2023 ITS Transportation Conference

Thursday, October 19, 2023

EAST WEST BRT

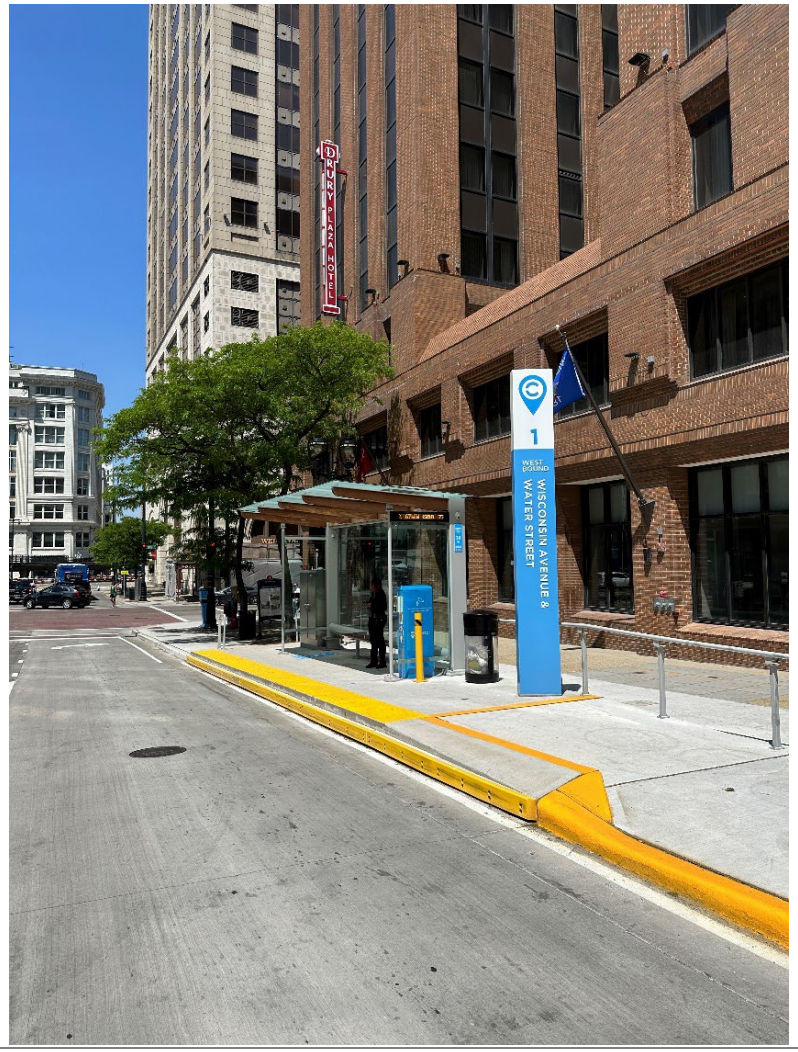
Today's Agenda

1. Introductions
2. Overview of Milwaukee County Transit System (MCTS)
3. Launch of the first BRT in Wisconsin
4. BRT Fleet
5. Transit Signal Priority (TSP)
6. What's Next?

EAST WEST BRT

David Locher, MCTS, Manager of Enhanced Transit

Mike Zabel, HNTB, Construction Manager



MCTS Milwaukee County Transit System

Fixed Route Public Transportation

County Pop: 943,240
Urbanize Area Pop: 1.38M
35 Rank out of 498 UZAs

Fixed Route Bus

44 Lines

- 1 BRT
- 36 local
  (14 High-Frequency)
- 1 worker shuttle
- 3 UBUS
- 3 school trippers

