

Performance

Performance of a plan, such as for Mason Street Transportation Corridor, can be measured in many ways. Some are direct, such as costs or potential users. Others are less direct. The following chapter presents some of the performance results associated with the project.

Capital Costs

Costs are an important measure of transit and bicycle/pedestrian improvements. The initial capital or construction costs are those costs associated with the construction of the project. The operating costs are the annual costs to operate and maintain the facility.

The capital construction cost estimates were developed from current prevailing unit cost estimates, the proposed concept plan, and preliminary discussions with project stakeholders regarding amenity improvements. The magnitude

of costs depends on the phasing option selected and the mode (transit or bike and pedestrian). For purposes of clarity, the construction costs were broken into the following four major categories:

- major capital construction (roadway, earth work, intersection improvements, storm water mitigation, and major structures),
- bid items (based on a percentage of the major capital construction),
- contingencies (construction contingencies, engineering design, and construction management), and
- right-of-way acquisition

The major capital construction quantities were developed from area estimates using the proposed concept plan and 1999/2000 unit costs. The bid item and contingency percentages were developed on recent Major Investment Studies (MIS) completed within the area, visual observations of the current site conditions, and engineering experience. These MIS studies present a range of values

Capital Costs		
	Low (\$M)	High (\$M)
Bicycle/Pedestrian Improvements		
Harmony to Prospect	6.7	6.7
Prospect to Pitkin	0.3	0.3
Pitkin to Cherry	0.7	0.7
Harmony to Fossil Creek	1.5	1.5
Total/Bicycle Pedestrian Improvements	9.2	9.2
Bicycle/Pedestrian Railroad Crossings		
CSU Vet Hospital to University Mall	0.5	0.5
Foothills Mall Connection	1.5	1.5
Troutman Connection	2.0	2.0
Total Railroad Crossings	4.0	4.0
Transit Improvements		
Cherry to Laurel ¹	6.6	9.2
Laurel to Prospect ²	3.8	5.1
Prospect to Drake ³	8.7	8.7
Drake to Horsetooth	2.0	4.5
Horsetooth to Harmony	2.4	2.4
South of Harmony	7.7	7.7
Vehicles and Maintenance Facility	6.3	6.3
Total Transit	37.5	43.9
Total Capital Costs	50.7	57.1

¹ Low range of costs assumes two-way operation of Mason and Howes Streets and the associated signal mast/head installation. High range assumes one-way operation and additional expenses for replacement of removed parking along Mason Street in a downtown parking structure. High range also includes costs for enhanced bike/ped lighting and a physical barrier between northbound Mason Street traffic and southbound contra-flow bike lanes. Both high and low ranges include costs for reconfiguration, striping, and signing of intersections.

² The difference in low and high range costs in this section are expenses and amenities associated with potential alignments through the CSU campus. High range includes replacement of removed parking in a structure.

³ High range of costs assumes realignment of the Mason/Horsetooth/McClelland intersection and associated right-of-way purchase.

based on a nationwide evaluation of published construction projects. Actual values are selected based on the Mason Street Corridor project specific conditions (urban construction). Unit costs for right-of-way acquisition were selected from current property values, available MIS information, and area calculations from the developed concept plan.

The estimated range for total construction of the bike/pedestrian facilities along the Mason Street Transportation Corridor is approximately \$9 million (2000 dollars). Adding the BNSF Railroad crossings between CSU Veterinarian Hospital and the University Mall, the Foothills Mall Connection, and the Troutman Connection will increase the bicycle and pedestrian costs by \$4 million to a total of \$13 million. This estimate includes all improvements proposed on the concept plan and covers all major construction and standard site improvements. As the corridor develops, additional site improvements (additional landscaping, art and other visual amenities) can be constructed. In addition improved bicycle and pedestrian

connections along perpendicular arterials that should be constructed in order to maximize utilization are not included in the above budget. They should be constructed to enhance connectivity.

For the proposed transit system, the estimated range of total construction costs is between 37 and 44 million dollars. This estimate includes all improvements proposed on the developed concept plan and covers all major construction and standard site improvements. Like the bike/pedestrian improvements, as the system becomes further developed, additional amenities may be added to meet future operational and character requirements.

