

# City of Madison

DEPARTMENT OF



TRANSPORTATION

## Revised Locally Preferred Alternative

East-West Bus Rapid Transit

December 22, 2020

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## 1.0 Introduction

The East-West BRT locally preferred alternative (LPA) is a bus rapid transit (BRT) system that will run along East Washington Avenue, around the Capitol, through the University of Wisconsin-Madison (UW-Madison) campus, continuing west on University Avenue and Mineral Point Road to the West Towne area. The route is approximately 15 miles in length and will be the first BRT system in Madison and the second in Wisconsin (a similar system is being developed in Milwaukee). About 30 similar BRT systems are operational in the U.S. and many more are in place around the world in Canada, Mexico, Europe, South America, and Asia.

The vast majority of public transit service in the Madison area is operated by Metro Transit. Metro operates 63 fixed routes in addition to paratransit and supplemental school-day service and experiences about 13 million transit boardings every year. Metro Transit is part of the City of Madison within the City Department of Transportation, which also oversees the Traffic Engineering Division and Parking Utility. The City of Madison Department of Transportation is the project sponsor and will implement the project with the help of other city agencies, partner public entities, and the private sector.

The LPA defines the mode, route, and general characteristics of the project. The route and station locations can be somewhat flexible with guidance strongly suggesting that the LPA be provide as much detail as possible to streamline the process during Project Development and environmental evaluation. Projects may be modified somewhat during Project Development.

The major components of the Small Starts process are shown below.

- **Alternatives Analysis.** In this phase, a corridor with a need for a major transit project is identified. Alternatives are explored such as mode (BRT, streetcar, light rail, etc.), routes, and running way characteristics. This phase is primarily completed locally with little official involvement from the FTA. The outcome is a locally preferred alternative which can be submitted to the FTA.
- **Project Development.** In this phase, planning and design is completed. Projects are scored based on their merits and recommended for funding by the FTA if they have an overall project rating of medium or better. Each year, Congress approves a list of projects to be funded through the 5309 discretionary grant program.
- **Construction Grant Agreement.** In this phase, final design is completed and the project is built.

System planning for the BRT system began in about 2012 with a report issued by the Greater Madison Metropolitan Planning Organization (formerly Madison Area Transportation Planning Board) in cooperation with Metro Transit, the Capital Area Regional Planning Commission (CARPC), and others. The report identified the need for a four-corridor BRT system organized into two routes – north-south and east-west. Because of Madison isthmus geography and the need to connect neighborhoods with both downtown Madison and the University of Wisconsin, the west and south lines continue towards the east and north respectively.

In January 2018, the Madison Common Council authorized staff to begin planning for BRT in the east-west corridor. The goal is to enter Project Development in early 2020, achieve a Construction Grant Agreement by 2021, and open the East-West BRT line in 2024.

A locally preferred alternative was adopted by the Madison Common Council in March 2020. This document revises the LPA and builds on the following reports:

- Downtown Routing Report – January 2020
- Westside Routing Report – January 2020
- Running Way Report – October 2020
- LPA Report – May 2020
- Campus Drive Transit Lane Memo – September 2020

This document makes revisions to the adopted LPA. Changes include:

- Several running way changes are converted from side-running to center running
- The Rosa Road extension is eliminated
- The Mendota Street routing is included
- The east terminal is modified to stay on East Washington Ave
- Several station locations are changed
- A revised operating plan includes three BRT routes

Figure 1.0-1 summarizes the changes being proposed with the revised LPA.

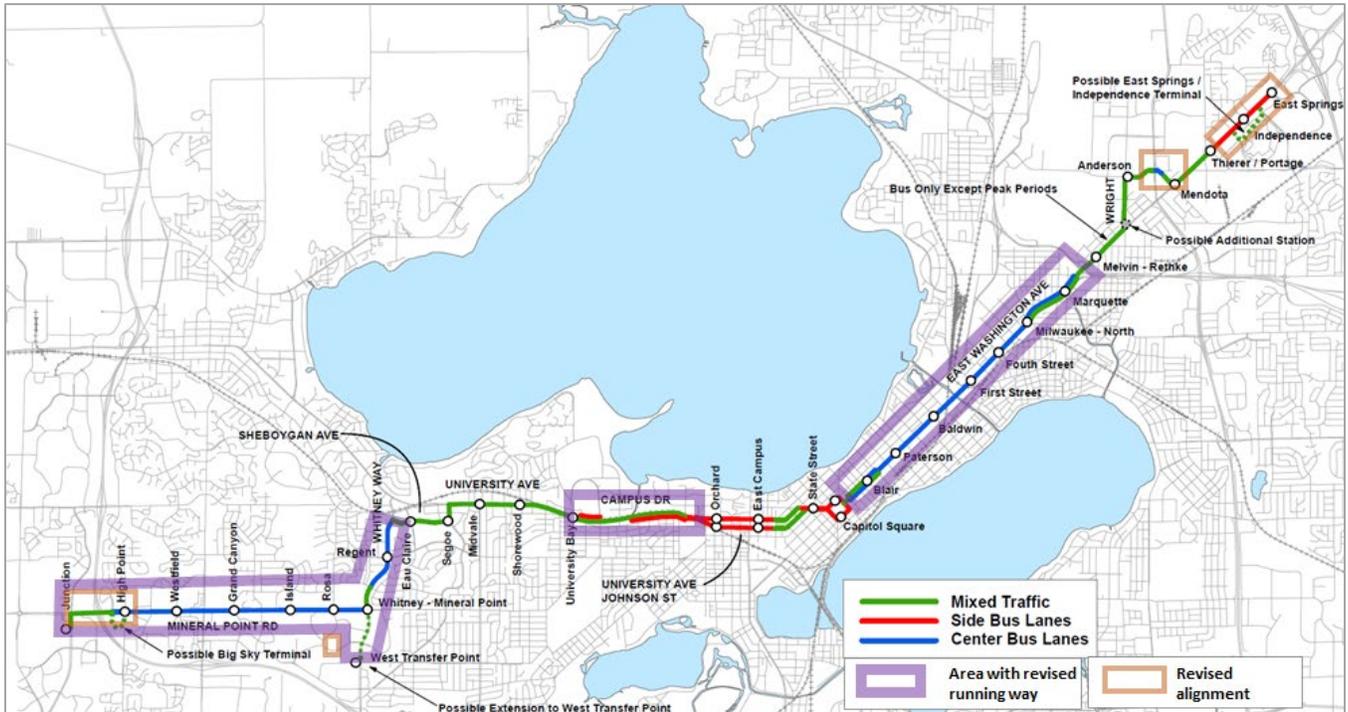


Figure 1.0-1 E-W BRT Locally Preferred Alternative Changes

## 2.0 Route and Stations

The locally preferred alternative for the Madison Bus Rapid Transit system is shown in Figure 2.0-1. It will be an on-street BRT system that runs in a combination of mixed traffic and bus-only lanes with running way improvements such as limited stops, transit signal priority, and other various intersection improvements. It will operate on Mineral Point Road, Whitney Way, Sheboygan Avenue, University Avenue, Campus Drive, University Avenue and Johnson Street, State Street, the Capitol Square, East Washington Avenue, Wright Street, Anderson Street, Mendota Street, and East Washington Avenue. The terminals are at Mineral Point Road and High Point Road on the west side, and On East Washington Avenue at East Springs Boulevard on the east side. It includes 31 station pairs and is 15.5 miles long. The locally preferred alternative is shown in Figure 2.0-1. The figure also shows modified station locations.

Stations will be located at:

- Junction Road (tentative)
- Big Sky Drive (tentative)
- High Point Road
- Westfield Road
- Grand Canyon Drive
- Island Drive
- Rosa Road
- West Transfer Point
- Mineral Point and Whitney Way
- Regent Street
- Eau Claire Avenue
- Segoe Road
- Midvale Boulevard
- Shorewood Boulevard
- University Bay Drive
- Orchard Street
- East Campus Mall
- State Street
- Capitol Square
- Blair Street
- Paterson Street
- Baldwin Street
- First Street
- Fourth Street
- Milwaukee Street
- Marquette Street
- Melvin Court
- Anderson Street at Wright Street
- Mendota Street
- Portage Road
- Independence Lane
- East Springs Drive

A future station is conceived on Campus Drive at Chamberlain Avenue. This would be a freeway station where buses stop on the shoulder and serve platforms that connect to Old University Avenue to the south and Linden Drive to the north with a new pedestrian and bike connection across Campus Drive. This would be a complex station to implement, but would provide a connection to a dense neighborhood and the west campus. Ramps would need to be ADA compliant. Due to the cost and delays that this station would have on the BRT timeline, the station has been deferred until an opportunity is available.

A west terminal station is planned at either a city-owned parcel on Junction Road or one at Big Sky Drive. The first option on Big Sky Drive may be able to accommodate a park-and-ride. If no parking can be provided at Big Sky Drive, then the terminal would be a charging and layover point only. The second option is a 3.5 acre parcel purchased as part of the eschlon interchange construction at Junction Road and Mineral Point Road. This parcel likely would accommodate bus charging with some parking.



