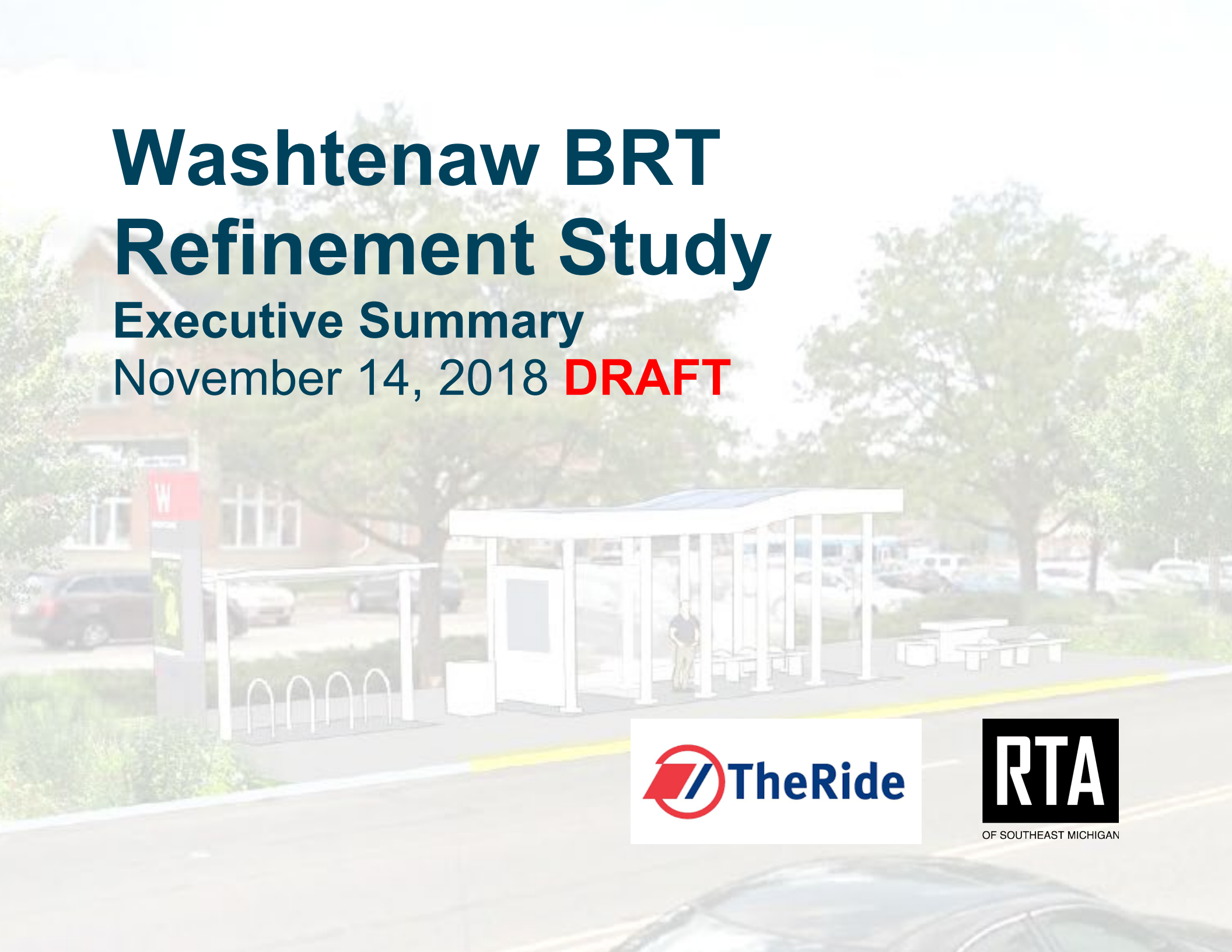
Washtenaw BRT Refinement Study

Executive Summary

November 14, 2018 **DRAFT**



TheRide

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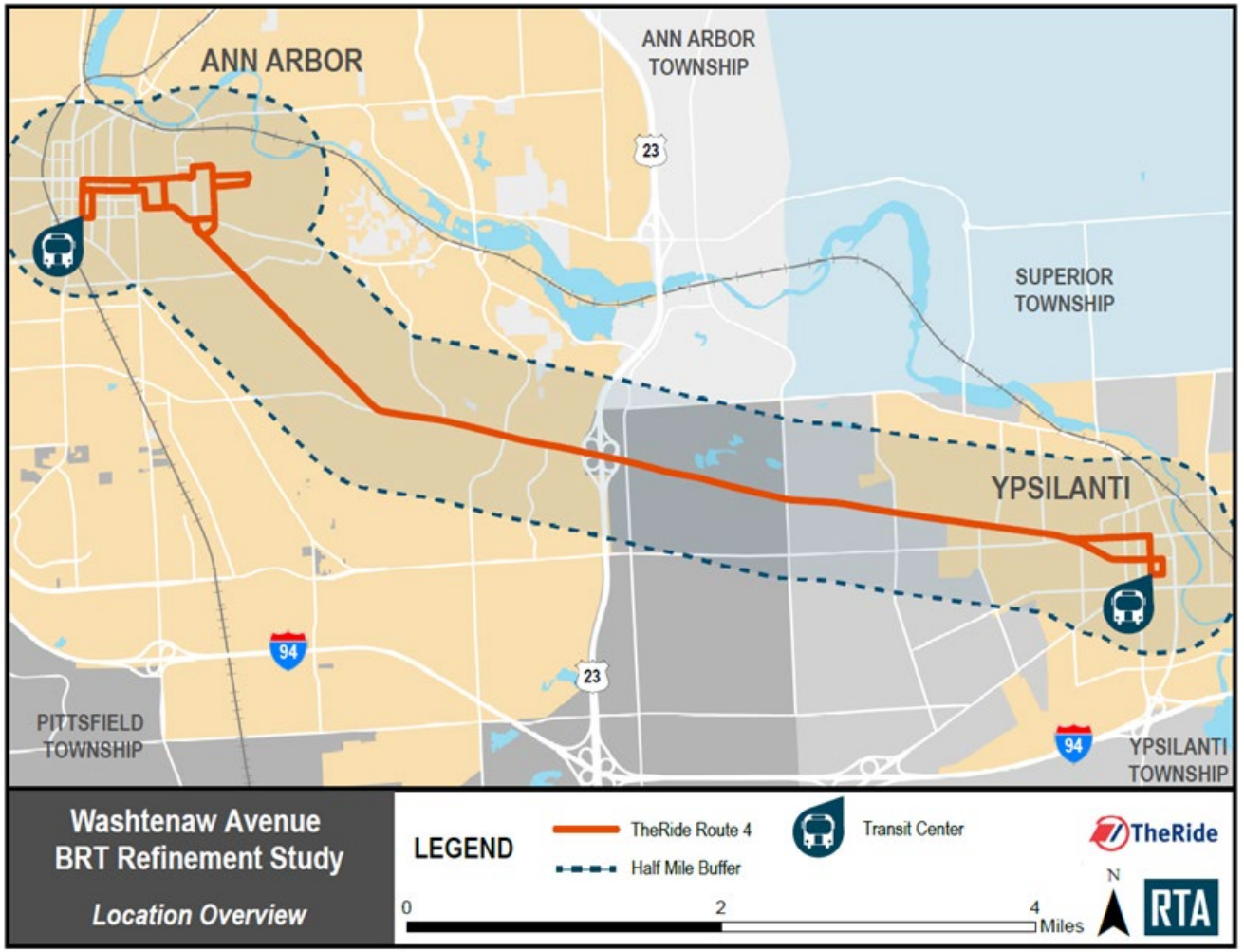
Introduction

The Washtenaw Avenue Bus Rapid Transit (BRT) Refinement Study has been led by the Ann Arbor Area Transit Authority (AAATA), whose transit system is called TheRide, in partnership with the Regional Transit Authority for Southeast Michigan (RTA). The purpose of the work has been to develop a more detailed design and operational strategy for improving transit along the Washtenaw corridor, building from TheRide's existing Route 4 service and consistent with the RTA's previously proposed Bus Rapid Transit (BRT) project. The study area follows Washtenaw Avenue (M-17) and the Route 4 alignment, passing through many communities within Washtenaw County, including the City of Ann Arbor, Ann Arbor Township, Pittsfield Township, City of Ypsilanti, and Ypsilanti Township.