Bus Fleet

- 314 Clean Diesel
- 11 Battery Electric
- 262 in Peak Hour

Personnel

- 1,050 Total
- Includes 750 Drivers

Ridership 2022: 15,557,421

Additionally

MCTS Paratransit Services

NOTE: MCTS is NOT the HOP

- Owned by City of Milwaukee
- Operated by Transdev

How We Do It

Operations Funding Sources

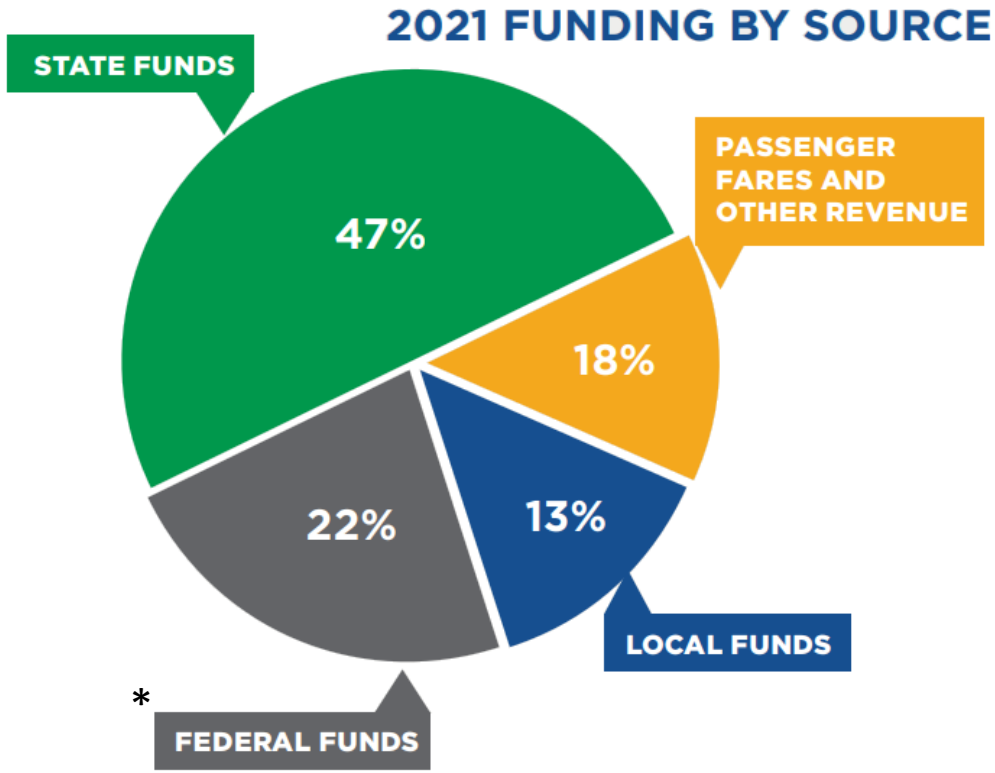
Typical Operating Budget: Up to $163M

MCTS Bus Service: $146M

MCTS Paratransit: $17M

As budgets shrink, the number of buses on the road decreases and the service frequency diminishes.

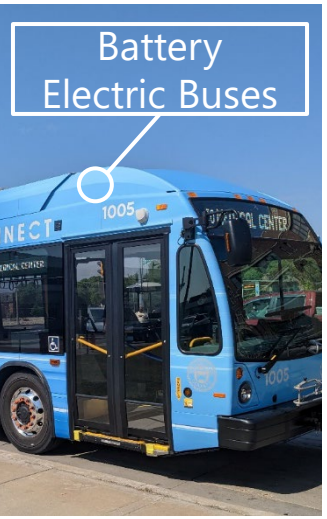
Strategy for delivering frequency?