### 3.0 Mode Alternatives

The Madison area has been investigating high capacity transit modes in the east-west corridor for many years.

- Light rail studies were published in the 1980s.
- Commuter rail was investigated in the 1990 with regional trains using the underutilized former Milwaukee Road and Chicago and Northwestern rail corridors serving Madison suburbs.
- Transport 2020 was a hybrid commuter rail – light rail plan in the 2000s. It would have used diesel multiple unit trains between Middleton and the far east side with trains every 10 to 40 minutes.
- The Madison streetcar project was a circulator in downtown Madison planned during the early 2000s.

Madison leaders are pursuing a bus rapid transit system based on this ongoing planning effort. Bus rapid transit will produce many of the regional transportation goals of these rail projects in the east-west corridors at a capital cost that can be borne by available funding sources.

Alternative modes previously considered include:

- Light rail. At a cost of \$50-75 million per mile, light rail was dismissed as a viable option. Many of Madison’s arterial streets have undergone major reconstruction and a light rail project would abandon some of these investments.
- Commuter rail. Commuter rail systems typically have high speeds with wide station spacing and limited frequency. It does not meet the urban mobility needs in Madison’s east-west corridor.
- Commuter rail – light rail hybrid – This was investigated in the Transport 2020 initiative, and would be similar to Ottawa’s O-Train, or the Oceanside-Escondido Sprinter train. This would be lower cost than a light rail project, but still would exceed Madison would struggle to afford such a project. In addition, the existing rail corridor does not effectively serve the West Towne area, downtown, or East Washington Avenue corridor.
- Streetcar. Streetcar systems would not be cost-effective or provide travel time improvements needed in the east-west corridor.
- Bus rapid transit. BRT is the preferred mode for Madison. BRT systems vary widely from corridor-based improvements on arterial streets in mixed traffic with transit signal priority to fully separated busways. It is able to be cost effectively implemented, about 1/8 the cost of light rail. And it is particularly appropriate for ridership levels that Madison currently experiences.

### 4.0 Downtown Route

The LPA includes the Alternative 1 route (see below) via State Street and the Capitol Square because it serves the downtown area best with stations that are central and attractive and has low travel times. The system will be easiest to use for new and occasional riders. Detours will be accommodated with improved signage and facilities.

Several route options were investigated in the downtown area. All route options connect to the University-Johnson Street couplet through the University of Wisconsin campus on the west side of downtown and East Washington Avenue on the east side. They included the:

- Capital Square (Alt 1)
- Capital (or Outer) Loop
- Wilson-Doty and Broom Street
- Wilson-Doty and Fairchild

The January 2020 Downtown Routing report provides more detail on the analysis and recommendation. Right-side running is proposed for the downtown routing because:

- Johnson/Gorham are one-way streets where left-side running does not provide an additional benefit.
- State Street does not have enough room for central stations.
- The City does not have control of the Capital Square, so it is not possible to install BRT stations on the left side of the street.

Figure 4.0-1 illustrates the downtown routing.

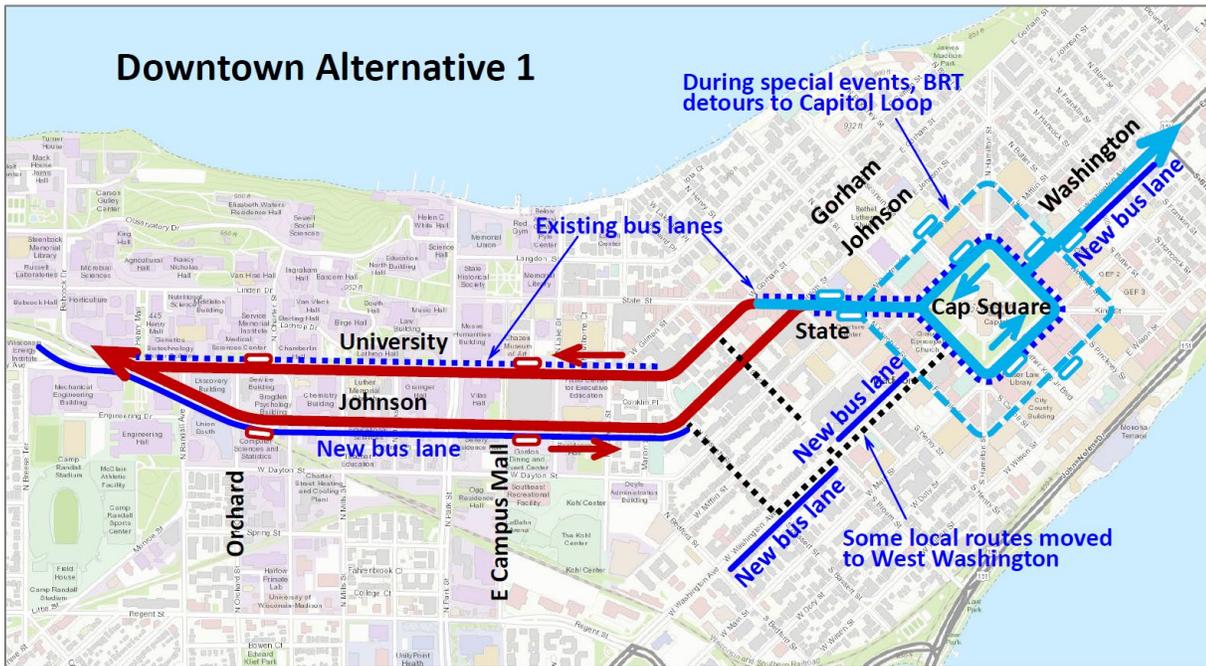


Figure 4.0-1 E-W BRT Downtown Routing

## 5.0 West Side Route and West Transfer Point

### A. Route and Transfer Point

The LPA includes a modified Alternative 3 (see alternatives below) on the west side traveling south on Whitney Way to the West Transfer Point, returning north on Whitney Way, and west on Mineral Point Road to a terminal near High Point Road. This route serves connections to other bus routes while using the bus lanes on Mineral Point Road and serving transit supportive residential areas. An evaluation of the alternatives is presented in the West Side Routing report.

Alternative 3 has been modified to no longer include the Rosa Road extension because of the cost associated with the extension and impacts to the storm water system. Figure 5.0-1 illustrates the planned routing near the West Transfer Point.



Figure 5.0-1 E-W BRT West Side Routing

The City of Madison is initiating the Transit Network Plan concurrent with BRT planning. That effort will investigate large scale changes to the Metro Transit bus network which could result in a modified or eliminated transfer point system. The outcome of the network redesign study may modify the LPA on the west side.

**B. West Terminal**

The west terminal has two options that both travel in mixed traffic in city streets. The first routing option would have BRT use the Big Sky Drive and South High Point loop to turn around. This option has the advantage of serving a movie theater with a parking structure along with some commercial uses.

The second option uses a city-owned parcel west of the Beltline on South Junction Road. This terminal would serve a yet-to-be developed University Research Park 2. Since the city owns the parcel, there could also be some park and ride opportunities. See Figure 5.0-2 for the two west terminal options.

The BRT routing can work with either terminal option, and the BRT would run in mixed traffic. Since charging will need to occur at the terminal, the ability to install charging equipment and restrooms will be a controlling factor on which terminal option is chosen.



Figure 5.0-2 West Terminal Point Options

### 6.0 Construction Staging and Joint Development

Construction of the BRT will need a staging area for equipment and materials. The city is pursuing the city-owned Brayton Parking lot, which is centrally located between the west and the east termini. The FTA has a “Joint Development” program (<https://www.transit.dot.gov/JointDevelopment>), which seeks to increase the value capture of a transit investment. After construction activities are complete, the city and FTA could jointly develop the lot into a transit supportive land use, with the proceeds used to fund operating costs of the BRT. If pursued at this location, the development would likely include a stepped 4 to 10 story building that would house a mixture of employment and housing. Further evaluation will occur during the environmental document process. Figure 6.0-1 illustrates the location of the E-W BRT line in relation to the Brayton Lot for staging.

