

# City of Madison

DEPARTMENT OF



TRANSPORTATION

## **Alternative State Street Stations on Johnson and Gorham Streets**

Madison East-West Bus Rapid Transit

April 2022

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## 1. Background and Purpose

The Madison East-West Bus Rapid Transit project will implement a Bus Rapid Transit (BRT) project along Mineral Point Road, Whitney Way, University Avenue, through downtown Madison, and East Washington Avenue. The project is about 15 miles long and includes bus-only lanes, transit signal priority, electric articulated buses, and 32 BRT stations.

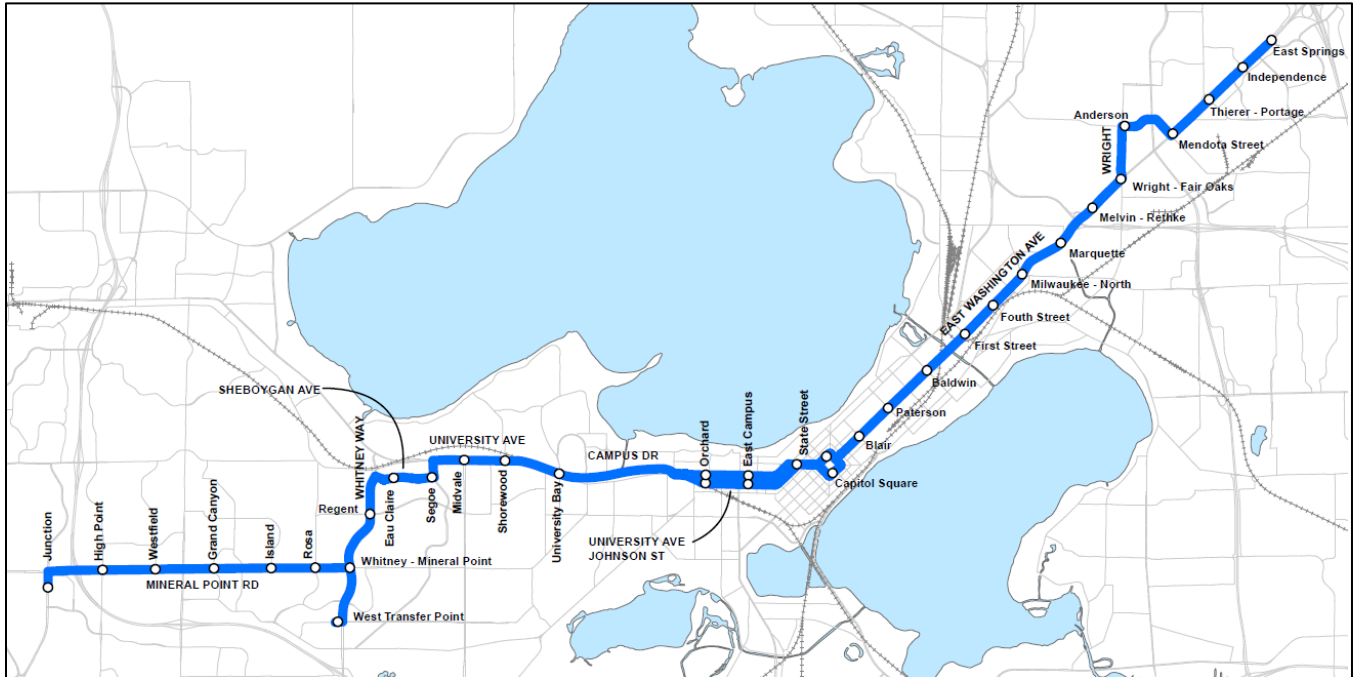


Figure 1.1: Bus rapid transit route and stations

The 2020 [Downtown Routing Report](#) evaluated a series of downtown routing alternatives, and recommended BRT routing that uses the Capitol Square, State Street, and the Johnson Street / Gorham Street one-way pair. This routing was used as part of Madison's application to the Federal Transit Administration for funding through the Capital Investment Grant (Small Starts) program. This application was subsequently recommended for funding in May of 2021.

During the 2022 budget process, some council members requested that BRT geometry and station locations be presented to appropriate boards, commissions, and the Common Council. The request included a review of alternative locations for the State Street BRT stations on Johnson Street and Gorham Street, west of the proposed locations on State Street. This memo provides a review of these alternative locations.