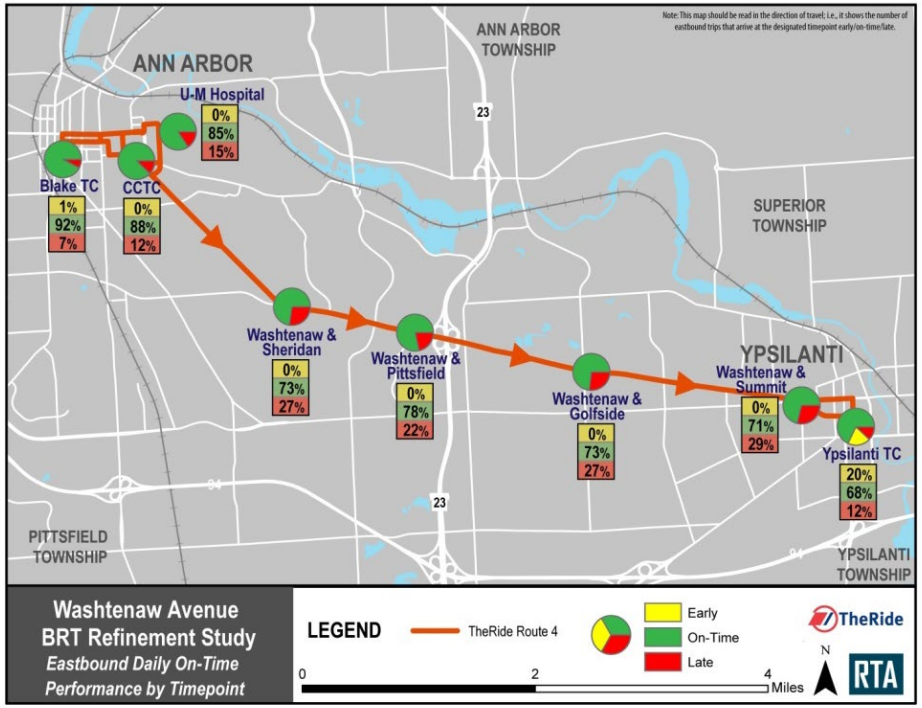
Why Focus on Washtenaw?

Route 4 Boardings					
Direction	**AM Peak**	**Midday**	**PM Peak**	**PM Late**	**Total**
Westbound	936	1,029	430	170	2,565
Eastbound	226	770	909	444	2,349
Total	1,162	1,799	1,339	614	4,914
Route 4 Alightings					
Direction	**AM Peak**	**Midday**	**PM Peak**	**PM Late**	**Total**
Westbound	945	1,056	443	165	2,610
Eastbound	275	839	946	475	2,535
Total	1,220	1,896	1,389	641	5,146

Source: AAATA 2017 September Bid Route 4 Average Weekday Ridership

The Washtenaw Corridor has the highest service levels and daily ridership in the system.

Route 4 has approximately 5,000 boardings per weekday, making it the most highly utilized route in TheRide's system. The heaviest passenger loads are on the westbound trip into Ann Arbor in the morning peak (and the reverse trip during the afternoon peak), but as shown in the table below there is significant ridership activity that occurs throughout the day in both directions.



Transit service along the Washtenaw Corridor experiences significant delays due to traffic congestion.

Route 4 experiences significant challenges in on-time performance, which is driven by traffic congestion issues in the corridor. In particular, central portions of the Washtenaw Avenue corridor around the US-23 Interchange are where traffic congestion and bottle necks tend to be concentrated, and where on-time performance is most impacted and affect more than 1 out of every four trips (see left). Utilizing the capabilities of traffic signal technology to actively manage congestion and provide higher-capacity transit vehicles with priority at intersections could allow for better performance and end-to-end speed of service. Although many of these capabilities exist at the traffic signals and on vehicles, the various jurisdictions need to develop a coordinated technology and operations strategy to improve conditions.

The Washtenaw Corridor connects TheRide's two hubs.

