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Memorandum

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Date: November 28, 2012

To: Joe Kern
SRF Consulting Group, Inc.

From: Lisa Rasmussen, P.E.
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Subject: Madison Transit Corridor Study – Station Site Review Methodology

This memorandum summarizes the methodology that will be used to review station location configurations (nearside, far-side, midblock), determine platform types (curb-side, bus-bay/turnout or bus-bulb) and perform a site constraint review of the shelter sizes for the Madison Transit Corridor Study.

A review of the station locations identified on the "Station and Running-way Types" graphic will be performed to determine the feasibility of constructing a BRT station at each specific location. The review will also include a determination of the shelter size and platform infrastructure needed as well as any anticipated site impacts. This review will be based on site visits, aerial and site photographs.

The following summarizes the review that will be performed to determine each of these elements:

- Shelter Size
  - The initial shelter size, which was developed based on the anticipated ridership demand, will be reviewed to determine if there is adequate space on the site, or if a smaller shelter could be used to minimize impacts to adjacent infrastructure.
- Platform Infrastructure
  - Platform type, location, and length are largely dependent on the existing site constraints – on-street parking, sidewalk widths, boulevard widths, adjacent buildings/infrastructure, etc. A high-level review of each station location, using aerial and site photographs, will be performed to determine the appropriate type, location, and length of the platform. Site impacts, that have the potential to affect cost, will also be identified. Table 1 provides a summary of the review that will be performed.

Table 1. Platform Infrastructure Summary

Platform Type	Review will determine the type of platform feasible at a particular location: • Corridor BRT: in lane, pull-out or bus-bulb • Fixed Guideway BRT: shared center or split-side platform o Split-side platforms will be provided at intersections that have exclusive left turn lanes, shared center platforms will be provided at other station locations Attached to this memo is a "Station Type Summary" table that defines the advantages/disadvantages of each station type. This information will be utilized to define the platform type at each station location.
Platform Location	Review will determine the location of the platform, near-side, far-side or mid-block, based on site constraints and existing bus service Far-side stations will be preferred over nearside or midblock stations. Attached to this memo is a "Station Location Summary" table that provides additional information on the advantages/disadvantages of the potential platform locations. This information will be utilized to determine the platform location.
Platform Length	Preferred platform length will be 60'
Site Impacts	Potential impacts to parking, existing utilities and adjacent infrastructure (sidewalk, retaining walls, etc., etc.), that are visible on site or aerial photographs, will be identified, with potential cost impacts identified within the capital cost estimate.

- Documentation
  - The station review to be performed will be documented in a table similar to Table 2 shown below. Shelter type, platform infrastructure, and additional site impacts for each station location (in both directions of travel) will be included in this table and will be the basis for the capital cost estimate that is developed for each corridor.

Table 2. Station Summary Example

Stop ID	On Street	Direction	Station Name	Shelter Size	Platform Type	Platform Location	Platform Length	On-Street Parking Impacts	Existing Sidewalk/ Blvd Width*	Notes
	University	WB	Farley	Small	Bus-Bulb	Far-Side	60'	0	10'	Retaining wall adjacent to platform
	University	EB	Farley	Large	Curb-Side	Near-Side	60'	0	10'	Building at the back of sidewalk

*Existing sidewalk/blvd width = face of curb to back of sidewalk

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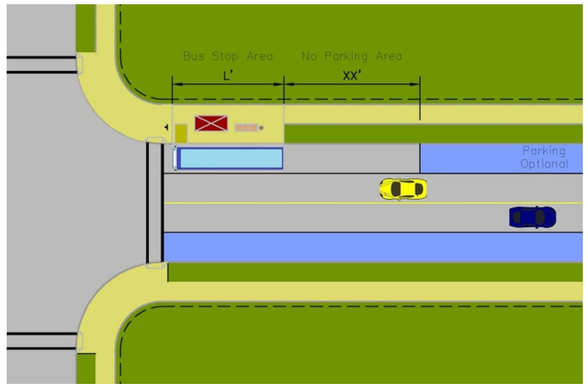
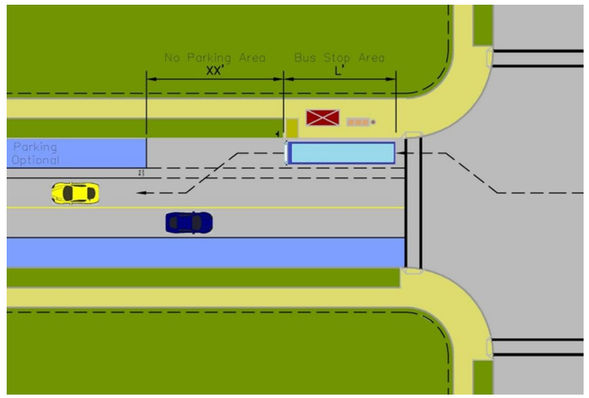
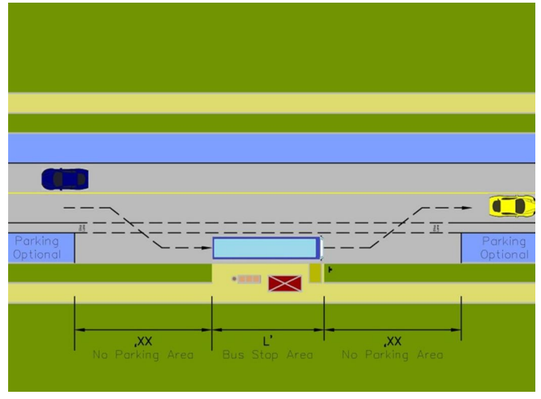
Station Location Table

