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# WELCOME

## MADISON CORRIDOR BRT STUDY

Thank you for joining us at the third Open House for the  Madison Corridor Bus Rapid Transit Study! Your particpation is a valuable part of our planning process. At this Open House you are encouraged to:

- Learn about the project
- Weigh in on priorities
- Share comments on design options

# PROJECT OVERVIEW

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## WHAT IS THE STUDY ABOUT?

The Madison Bus Rapid Transit (BRT) Study is a project of the Seattle Department of Transportation (SDOT). The purpose of the Study is to identify a preferred alternative for BRT service in the Madison corridor between the waterfront and 23rd Avenue or Martin Luther King, Jr. Way. Service is proposed to begin in 2019.

The study develops and evaluates BRT alternatives that include transit facilities and operations, streetscape and pedestrian improvements, and an alternate bike facility. The study process includes on-going community engagement, particularly at key decision points.

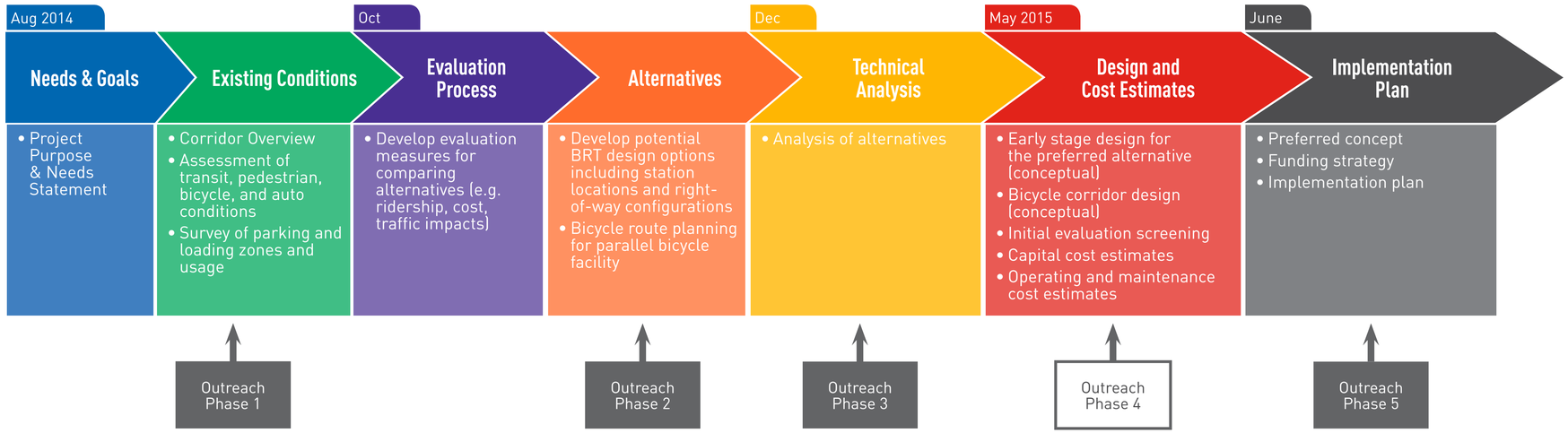
## STUDY OUTCOMES

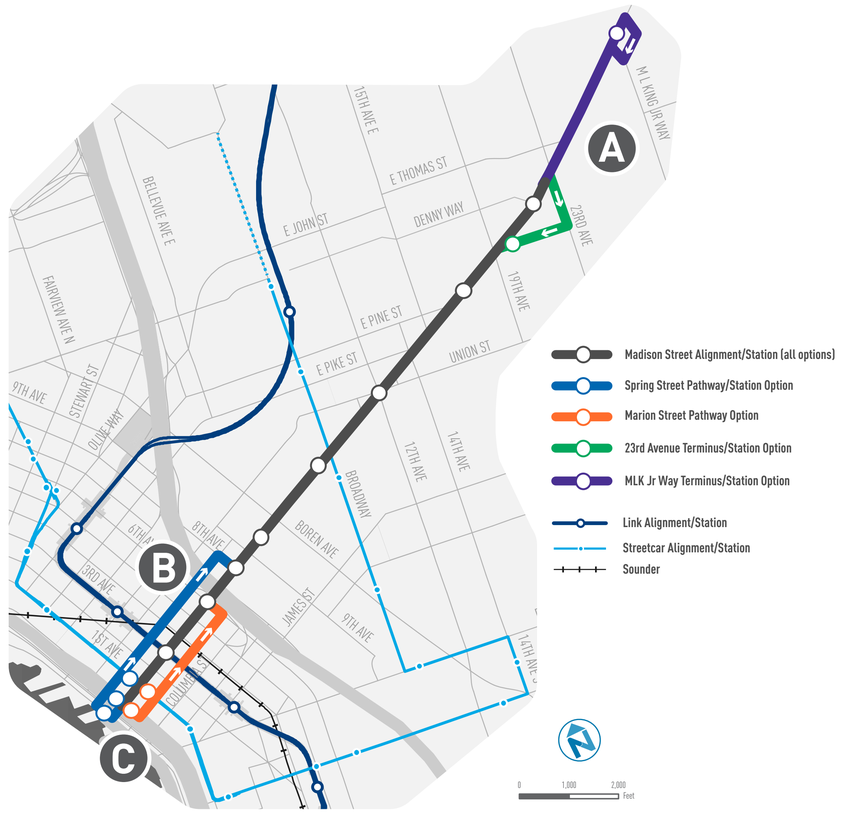
This study will develop a BRT concept for the corridor that:

- Has stakeholder, public, and elected official support
- Is backed by a viable phasing and implementation plan
- Positions the City for future funding opportunities to help design and build the project



# PROJECT TIMELINE



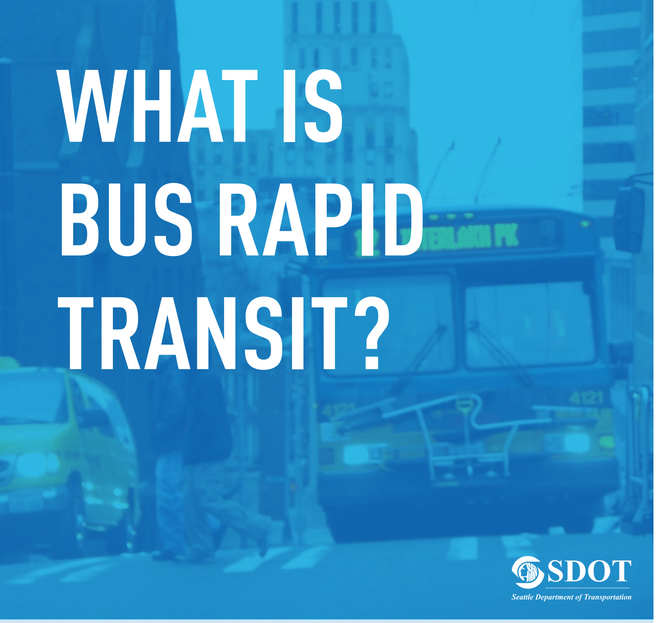




# PROJECT CORRIDOR

There are two options under consideration for **A) the eastern terminus** (23rd Ave or MLK Jr Way) and three alternatives for **B) the western terminus** (1st Ave, Western Ave, or Alaskan Way). There are two options for **C) the eastbound pathway** alignment through downtown (Spring St or Marion St).

**Please particpate in the survey tonight, or online at:**
**www.seattle.gov/transportation/madisonbrt.htm**

# WHAT IS BUS RAPID TRANSIT?



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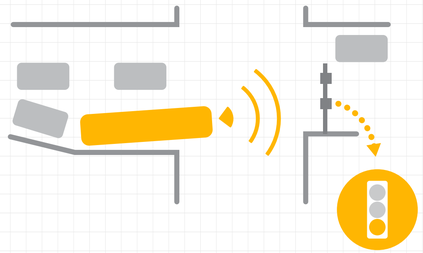
Bus Rapid Transit (BRT) is a high-quality transit service featuring reduced travel times, greater reliability, greater passenger comfort, and unique branding to increase visibility and awareness. These features are accomplished using:

- **Bus-only lanes and transit signal priority –** roadway and intersection improvements allowing buses to bypass congestion.
- **Enhanced stations –** stations designed to further reduce delay (for example, by making platforms level with bus floors so that no steps are required) and improve the customer experience by providing off-board fare payment, larger shelters, real-time arrival information, and other amenities.
- **Specialized vehicles –** custom buses with more space, low floors to ease loading and unloading, and unique branding.
- **Frequent service –** in addition to reduced travel times and greater reliability, BRT service operates more frequently and over longer hours.



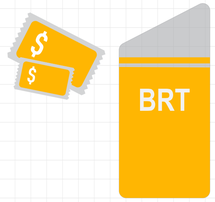


## TRANSIT SIGNAL PRIORITY

Transit signal priority (TSP) allows buses to bypass congestion. TSP does so by giving buses earlier and/or longer green lights.

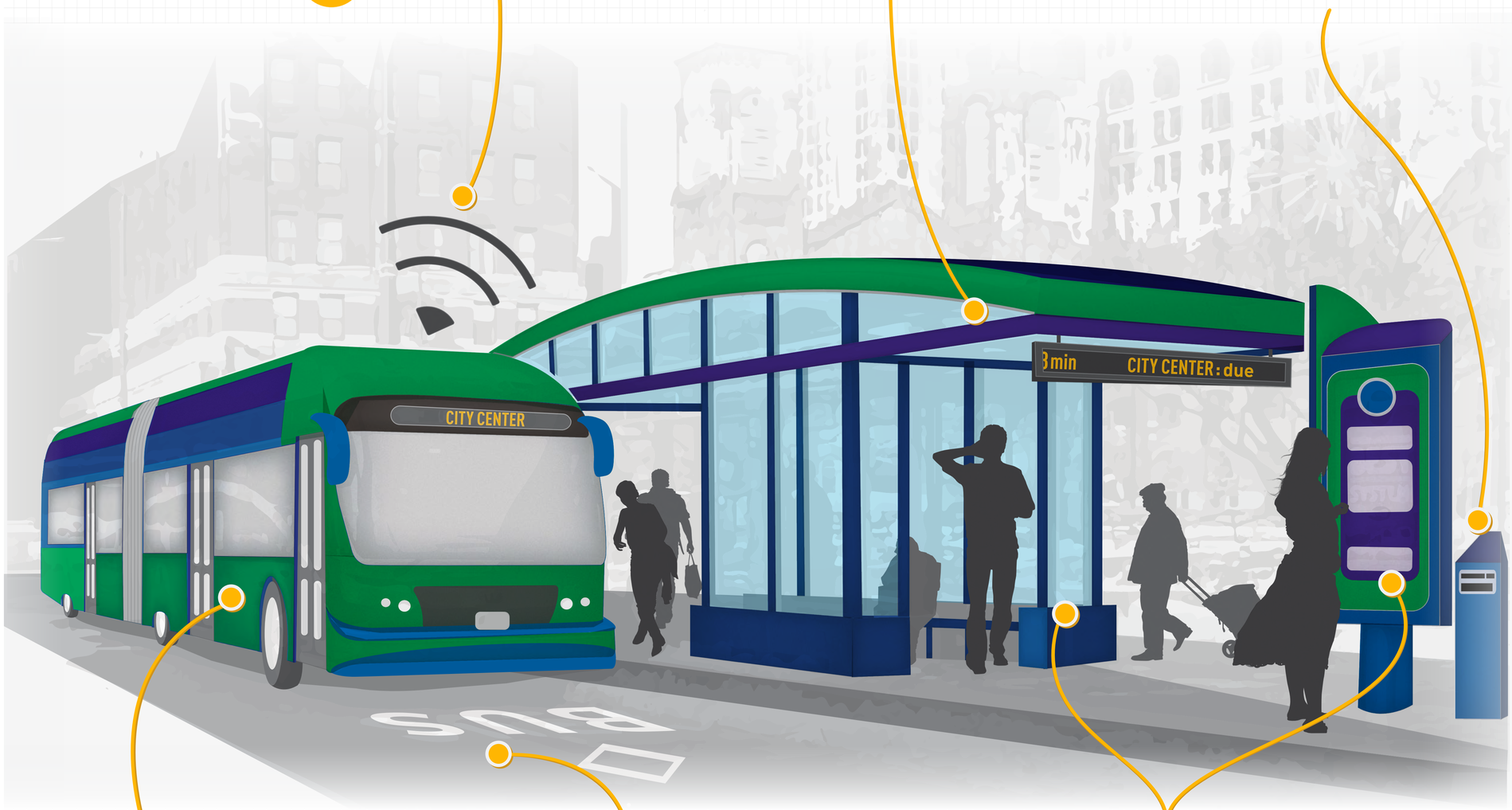
## BRT BRANDING

Unique designs make buses and stations more visible, raising awareness of BRT and increasing customer expectations for higher levels of service.