* One-time federal assistance 2020-2024
Pre-pandemic ~15% federal

Getting to Know BRT

Key features of the MCTS CONNECT BRT system

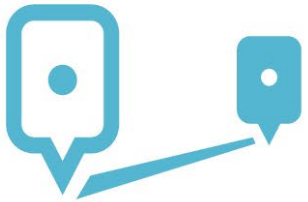


Project Details & Features

EAST WEST BRT

17 stations connect regional network of major employment centers, education facilities and recreational destinations

Modern electric buses provide a quiet, comfortable, sustainable vehicle with features for easy boarding and interior bike storage



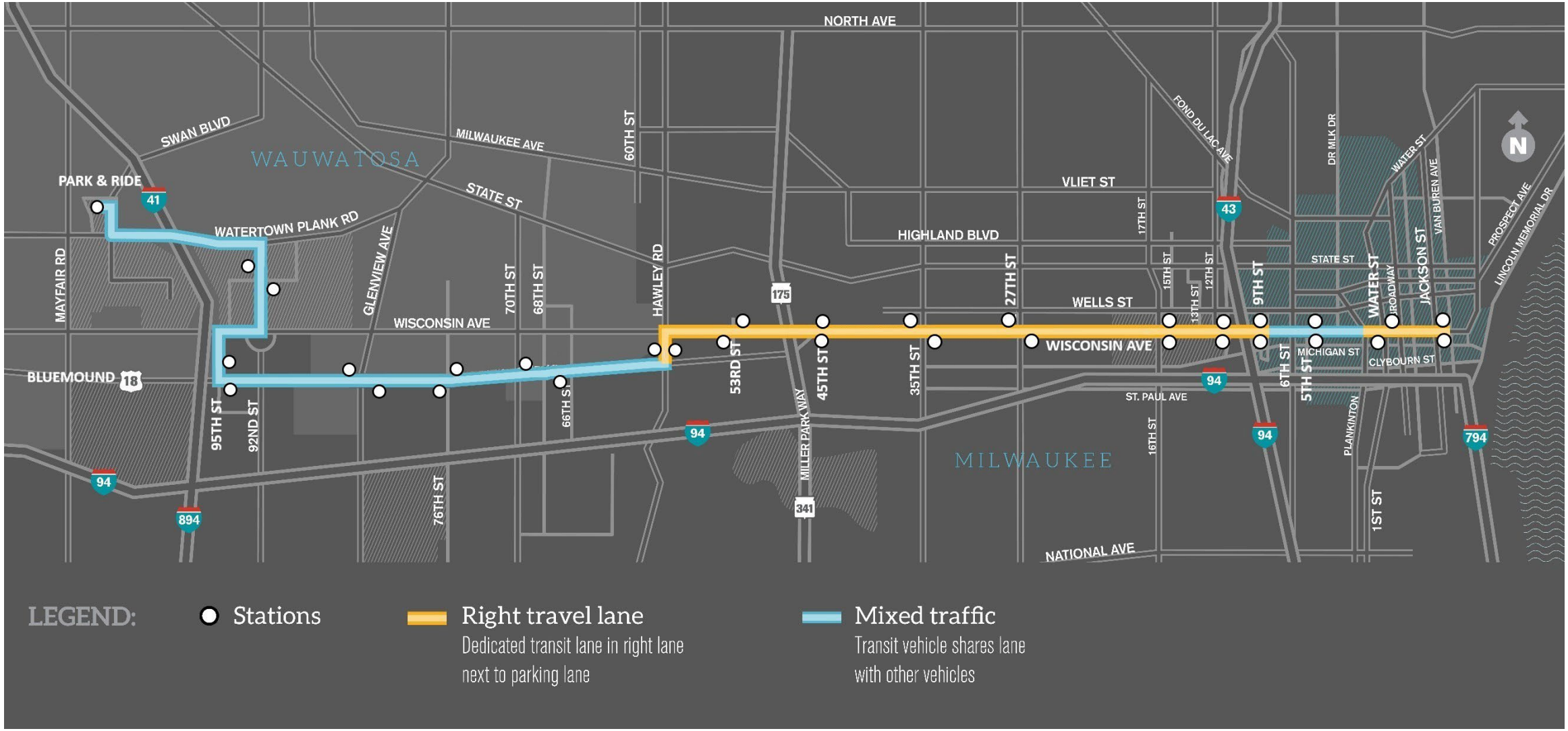
Reliable and predictable travel times through the use of dedicated lanes (over 50% of the corridor length), fewer stops, traffic signal priority and pre-board ticketing

