
**EAST
WEST BRT**
a feasibility study

MILWAUKEE COUNTY EAST-WEST BUS RAPID TRANSIT

Tech Memo #6:
Ridership Forecasts

REVISION #1

DATE June 28, 2016



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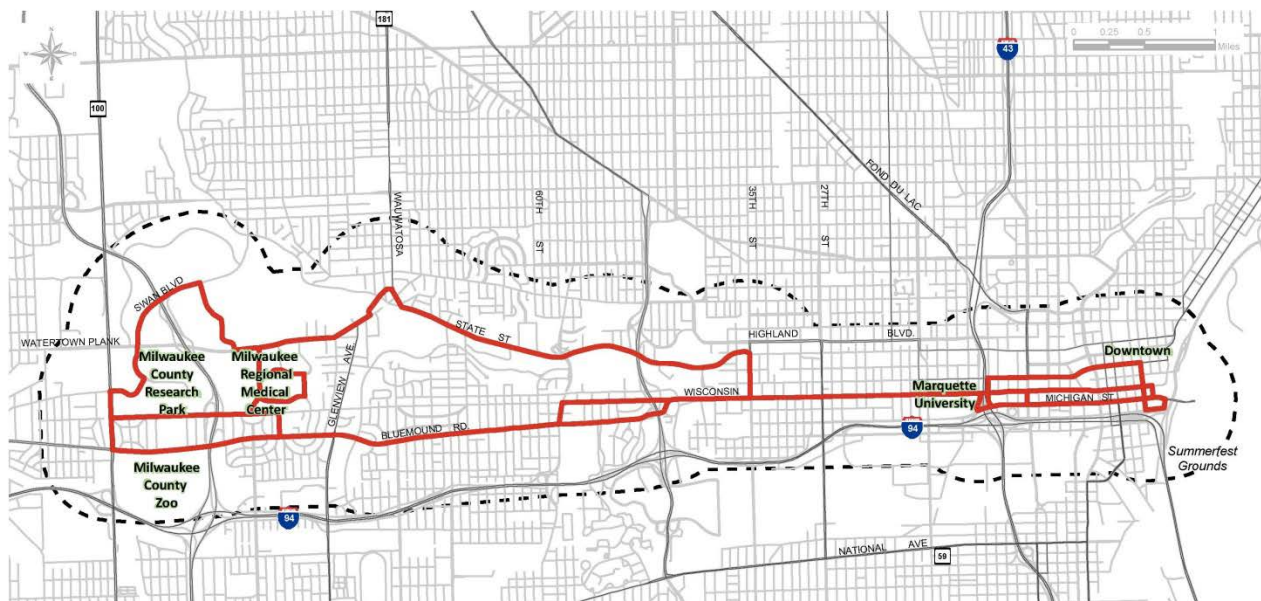
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1. INTRODUCTION

1.1 Project Description

Milwaukee County and its partners have initiated a feasibility study to evaluate transit investment in the seven-mile East-West Corridor connecting major employment and activity centers between downtown Milwaukee, the Milwaukee Regional Medical Center (MRMC), and Milwaukee County Research Park (MCRP). Completing the feasibility study is a first step towards applying for funding through the Federal Transit Administration’s (FTA) Small Starts program.

Figure 1-1: East-West Study Corridor



2. OVERVIEW OF PROJECT EVALUATION PROCESS

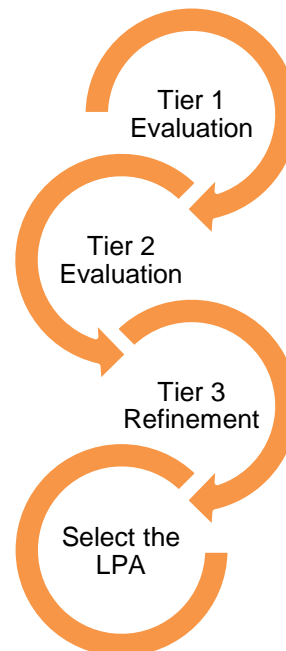
In order to evaluate the initial group of transit modes and alignment options and identify the appropriate mode-alignment pairings that will comprise the detailed alternatives, the East-West Corridor Study will follow a three-step method.

- The first step (“Tier 1 Evaluation”) will entail the assessment of each mode and alignment relative to overall implementation viability.
- The second step (“Tier 2 Evaluation”) will assess the mode/alignment pairings that passed the Tier 1 Evaluation and compare the benefits and impacts of each.
- The alternative(s) that fare(s) best against the detailed criteria in this second step will be identified as Preferred Alternative(s) and further refined in the third step (“Tier 3”). The Locally Preferred Alternative will be identified at the conclusion of the third step.