## ENHANCED FARE COLLECTION SYSTEMS

Off-board fare collection using ticket vending machines, card readers and other tools at stations allows passengers to load without waiting in line to pay their fares.




## SPECIALIZED VEHICLES

Custom buses provide more capacity, more doors and lower floors for easier loading and unloading, and unique designs.

## DEDICATED RUNNING WAYS

Bus-only lanes separate transit from traffic and may be painted red or another color to increase their visibility.

## ENHANCED STATIONS

BRT stations include raised platforms, off-board fare payment, real-time arrival information, transit route maps, larger shelters and other passenger amenities.

# BUS RAPID TRANSIT SYSTEMS ARE ON THE RISE

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BRT may be a relatively new idea in North America, but it is one that is catching on fast. BRT has been common in Latin America, Australia, and other locations for some time. Until recently, the only BRT systems in the U.S. were in Miami and Pittsburgh. Today there are major new lines in Cleveland, Eugene, Los Angeles, Las Vegas, and other places, and there are systems in development throughout the country. The reason? BRT is a relatively simple, cost-effective, and flexible way to improve urban transit.



# BUS RAPID TRANSIT AROUND THE NATION







## INTERNATIONAL EXAMPLES

- Mexico City, Mexico
- Guangzhou, China
- Johannesburg, South Africa
- Paris, France
- Leeds, England
- Sydney, Australia
- Curitiba, Brazil

Source: National BRT Institute

# PROJECT PURPOSE & NEED

The Madison Street Bus Rapid Transit (BRT) corridor is one of five High Capacity Transit (HCT) corridors identified for priority implementation in the City of Seattle's 2012 Transit Master Plan (TMP). The purpose of the Madison BRT project is to improve transit capacity, travel time, reliability, connectivity, comfort, visibility, and legibility in the Madison corridor, while also making related improvements to pedestrian and bicycle access and the streetscape and public realm. The project would improve overall mobility in a dense and rapidly developing corridor that spans diverse neighborhood districts from Center City to First Hill, Capitol Hill, the Central District, and east of the study area to the Madison Valley and Madison Park.



## THE MADISON BRT PROJECT IS BASED ON THE FOLLOWING NEEDS:

**Residents, employees, visitors, students, and shoppers all need frequent, reliable transit service.**
Bus service can be slow, unreliable, and crowded during peak hours and service could be more frequent.

**People using transit in the corridor need to make east-west connections to major transit hubs.**
Madison BRT would connect Colman Dock, RapidRide, Link, Downtown transit corridors, and the First Hill Streetcar, helping to form a network of frequent, high-capacity transit.

**Intensifying land use necessitates a robust multimodal transportation network for the Madison corridor.** The Madison corridor connects Downtown Seattle with dense and growing mixed-use neighborhoods. Large-scale infill development is occurring throughout the corridor and more is expected. The transit network and supporting non-motorized facilities are needed to accommodate this growth.

**Pedestrian and bicycle improvements are needed to support the transit network and improve safety and comfort.** Pedestrian and bicycle volumes are high and growing, and the Pedestrian and Bicycle Master Plans identify needed improvements to support these modes.

**Public realm improvements would help support the transit investment, livability, and economic development.** The corridor could be made a more pleasant place to spend time by adding more green space, places to sit, and more comfortable and attractive bus stops.

**Affordable access is needed to Center City jobs and the health, social services, and educational facilities on First Hill.** Higher-quality transit service could ensure that employees, patients, visitors, students, and staff have an affordable and convenient travel option.

**Greenhouse Gas (GhG) emissions are on the rise.** Seattle's Climate Action Plan relies on high-capacity transit in major corridors, including Madison, to meet targets.

# BUS RAPID TRANSIT ALIGNMENT OPTIONS

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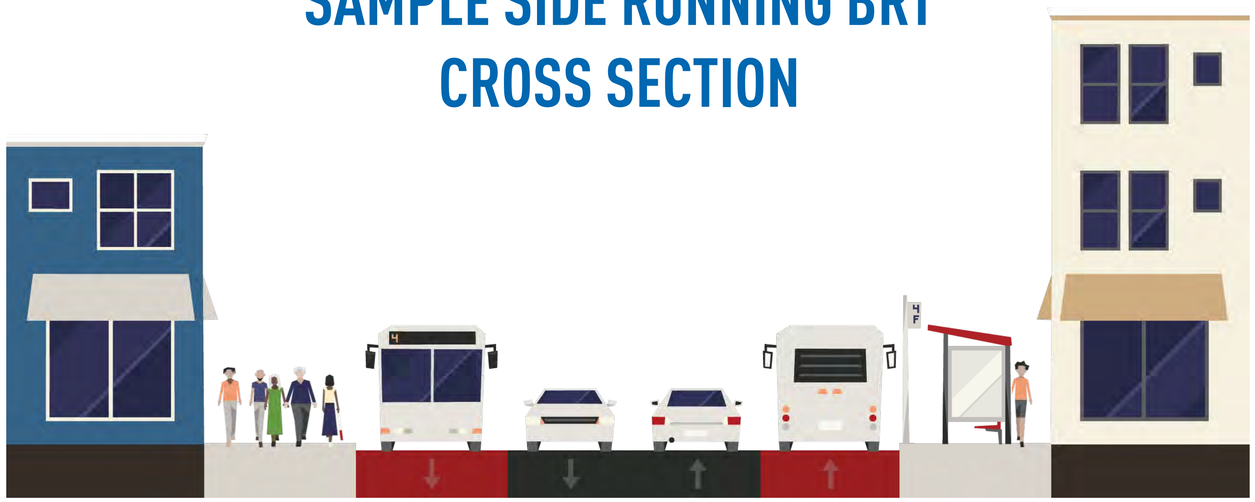
There are two potential alignment options for the Madison BRT: Side Running and Center Running. Each option has pros and cons that can impact transit and auto operations, the pedestrian environment, driveway access, and other impacts. For more detailed information about the selection of a side versus center running alignment see the SIDE VS. CENTER RUNNING BRT board.

## SAMPLE SIDE RUNNING BRT CROSS SECTION



### PROS

- Stations can be on the sidewalk, which offer more space for waiting passengers.
- Fewer left-turn restrictions may be necessary.
- The lane can double as a right-turn lane at driveways and intersections.

### CONS

- Buses must share the lane with cars and trucks turning right, slowing buses down.
- Sidewalk stations are less visible than stations in the street.
- Can create conflicts with through pedestrians.

## SAMPLE CENTER RUNNING BRT CROSS SECTION

### PROS

- Traffic is not allowed in the bus lanes and lanes may even be physically separated by curbs or medians.
- Both center lanes and stations on islands are highly visible and there may be more room on platforms for shelters and other amenities.
- Stations can double as refuges for pedestrians crossing the street.

### CONS

- Island platforms require more space.
- Some left turns may be restricted.
- Passengers may not be comfortable waiting in the middle of the street.

# STATION DESIGN ALTERNATIVES

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## TERRY AVENUE

The intersection of Madison and Terry is one block west of Boren, near the center of First Hill and one block from Virginia Mason. These drawings show what a BRT station at this location might look like under the Center and Side Running BRT alternatives. Under the Side Running alternative, the station would be located on both sidewalks. Under the Center Running alternative, the station would be in the street, either on an island between the bus lanes or on separate platforms to the right of the bus lanes between the bus and traffic lanes. There are advantages and disadvantages to each design, described on other boards.


# STATION DESIGN ALTERNATIVES

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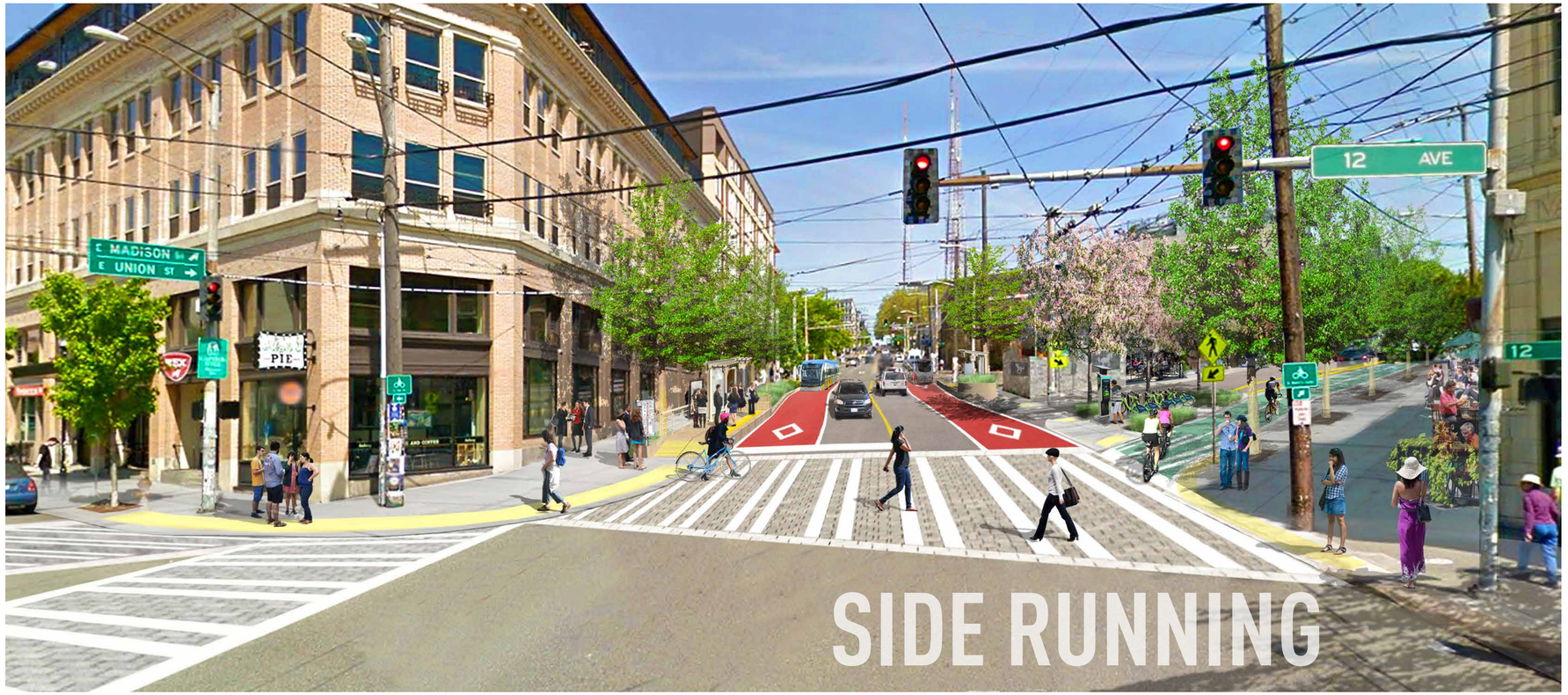
## 12TH AVENUE AND UNION STREET

This six-way intersection is a major crossroads at the nexus of Capitol Hill and the Central District and a natural location for a BRT station. It is also a challenging intersection to navigate for all users – transit riders, pedestrians, cyclists, and drivers. At the same time, it presents unique opportunities that might be taken advantage of as part of BRT implementation: for example, drivers westbound on Union can continue west using 13th and Madison, meaning that part of Union between 12th and 13th could be converted to a plaza with a protected bike lane running through it. The intersection itself could also be redesigned to make it easier to cross. These drawings show what a station, plaza, and other improvements at this location might look like under the Center and Side Running BRT alternatives.