Reduces traffic congestion by attracting more transit riders and removing thousands of cars from the corridor

More frequent daily service with buses every 10 minutes during peak hours and midday, and every 20-30 minutes in early morning, evening and late-night

The East-West Corridor

EAST WEST BRT



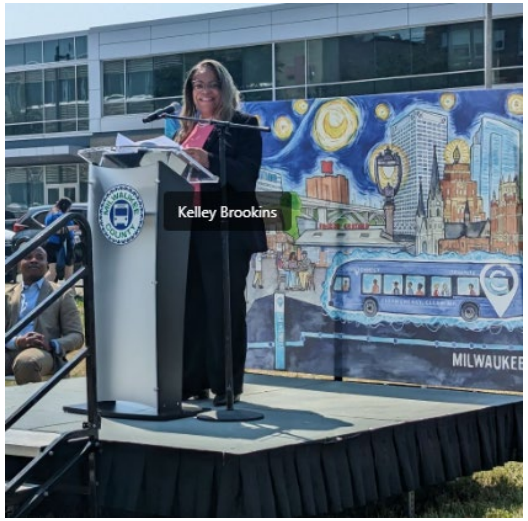
Preparing for Revenue Service

System Integration Experience

a) TVM
b) TSP
c) Real-Time Sign

Revenue Service

June 4, 2023 Revenue Operations Start



Launch of Service

Revenue Operations

1. BEB-Diesel Bus Hybrid Fleet Experience
2. Ridership: 3,600 per day
3. Service Frequency: 85-90%
4. TVM and Validators Revenue Service: Expected April 2024
5. Issues and Concerns
    a) Real-time adjustments
    b) Fleet size
    c) Signal upgrades

BRT Fleet

1) Status of NOVA Buses
    a) Original order: 11 buses
        i. All batteries on property
        ii. 4 in service
        iii. Best case: All in service in mid-November
    b) LoNo order: 4 buses
        i. Expected 1st Quarter of 2024
2) Current BRT Fleet Status
    a) 17 buses (2 BEB; 15 clean diesel)
3) Impact to MCTS Regular Bus Routes

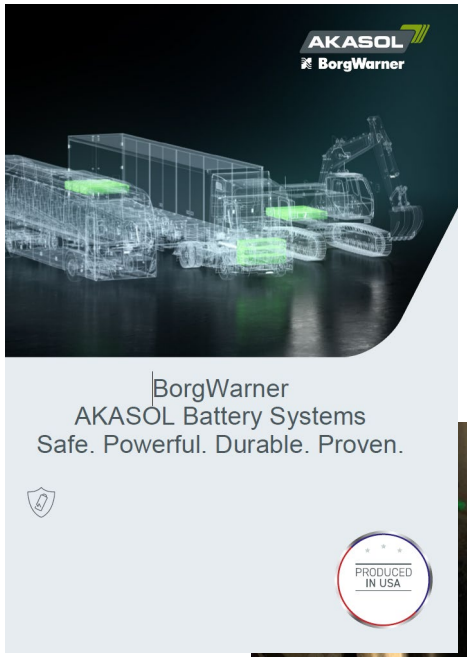
Battery Electric Buses

- 11 Nova LFSe+ Electric
- 4 LoNo BEB
- 1 in-route charger (450 kW)
- 8 depot chargers (150 kW)