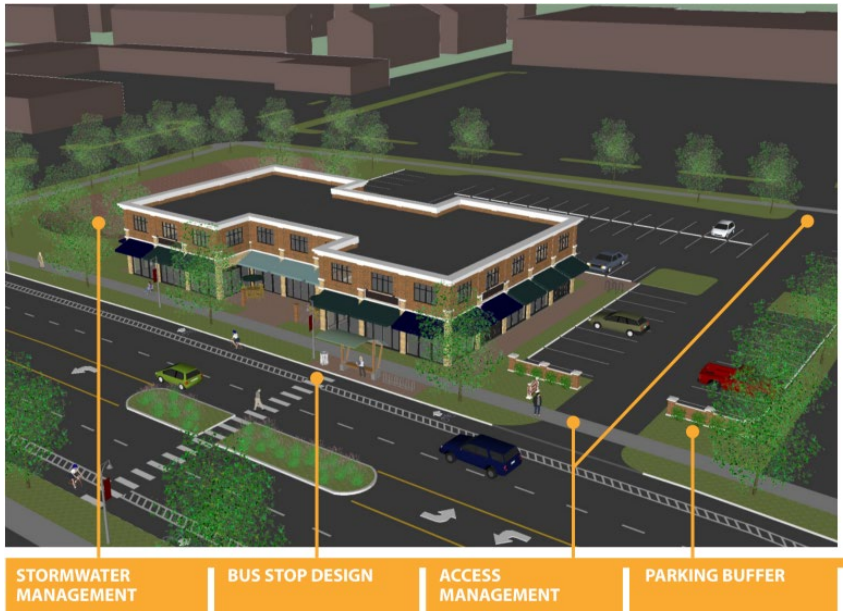
TheRide's system is largely structured around its transit centers in Ann Arbor and Ypsilanti, with nearly all routes connecting at one of these two locations. Route 4 provides the most direct connection between the two hubs. Many riders on the Corridor make timed connections to numerous other routes. Further, there is evidence suggesting that there is a significant end-to-end travel market between downtown Ypsilanti and Ann Arbor, a trip that is currently scheduled to take up to 45 minutes on Route 4.

Regional planning has identified the Washtenaw Corridor as having significance for potential investment.

In 2015, the RTA initiated the Michigan Avenue Corridor Study to identify and evaluate a series of transit investment alternatives to develop and improve transit service between Detroit, Ann Arbor, Detroit Metropolitan Wayne County (Metro) Airport, and intermediate communities. Within Washtenaw County, a BRT investment along Washtenaw was identified as part of a network of services that could provide rapid transit-connectivity along the Washtenaw Corridor, along with a regional rail service that would connect Ann Arbor and Ypsilanti to Detroit. Through this work, an express, faster service along Washtenaw was shown to have regional significance and to potentially compete strongly funds through the FTA's Capital Investment Grant program.

Local planning seeks to transform Washtenaw into a more transit-supportive, mixed-use corridor.

Existing land uses along much of Washtenaw Avenue feature an auto-centric development pattern that limit the ability to provide



Recent planning and design guidelines, developed through the ReImagine Washtenaw initiative, envision more dense and walkable land use along the corridor.

the high quality of place residents and visitors expect. These issues led to the emergence of the *ReImagine Washtenaw* study: a collaborative planning effort that began in 2009 with clear goals to transform the corridor into a vibrant, multi-modal, mixed-use corridor that more efficiently moves people. Follow-on work has offered detailed actions to achieve the communities' land use and transportation vision, including the creation of transit "super stops" at key development nodes. Washtenaw County provided technical assistance to update land use plans and zoning codes, to develop and adopt detailed Design Guidelines, and has also been instrumental in executing several ongoing physical improvements in the corridor, from sidewalk infill to improved crossings and signals.

Recommended BRT Solution

Bus Rapid Transit is not a one-size-fits-all solution, but can combine multiple elements that improve transportation efficiency, enhance safety and comfort, and support economic development.

Each of the seven elements in the table below can be incorporated at different levels (low-, medium-, high-), with highlighted elements being those initially being recommended for Washtenaw.