Operation and Maintenance Costs

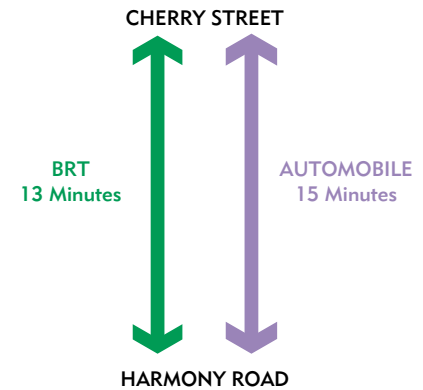
Operations and maintenance (O&M) costs are largely a function of the revenue hours of operation for the system. While the Mason Street Bus Rapid Transit (BRT) will provide service seven days a week, the number of buses varies. More

buses will run during peak travel times, requiring additional O&M costs accordingly. Over 19,000 revenue service hours will be necessary in the year 2020 to operate the Mason BRT. Total annual transit, bicycle, and pedestrian operating and maintenance costs are approximately \$1.3 million. However, redundant service on College Avenue will likely be replaced by the Mason BRT, so O&M costs related to the existing Transfort Route 1 service (\$500,000) can be subtracted to provide net O&M costs for the Mason BRT service.

This results in a net O&M increase of \$800,000. Furthermore it is estimated that there will be a \$500,000 fare box recovery for a net annual O&M increase of \$300,000. This is a minor cost associated with the accompanying benefits.

Operating and Maintenance Costs (Year 2000 Dollars)	
\$ 1,300,000	Annual O&M Costs
\$ -500,000	Removal of Redundant College Avenue Service
\$ -500,000	Farebox Recovery (\$0.50 per trip)
\$ 300,000	Net Annual O&M Cost

Travel Times



Travel Time

Current bus service must operate in the congested College Avenue corridor. With a dedicated busway, transit from the south transit center to downtown, including stops for passenger loadings will operate faster than vehicular travel on College Avenue between Harmony and downtown in the year 2020.

Transit Ridership

Ridership estimates for the Mason BRT were generated using the Mason Street Multi-Modal Travel Model developed specifically for this project. A total of

9,500 riders (3,600 new riders) are expected on the Mason BRT each week-day. This amounts to about 300 riders in the peak direction during the highest (i.e., rush) hours each day on the segment between Drake Road and Prospect Road. In effect, each of the six northbound buses in the morning and evening peaks hour will be filled beyond their seated capacity.

Park-and-Ride Lots

While most patrons currently and in the future will walk to the bus, about 20 percent of the daily riders on the Mason BRT are expected to access the system via automobile. Longer commute trips, for example, are particularly well-suited to auto access. Those accessing the system in this manner will either be dropped off at or near a bus stop (Kiss-n-Ride), drive to a Park-and-Ride (PnR) lot, or carpool to a PnR lot.

To accommodate the PnR needs, a total of between 650 and 825 parking spaces will be necessary along the corridor. As expected, modeling efforts revealed the

highest demand for parking to be at the South Transit Center. Between 500 and 600 parking spaces will be necessary at the south end of the corridor. Another 50 to 100 additional parking spaces are needed in the middle of the corridor in the vicinity of Drake Road and Mason Street. At the North Transit Center, a demand of 100-125 spaces is predicted. Parking requirements at a proposed off-campus site near Prospect Road serving CSU students will be a function of its design, pricing, and operation by CSU planning and parking policies.

Bicycle Usage

On average, bike trips currently account for about three percent of the overall trips made in the City of Fort Collins. The number is much higher for trips to and from the CSU campus. In fact, a fall 1999 count indicated over 12,000 bicycle trips are made to and from the CSU main campus each day when school is in session. Many of these trips occur on and across busy streets that offer little protection from automobile travel.

With the implementation of the bicycle



BNSF Railroad along Mason Street in Fort Collins' downtown Civic Center.

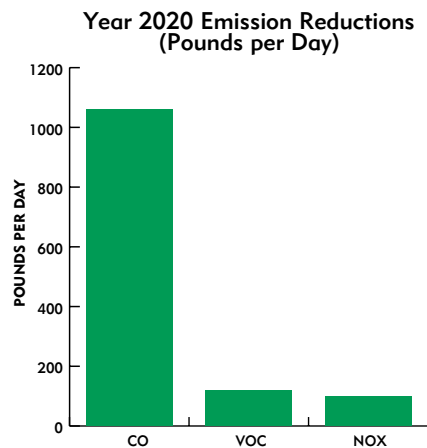
facility along the length of the Mason Street Transportation Corridor connecting the current and future east-west trails, bicycle and other forms of non-motorized travel are anticipated to increase. In the year 2020, over 3,000 daily bike trips are expected to occur on segments of the Mason Street bikeway. The safety benefits to these travelers is considerable because the Mason bikeway will provide undercrossings at major east-west arterials and minimize bicycle/automobile conflicts.