The evaluation criteria associated with each step are a combination of quantitative and qualitative performance measures.

- The Tier 1 Evaluation will apply fewer and broader measures, including information from previous corridor/area studies. The analysis will largely rely on order-of-magnitude estimates and the outcomes of similar transit projects from around the country.
- The Tier 2 Evaluation will apply more detailed and alternative-specific evaluation results.
- The Tier 3 Evaluation will evaluate the Preferred Alternative(s) against federal criteria to identify and refine the Locally Preferred Alternative.

This three-step process will result in the identification of an LPA that not only meets locally-identified project purpose and needs, but is also competitive for federal funding.



3. TECH MEMO #6 OVERVIEW

This report is the sixth in a series of technical memoranda (tech memos) that report the results of the Tier 2 Detailed Evaluation of Alternatives; the five other tech memos are available under separate cover:

- Tech Memo #1: Station Area
- Tech Memo #2: Transportation
- Tech Memo #3: Environmental Impacts
- Tech Memo #4: Capital Costs
- Tech Memo #5: Operating and Maintenance Costs
- Tech Memo #6 (this memo): Ridership

Results contained in the six tech memos are summarized in the Detailed Evaluation of Alternatives Report, also available under separate cover.

This tech memo includes the ridership forecasts that were used to evaluate the performance of the BRT alternatives that are under consideration as part of the Tier 2 evaluation.

The Tier 2 alternatives and station locations under evaluation are described in Section 4. The methodology, data sources, and results of the evaluation are presented in Section 5.

4. THE ALTERNATIVES

Four modes are being evaluated as part of Tier 2:

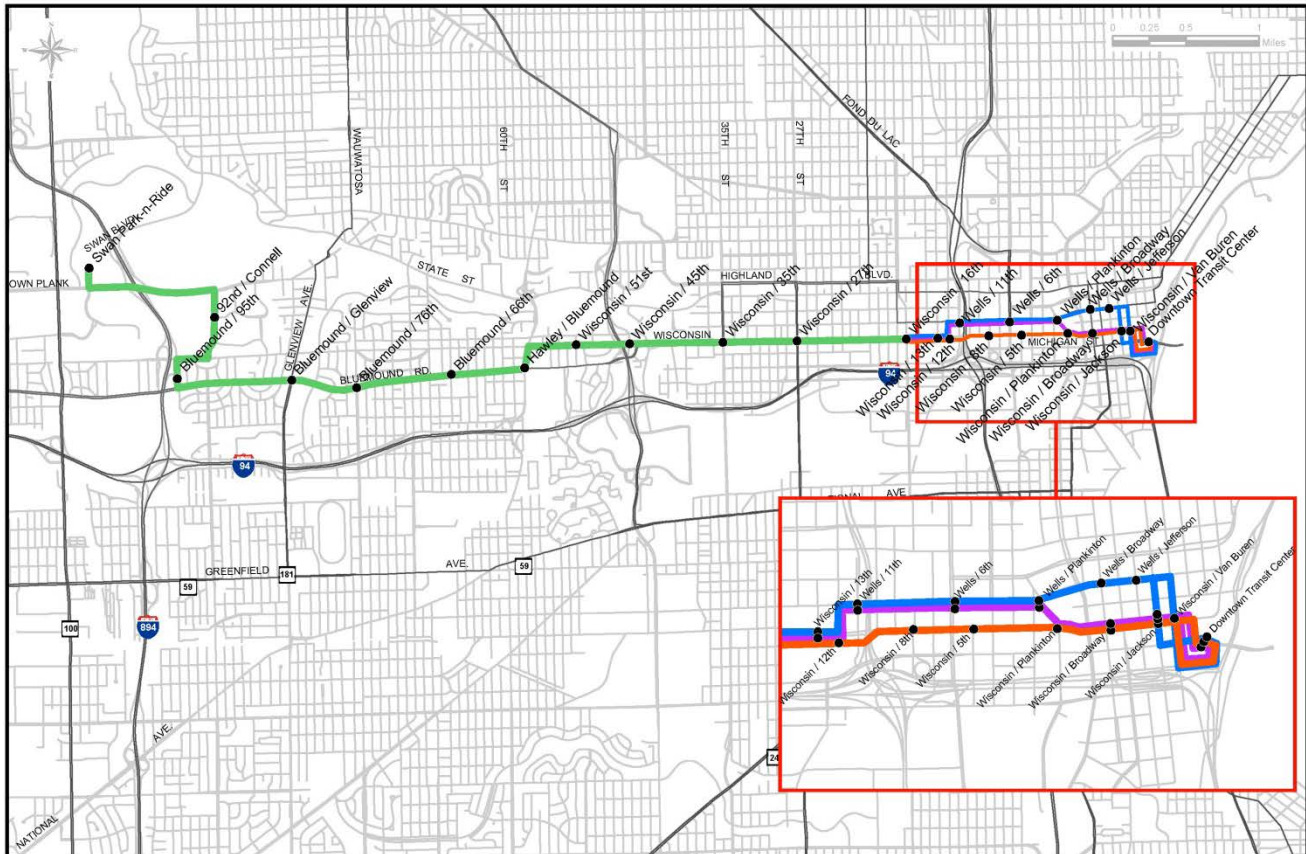
- No Build
- BRT in Mixed Traffic
- BRT in Dedicated Center Lane
- BRT in Dedicated Curb Lane