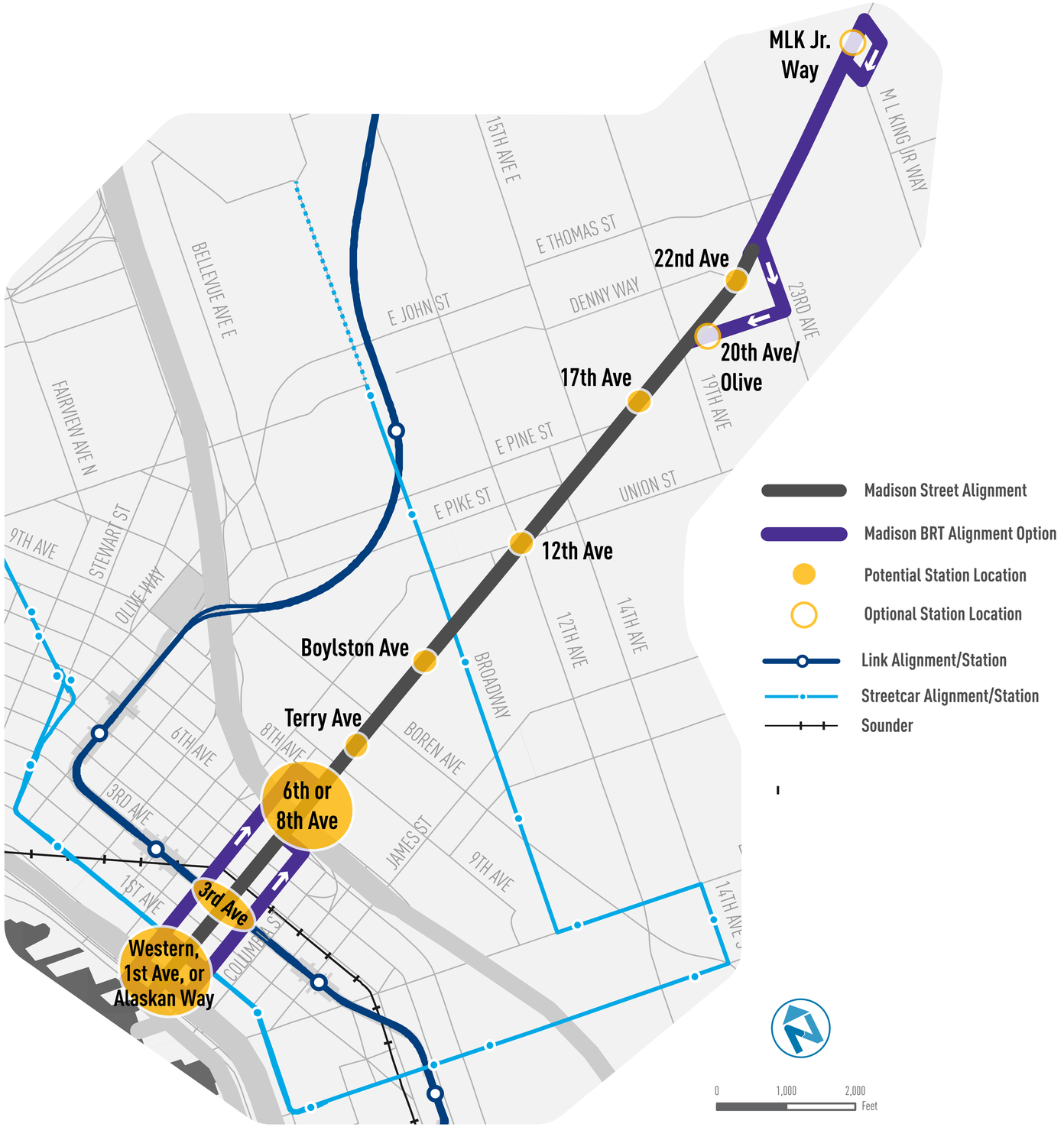



SIDE RUNNING


CENTER RUNNING

# PROPOSED STATION LOCATIONS

One of the ways BRT makes bus service faster and more reliable is by removing lightly-used stops, improving travel times for all users while maintaining stops at the busiest locations. On some BRT lines, stations are a half-mile, a mile, or more than a mile apart. In the Madison corridor, stations are proposed to be about one-third to one-half of a mile apart. The proposed station locations were chosen on the basis of high existing ridership, access to major destinations such as Link light rail and First Hill hospitals, and sidewalk grades, with stations located more closely together in the steeper western segments of the corridor. Potential for adjacent properties to redevelop and provide additional setback was also considered. The exact locations of stations near I-5 and at both terminals have not yet been determined. Analysis found that about 85% of those boarding at existing stops would be no more than a block from a BRT stop.




# KEY DECISIONS

A number of key decisions must still be made about this project. To help make these decisions, we have identified major decision factors and provided key findings from the analysis. These decision points have to do with:

- The basic configuration of bus lanes and stations and the design of the street in the central segment of the corridor
- The eastern terminal of the BRT corridor (note: some buses might continue east past the BRT terminal)
- The eastbound alignment of BRT downtown (westbound buses would be on Madison)
- The western or downtown/waterfront terminal
- Where to locate a station between Third and Terry Avenues

The purpose of this meeting is to share our analysis with you and hear back from you what choices you would make in each of these areas.

# HOW DO WE SHAPE THE BEST BRT ALTERNATIVE?

## **5 Key Decision Factors** with established **Metrics** help us compare different options

**1** CENTER VS. SIDE RUNNING BRT FACILITIES (COULD VARY BY SEGMENT)

- Transit Reliability
- Capital Cost
- Transit Travel Time
- Pedestrian and Bicycle Impacts

**2** 23RD AVENUE OR MLK TERMINUS

- Ridership
- Operations & Maintenance
- Capital Cost
- Public Support

**3** SPRING STREET VS. MARION STREET EASTBOUND PATHWAY

- Operations & Maintenance Cost
- Capital Cost
- Traffic Impacts
- Public Support
- Impacts and Benefits for Other Transit Users

**4** 1ST AVENUE, WESTERN AVENUE, OR ALASKAN WAY TERMINUS STREET

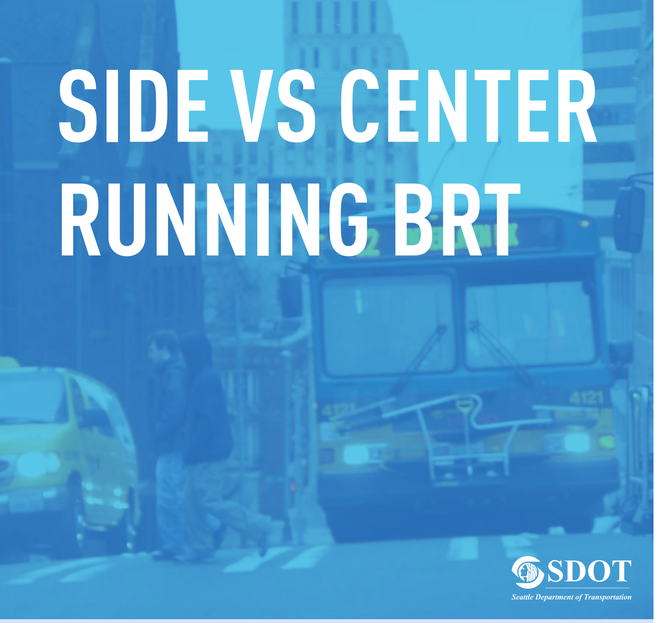
- Traffic Impacts
- Quality of Connections/ Transfers

**5** I-5 AREA STATION LOCATION

- Proximity to Land Use/Demand Generators
- Pedestrian Access
- Traffic Impacts
- Parking & Loading Impacts

**Scoring individual metrics helps determine the best alternative for each decision factor**

# SIDE VS CENTER RUNNING BRT



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## SIDE VS. CENTER RUNNING

The Side and Center Running alternatives differ in where BRT lanes and stations would be located: on the side of each street, or in the center. Under the Side Running alternative, the curb lanes would be converted to bus lanes, and the station would be on both sidewalks. Under the Center Running alternative, the center lanes would be converted to bus lanes, and the station would be in the street, either on an island between the bus lanes or on separate platforms to the right of the bus lanes, between the bus and traffic lanes. Both Side and Center Running alternatives are under consideration in the central segment of the corridor between 8th and 20th Avenues.



## CAPITAL COSTS

The Center Running alternative is somewhat more expensive than the Side Running alternative primarily because it would require roadway widening around stations. This would require reconstruction of both the roadway and sidewalk, as well as measures to mitigate traffic impacts during construction.

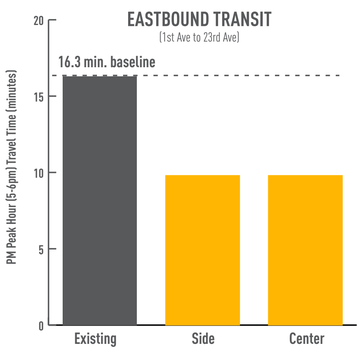
| SIDE RUNNING | CENTER RUNNING |
|---|---|
| $98M | $120M |

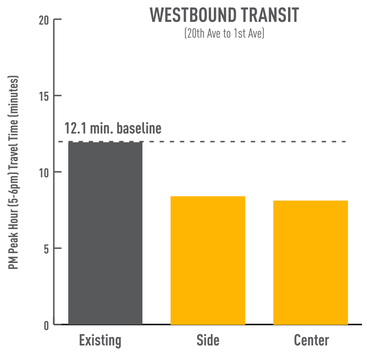
Major cost categories include:

- Design and engineering ($21-23M)
- Vehicles ($18M)
- Construction-related costs ($11-13M)
- Technology ($11M)
- Roadway changes ($6-10M)
- Stations ($8M)
- Storage and maintenance facilities ($7M)
- Ped/bike, sidewalk, and landscape ($7M)
- Utilities ($3-5M)
- Other ($6-18M)

Note: Costs are for Western to 23rd Ave via Marion in 2015 dollars.

## TRANSIT TRAVEL TIME




## TRANSIT RELIABILITY

Today a transit trip betwen 6th and 13th Avenues, westbound in the PM peak hour, may take as little as 7 minutes and as much as 14 minutes. Under both the Center Running and Side Running Alternatives there would be little variability by direction or by time of day.

**7.0 min.**
**variability between shortest and longest run**

EXISTING: MIXED TRAFFIC

**0.6 min.**
**variability between shortest and longest run**

CENTER-RUNNING

**0.8 min.**
**variability between shortest and longest run**

SIDE-RUNNING

## PEDESTRIAN AND BICYCLE IMPACTS

Which option would improve crossings the most? **CENTER**

Which option would improve sidewalk conditions the most? **SIDE**

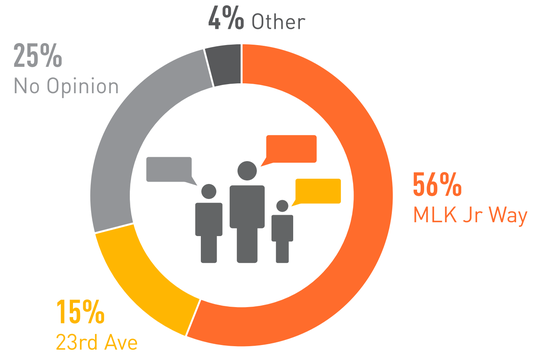
Which option would free up more space for street furniture, planting, and street trees? **SIDE**

Note: Next phase of the project will evaluate design impacts and mitigations in greater detail.