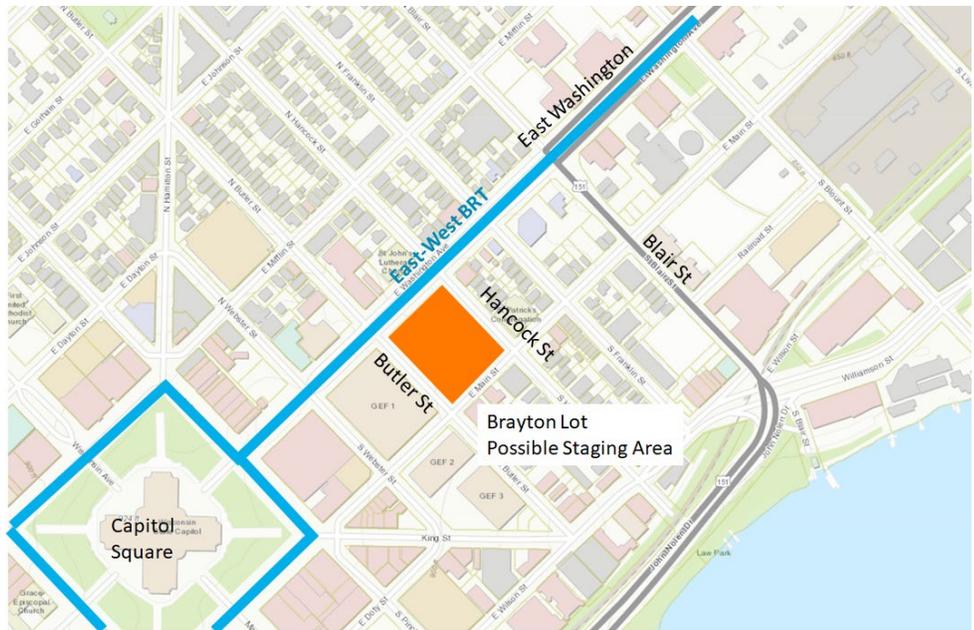


Figure 6.0-1 Brayton Lot Joint Development

## 7.0 Routing on Mendota Street

There are essentially four ways that BRT can travel through the Madison College area, which are listed below. The route included in the LPA is the Mendota Street route.

- **Stoughton Road** – This is the most direct route using existing street connections that serves Madison College. However, it travels through the Stoughton Road/East Washington intersection which is subject to long delays during rush hour.
- **Mendota Street Route (Recommended)** – This route reduces a minute of travel time off the Stoughton Road route by using Mendota Street. It also eliminates reliability concerns with the Stoughton Road intersection.
- **Kinsman Boulevard to Stoughton Road or Bartillon Drive (Existing Route 6 Route)** – This route currently serves Madison College and potentially the light industrial area to the north. It is long and circuitous, adding four to five minutes to the direct route on East Washington Avenue, which is inconsistent with Bus Rapid Transit goals.
- **Direct East Washington Route** – This is the direct route but fails to serve Madison College – a regional destination. Students attending Madison College would be required to walk a half-mile walk from the BRT route. Consequently, Metro would probably need to operate a separate route to Madison College, increasing the cost and complexity of the system.

The planned Mendota Street Route is illustrated in Figure 7.0-1

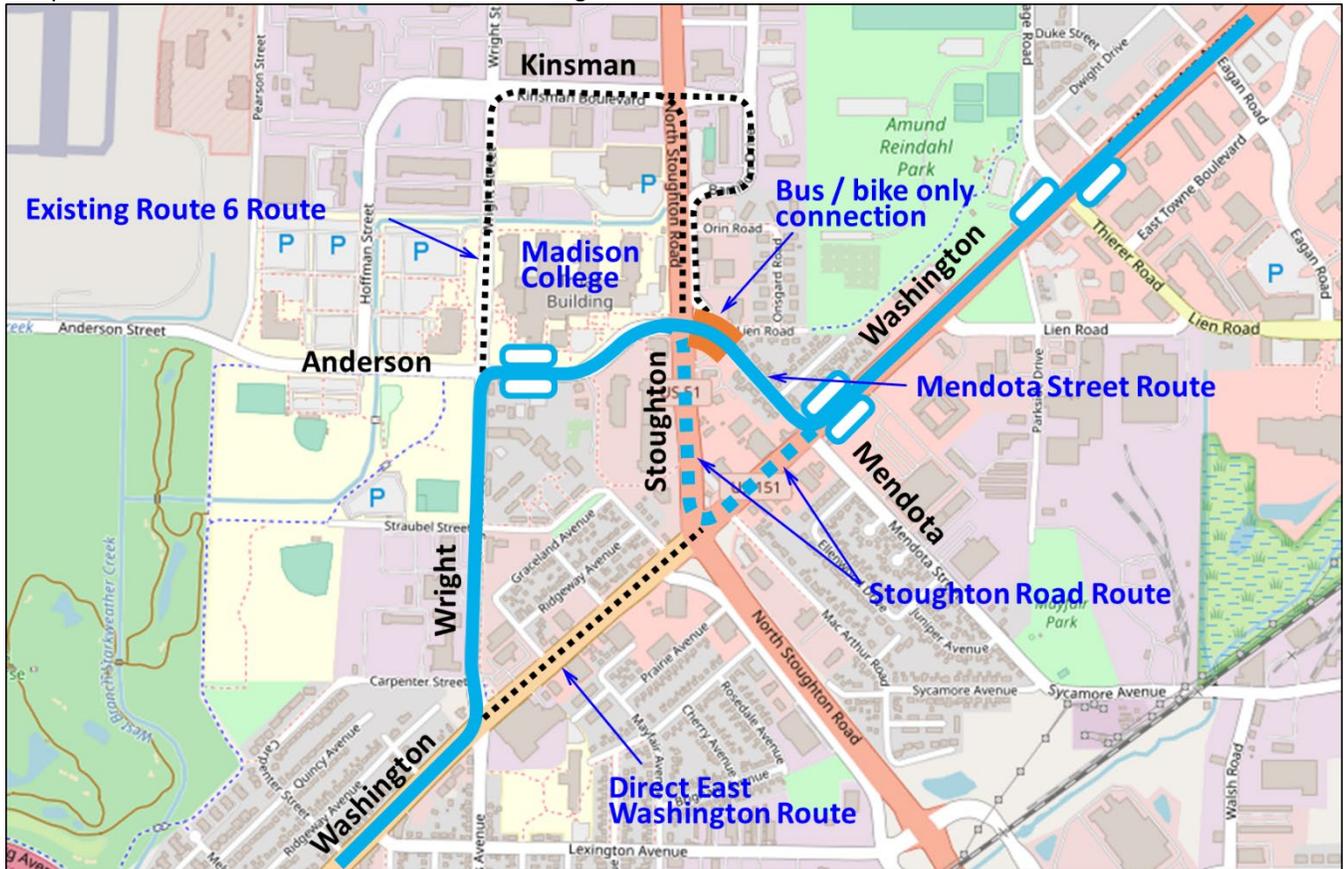


Figure 7.0-1 Mendota Street Routing

A key characteristic of the planned Mendota Street routing option is converting the existing dedicated bicycle and pedestrian path that connects Stoughton Road and East Washington Ave to allow BRT buses (as highlighted in orange in Figure 7.0-1). The connection would prohibit general traffic. Because the path lies on public right-of-way for Mendota Street no land would need to be acquired for the project to allow buses through the connection.



Figure 7.0-2 Mendota Street Connection to Stoughton Road

The busway connection could contain some, or all, the following features designed to prevent general purpose traffic from using it.

- Path with raised or missing center making it difficult or impossible for narrower cars to use
- Clear and foreboding signage
- Video monitoring
- Landscaping and entrance features designed to make it hard to find
- Gates activated by buses

Residences along Mendota Street (16) may be affected by the bus traffic, which would pass every 15 minutes in each direction, but would serve no bus stops or stations. All buses on Mendota Street would be electric.

## 8.0 East Terminal

Phase 1 planning implied that the BRT would terminate at the existing bus stop in the East Towne parking lot which serves multiple routes. Difficulties with maintaining this location include finding room for charging infrastructure (electric buses), and its distance from the neighborhoods north of East Washington Ave.

Consequently, the planned east terminal routing will follow East Washington Avenue with a terminal station at East Springs Drive. Infrastructure changes needed for this route include:

- The right lane will be converted to bus and right turn only between Portage Road and East Springs Drive (the existing separate bike lane will remain).
- A new traffic signal will be added at Independence Lane to serve crossings at the station there, as well as connect the residential area on the north side with the retail area on the south side using a new, higher quality pedestrian crossing compared to other intersections in the area.
- The traffic signal at East Springs Drive will need to incorporate a dedicated phase for buses to make a U-turn around. During this phase, all traffic movements except the eastbound right turn will be stopped, but the phase will only come up once every 15 minutes.

This BRT segment is proposed to remain side running in a dedicated bus/right turn lane. Reasons for this recommendation include:

- In order to make the U-turn at East Springs Drive, the bus turning radii requires that buses start in the right-most lane, and turn into the right most lane.
- Since this is the end of the line, it is likely that charging equipment will be needed to rapid charge the electric BRT buses. Room greater than the median width will be needed to house the charging equipment.
- Westbound BRT will have to turn right at either Mendota or Stoughton Rd, requiring that BRT buses are in the right lane.
- The eastbound right turn lane is already mostly occupied by right turning vehicles. So designating a shared bus/right turn lane is unlikely to reduce roadway capacity.