## 2. State Street Routing

Several alternative alignments to State Street were investigated, including West Washington Avenue, Wisconsin Avenue, and Wilson Street. These alternatives were not recommended because they either did not adequately serve the State Street area, did not adequately serve the Capitol Square area, or were long and circuitous. The route alternatives would have made BRT service slower through the Isthmus, and served fewer locations, than the existing bus service. This is contrary to the goals of the BRT project. Because of the street network in Madison and the State Street diagonal, alternative paths between the UW campus and Capitol Square that do not include routing on the 100-300 blocks of State Street are considerably longer.

The BRT project and transit network redesign project will remove some bus traffic on State Street. Bus service will be removed on the 400-600 blocks of State Street entirely. The 10 existing bus stops on State Street will be replaced with two BRT stations. Further, the number of bus trips on State Street on a typical weekday will be reduced from over 600 per day before COVID to less than 400 after BRT is implemented. Buses serving State Street are planned to be electric.

### 3. Alternative Station Locations

The BRT routing is on State Street, yet stations that serve State Street could be located on adjacent streets. From a station spacing perspective it would be possible to move them west to Johnson and Gorham Streets. The graphic below shows four possible locations for a westbound station on Gorham Street and two possible locations for an eastbound station on Johnson Street. The following sections investigate the feasibility of these stations.