Batteries

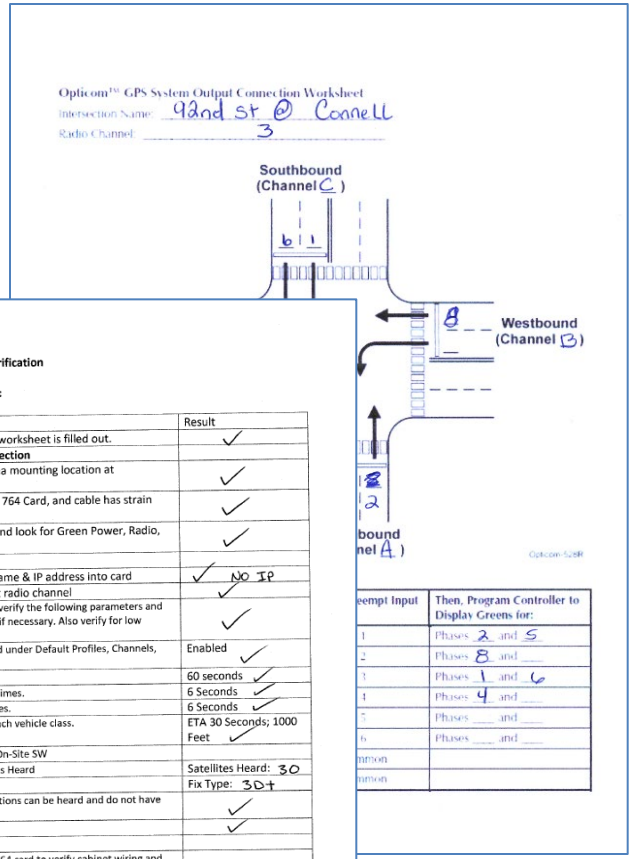
Nova Bus Safety Issues

- High-voltage battery pack recall
- On 3 Nova buses in MCTS possession
- All other buses received have been inspected and certified
- Buses still safe to use, but NOT to be filled with coolant
- Inspection and fix on 3 vehicles expected starting July 3



Transit Signal Priority (TSP)

Range setting for each vehicle:
30seconds; 1000 feet



Opticom™ GPS System Output Connection Worksheet
Intersection Name: 92nd St @ Connell
Radio Channel: 3

Southbound (Channel C)

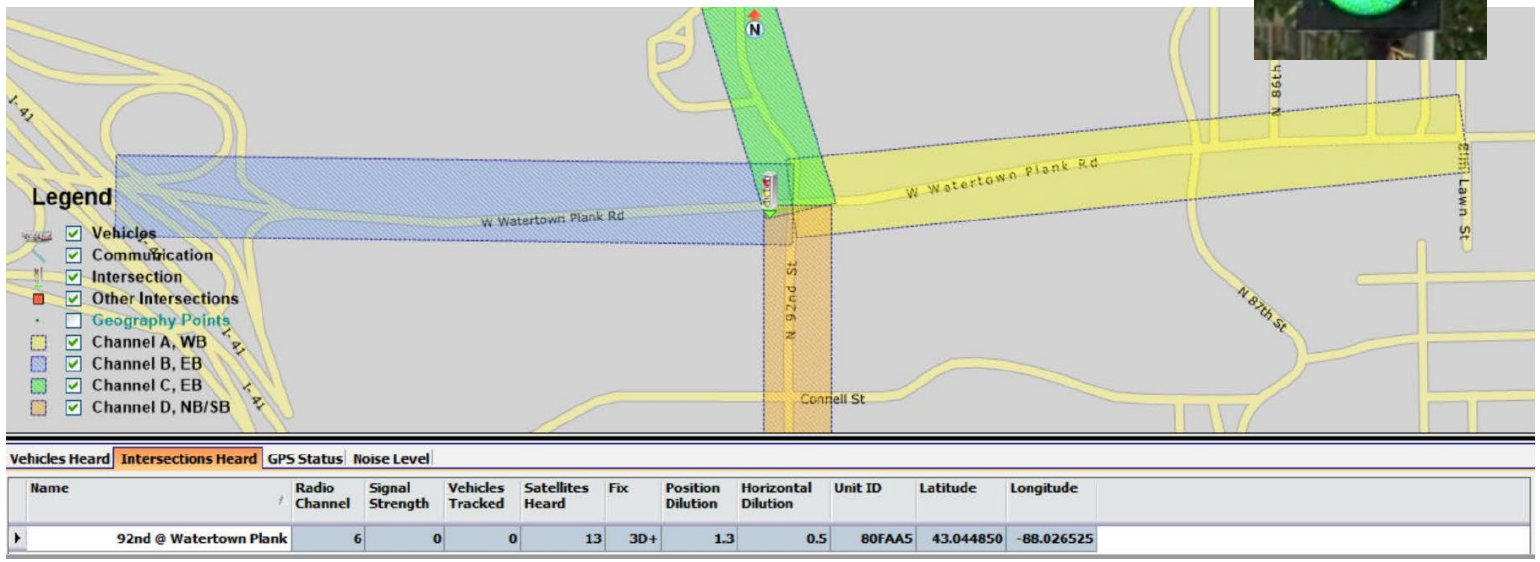
Westbound (Channel B)