Congestion Delay

Vehicle miles of travel are reduced by over 26,000 miles per day with a corresponding decrease of 1,200 vehicle hours of travel and congestion delay in the year 2020. The congestion delay figure equates to about 1,600 person hours of delay reduced, allowing more free time for people to spend somewhere other than in traffic.

Congestion Mitigation

As transit riders take advantage of the many benefits of the Mason Street BRT, their actions will reduce the number of vehicles on the city’s roadways, benefiting the entire transportation system. The new weekday transit riders resulting from implementation of the Mason BRT equal 2,800 vehicles per day that would be removed from College Avenue and its parallel corridors. Furthermore, implementation of the Mason BRT would allow those buses on College Avenue to be redirected to Mason Street, thus freeing up capacity on the congested College Avenue. It should be



noted, however, that as ridership increases on the Mason BRT and those passengers vacate College Avenue, trips along Lemay and Shields will likely redirect back to College and not result in a net decrease in College congestion.

Natural Environment

Preliminary investigations did not identify significant adverse environmental impacts from the proposed corridor improvements. The City will consult with the Division of Wildlife regarding potential impacts to wildlife species, and meet the requirements of the U.S. Army Corps of Engineers for any impacts to wetlands or Waters of the U.S. The project is expected to modestly improve air quality conditions in the Fort Collins region, and not appreciably affect ambient noise conditions along the Corridor.

Air Quality

The City of Fort Collins is a non-attainment area for the pollutant carbon monoxide, which is a product of combustion and is primarily caused by auto-

mobile travel. Projects that reduce carbon monoxide emissions include those that improve vehicle speeds (i.e., reduce traffic congestion delay) and/or reduce vehicle miles of travel. The Mason BRT has both effects by providing mobility options for travelers switching to transit and thus freeing up roadway capacity. Carbon monoxide (CO), a winter pollution problem, is reduced by half a ton per day through the implementation of the Mason BRT.

Another pollutant growing in importance in Northern Colorado is ozone, due to its increased summertime levels in recent years. Ozone is formed in the presence of sunlight through the combination of volatile organic compounds (VOC) and nitrogen oxides (NOX), both automobile emissions. Although modest, the Mason BRT reduces the level of emissions of both of these emissions, providing safer and cleaner air for the City’s citizens.



The Mason BRT will minimize carbon monoxide emissions by reducing traffic congestion delay.

What kind of service can I expect?

The Mason BRT will provide reliable, on-time transportation in clean, modern, non-polluting buses operating on a dedicated busway through the heart of the city. The simple fact that the busway is separated from other roadways means you and your bus will not be impeded by the effects of traffic congestion.

The system has been designed to serve the needs of the traveling public, so it will run when you travel. Typical weekday service will occur from early morning to late evening. More buses will be used during rush hour to accommodate the additional demand. Ten minute headways are planned for the peak periods, meaning that a bus will arrive at your stop in your direction of travel six times an hour. Enhanced weekend and evening service will be coordinated with special events at CSU, Old Town, and other locations.

Several stops will be placed strategically along the corridor to maximize access to activity centers and to facilitate transfers to and from crosstown routes. As Transfort buses currently do, the Mason BRT buses will accommodate those arriving on bicycles. Park-and-ride lots located on the corridor will allow for additional access options to Transfort's system. Park-and-ride lots tend to serve commuter trips more than others. As such, one can envision commuters from Loveland or Greeley coming to work in the Mason corridor by driving to a park-and-ride lot at the south end of the BRT line and taking transit for the most congested part of their journey.

Furthermore, the service will be all-weather. Transfort's experience has shown that transit ridership spikes during times of foul weather. Many of the bus stops will be outfitted with covered shelters. Low platform buses means that there will be no need to step up into the vehicle, so access will be simple and seamless.

Because the Mason BRT's full implementation may be several years away, exact fares are difficult to predict. However, transit riders can expect them to be in line with current bus fares, adjusted over time for inflation.

Why can't we run cars down the transit way?