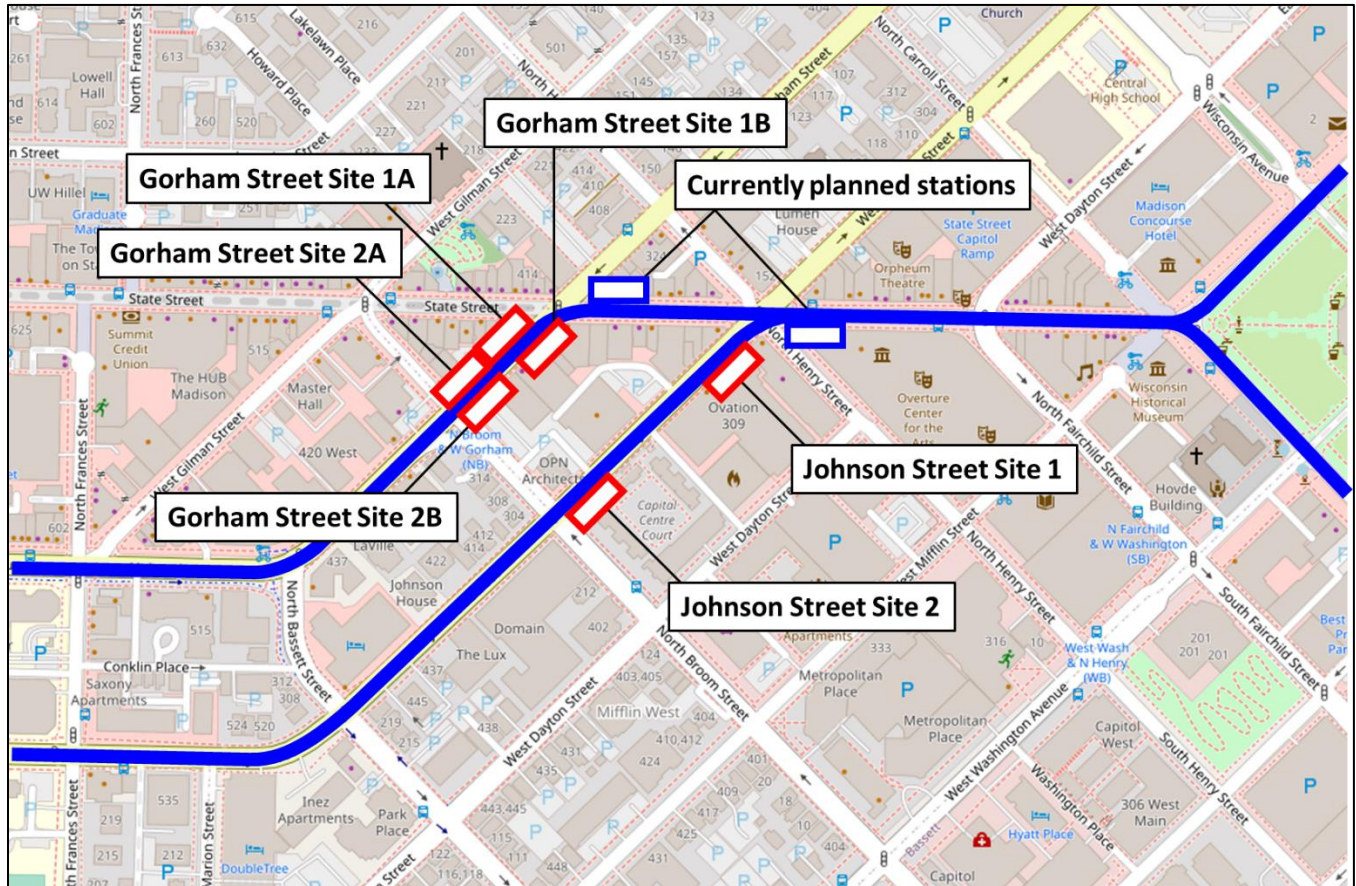


Figure 3.1: Alternative State Street station locations on Johnson and Gorham Streets

Changes to the cross sections should generally provide adequate space for pedestrians on the sidewalks and terraces since this is a downtown area with heavy pedestrian volumes. Continuing bike lanes, acceptable traffic operations, and acceptable transit operations are needed.

Some existing curb uses, such as parking or loading, could be eliminated or moved to nearby streets, yet that driveway access generally needs to be maintained.

### 4. Westbound Gorham Street Station

The existing cross section of Gorham Street just west of State Street consists of one parking lane, two travel lanes, one bike lane, and a second parking lane. There would be two possible ways to construct a station on this block.

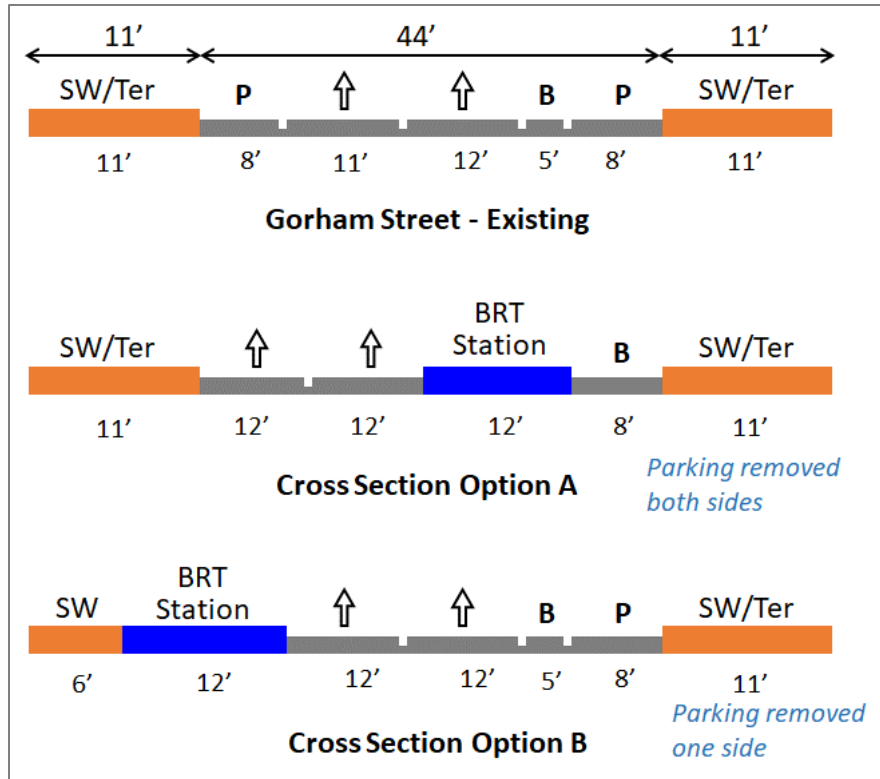


Figure 4.1: Existing and conceptual cross sections for Gorham Street just west of State Street

### Cross Section Option A

This cross section would remove on-street parking on both sides of Gorham for 300 to 400 feet, as it installs a floating BRT station and shifts the through travel lanes 8 feet to the left. This could require reconstruction to align the pavement joints with the lane designations. Cyclists would travel along the right curb and travel around the BRT station.