# EASTERN TERMINUS ALTERNATIVES

BRT vehicles could turn around at either 23rd Avenue or farther east at Martin Luther King Jr. Way in Madison Valley. This project must decide which terminus option is best for both transit operations and the community. If buses turned around at 23rd Avenue, they would make a clockwise loop using 23rd and Olive, "laying over" at the end of the line on Olive just east of 20th. If they continued to Martin Luther King Jr. Way, they would layover on Arthur Place between MLK Jr. Way and 29th Avenue.

## PUBLIC SUPPORT




Note: Based on 1/15/2015 web survey.

## OPERATING COSTS

MLK Jr. Way Extension costs an additional

**$40k - $340k per year**

Note: 2019 dollars, 5-min peak/10-min off-peak service.

## RIDERSHIP

The MLK Jr. Way Extension would add up to

**1,000 additional BRT line riders per day**

under current conditions

## CAPITAL COST (construction 2019)

MLK Jr. Way Extension* costs an additional

**$13.4M** 2015 Dollars

*Includes new trolley wire and substation.

# DOWNTOWN EASTBOUND PATHWAY

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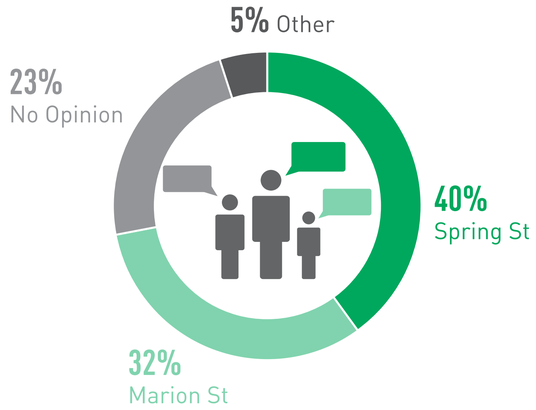
Downtown BRT vehicles would travel west on Madison, as Route 12 does today. However, vehicles could either travel east on Marion or Spring. If vehicles used Marion, BRT buses would connect back to Madison using 6th Avenue. If BRT used Spring, they would connect back using 8th Avenue. Whichever street was used, BRT vehicles would mostly use side running bus lanes and stations. The information in this section will be used to decide whether buses travel eastbound via Marion and 6th or Spring and 8th downtown.



## PUBLIC SUPPORT




Note: Based on 1/15/2015 web survey.

## OPERATING COSTS

**Spring Street alignment costs an additional**

**$0k - $20k per year**

Note: 2019 dollars, 5-min peak/10-min off-peak service.

## CAPITAL COST (construction 2019)

**Spring Street alignment costs an additional**

**$5.8M 2015 Dollars**

## IMPACTS + BENEFITS FOR OTHER TRANSIT USERS

### SPRING STREET

- Offers better connectivity to Downtown Seattle Transit Tunnel
- Would allow Route 2 to take advantage of future bus-only lanes
- Offers opportunity for a shared streetcar platform or an Alaskan Way terminal
- Requires longer transfer from Washington State Ferries at Colman Dock


**See Western Terminus Board for more information on station location options**

Not to scale

**Madison Street Alignment/Station (both options)**

**Spring Street Pathway/Station Option**

**Marion Street Pathway Option**

**Link Alignment/Station**

# WESTERN TERMINUS


A western terminus station could be in any of four locations: between Madison and Marion southbound on Western, between Madison and Marion southbound on 1st Avenue, or between Madison and Spring northbound on 1st Avenue, Western, or Alaskan Way. Vehicles would not lay over here. The information in this section will be used to help decide between the western terminus options.

Evaluation was conducted based on potential for conflict between traffic and transit, transit connectivity, and for a 1st Avenue terminal.

| WESTERN TERMINUS OPTIONS | TRAFFIC CONFLICTS | QUALITY OF CONNECTIONS / TRANSFERS |
|---|---|---|
| WESTERN BETWEEN MADISON AND MARION (W SIDE) | ◔ | ◑ |
| 1ST AVE BETWEEN MADISON AND MARION (W SIDE) | ○ | ◕ |
| 1ST AVE BETWEEN MADISON AND SPRING (CENTER PLATFORM) | ◑ | ◕ |
| WESTERN BETWEEN MADISON AND SPRING (E SIDE) | ● | ◕ |
| ALASKAN WAY BETWEEN MADISON AND SPRING (E SIDE) | ● | ◑ |

IMPACT RATING SCALE

○ ◑ ◕ ●

Worst Result ← → Best Result

Note: Integrating with the Center City streetcar station poses significant challenges including complexity with OCS wire crossing, transit vehicle capacity issues with the proposed headways, signalization complexity, and platform length issues.

# I-5 AREA STATION LOCATION

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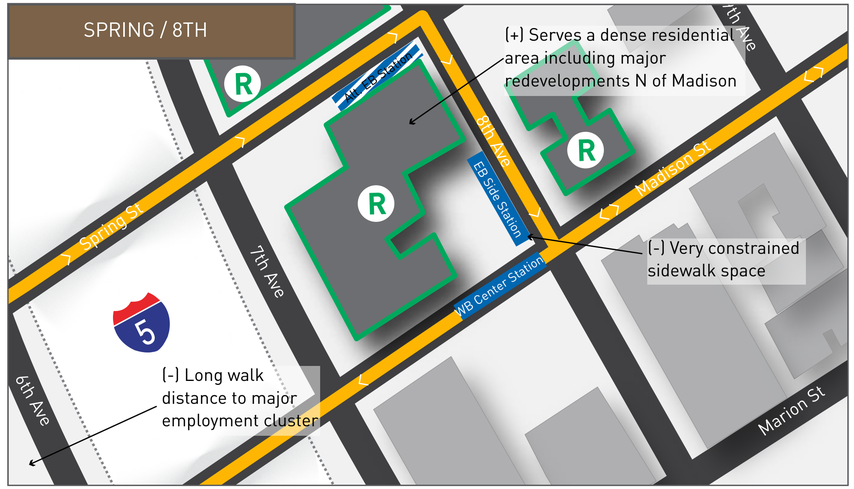
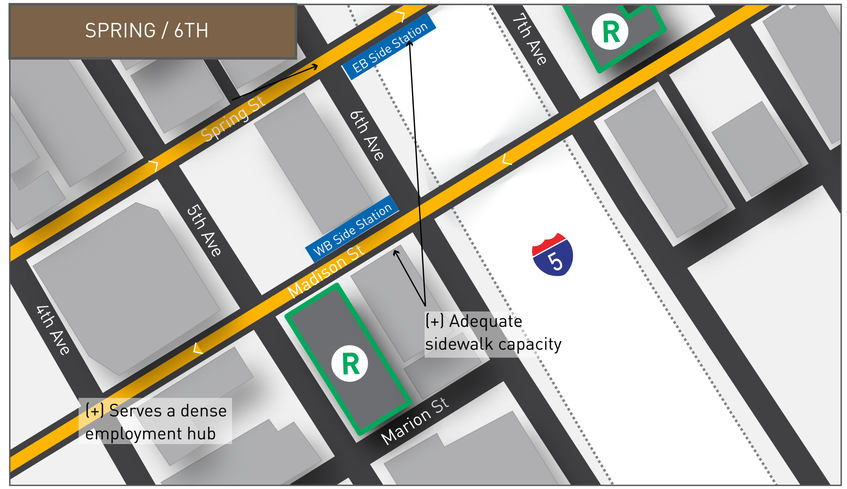
BRT stations are proposed for 3rd Avenue and Terry Avenue on Madison. There is a desire for a station located between these two stations that would serve employment and residential concentrations. I-5 creates a major gap in otherwise continuous land uses along the corridor. It is difficult to locate a station between 7th and 8th Avenues or on the Madison I-5 bridge due to street operations and street geometry. This leaves two primary options:

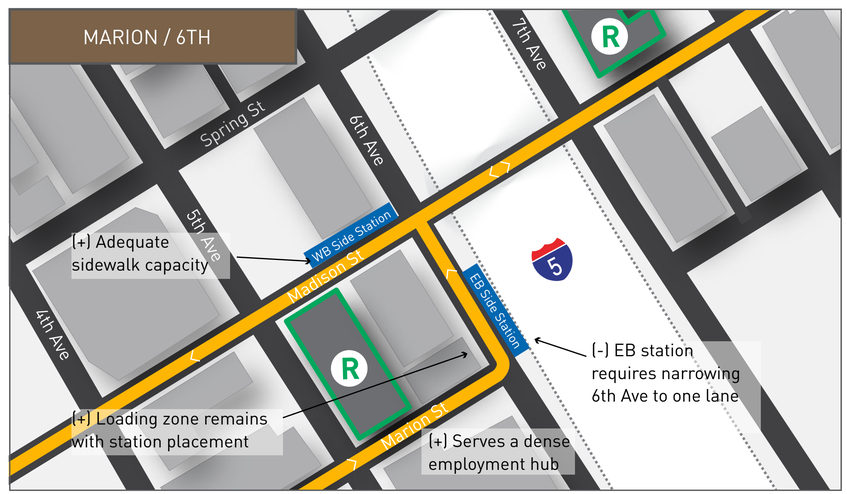
- A station pair in the vicinity of 8th Avenue which would better serve First Hill but reduce access to a dense employment area on the east side of Downtown.
- A station pair west of I-5 serving the eastern side of Downtown. The westbound station would be on Madison with an eastbound station on either 6th Avenue or Spring.

Analysis was conducted to determine the range of impacts and benefits from siting BRT stations in different I-5 vicinity locations. The analysis employed four criteria to evaluate impacts at different east-west station pairs. Criteria include pedestrian access (e.g., sidewalk capacity and hill climbing), density of destinations served, additional parking removal (independent of the alignment parking impacts), and traffic operations.






Proposed Station Location

Alternative Station Location

Proposed BRT Alignment

Planned Redevelopment Site

| I-5 STATION OPTION | PEDESTRIAN ACCESS | | DESTINATIONS SERVED | PARKING & LOADING | TRAFFIC OPERATIONS |
|---|---|---|---|---|---|
| SPRING / 8TH | ◐ | ○ | ◐ | ● | ◐ |
| SPRING / 6TH | ● | ● | ● | ● | ◔ |
| MARION / 6TH | ◔ | ● | ● | ◑ | ● |

RATING SCALE

Undesirable

Desireable

**PEDESTRIAN ACCESS**

Level of climbing required to access BRT station

Sidewalk capacity for both BRT station activity and pedestrian through movement

**DESTINATIONS SERVED**

Density of destinations served by BRT station

Population and employment intensity in the immediate vicinity of BRT station

**PARKING & LOADING**

Parking removal required to accommodate BRT station and safe access

**TRAFFIC OPERATIONS**

Impact on intersection operations as a result of lane reconfiguration

# CONNECTIONS TO OTHER TRANSIT SERVICES

The Spring alternative would provide greater connectivity than the Marion alternative, as an eastbound stop at 3rd Avenue would be one block closer to a Link station entrance than an eastbound stop on Marion. Depending on terminal location (1st Avenue, Western or Alaskan Way), the Marion alternative might provide greater connectivity to ferry service at Colman Dock, but there are fewer ferry riders than there are Link users – and Link ridership will only continue to grow as the system is expanded.