bound nel A)

eempt Input	Then, Program Controller to Display Greens for:
1	Phases 2 and 5
2	Phases 8 and ___
3	Phases 1 and 6
4	Phases 4 and ___
5	Phases ___ and ___
6	Phases ___ and ___
mmon	
mmon	

Intersection Field Verification
Intersection Name:
Date Test Performed:

Test ID	Test	Result
1.1	Verify that intersection worksheet is filled out.	✓
2.0	**Intersection Visual Inspection**	
2.1	Verify radio/GPS antenna mounting location at intersection.	✓
2.2	Verify wiring of cable to 764 Card, and cable has strain proper relief.	✓
2.3	Verify 764 card power and look for Green Power, Radio, and GPS indicators.	✓
3.0	**764 Card Programming**	
3.1	Program Intersection Name & IP address into card	✓ NO IP
3.2	Program and Document radio channel	✓
3.3	For each output channel, verify the following parameters and change from the defaults if necessary. Also verify for low priority (if used).	✓
3.3a	Enable low priority. Listed under Default Profiles, Channels, Low Priority Calls	Enabled ✓
3.3b	Verify max call times.	60 seconds ✓
3.3c	Verify off-approach hold times.	6 Seconds ✓
3.3d	Verify lost signal hold times.	6 Seconds ✓
3.3e	Verify range setting for each vehicle class.	ETA 30 Seconds; 1000 Feet ✓
3.4	Open Current Activity in On-Site SW	
3.4a	Verify number of Satellites Heard	Satellites Heard: 30
3.4b	Verify GPS Fix Type	Fix Type: 3D+
3.4c	Verify that other intersections can be heard and do not have conflicting Radio Channel	✓
3.5	Draw Approach Map	✓
4.0	**Intersection Testing**	
4.1	Place manual calls from 764 card to verify cabinet wiring and controller inputs	
4.2	While someone is monitoring the On-Site SW in the cabinet a second person will conduct a drive test.	✓
4.3	Observe On-Site SW for each approach as the test vehicle is driving the approach.	✓
4.3a	Verify that the vehicle can be seen for the entire approach and they are not dropped. Vehicle should be seen for at least 2,500 feet away.	✓
4.3b	Verify channel output to the controller is correct.	A: ✓ B: ✓ C: D:
5.0	Verify Emergency Vehicle functionality is operational	✓



Name	Radio Channel	Signal Strength	Vehicles Tracked	Satellites Heard	Fix	Position Dilution	Horizontal Dilution	Unit ID	Latitude	Longitude
92nd @ Watertown Plank	6	0	0	13	3D+	1.3	0.5	80FAA5	43.044850	-88.026525