BRT travels in mixed traffic for this portion of the corridor. Consequently, BRT buses would reduce Gorham Street to one lane of westbound traffic while stopping at the station. BRT buses would stop at this location every 5 minutes throughout the day, and it is possible local buses may need to stop in lane as well.

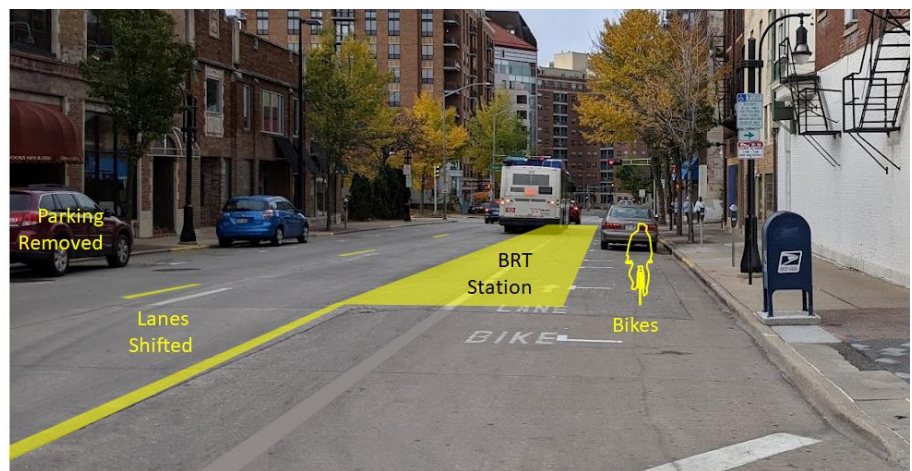


Figure 4.2: Conceptual BRT station on Gorham Street, Option A

**Cross Section Option B**

This cross section would remove on-street parking on the left side of Gorham Street for 300 to 400 feet and reduced the sidewalk/terrace area from 11-feet to 6-feet to accommodate the BRT station. No realignment of travel lanes would be necessary, and cyclist would continue to use the shared parking/bike lane on the right side of Gorham Street.



Figure 4.3: Conceptual BRT station on Gorham Street, Option B

As with Cross Section Option A, BRT travels in mixed traffic for this portion of the corridor. Consequently, as BRT stops at the station the through travel lanes would be reduced from two lanes to one lane about every 5 minutes throughout the day.

The following table summarizes the effects of Option A (right side station) vs Option B (left side station) on Johnson Street.

Factor	Option A (right side station)	Option B (left side station)
Pedestrians	Loss of bump out at State Street.	None – terrace removed
Bicycles	Accommodated through bike lane and floating BRT station.	No change from existing condition.
Business effect	In front of property being redeveloped (location 2A and 2B).	Near Warby Parker (location 1A) or Danny’s Pub (location 1B)
Traffic	No loss of through travel lanes. BRT bus would stop in travel lane about every 5 minutes. Requires lane shift that may prompt reconstruction to align pavement joints with lane markings.	No loss of through travel lanes. BRT bus would stop in travel lane about every 5 minutes.
Parking	Loss of 13 parking spaces.	Loss of 5 parking spaces.
Trees	Loss of up to one tree.	Loss of one or two trees.
BRT Service	None.	BRT buses would need to merge right from the left lane to the right lane. Merging to the right in dense traffic is poor and often causes delays because of the drivers’ reduced visibility.

Table 4.1: Effects of a BRT station on Gorham Street

## 5. Eastbound Johnson Street Station

The existing cross section consists of a bike lane, two travel lanes, and a parking lane that turns into a travel lane during the morning and evening peak periods, for a total of three through lanes. If a BRT station was located on Johnson Street, it would be on the right side and would require removing the peak-period travel lane, but parking on the right side could mostly remain.

Figure 5.1 illustrates the typical section, and Figure 5.2 illustrates what this would look like on the street.