## KEY TRANSIT CONNECTIONS

**A. Washington State Ferries / Colman Dock**

- Marion routing provides best connection
- 1st Avenue Station option provides level grade access to Colman Dock pedestrian connection

**B. 1st Ave Streetcar**

- Comparable in both center and side options, depends on terminus station location

**C. Downtown Seattle Transit Tunnel / LINK**

- Spring reduces walk distance/time

**D. 3rd Avenue**

- Good connection in all Western terminus alternatives

**E. Broadway Streetcar/Bus**

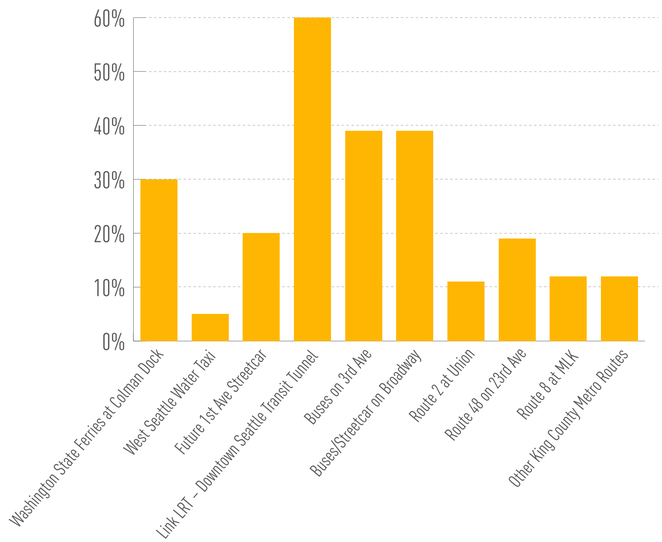
- Comparable access in both center and side options

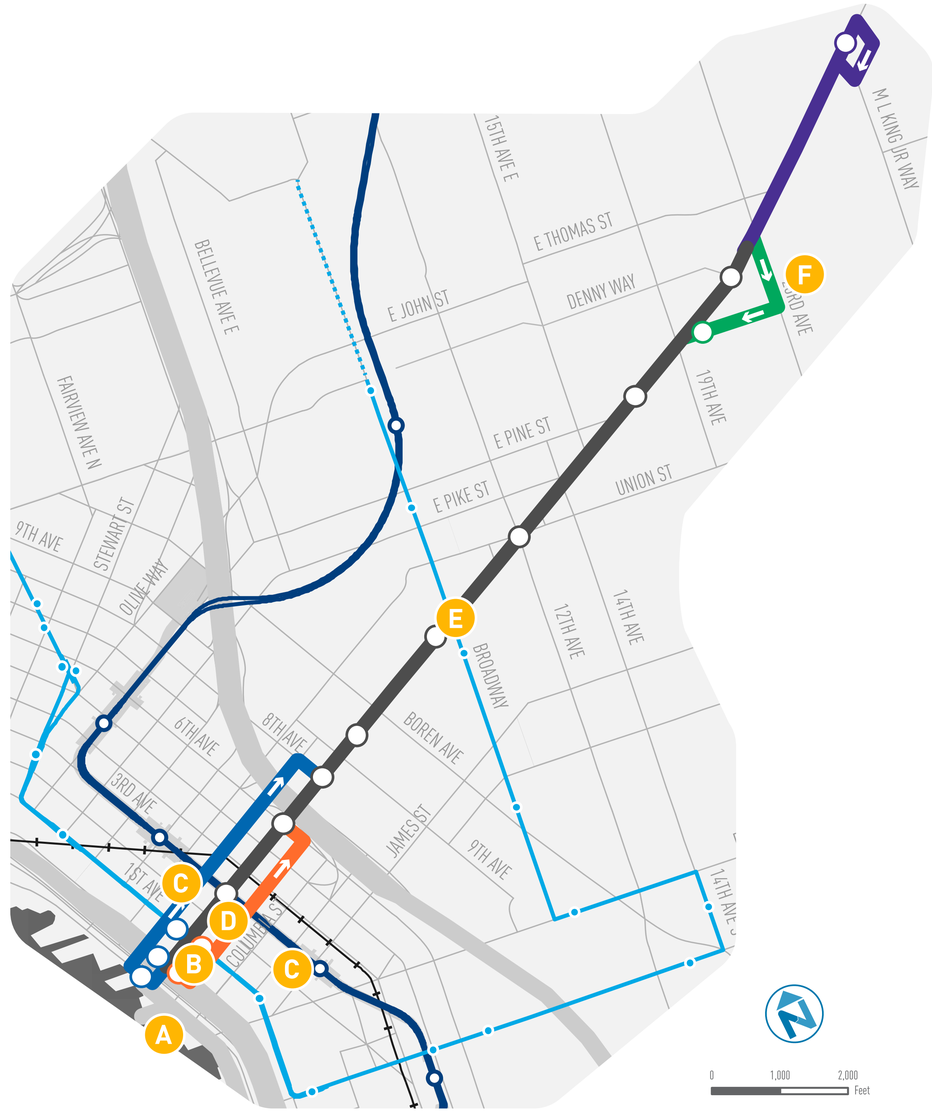
**F. Route 48 on 23rd Avenue**

- Comparable access in both center and side options

## PUBLIC RATING

Participant responses in the web survey indicated the following high priority transfer points with the BRT line




- Madison Street Alignment/Station (all options)
- Spring Street Pathway/Station Option
- Marion Street Pathway Option
- 23rd Avenue Terminus/Station Option
- MLK Jr Way Terminus/Station Option
- Link Alignment/Station
- Streetcar Alignment/Station
- Sounder

# BRT PERFORMANCE


BRT performance was analyzed based on two conceptual operating plans: 5-minute peak and 10-minute off-peak service, and 6-minute peak and off-peak service. Analysis was conducted for the segment between Western and Martin Luther King Jr. Way. The analysis found that BRT service would be well-utilized, highly productive and cost-effective, and that 6-minute all-day service would perform somewhat better than 5-minute peak and 10-minute off-peak service.

## RIDERSHIP

Average weekday boardings.

**SERVICE**
5 min. peak
10 min. off-peak

2015: 10,000
2035: 16,000

**SERVICE**
6 min. peak
6 min. off-peak

2015: 12,000
2035: 17,000

## COST EFFECTIVENESS

Operating and maintenance cost per average weekday boarding.

**SERVICE**
5 min. peak
10 min. off-peak

**$1.64-1.89**

**SERVICE**
6 min. peak
6 min. off-peak

**$1.40-1.62**

Note: In 2013, Metro's systemwide average cost per boarding was $4.26.
Source: Metro Online

## PRODUCTIVITY + LOADS

Productivity and loads are calculated using average weekday boardings per revenue hour and average boardings per PM peak trip. The transit model demonstrated increased passenger boardings for both metrics under the 6 minute peak/off-peak headways scenario.

| | AVERAGE WEEKDAY BOARDINGS | AVERAGE PM PEAK BOARDINGS |
|---|---|---|
| 5 min. peak /10 min. off-peak | 106 per hour | 42 per trip |
| 6 min. peak /6 min. off-peak | 124 per hour | 60 per trip |

# PARKING & LOADING IMPACTS

SDOT
Seattle Department of Transportation

As indicated by the figures at right, each alternative would remove approximately 94 parking and loading spaces between 8th and 20th avenues, of which 57 are parking spaces that are already unavailable during peak periods. Impacts of the Marion and Spring and 23rd Avenue and Martin Luther King Jr. Way terminal alternatives, meanwhile, would vary.

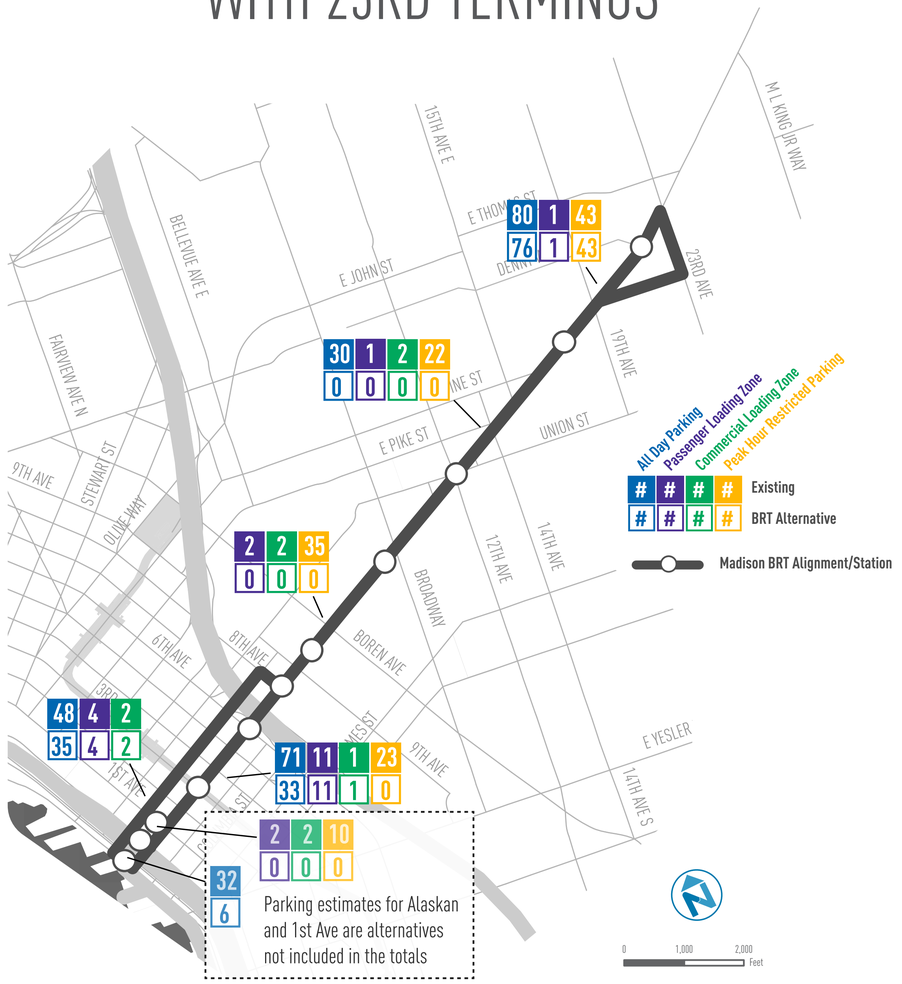
The overall impact of the Spring alternative would be greater, as it would result in the removal of approximately 73 parking and loading spaces west of 8th Avenue, compared to 36 spaces for the Marion alternative. Both the Spring and Marion alternatives assume a terminus at Western Avenue. At the eastern terminus, the MLK Jr. Way alternative would require the removal of 32 spaces compared to 4 for the 23rd Avenue alternative.