What's Next? North-South BRT

27th Street Corridor

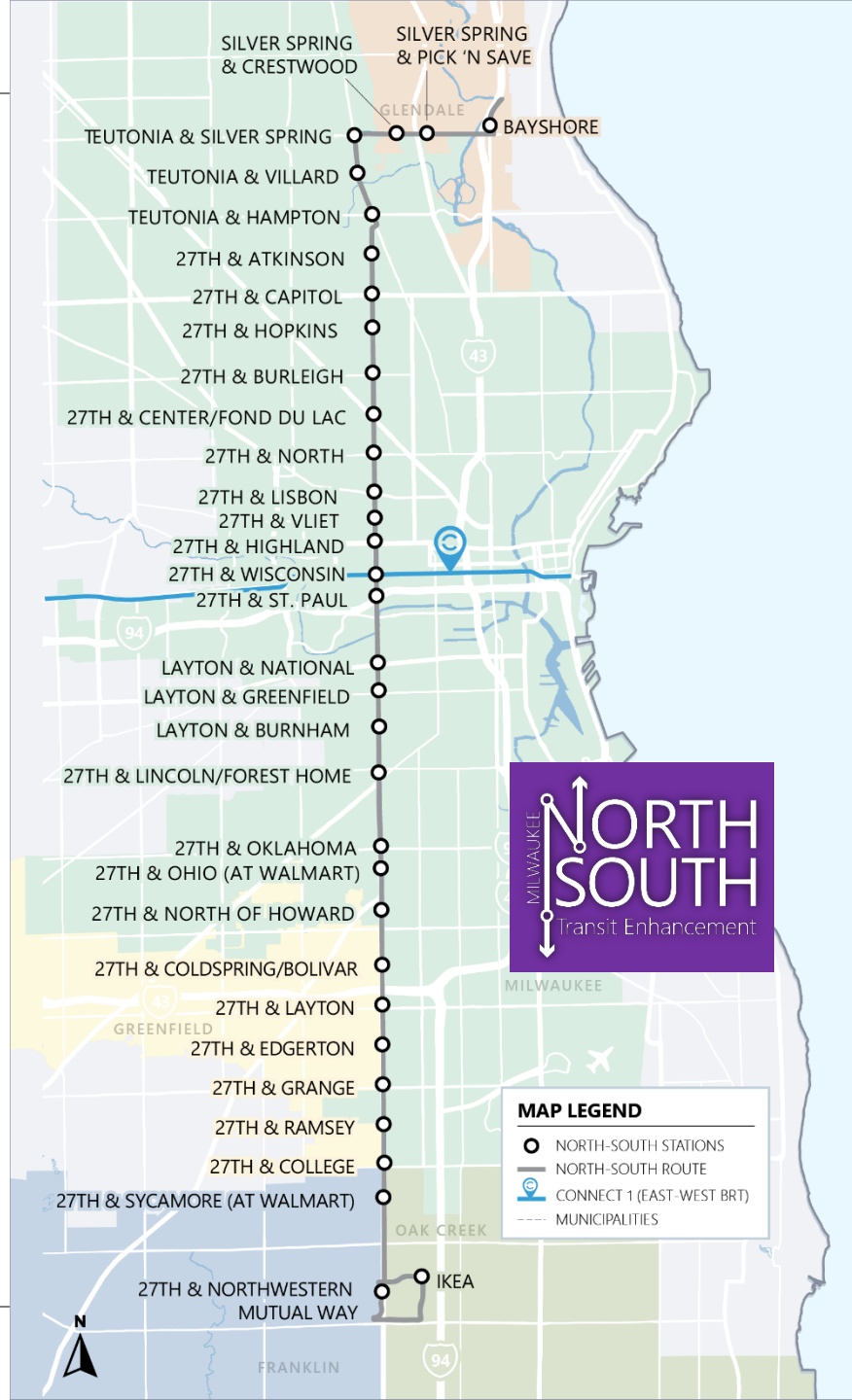
Recommended route is **Bayshore to IKEA**

Electric **bus rapid transit (BRT)** vehicles

18 miles, with bus-only lanes

33 stations

Buses arrive **every 10 minutes** (during peak hours)



Questions?

For more information:

www.eastwestbrtmke.com

Or contact:

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