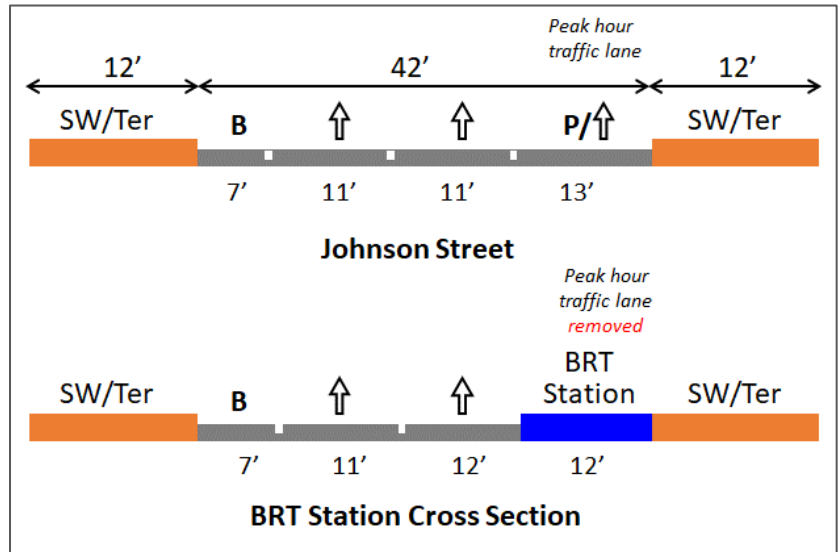


Figure 5.1: Existing and conceptual cross sections for Johnson Street just west of State Street



Figure 5.2: Conceptual BRT station on Johnson Street, Location 1

Using 2019 traffic volumes, removing the peak-period travel lane to accommodate a BRT station, with buses stopping in one of the two travel lanes, increases peak hour congestion. Traffic modeling at the Johnson and State Street intersection show vehicle delays increasing from 33 seconds to 164 seconds with queues increasing from about 100 feet to over 1,000 feet throughout the peak hour. The increased queueing spills into the Broom Street intersection upstream of this signal and could affect other intersections upstream. These traffic impacts could be moderated a bit with longer signal cycles, which would increase delay for State Street vehicles and pedestrians.

The following table summarizes the effect of relocating the State Street Eastbound BRT station to Johnson Street.

<b>Factor</b>	<b>Option A – both locations (right side station)</b>
Pedestrians	No change.
Bicycles	No change - accommodated through existing bike lane on left side.
Business effect	Location 1 is in front of Short Stack Eatery and Dragonfly. Location 2 is in front of Capital Center Court housing.
Traffic	There would be a loss of one peak-period through lane on Johnson Street, reducing through travel lanes from 3 to 2, and with buses occupying the second travel lane some of the time. This would have a detrimental effect of vehicle delays of 164 seconds and queueing of over 100 feet.
Parking	5 spaces would be removed in location 1A. 1 or 2 spaces would be removed in location 1B.
Trees	Loss of about two trees in either location.
BRT Service	Congestion associated with peak hour lane reduction would affect BRT operations.

## 6. Combining Sites

The alternative sites could be combined with each other, yet it is desirable to keep opposing stations within a block of each other so that people can logically understand where opposing stations are. Therefore it is not recommended that Johnson Site 2 be combined with the planned westbound State Street station, or that Gorham Site 2A or 2B be combined with the planned eastbound State Street station, or Johnson Site 1.

## 7. Staff Recommendation

Staff continue to recommend maintaining the State Street stations in their planned locations. The planned locations serve key State Street attractions and would be readily identifiable for State Street patrons. Station locations on Johnson Street and Gorham Street have additional impacts without clear advantages.

- The Johnson Street BRT station location is the most impactful. The station platform requires the removal of one travel lane, creating a capacity reduction that affects all motor vehicle operations, including buses.
- Metro Transit generally supports in-lane bus stops. However, in this case the high volume of buses combined with the reduction of travel lanes, has a considerable impact on traffic operations. The actual traffic and transit impacts could be worse than the traffic modelling suggests.
- Westbound Gorham Street locations 2A and 2B are too distant from the eastbound station location on State Street. It is not possible to move the eastbound State Street station farther west because the buses from Johnson Street would not be able to access it.
- Westbound Gorham Street locations 1A and 2A requires removing the sidewalk bumpout on the southeast corner of the intersection, increasing the crossing distance for pedestrians.
- Westbound Gorham Street location 1B eliminates the terrace has a similar impact to businesses as the currently planned westbound station on State Street. This station location introduces a right merge for the BRT bus.
- Eastbound Johnson Street location 1 would have a similar impacts to businesses. Station impacts would be relocated from MMoCA to Short Stack Eatery and Dragonfly.