Note: The following are not identified on the summary maps, but should be noted:

- Marion 1st to 2nd, N side: 12 government employee-only spaces (not included in analysis)
- 6th Madison to Marion, E side: bus/charter-only (not included in analysis)
- Madison 24th to 25th, SE side: 3 carpool spaces, included in analysis
- Madison 2nd to 3rd, SE side: 11 carpool spaces, included in analysis
- Madison 6th to 7th, SE side: 11 carpools spaces, included in analysis
- Marion 2nd to 3rd, NW side: 6 carpool spaces, included in analysis



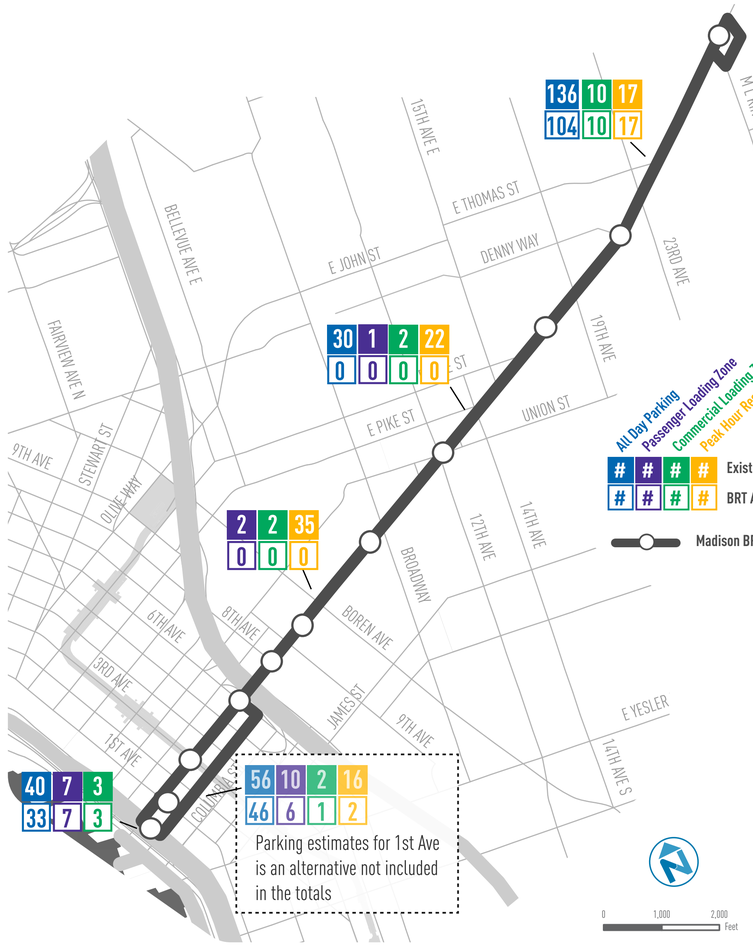
## SPRING STREET ALIGNMENT WITH 23RD TERMINUS




## TOTAL PARKING IMPACT
(entire corridor length)

| All Day Parking | Passenger Loading Zone | Commercial Loading Zone | Peak Hour Restricted Parking | |
|---|---|---|---|---|
| 229 | 18 | 7 | 123 | Existing On-Street Parking Supply |
| 143 | 17 | 3 | 43 | On-Street Parking Supply with BRT Alternative |

## MARION STREET ALTERNATIVE WITH MLK TERMINUS




## TOTAL PARKING IMPACT
(entire corridor length)

| All Day Parking | Passenger Loading Zone | Commercial Loading Zone | Peak Hour Restricted Parking | |
|---|---|---|---|---|
| 262 | 20 | 19 | 90 | Existing On-Street Parking Supply |
| 182 | 14 | 14 | 19 | On-Street Parking Supply with BRT Alternative |

# PARKING MITIGATION STRATEGIES

SDOT
Seattle Department of Transportation

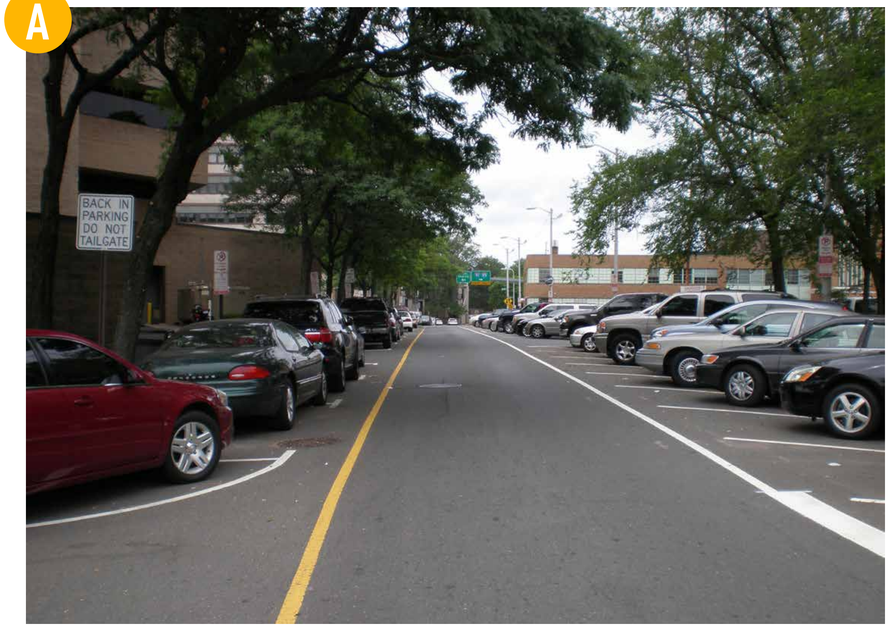
A number of mitigation strategies could be evaluated to mitigate the impact of parking loss along Madison Street. There are opportunities for parking mitigation along intersecting streets and through reconfiguration of the right-of-way. Two approaches are being investigated:

- Converting short segments of select two-way streets into calmed, one-way streets with both angled and parallel parking
- Closing select streets at Madison to create limited space for parking stalls and additional space for placemaking

Further study will be conducted to determine the feasibility and extent of these mitigation strategies.



A

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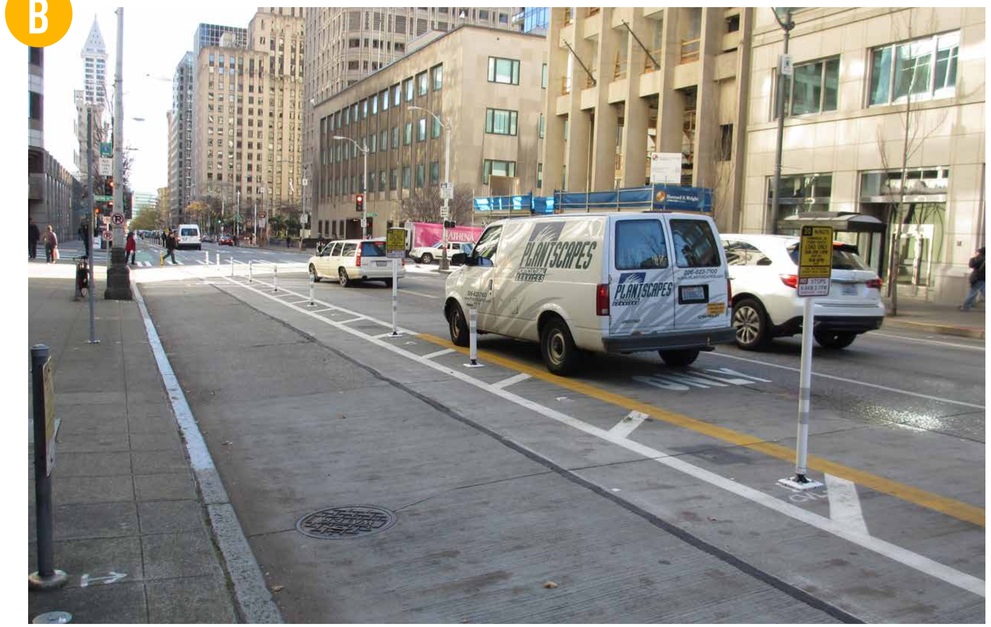



C

**A)** A one-lane one-way street with angle-in and parallel parking.

**B)** The 2nd Avenue protected bike lane retains on-street parking by moving the parking lane to the outside of the bike lane.

**C)** Street closures at intersections can provide the dual benefit of adding limited amounts of new parking stalls while developing great pedestrian plaza spaces that enable people to enjoy the street environment. This pedestrian plaza in Philadelphia was developed to create a more pedestrian-friendly environment and optimize parking supply.

Images: Nelson\Nygaard

# AUTO TRAVEL TIME, INTERSECTION OPERATIONS, & TRAFFIC DIVERSION

While conversion of travel lanes to transit lanes can reduce traffic capacity, impacts on traffic vary, as turn restrictions and dedicated turn lanes can help keep through traffic flowing. In addition to impacts on auto travel times within the corridor, BRT can also impact traffic on cross and parallel streets.

Traffic modeling found that:

- The Side Running alternative would have less impact on traffc. This is because autos could use transit lanes to turn right and could turn left at more locations.
- Both alternatives would impact traffic on side streets including Terry, Boyston, 11th and 12th Avenues.
- Both alternatives would have major impacts on the intersections of Madison with 11th and 12th Avenues, and the Side Running alternative would have a major impact at Madison and Boren.
- Because both alternatives would provide more capacity near I-5, they would not have a major impact on traffic near I-5.



# INTERSECTION OPERATIONS

Level of Service E and F indicate intersections that are at or above capacity for certain approaches

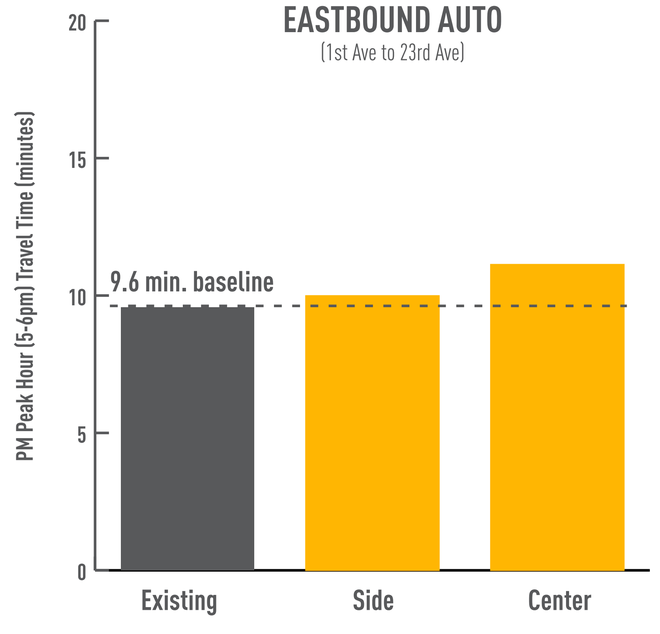
## SIDE RUNNING

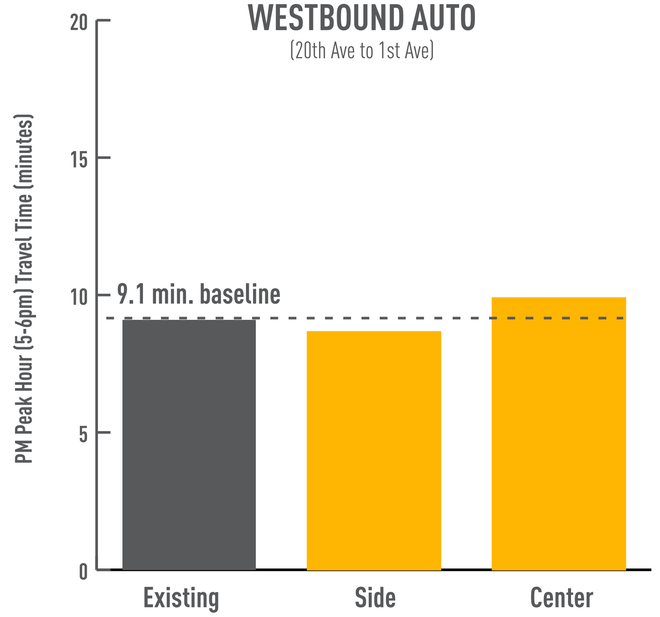

Note: Analysis is based on PM peak hour of 5-6 p.m.

## CENTER RUNNING


Note: Analysis is based on PM peak hour of 5-6 p.m.

