half of survey respondents reported driving alone as their most common commute, but many would like to try other options.

People are interested in programs that provide flexibility to choose transportation options daily.

70% of employers surveyed subsize or allow pre-tax purchase of parking as part of a benefits program.

80% of employers surveyed subsize or allow pre-tax purchase of a monthly transit pass.

People are interested in new transportation ideas, particularly those leveraging new technology.

Work is continuing to address safety and security issues in and around the areas surrounding the ramps.
Task Reports and References
Online at cts.umn.edu/ABC-Ramps

Task Reports
Following are the task reports for the ABC Ramps Transportation Options Program Plan final report.

State and Local Policy Program, Humphrey School of Public Affairs, University of Minnesota
- History of the ABC Ramps (Task 2)
- Corridor Review—Current and Planned (Task 3)
- Customer and Commuter Demographics (Task 4)
- Employer and Business Evaluation (Task 5)
  - Travel Demand Management Landscape
- Regional Stakeholder Transportation Goals (Task 6)
- Policy, Ordinance, Statute, and Guidance Review (Task 8)
- Literature Review / Program Scan (Task 9)
  - Encouraging Carpooling, Biking and Transit Use at the ABC Ramps
- Long Range Transportation Trends (Task 10)

Zan Associates
- Stakeholder Engagement Summary Report (Task 11)

Alta Planning + Design
- ABC Ramps Outreach and Marketing Plan (Task 12)

SRF Consulting Inc.
- ABC Ramps Transportation Options Implementation Plan (Task 13)

References
2. abc-ramps.com
3. History of the ABC Ramps
4. Policy, Ordinance, Statute, and Guidance Review
5. US Census Bureau
6. History of the ABC Ramps
7. ABC Ramps Transportation Options Implementation Plan
8. Customer and Commuter Demographics
9. Corridor Review—Current and Planned
10. Travel Demand Management Landscape
11. Regional Stakeholder Transportation Goals
12. Regional Stakeholder Transportation Goals
13. Encouraging Carpooling, Biking and Transit Use at the ABC Ramps
15. Panel discussion on mobility hubs, August 2018 symposium
16. Encouraging Carpooling, Biking and Transit Use at the ABC Ramps
17. ABC Ramps Transportation Options Implementation Plan
18. Long Range Transportation Trends
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