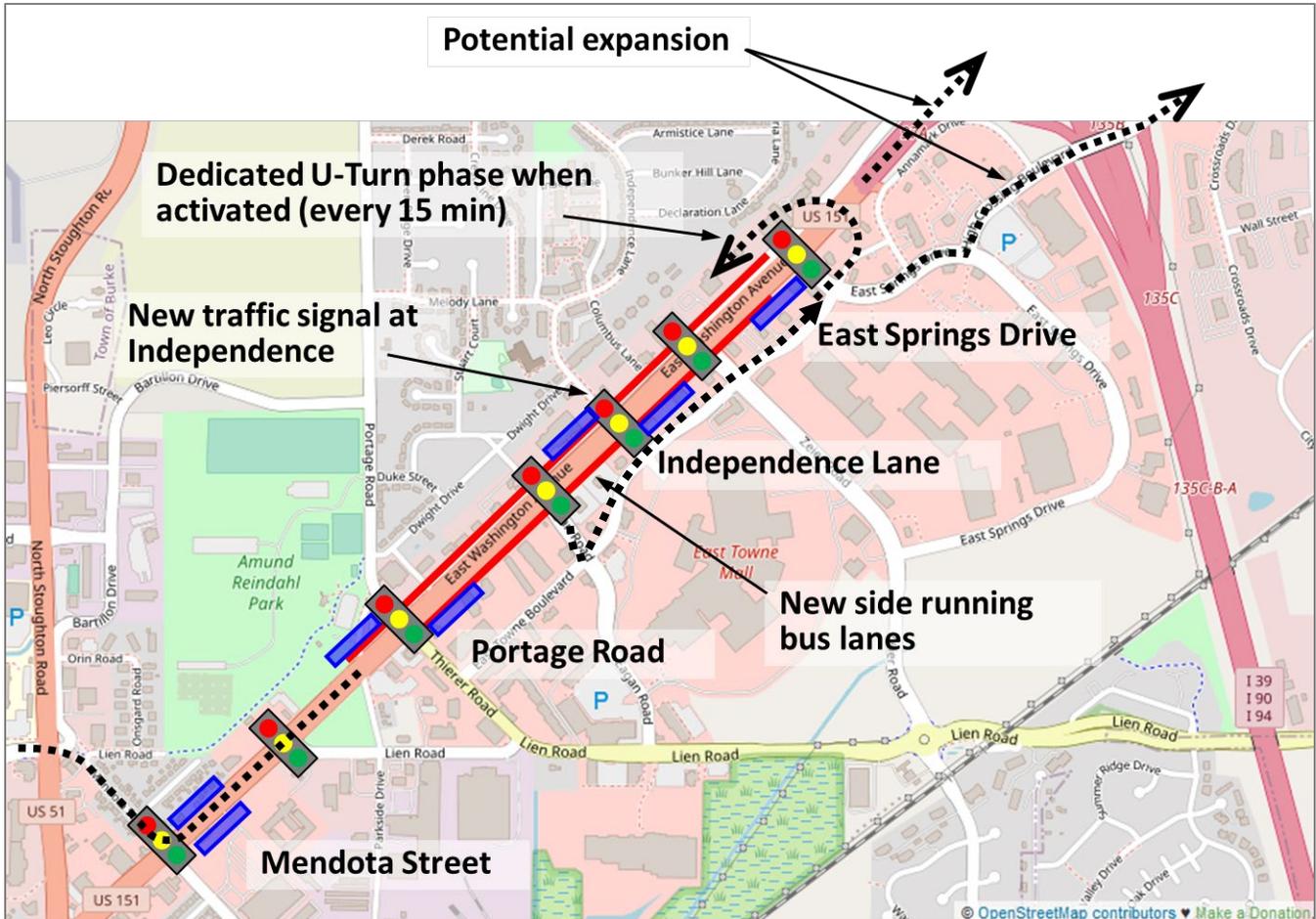


Figure 8.0-1 BRT East Terminal on East Washington Ave.

The walk to the mall entrance would increase from about 400 feet to about 1,300 feet and some new pedestrian connections may be needed, yet residential areas north of East Washington will have closer access to BRT. One drawback of the revised east terminal is the lack of connection to other routes. Remedies to this drawback will be explored in Project Development.

Note that from this BRT endpoint, local service may be extended via East Towne Blvd, High Crossing Blvd, and US 151 to access destinations beyond East Towne.

## 9.0 Service Plan

Three BRT routes will be operated within the BRT corridor. All routes will be branded as BRT and use BRT vehicles. Outside the BRT corridor, the BRT routes will serve local bus stops. The exact routing outside the BRT corridor is not determined at

this time. This service plan is needed to accommodate the passenger volume in the core of the system, while acknowledging the lighter BRT demands towards the end of the BRT system.

- BRT A will operate from end to end on the BRT corridor
- BRT B will operate between the Capitol Square and Sheboygan Avenue and Middleton, with some buses ending at Eau Claire Avenue Station
- BRT C will operate from Park Street and Badger Road to north Madison via Park Street and either Sherman Avenue or Packers Avenue

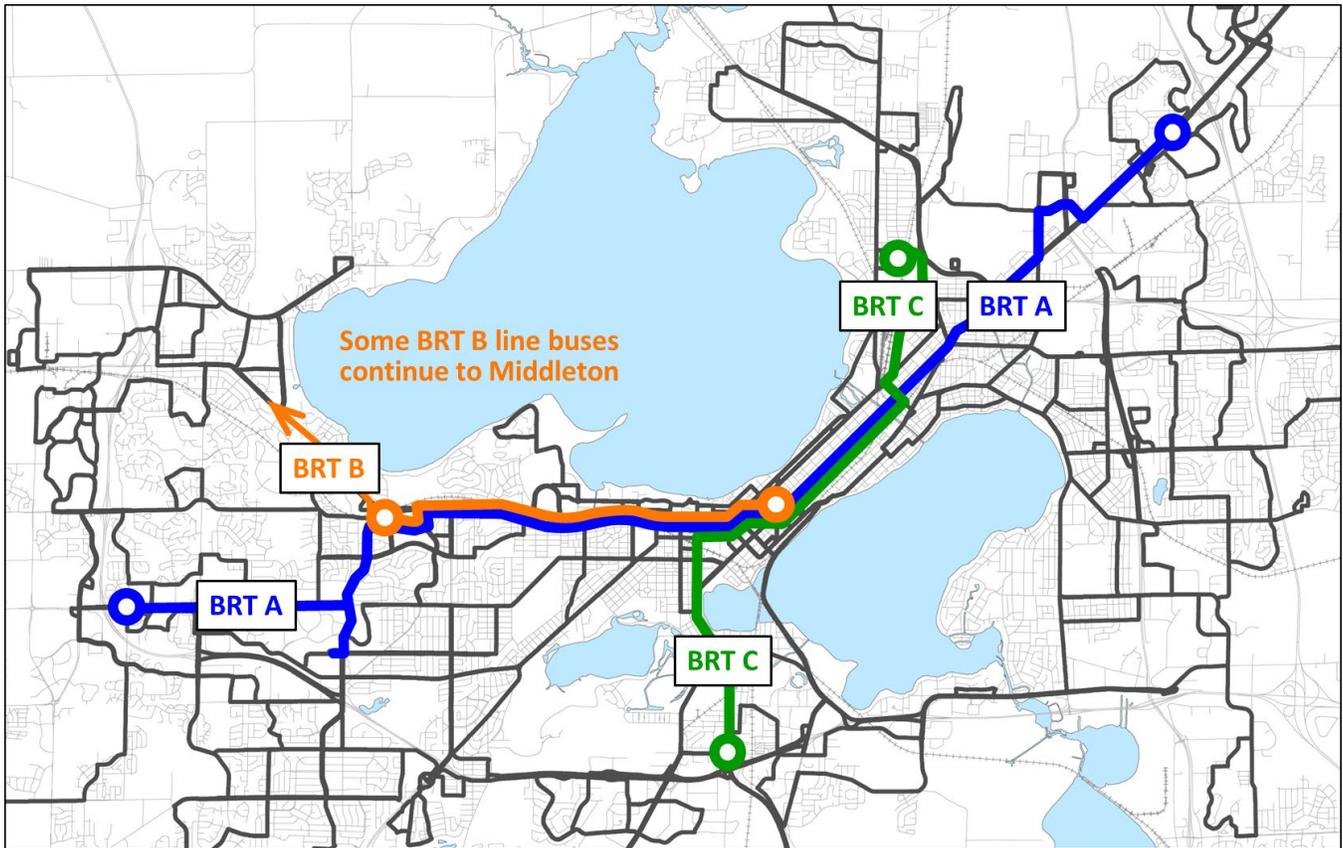


Figure 9.0-1 BRT Service Plan

Table 9.0-1 shows the planned service spans and frequencies for BRT.