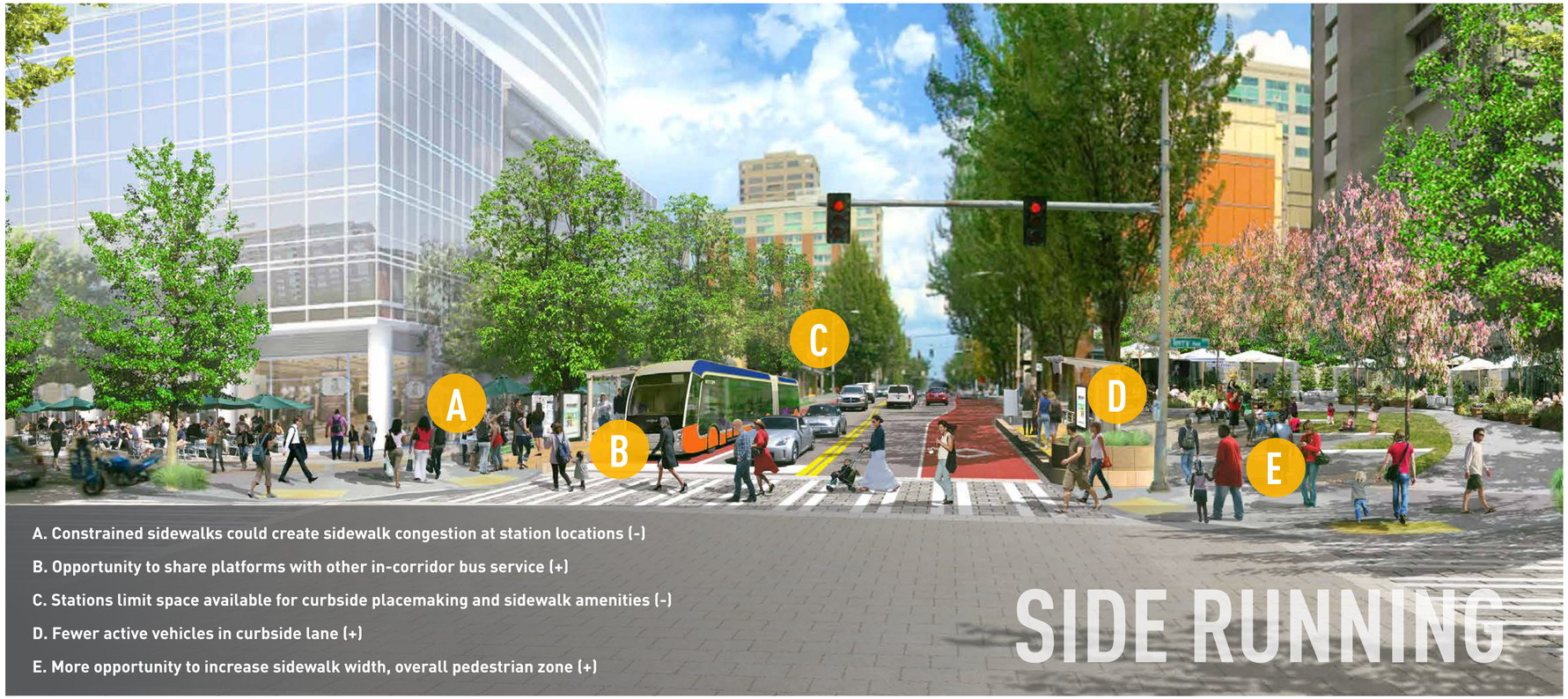
# AUTO TRAVEL TIME



# PUBLIC REALM

The Madison Street BRT corridor is comprised of a diverse set of urban environments, each with their own unique character and implications for walkability and placemaking. The surrounding street network, the flow of people accessing transit and adjacent land uses, and rapid employment and residential growth along the corridor factor into Madison's vibrancy and potential to become a great transit street. While the corridor's vibrancy is evident, the Madison Street BRT corridor project presents a unique opportunity to enhance the quality of the public realm. Station placement and changes to pedestrian space will require thoughtful design as the Madison Street BRT project progresses toward implementation.




A. Constrained sidewalks could create sidewalk congestion at station locations (-)

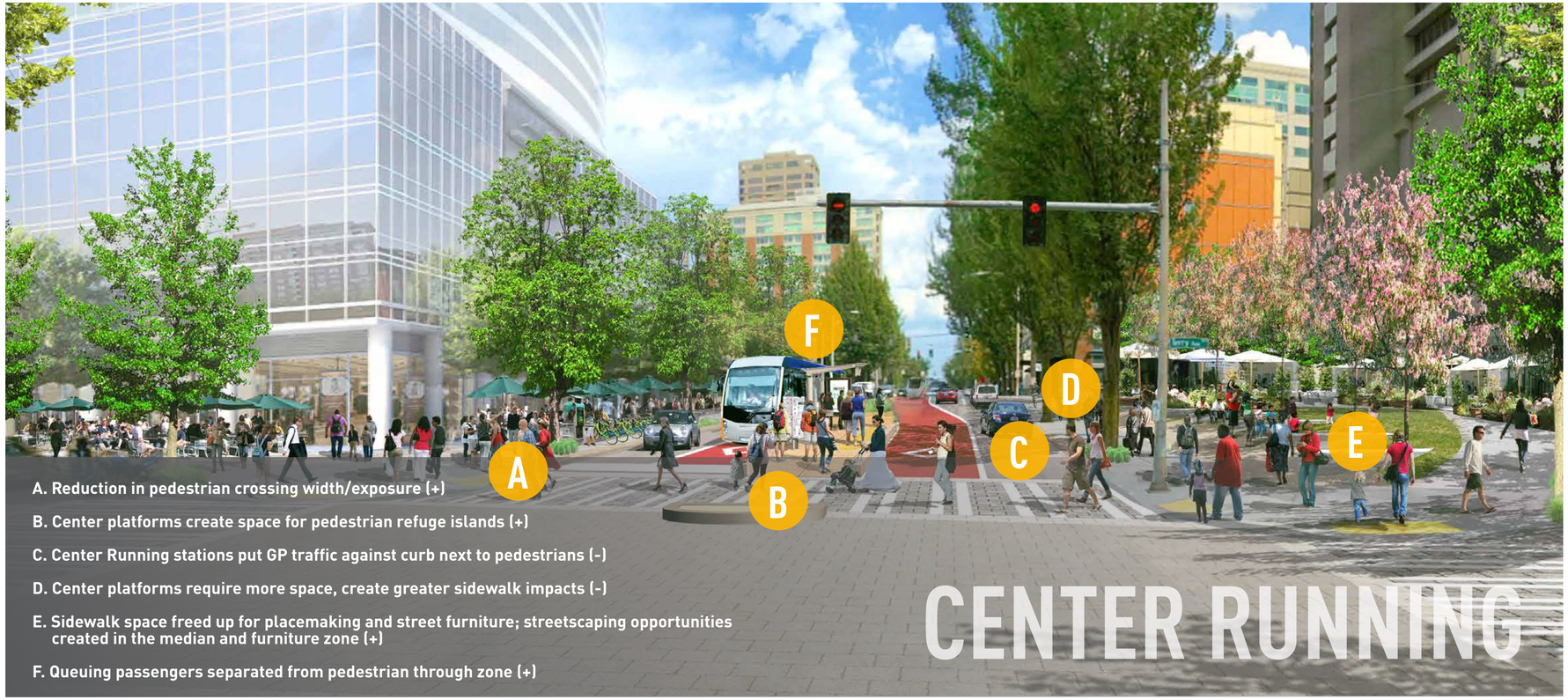
B. Opportunity to share platforms with other in-corridor bus service (+)

C. Stations limit space available for curbside placemaking and sidewalk amenities (-)

D. Fewer active vehicles in curbside lane (+)

E. More opportunity to increase sidewalk width, overall pedestrian zone (+)

## SIDE RUNNING




A. Reduction in pedestrian crossing width/exposure (+)

B. Center platforms create space for pedestrian refuge islands (+)

C. Center Running stations put GP traffic against curb next to pedestrians (-)

D. Center platforms require more space, create greater sidewalk impacts (-)

E. Sidewalk space freed up for placemaking and street furniture; streetscaping opportunities created in the median and furniture zone (+)