LOCATION	ADVANTAGES	DISADVANTAGES	FIGURE
NEAR-SIDE	• Minimizes interference when traffic is heavy on the far side of the intersection • Allows passengers to access buses close to crosswalk • Intersection width available for bus to pull away from the curb • Eliminates the potential for double-stopping • Allows passengers to board and alight while stopped for red light • Allows drivers to look for oncoming traffic, including other buses with potential passengers	• Increases conflicts with right-turning vehicles • May result in stopped buses obscuring curbside traffic control devices and crossing pedestrians • May cause sight distance to be obscured for side street vehicles stopped to the right of the bus • Increases sight distance problems for crossing pedestrians • Complicates bus signal priority operation, may reduce effectiveness or require a special queue-jump signal if the stop is located in the parking lane or a right-turn lane	
FAR-SIDE	• Minimizes conflicts between right turning vehicles and buses • Provides additional right-turn capacity by making curb lane available for traffic • Minimizes sight distance problems on intersection approaches • May encourage pedestrians to cross behind the bus, depending on distance from intersection • Creates shorter deceleration distances for buses, since the intersection can be used to decelerate • Buses can take advantage of gaps in traffic flow created at signalized intersections • Facilitates bus signal priority operation, as buses can pass through intersection before stopping	• May result in intersections being blocked during peak periods by stopped buses • May obscure sight distance for crossing vehicles • May increase sight distance problems for crossing pedestrians • Can cause a bus to stop far-side after stopping for a red light, interfering with both bus operations and all other traffic • May increase the number of rear-end crashes since drivers do not expect buses to stop again after stopping at a red light • Could result in traffic queued into intersection when the bus stops in the travel lane	
MIDBLOCK	• Minimizes sight distance problems for vehicles and pedestrians • May result in passenger waiting areas experiencing less pedestrian congestion	• Requires additional distance for no parking restrictions • Encourages passengers to cross street mid-block (jaywalking) • Increases walking distance for passengers crossing at intersections	

Source: TCRP Report 90v2

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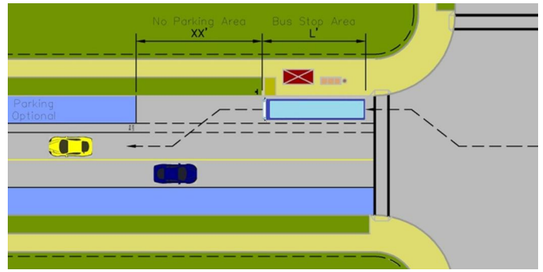
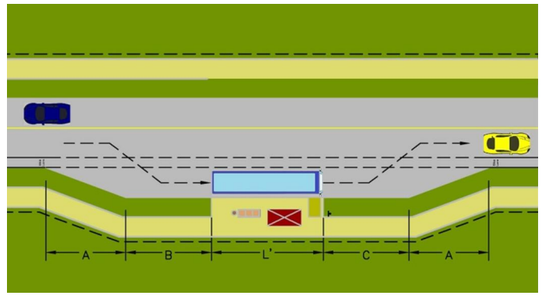
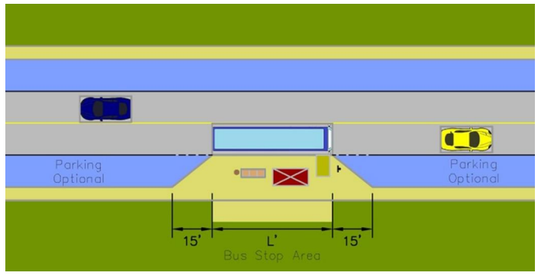
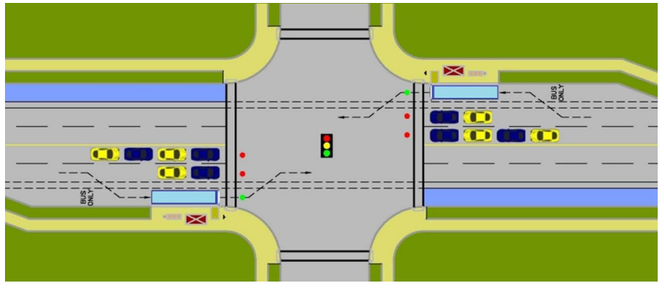
Station Type Table

TYPE	ADVANTAGES	DISADVANTAGES	FIGURE
IN LANE	• Provides easy access for bus drivers and results in minimal delay to bus • Is simple in design and easy and inexpensive for a transit agency to install	• Can cause traffic to queue behind stopped bus, thus causing traffic congestion • May cause drivers to make unsafe maneuvers when changing lanes in order to avoid a stopped bus	
PULL-OUT	• Allows patrons to board and alight out of the travel lane • Provides a protected area away from moving vehicle for both the stopped bus and the bus patrons • Minimizes delay to through traffic	• May present problems to bus drivers when attempting to re-enter traffic, especially during periods of high roadway volumes • Is expensive to install compared with curbside stop • Is difficult and expensive to relocate	
BUS-BULB	• Remove fewer parking spaces for the bus stop • Decrease the walking distance (and time) for pedestrians crossing the street • Provided additional sidewalk area for bus patrons to wait • Results in minimal delay for bus	• Cost more to install compared with curbside stop • See Curb-side disadvantages	
QUEUE JUMP/BYPASS LANE	• Allows buses to bypass queues at a signal • See Open Bus Bay advantages	• May cause delays to right-turning vehicles when bus is at the start of the right turn lane • See Bus Bay disadvantages	

Source: TCRP Report 19-b