Table 9.0-1 BRT Service Plan

BRT A (West Towne to East Towne)	
Span	Frequency
Weekdays 6 am to 8 pm	Every 15 minutes
Weekdays 8 pm to midnight	Every 30 minutes
Saturdays 7 am to 6 pm	Every 15 minutes
Saturdays 6 pm to 11 pm	Every 30 minutes
Sundays 7 am to 11 pm	Every 30 minutes
Holidays 7 am to 7 pm	Every 30 minutes

BRT B (Capitol Square to Eau Claire Station and Middleton)	
Span	Frequency
Weekdays 6 am to 9 am, 3 pm to 6 pm	4 buses per hour to Middleton, 4 buses per hour to Eau Claire

Weekdays 9 am to 3 pm	Every 15 minutes to Eau Claire
<b>BRT C (North-south)</b>	
<b>Span</b>	<b>Frequency</b>
Weekdays 6 am to 6 pm	Every 15 minutes
Weekdays 9 am to 3 pm	Every 30 minutes
Saturdays 7 am to 11 pm	Every 30 minutes
Sundays 7 am to 11 pm	Every 30 minutes
Holidays 7 am to 7 pm	Every 30 minutes

The outcome of this service plan is a combined level of service of a bus every 5 to 7.5 minutes in the core of the system between Eau Claire Station and downtown Madison, and every 7.5 minutes between downtown Madison and First Street for most of the time on weekdays. Other parts of the system will generally see a bus every 15 minutes.

## 10.0 Running way Characteristics

The running way for the East-West BRT system will be a combination of mixed traffic and bus lanes, with both center running and side running. Madison’s existing collection of bus lanes on Mineral Point Road, University Avenue, State Street, and the Capitol Square will be upgraded and augmented with new facilities.

### A. Types of Running Way

Figure 10.0-1 illustrates the planned running way for each segment of the BRT system. The following paragraphs describe the type of running way available, and what is selected for each segment.

#### 1. Mixed Traffic BRT Operations

BRT systems can, and do, operate in mixed traffic like normal buses do. Some streets are not wide enough to incorporate bus lanes. In some situations, removing parking or bike facilities, or widening streets to add bus lanes does not fit with the character of the street, and in many of these cases traffic volumes simply do not present significant delays to transit buses. Virtually all BRT systems have some segments that operate in mixed traffic. Although there is a strong preference by FTA to have at least 50 percent of the routing be on dedicated running way (bus lanes). Removing unpredictable delays associated with traffic congestions is one of the fundamental characteristics of BRT.

Several improvements to mixed traffic running ways can reduce delays for buses in mixed traffic. In-lane bus stops, as opposed to pull-out stops, mean buses do not have to wait for a gap in traffic. Transit signal priority, more direct routing, and fewer stops also improve service.

#### 2. Side Running Bus Lanes

Bus lanes on the right side of the road are present on several Madison streets, including Mineral Point Road and Park Street. These lanes prevent most through traffic from delaying the bus. At intersections, buses usually do not have to wait for a queue of cars to clear when the light turns green. Side running bus lanes are usually fairly easy to implement if space is available.

Side running bus lanes are almost always shared with right turning traffic and bikes. This scenario can present delays and a diminished quality of service for buses. Further, side running bus lanes may be occupied by parked cars, delivery vehicles, and other uses like garbage collection.

#### 3. Center Running Bus Lanes

Center running bus lanes remove virtually all conflicts with other road users, creating the highest level of on-street performance. Further, stations located in the middle of the street can often be built without acquiring right-of-way from adjacent parcels. The stations can be lower cost because they consist of one double sided platform, with only one

shelter, one real-time information sign, and one set of fare equipment. (Instead of two stations, as required for side running BRT)

The main disadvantages to center running bus lanes are logistical. In some cases, left turns need to be protected only where turns can only be made on a green arrow. In some cases, left turns need to be removed entirely. All buses using center running stations must be equipped with doors on both sides of the bus.

#### 4. Off-Street busways

Off-street busways are sometimes constructed along railroad or freeway rights-of-way, or in tunnels. These facilities are generally completely free of conflicts except for where they cross streets. Busways, however, are generally expensive and used for short distances to make connections that would not otherwise exist. Madison's rail system provides some opportunities for busways, but in most cases they provide inferior access to neighborhoods and destinations and do not reduce travel times because of the circuitous routing needed to access them.

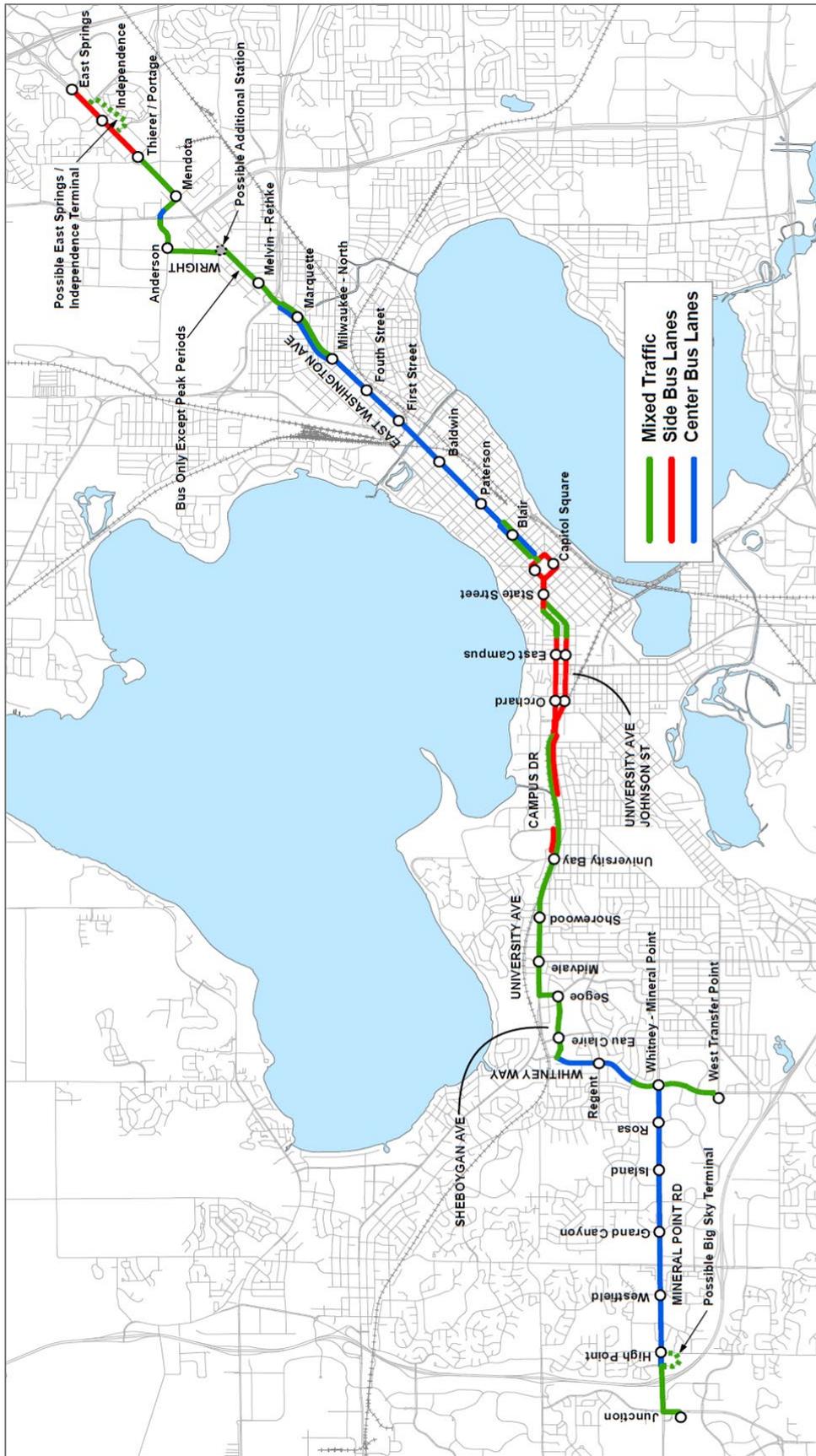


Figure 10.0-1 E-W BRT Running Way

**B. Mineral Point Road**

The existing Mineral Point Road cross section contains two general purpose travel lanes and a bus, bike, and right-turn lane in each direction with a median, left-turn lanes, and sidewalks. The BRT project plans to convert the existing left travel lane to bus only and the bus, bike, and right-turn lane to a general purpose lane. Buses would operate in the left (median) lane. BRT stations would be located in the median. Figure 10.0-2 illustrates both the proposed plan view and cross section for Mineral Point Road.