F. Queuing passengers separated from pedestrian through zone (+)

## CENTER RUNNING

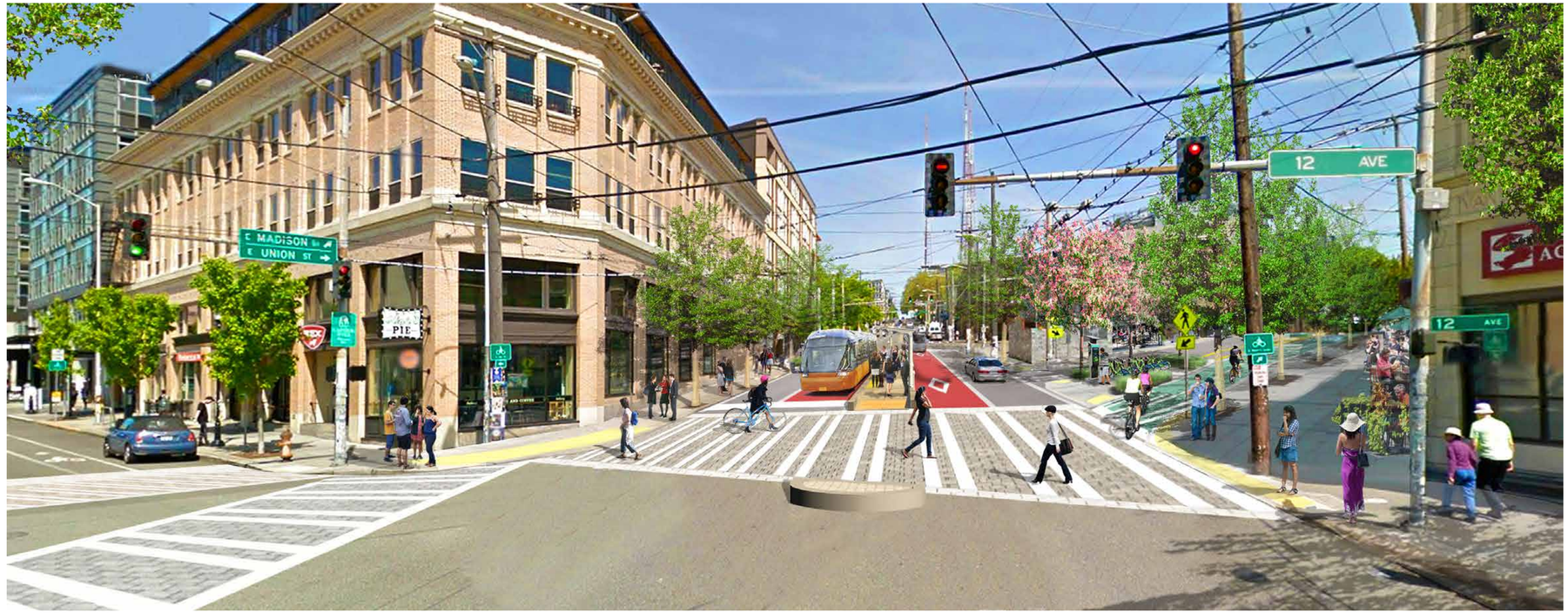
# PEDESTRIAN & BICYCLIST BENEFITS

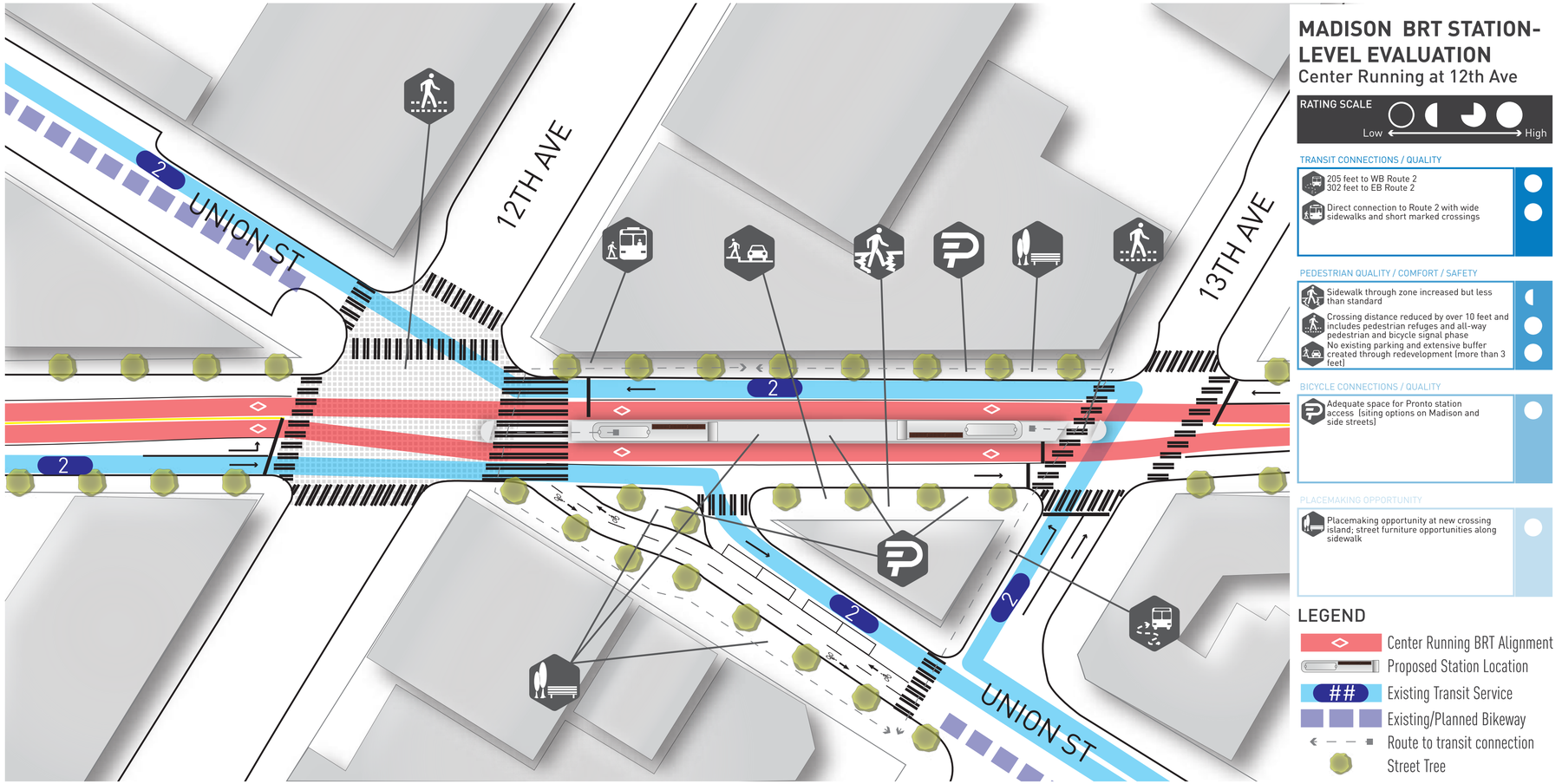
SDOT
Seattle Department of Transportation

Improving transit service in the Madison Street corridor is reliant on making Madison a better place to walk and to arrive by bicycle. Our active transportation evaluation looked at opportunities to improve walking and cycling conditions through the transit project investment. The evaluation helps to answer some key project questions:

- Which BRT design, Side or Center Running, is better for people walking and biking?
- Which station locations provide the best opportunity for people to access the BRT service, connect to key public transportation services, and access key destinations?
- What SDOT priority pedestrian and bicycle projects could be implemented or aided by the Madison Corridor BRT investment?

The rendering and plan view graphics at right illustrate how the pedestrian and bicyclist analysis was used to develop safe and comfortable facilities that maximize active transportation access.



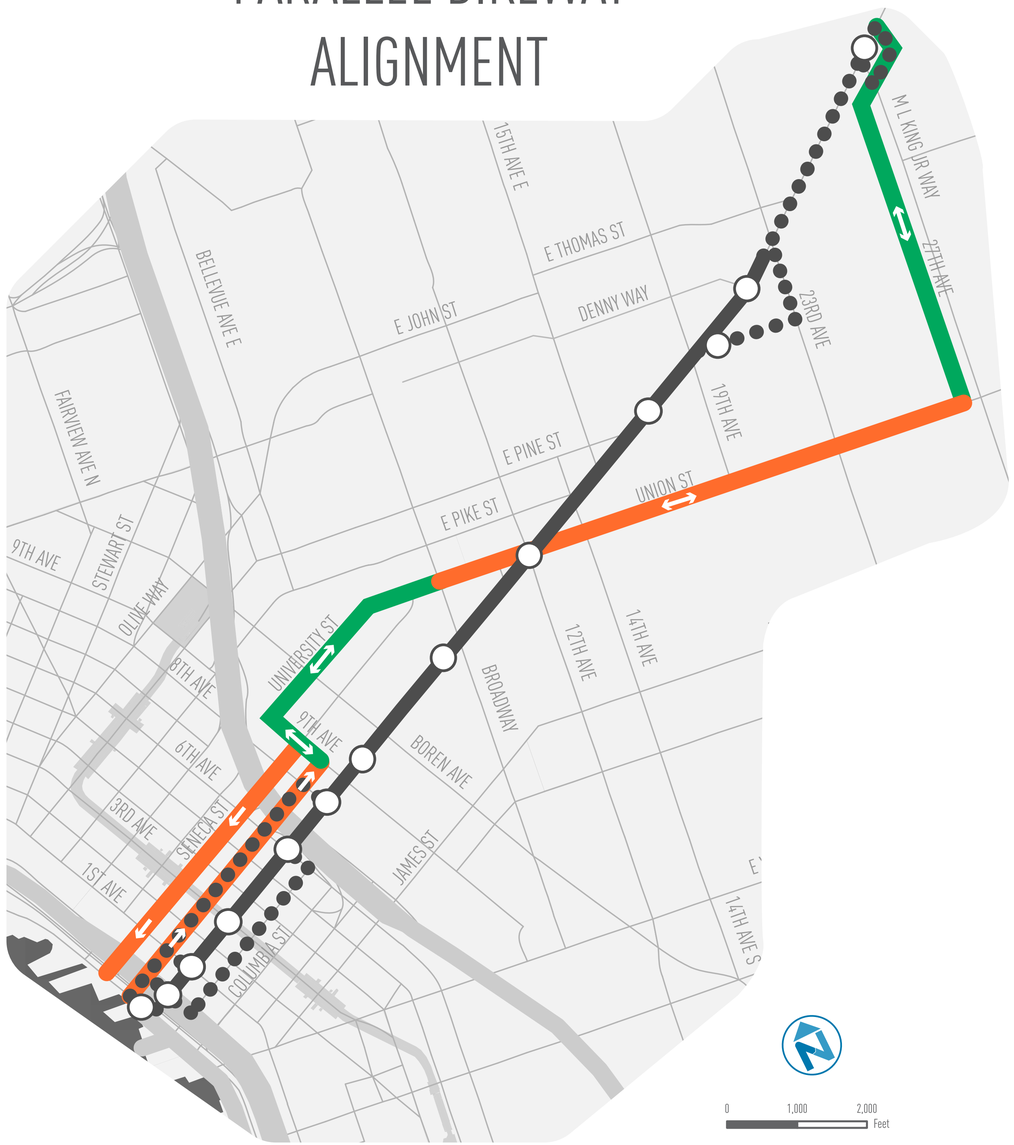
# PARALLEL BIKE ROUTE DESIGN ALTERNATIVES


The Madison Corridor is intended to support travel for multiple modes, including people on bikes. Right-of-way limitations prevent Madison Street from being considered for bikeway improvements. The Madison BRT study includes the identification of a "parallel" bikeway facility. As a diagonal street in a grid network, it is not possible to develop a precise parallel route to Madison for bicyclists. However, with a suite of targeted bikeway investments and intersection enhancements, improved bicycle access to existing destinations and the future bus rapid transit service on Madison Street is possible. The goal of this bikeway is to **improve bicycle access for people of all ages and abilities.**

The map at right illustrates the recommended parallel bikeway route. The route takes advantage of the planned protected bike lanes (PBLs) on Spring Street, Seneca Street, and Union Avenue, as well as the low speed/low volume on University Avenue and 27th Avenue. There are two design alternatives for the protected bike lane facility: a one-way PBL and a two-way PBL. The criteria listed at right were developed to weigh these two alternatives.



## PARALLEL BIKEWAY ALIGNMENT




**Madison Street Alignment/Station (all options)**

**Madison Terminus/Pathway Option**

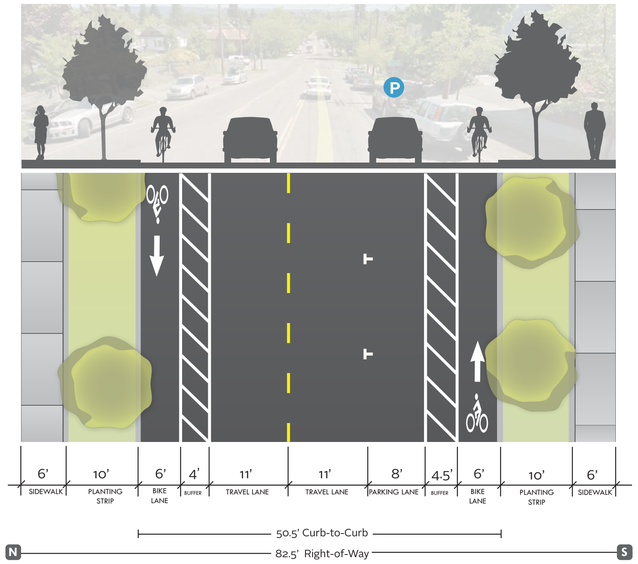
**Protected Bike Lane**

**Neighborhood Greenway**

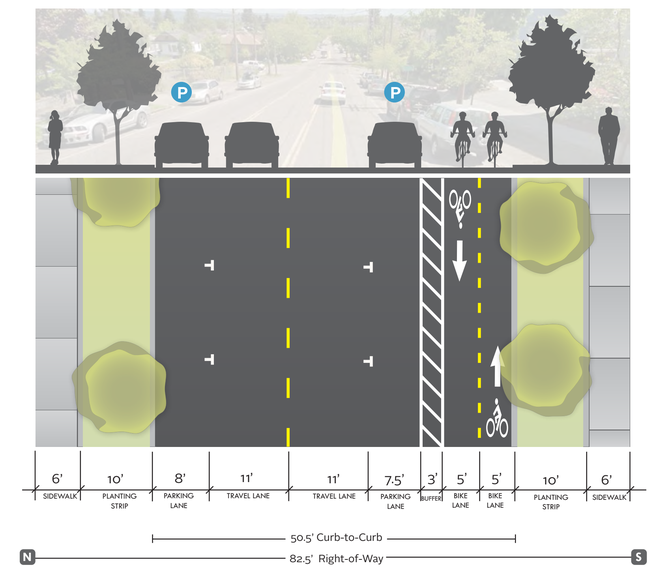
## Criteria for Identifying a Preferred PBL Alternative on Union Street

- Transit conflicts
- Crossing experience for people walking
- Quality of experience at intersections for people riding bicycles
- Quality of experience along segments for people riding bicycles

## One-Way Protected Bike Lane Alternative




## Two-Way Protected Bike Lane Alternative



# PARALLEL BIKE ROUTE CRITICAL INTERSECTIONS

SDOT
Seattle Department of Transportation

Critical intersections identified early in the planning process will be improved to create a safe and comfortable bicycling environment. Design specifications for these intersections have not yet been identified, but an example of how these treatments might be used at the intersection of 23rd Avenue and Union Street with the Two-Way Protected Bike Lane Alternative is depicted at right. Additional intersection treatments under consideration are also shown. The final design of critical intersections is contigent on the protected bikeway alternative that is selected following further evaluation.



# POTENTIAL INTERSECTION TREATMENTS