During the public participation and lead team process, a number of individuals asked why could we not put cars or maybe high-occupancy vehicles down the transit corridor. This issue was examined in great detail. The analysis indicated that neither cars nor high occupancy vehicles would be permitted along the Transitway for the following reasons:

1. **BNSF Acceptance:** Given that the Mason Street Transportation Corridor will utilize the Burlington Northern Santa Fe Railroad right-of-way, it will be necessary for the Railroad to agree to the modes and design of the corridor. Whereas they have been accepting of the transit, bicycle and pedestrian uses based on the concept plan, automobile travel significantly changes the character and safety aspects of the corridor. BNSF acceptance is not likely and pursuing automobile usage could jeopardize the overall planning effort.
2. **Cost and Property Impacts:** The Bus Rapid Transitway as currently designed is a 24 foot paved strip that would be accommodated within the available 35 foot right-of-way. This design would therefore have minimum impacts to adjacent properties and would not require buildings acquisitions. If the transit corridor were converted to automobile use, it would be necessary to increase the roadway width and flair out the intersections to accommodate turn lanes. In numerous locations, this would require the acquisition of adjacent property and buildings and could increase the overall cost of the project by millions of dollars.
3. **East-West Arterial Impacts:** The proposed Bus Rapid Transit traffic control at the arterial intersections is a signalized intersection. The intersection will be coordinated with the future upgraded signal system. The green indicator for the Bus Rapid Transit would only occur every ten minutes with very short cycle lengths. In the event that automobiles were permitted on the corridor, the frequency of signal allocation for the corridor would be every 90 to 110 seconds and would require significant higher side street green time to accommodate the higher through volume and left turn phases. This change would have a dramatic negative impact on the east-west arterial travel times.
4. **Federal Transit Administration Funding:** The Mason Street Transportation Corridor as proposed might be available for FTA New Start funding, in which

the City could receive federal grants to build the corridor of \$40 million dollars or more. If the proposed corridor were also used for automobiles, the Bus Rapid Transit New Start grant would not be available and the City would have to pick up the full cost of the project.

5. **Impacts to Transit Travel Time:** The attractiveness of transit is directly correlated to transit travel time compared to automobile travel time. With the Mason Street Transportation Corridor as proposed, it will be faster to travel the length of the corridor on a dedicated Transitway, versus traveling by automobile along a congested College corridor. If automobiles were permitted along the corridor, the strategic advantage of a higher speed Bus Rapid Transit would be lost and transit ridership would be significantly impacted.
6. **Noise and Air Quality Impacts:** If automobiles were to utilize the Mason Street Transportation Corridor, vehicular traffic would increase noise and air emissions and impact adjacent development.

Why don't we take cars off of existing Mason?

During the public participation, a number of individuals liked the concept of a Bus Rapid Transit corridor and asked why do we not take cars off of existing Mason. From the very beginning of the project, the City has stated that automobile traffic would remain on existing Mason. Automobile access to serve existing businesses and parking facilities is critical to the overall corridor.

Who rides transit?

Anybody and everybody rides transit. Recent studies by the City have shown that Transfort riders represent a cross-section of the general public. Women are slightly more inclined to ride the bus than men, and students make up the largest single group of users.

CSU plays a key role in the City's transit formula. The university is centrally located

in the city and the corridor, parking is limited on campus, and transit is a low-cost transportation option for students. If all of the students currently riding transit suddenly switched to cars, the effects on the roadway system would be dramatic. Maintaining transit viability for students is imperative to congestion relief. About 75 percent of transit riders are students. Over 60 percent of the trips currently taken on Transfort buses are for travel directly between home and school made by students.

People make lots of trips for many reasons. What markets and trip types will the Mason BRT serve?

The Mason corridor is unique in that it connects several of the city's major activity centers with residential areas along the route and throughout the city. College Avenue congestion is bad now and will worsen in the future as growth and traffic increase. In fact, the very traffic that brings economic opportunity to the corridor may very well be the same traffic in the future that strangles the corridor from its full economic potential.

Enhancing transportation capacity along the corridor is a critical step towards maintaining its economic vitality. Businesses all along the corridor will benefit due to the increased accessibility. As the corridor matures, many businesses will likely open storefronts along the Mason busway, further enhancing their opportunity to attract patrons. Other businesses may locate in the transit-oriented Enhanced Development Areas under development as part of the Mason Street Transportation Corridor Master Plan.

Transit is especially adept at capturing the regularly scheduled commuter and school trips. It also performs well for flexible, discretionary trips such as shopping, recreation, eating, and so forth. Workers and students will have increased opportunity to take midday trips to restaurants and stores without spending their lunch hour in traffic or looking for a parking space. Special events service is also planned so that weekend and evening travelers have enhanced mobility options.

If additional person-carrying capacity provided by the Mason BRT is a good thing, is more capacity even better?