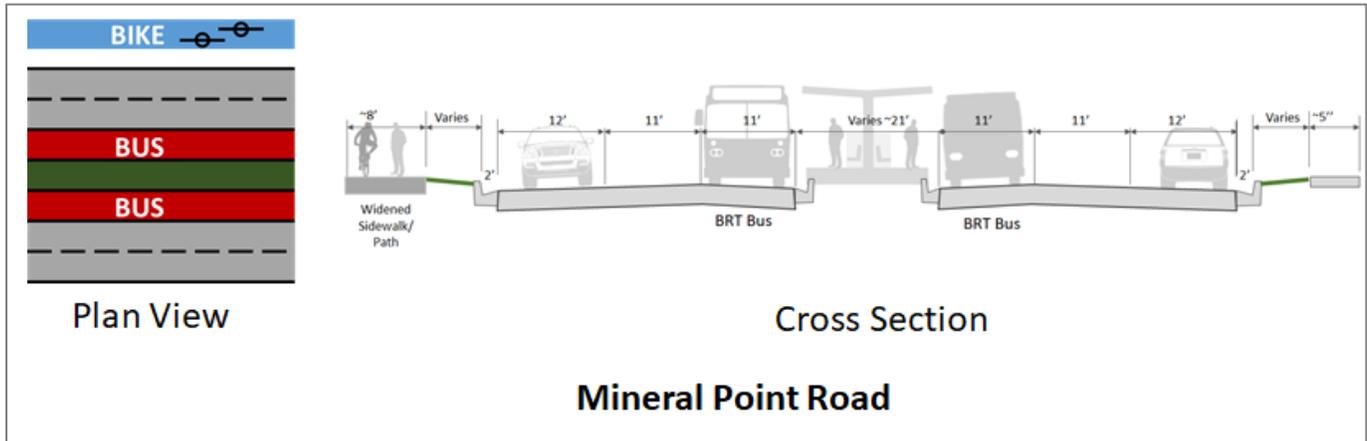


Figure 10.0-2 Mineral Point Road Running Way

Left turns would generally be accommodated by allowing left turning vehicles to merge through the bus lane into the left-turn lanes. The project will remove one left turn at each station in order to provide enough width for station amenities and platforms. At some stations, all left turns may be accommodated by using a less than optimal station configuration.

The existing sidewalk on the north (or possibly south) side of Mineral Point Road would be widened in order to provide a bicycle facility along the corridor. Right-of-way would need to be acquired from about 30 properties. It is likely that sidewalk widening would be constructed with a separate project which may be let on a timetable that is delayed a year from BRT implementation.

**C. Whitney Way**

The existing Whitney Way cross section contains three lanes in each direction with a median, left-turn lanes, and sidewalks. South of South Hill Drive, all three lanes are travel lanes. North of South Hill Drive, the right lanes are parking and bike lanes.

With the currently reduced traffic volumes which are only 70 percent of normal, a dedicated median running BRT lane should initially be implemented.

As a separate action separate from the BRT project, staff recommend eliminating on-street parking north of South Hill Drive and installing buffered bike lanes because of the low parking utilization. Recent parking occupancy counts find that only 2 and 3 percent of the parking spaces are occupied during the morning and afternoon respectively. If public interaction indicates that on-street parking continues to be needed, the existing bike lanes adjacent to parking may be maintained where it is needed. Center running BRT is accommodated with either parking/bike lane or a buffered bike lane.

South of South Hill Drive, buses would operate in the left lane in mixed traffic. The one BRT station at Mineral Point Road would be located in the median. Left turns would generally be accommodated by allowing left turning vehicles to merge through the bus lane into the left-turn lanes.

As a separate action separate from the BRT project, staff recommend converting the right most lane to a buffered bike lane. This recommendation would continue the lower stress bikeway from South Hill Drive to Tokay Blvd. Center running BRT is accommodated with either a general purpose lane on the outside lane, or a buffered bike lane.

Figure 10.0-3 illustrates the plan and cross section for Whitney Way both north and south of South Hill Road.

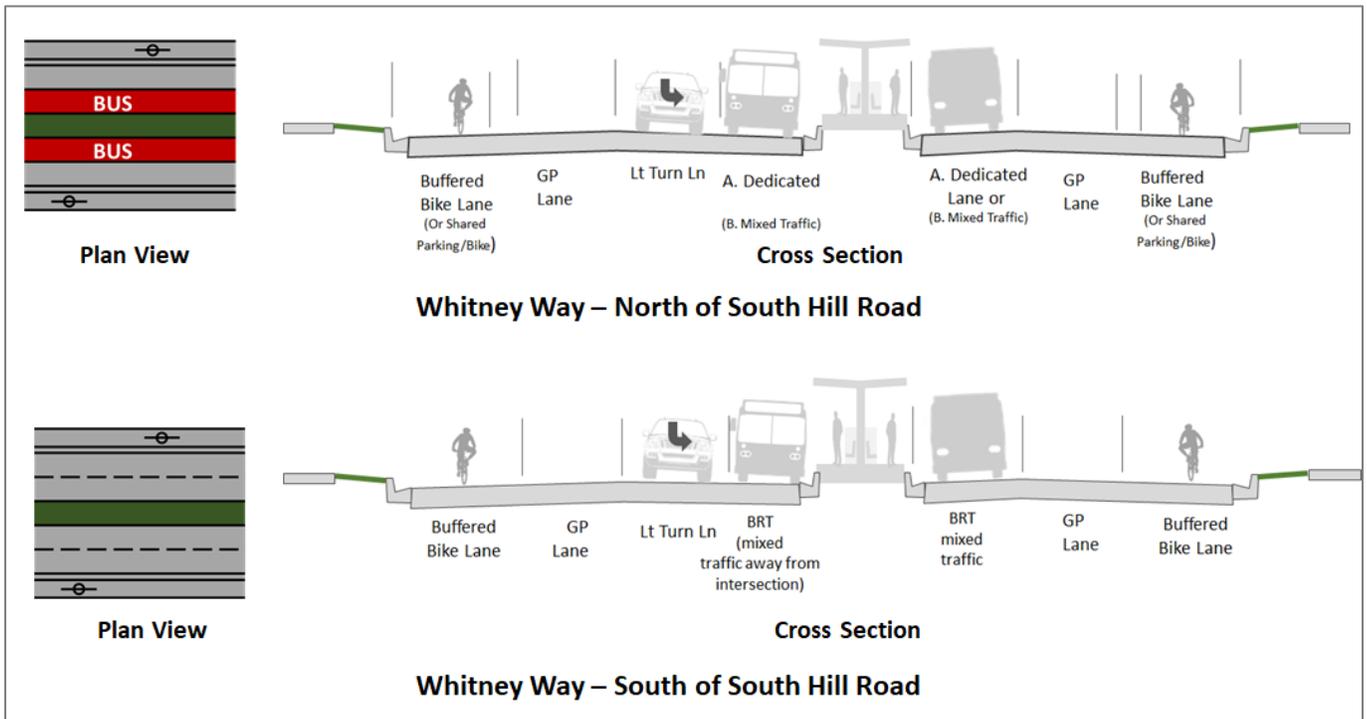


Figure 10.0-3 E-W BRT Running Way

D. University Avenue

The existing University Avenue cross section contains three lanes in each direction with a median, left-turn lanes, and sidewalks. Bike lanes are present from Shorewood Boulevard to the west. The roadway will be reconstructed in 2022 between Shorewood Boulevard and University Bay Drive, and any cross section changes made for BRT would be included in the reconstruction project.

BRT will operate in the right hand lane in each direction in mixed traffic. Several alternative cross sections were investigated which would include dedicated bus lanes center running in the left lanes or side running in the right lanes. Bus lanes are not included in this section because they would require the removal of one of the three traffic lanes, resulting in insufficient vehicle capacity, delays, and traffic diversion onto local streets. Further, changing the cross section would require approval by several partner jurisdictions, including the Village of Shorewood Hills, Dane County, and the Madison Area MPO, and could potentially jeopardize committed federal funding for the project. A more detailed analysis of options for this section is presented in the BRT Running Way Report, October 2020.

With stations built on the sides, future changes could include changing the right lane to buses and right turns only, depending on future traffic volumes. Figure 10.0-4 illustrates the proposed plan and typical section for University Ave.

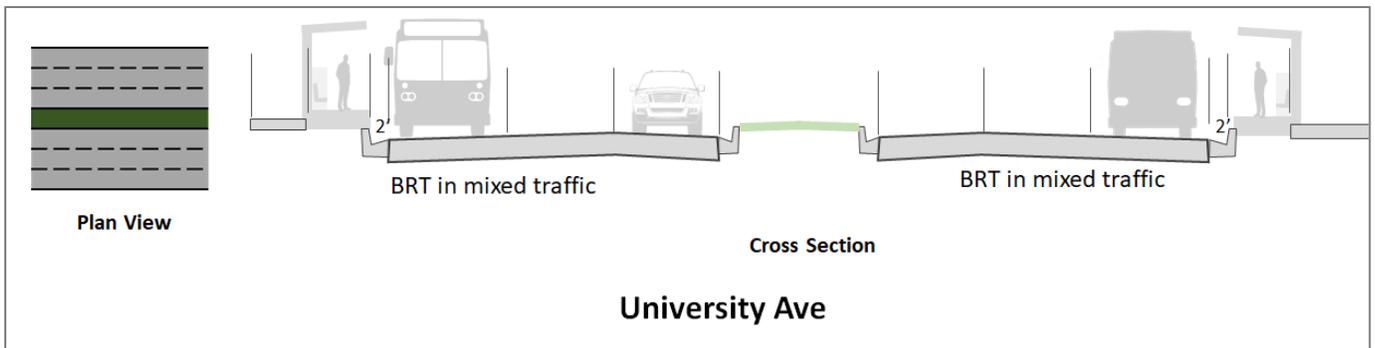


Figure 10.0-4 University Ave. Running Way

E. Campus Drive

The existing Campus Drive cross section contains two lanes and a shoulder in each direction and a narrow median. It is a freeway section with no access or intersections between University Bay Drive and University Avenue.