Three routes are being evaluated as part of Tier 2; any of the modes listed above (or combination of the modes) could operate on these routes:

- Alternative 1: from Swan Park-and-Ride lot to the Downtown Transit Center via Wisconsin Avenue through downtown Milwaukee
- Alternative 2: from Swan Park-and-Ride lot to the Downtown transit Center via Wells Avenue
- Alternative 3: from Swan Park-and-Ride lot to the Downtown Transit Center via a hybrid of Wisconsin Avenue and Wells Street through downtown Milwaukee (called the Hybrid alternative)

The routes and station locations are shown in Figure 4-1; the station locations for each alternative are listed in Table 4-1. Additional detail regarding these alternatives can be found in the Tier 2: Detailed Definition of Alternative Reports, which is available on the project website (eastwestbrt.org).

Figure 4-1: Alternative Alignments and Stations



- Legend
- Western Corridor Alternative Segment
 - Alternative 2 Wells and Bluemound
 - Alternative 3 Hybrid Wells and Bluemound
 - Proposed Stations

Table 4-1: Stop Location by Route Alternative

Stop Locations	Route Alternatives		
	Wisconsin	Wells	Wells/Wisconsin Hybrid
Downtown Transit Center	X	X	X
Van Buren/Wisconsin		X	

Stop Locations	Route Alternatives		
	Wisconsin	Wells	Wells/Wisconsin Hybrid
Wisconsin/Jefferson	X	X	X
Wisconsin/Broadway	X		X
Wells/Jefferson		X	
Wells/Broadway		X	
Wisconsin/Plankinton	X		
Wells/Plankinton		X	X
Wisconsin/5th St.	X		
Wells/6th St.		X	X
Wisconsin/8th St.	X		
Wells/11th St.		X	X
Wisconsin/12th St.	X		
Wisconsin/13th St.		X	X
Wisconsin/16th St.	X	X	X
Wisconsin/27th St.	X	X	X
Wisconsin/35th St.	X	X	X
Wisconsin/45 th St.	X	X	X
Wisconsin/51st St.	X	X	X
Hawley/Bluemound	X	X	X
Bluemound/66th St.	X	X	X
Bluemound/76th St.	X	X	X
Bluemound/Glenview	X	X	X
Bluemound/95th St.	X	X	X
92nd & Connell (MRMC)	X	X	X
Swan Road Park & Ride	X	X	X

5. RIDERSHIP FORECASTS

5.1 Methodology

This project used the Federal Transit Administration travel demand forecasting tool: STOPS (Simplified Trips-on-Project Software). It is a limited implementation of the conventional four step model where trip generation and trip distribution is replaced by American Community Survey (Census) data to describe the travel markets. It also uses GTFS (General Transit Feed Specification) transit schedule data to replace the traditional coded transit network. Version 2.0 of STOPS was obtained from FTA for use in this project.

5.2 Calibration and Data Sources

Three different options in STOPS were tested to forecast ridership for the Milwaukee region and the study area:

- Trip distribution using year 2000 Census Transportation Planning Package (CTPP) information (the default for older versions of STOPS)
- Trip distribution using 2006-10 American Community Survey (ACS) information (an option in newer versions of STOPS). A second version of this was tested using special market (employee and student trip information from the Southeastern Wisconsin Regional Planning Commission (SEWRPC) 2011 Household Survey for Marquette University.
- Trip distribution using SEWRPC's year 2012 (Transit) On Board Survey

Of these three methodologies a “standard” implementation using the 2006-10 ACS data generated the most favorable calibration and results.