Sure. In fact, the Mason corridor has been designed to accommodate greater carrying capacity as the city grows and the corridor matures. The system is flexible. As travel demands increase, additional buses can be added during the peak period and other times. Articulated buses with higher capacities can be used. Preservation of the route as a multi-modal transportation corridor means that future uses could include light rail and perhaps even intercity passenger rail to Denver and other cities.

Capacity is measured as the number of persons the system can carry in an hour's time in one direction past a given point. In this way, it can be compared to other transportation systems, such as roadways. The key issue to keep in mind is flexibility. Transit capacity will increase along the corridor as demand warrants. The initial service and fleet requirements were sized to meet anticipated demand in the year 2020.

Initial Mason BRT between 5 about 10 percent more person-carrying capacity in the peak hour and peak direction along the length of the Mason Street/College Avenue corridor with 10 minute headways and 40-person buses. With longer buses and shorter headways, the BRT could further increase person carrying capacity in the peak hour and direction. Future light rail and passenger rail configurations could carry even more.

North/south access is fine. But what if I want to travel east-west?

The City is currently evaluating route changes to the Transfort Bus System. One option is to operate Transfort on an east/west and north/south grid throughout the city, and have full transfer capability with the Mason BRT. Buses will arrive at stops in a coordinated fashion in order to minimize transfer wait times.

Will the Mason Street BRT be environmentally friendly?

The Mason BRT offers a number of environmental benefits, including air quality, fuel consumption, and water quality.

As the city continues to be impacted by air quality regulations associated with its nonattainment status, the situation will grow worse as growth brings more traffic and more congestion onto the city's roads. Since vehicle miles of travel increase and travel speeds decrease correspondingly, automobile-related emissions will go up. Transit is an attractive answer to the smog caused by automobile pollutants. More people in buses and fewer vehicles on the road have the compounding effects of reducing both congestion and emissions.

A related environmental benefit is reduced motor vehicle fuel consumption due to increased transit ridership. In fact, over 350,000 gallons of fuel per year will be saved with implementation of the Mason BRT.

Water quality benefits as well with the implementation of the Mason BRT. Fewer vehicles on the road means less motor vehicle pollutant runoff (e.g., oil, gas) in our streams and rivers.

Why should we build the Mason Street BRT if we have to support it?

One of the questions raised at some of the open houses and workshops is why should the City build the Mason Street Transit element when it is recognized that transit service needs to be subsidized annually.

What is often not recognized is that through the General Fund the City currently

subsidizes many different things. As an example, in response to growth and development in the downtown area, the City of Fort Collins, Larimer County and the Downtown Development Authority are building downtown parking which costs approximately \$10,000 per space.

The current monthly parking pass for one of these spaces is \$36, which basically only offsets the operating costs of the parking structure. Total operating and maintenance costs are estimated at \$78 per space per month. When considering the debt financing of a \$10,000 parking space over 20 years at five percent, the additional monthly cost is \$65 for a total cost of debt financing, operations and maintenance of \$143 per month per space. With a monthly parking fee of \$36 per month, the subsidy per space per month is \$107, or \$97 per user per month.

With an estimated \$1,100,000 transit operations and maintenance cost and 3,600 new daily riders generating a fare box recovery of \$500,000 for a net deficit of \$800,000, the monthly transit rider subsidy will be about \$40 per user. This transit subsidy is significantly less than the cost to provide downtown parking.

What's the final word? Why would I take transit instead of drive a car?

It is impractical to think that the Mason BRT will negate the need to own a car today or in the foreseeable future. Our society is dominated by automobile transportation. Transit isn't an attractive option in some instances; it doesn't go everywhere all the time. It is not always a practical alternative to the automobile.

On the other hand, the Mason Street BRT should be considered a viable transportation option for a city like Fort Collins that is growing faster than the necessary roadway infrastructure improvements. The top ten reasons for choosing transit are:

1. You will have reliable, all-weather service unaffected by traffic congestion.
2. You won't need to spend time and money searching for a parking space.
3. You can do something good for the environment.
4. Riders will pay a reasonable fare for transportation service.
5. People might live closer to their work as transit-oriented developments become a reality.
6. Commuters will likely spend less time on a bus than in an auto for a comparable rush hour trip along the corridor.
7. Workers and students could spend their lunch time shopping and eating in other parts of the corridor.
8. Transit riders will benefit the motoring public by reducing the number of vehicles on the roads, thereby reducing traffic congestion.
9. You can access numerous employment, commercial/retail, recreational, and special events activities along the corridor.
10. You may just meet some friendly faces.