The Campus Drive Bus Lane Memo, September 2020 provides an analysis of Campus Drive for BRT. While bus lanes are needed on Campus Drive, the clear width at the bridge locations is not sufficient to provide required clear width, and crash worthy bridge parapets, at the bridge crossings if dedicated running way was provided in both directions. Consequently, a dedicated westbound running way is proposed directly west of Walnut Street and a dedicated eastbound running way is proposed east of Walnut Street. Since side running is proposed for University Avenue west of Campus Drive, and for University/Johnson Ave east of Campus Drive, side running is also proposed for Campus Drive. Some structural improvements to the two Campus Drive bridges may be needed, such as strengthening the approach slabs in the existing shoulders and replacing the parapet walls so that they meet modern standards. Figure 10.0-5 provides both a schematic of the Campus Drive and where bus lanes will be implemented.

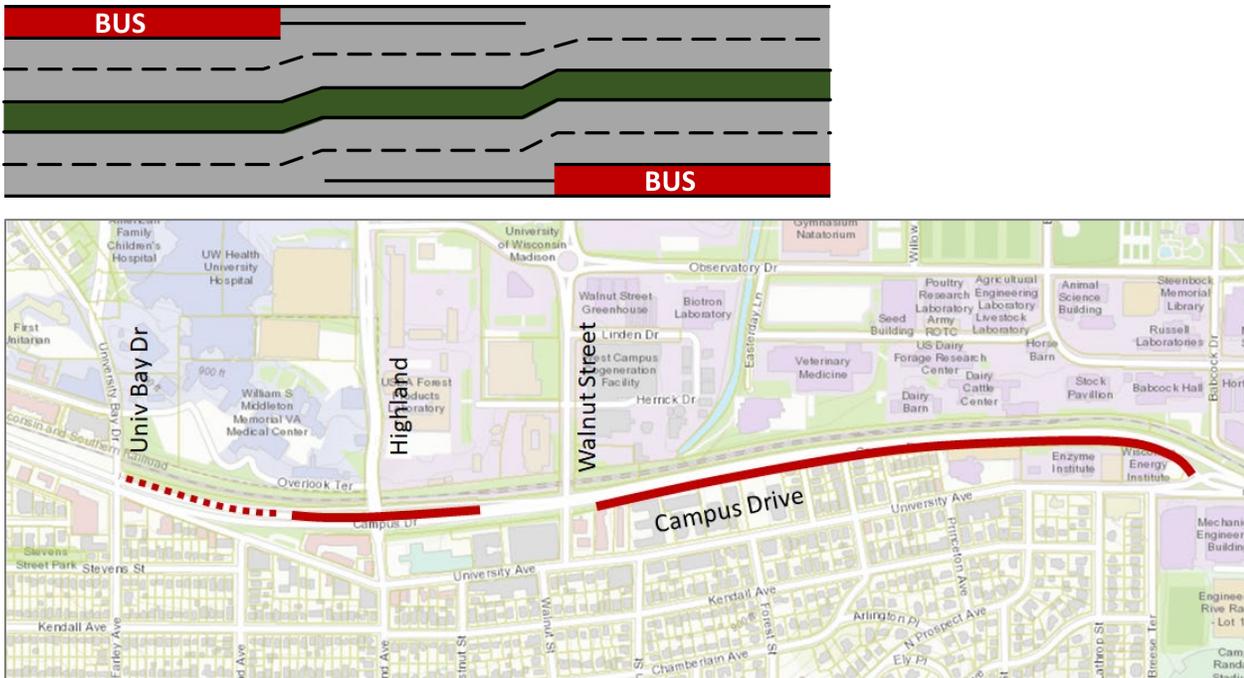


Figure 10.0-5 Campus Drive Running Way

**F. Downtown Madison**

As mentioned in Section 4, central Madison routing and running way was evaluated in the Downtown Routing Report, January 2020. Through central Madison, the BRT route will operate on the University Avenue and Johnson Street couplet, State Street, and the Capitol Square (Carroll, Main, Pinckney, and Mifflin Streets), and then continue east on East Washington Avenue.

On University Avenue, the existing bus and right turn lane will be maintained in its current configuration with buses and right turning vehicles in the right-hand curb lane and bikes to the left. This configuration allows buses to serve bus stops and stations without crossing and blocking the bike lane.

The existing Johnson Street cross section contains four general-purpose travel lanes, one-way eastbound only. Eastbound bicyclists are accommodated in the University Avenue contra-flow lane. The LPA running way converts the right curb lane to bus and right turn only between Babcock Drive and Frances Street with stations on the right side. From Frances Street to the east, buses would merge left into the general purpose through lanes.

The existing State Street cross section contains one lane in each direction. The street is only open to buses, bikes, and authorized vehicles such as municipal and delivery vehicles. No changes would be made to State Street.

The existing Capitol Square cross section contains one general purpose travel lane, one bus bike and right turn lane, and parking on both sides, one-way counter-clockwise only. No changes would be made to the Capitol Square besides potential signing, marking, and traffic signal timing improvements. During many special events downtown, buses are detoured to the Capitol Loop, one block outside the Capitol Square. No changes would be made to the Capitol Loop.

Figure 10.0-6 schematically illustrates the BRT running way through this section.

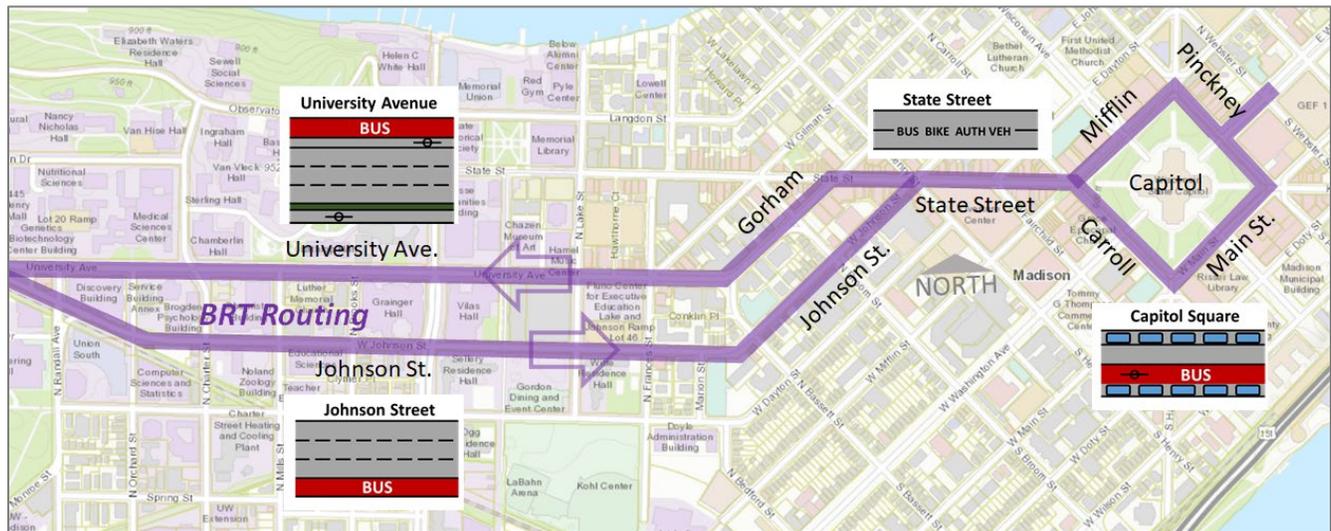


Figure 10.0-6 Downtown Running Way – All Right Side Running

**G. East Washington Avenue – Isthmus (Capitol Square to Wright Street)**

East Washington is classified a “Connecting Highway”, as it carries US 151 through the City and connects with other portions of US 151 on John Nolen Drive and Park Street. It is the responsibility of WisDOT to construct and reconstruct US 151, which includes John Nolen Drive and Park Street.<sup>1</sup> Because East Washington is a connecting highway, coordination and approval is needed from WisDOT, with maintaining capacity during peak hours being desired.

<sup>1</sup> SS 84.03 (10)

The existing East Washington Avenue cross section contains three lanes in each direction with a median and left turn lanes. Bike lanes are in place between about Blount Street and I-39/90/94. On-street parking is available between the Capitol Square and Milwaukee Street in the eastbound direction and Hwy 30 in the westbound direction.