SEWRPC also provided highway travel times (skim files) and traffic analysis zone (TAZ) level demographic (population and employment) projections for 2011 and 2035. This was supplemented by year 2015 GTFS and Automated Passenger Count (APC) data for Routes 30, 30x, 31, and the Gold Line.

A year 2015 calibration using observed boardings from the 2012 On Board survey and “ons and offs” for the corridor routes from the APC data. Table 5-1 shows comparisons from

STOPS “auto calibration” routine for the corridor routes for an average weekday in 2015. As with most models STOPS individual route boardings can vary but does well with corridor or grouped boardings.

Table 5-1: Year 2015 Average Weekday Modeled vs. Observed Boardings

Route	2015 (APC) Counts	Modeled	Modeled - Counts
30	6,340	4,878	-1,462
30X	4,941	4,755	-186
31	1,711	2,193	482
GOLD	5,030	6,296	1,266

5.3 Summary of Results

The forecast for each alternative are summarized for the horizon year (2035) in this section. Several statistics are shown, which include:

- Boardings by station (Table 5-2)
- Boardings by route (Table 5-3)
- Linked trips on the project (Table 5-4)
- New Riders (Table 5-5)
- Vehicle Miles of Travel Saved (Table 5-6)

If the East-West BRT was completed, there would be over 8,000 new riders to the transit system. There would also be over 50,000 vehicle miles traveled savings. Average weekday boardings on the BRT route would be approximately 14,000 riders. In all alternatives, ridership increases, with a significant number of transit customers riding the BRT route.

Table 5-2: Average Weekday Boardings by Station

Station	Alternative 1	Alternative 2	Alternative 3
DTC	97	134	92
Wisconsin / Jackson	1,152	360	1,007
Wisconsin Van Buren	-	116	-
Wells / Jefferson	-	839	-
Wisconsin / Broadway	1,079	-	1,148
Wells / Broadway	-	939	-
Wisconsin / Plankinton	2,310	-	-
Wells / Plankinton	-	2,585	2,594
Wisconsin / 5th	2,025	-	-
Wells / 6th	-	2,094	2,165
Wisconsin / 8th	1,586	-	-
Wells / 11th	-	1,363	1,338
Wisconsin / 12th	1,178	-	-
Wisconsin / 13th	-	832	725
Wisconsin / 16th	1,922	1,795	1,785
Wisconsin / 27th	2,603	2,645	2,644
Wisconsin / 35th	1,327	1,251	1,274
Wisconsin / 45th	426	443	427
Wisconsin / 51st	160	152	162
Hawley / Bluemound	191	181	185
Bluemound / 66th	237	240	232
Bluemound / 76th	285	279	282
Bluemound / Glenview	221	221	221
Bluemound / 95th	1,394	1,404	1,374
MRMC	197	197	201

Station	Alternative 1	Alternative 2	Alternative 3
Swan PNR	223	219	221
Total	18,613	18,289	18,077

Table 5-3: Average Weekday Boardings by Route

Route Name	No Build	Alternative 1	Alternative 2	Alternative 3
30	5,030	6,207	6,260	5,971
30X	4,889	6,176	6,448	6,229
31 (includes 10E in Alts.)	2,261	5,072	4,769	4,917
GOLD	6,951	-	-	-
10W	-	697	692	711
BRT	-	14,346	13,878	13,876
Total	19,131	32,498	32,047	31,704

Table 5-4: Average Weekday Linked Trips on the Project

(includes BRT and 30/30X on BRT alignment)

	Alternative 1	Alternative 2	Alternative 3
Low Income (Zero-Car HH)	8,350	8,345	7,995
Higher Income (1+ Car HH)	13,175	13,001	12,901
Total	21,525	21,346	20,896

Table 5-5: Average Weekday New Riders

(Incremental new riders)

	Alternative 1	Alternative 2	Alternative 3
No Build	121,136	121,136	121,136
Build	129,482	129,400	129,178
New Riders	8,346	8,264	8,042

Table 5-6: Average Weekday VMT Savings

Alternative	VMT Savings
Alternative 1 (Alt 1): Wisconsin Avenue	52,538
Alternative 2 (Alt 2): Wells Street	52,564
Alternative 3 (Alt 3): Hybrid	50,854