The LPA running way is center running on this segment of East Washington Avenue. The existing left lane will be converted from general purpose to bus only in the eastbound direction from the Capitol Square to Blair Street and from Blount Street to Sixth Street. In the westbound direction, the existing left lane will be converted from general purpose to bus only from Hwy 30 to Livingston Street and from Blair Street to Hancock Street. This change leaves two general purpose lanes in each direction. In order to provide the capacity needed during peak periods, parking is restricted during peak periods in the peak direction (westbound in the morning and eastbound in the evening), and the outside lanes are opened as travel lanes. This maintains capacity during rush hours.

Between Wright Street and Hwy 30 westbound, Milwaukee Street eastbound, a parking lane is not available. In this stretch, the left lane in each direction will be converted to bus only during non-peak periods. General traffic will be allowed during peak periods in the peak direction. This design will likely need to be enforced with dynamic overhead message boards. Figure 10.0-7 illustrates the lane configuration both in plan-view and as a typical section

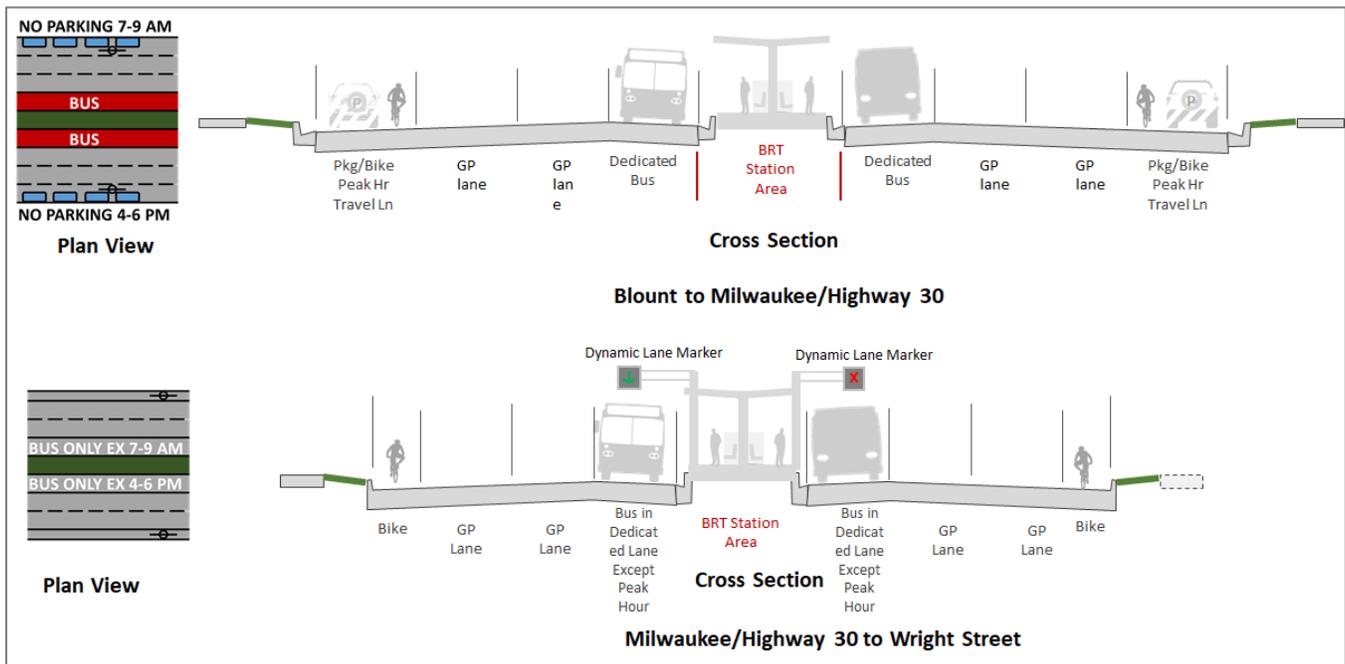


Figure 10.0-7 East Washington Ave. Running Way

Because East Washington Avenue has a narrow terrace, most station areas will need to remove the left turn bays and not allow left turns. All other left turns will be accommodated by allowing vehicles to merge across the bus lane and into the left turn bay. Some left turns may need to be converted from permitted (flashing left arrow) to protected only (red, yellow, and green left arrow only). The left turns are planned for removal include:

- Eastbound or westbound at Paterson Street
- Eastbound or westbound at Baldwin Street
- Westbound at Fourth Street
- Westbound at Milwaukee Street
- Eastbound at Melvin Court

Figure 10.0-8 illustrates left turns that will likely be affected.

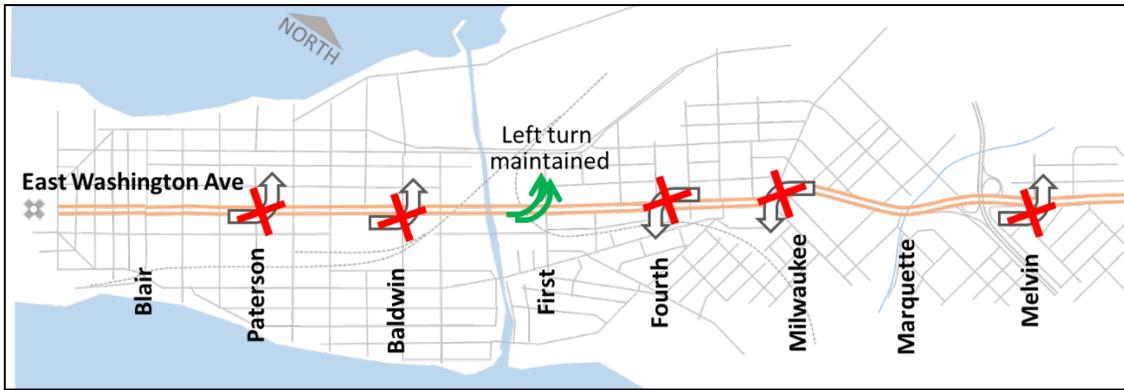


Figure 10.0-8 East Washington Left Turn Lanes Affected

Traffic needing to turn left at these intersections will be able to turn at intersections before or after and use the street network to go to their destinations, or in most cases make a U turn at the next intersection and a right turn.

Reasons supporting this East Washington Ave. running way plan include:

- It provides the advantages of center running for the full corridor between Webster and Wright.
- It has acceptable bike accommodations for the majority of the week on the isthmus.
- There is the ability to maintain parking for the majority of the week.
- It has limited to no traffic diversion.
- It is limited to no effect on traffic operations.
- Because it does not reduce capacity during peak periods, there is a good probability of acceptance by WisDOT, who has some jurisdiction over the US 151 highway.

H. East Washington Avenue – Mendota Street to East Towne

Section 7 describes the East Terminal end point and the reasons for it. The existing East Washington Avenue cross section has three lanes in each direction from Mendota Street to Portage Road. A fourth lane is in place in each direction only between Portage Road and East Springs Drive.

The planned LPA running way is side running east of Mendota Street. BRT is in mixed traffic west of Portage Road. East of Portage Road the fourth lanes are converted to buses and right turns only. Figure 9.0-9 illustrates the plan view of the proposed running way.

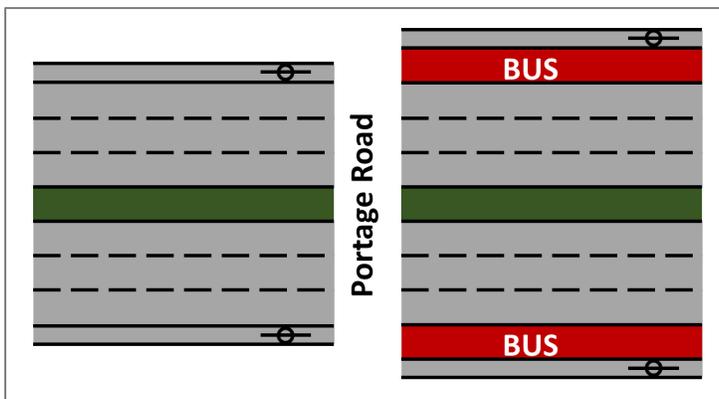


Figure 10.0-9 East Washington Running Way Between Mendota Street and East Springs Drive

## **11.0 Vehicle Characteristics**

A goal of the BRT project is to use electric buses to the extent practical. Electric buses have made significant progress in the last few years. With the center running portions of the BRT system, all BRT buses will need to have doors on both the left and right side of the bus. The three BRT routes are planned to use the following vehicle types. This plan may be refined during project development.

- BRT A (West Towne to East Towne): Electric articulated buses with doors on both sides and on-route charging
- BRT B (Capitol Square to Sheboygan Avenue and Middleton): Diesel articulated buses with doors on both sides
- BRT C (North-south route): Electric articulated buses with doors on both sides and depot charging