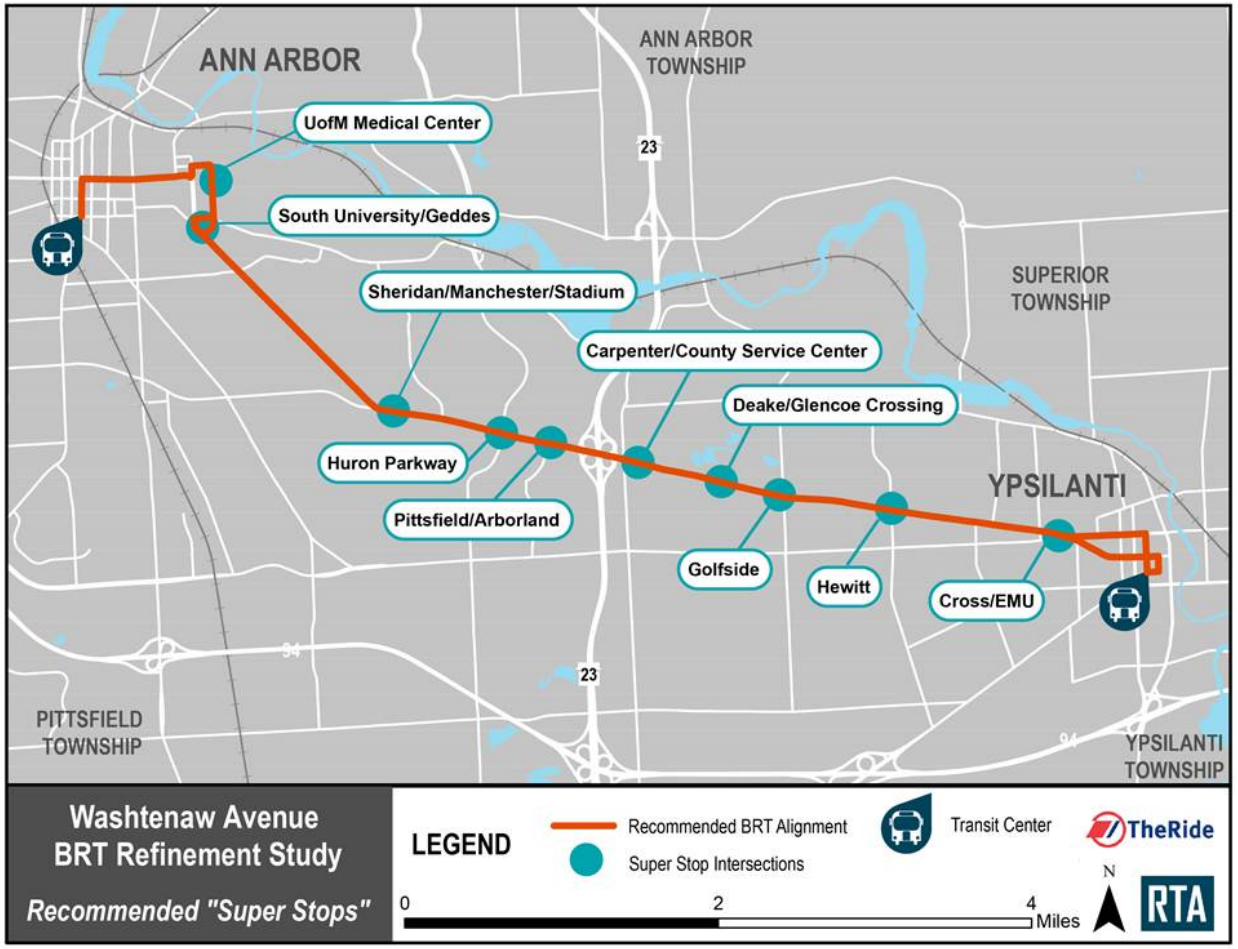
Element	Low-Scale BRT	Mid-Range	Full-Scale BRT	What's Recommended for Washtenaw?
Running Ways that provide exclusive space for transit vehicles.	Service operates in mixed traffic.	Queue jumps at congested intersections, or portions operating in dedicated lanes.	Full corridor separated from general traffic and in its own dedicated lane.	Previous studies have indicated limited options for dedicated lanes unless there is major, costly expansion of roadway. Key congested intersections can be targeted for queue jumps.
Service & Operations Plan that provides direct connections and stops less frequently to speed up service.	Limited stop consolidation, all buses still serve existing stations.	Mix of faster BRT service while keeping underlying local bus service in corridor.	Operate corridor to serve highest-boarding stations and fastest end-to-end travel times.	Limited stop operations would offer significant time savings when combined with other features. With level-floor boarding local vehicles would need to stop at different stations.
Intelligent Transportation Systems that give buses priority at signals and provide real-time information at stations.	Passive transit signal prioritization and utilization of existing bus tracking features.	Active TSP management in coordination with traffic management and real-time arrival info at stations.	Fully connected stations and vehicles to allow for communications and active signal management.	Many of the vehicle and signal technologies to support TSP already in place, but there is a need to establish connectivity to traffic management systems and define operational protocols.
Stations that contain additional amenities for comfort, access and improved boarding capability.	Shelter and amenities at each stop location.	Inclusion of pedestrian and bicycle access amenities around each station.	Distinct station platform with level-floor boarding and new park-and-ride facilities.	Station access and crossings of Washtenaw are needed items at many station locations. Level-floor boarding would speed up service and additional amenities would lend support for corridor land use vision.
Fare Collection that reduces boarding times.	Standard fares payment options with policies to reduce cash payment.	Additional payment options (e.g., Mobile) on vehicles to reduce on-board transactions.	Fully off-board fare collection with vending machines at each station.	Off-board fare collection machines add significant cost but would also help speed up boarding process. Enforcement of fare payment will need to be considered.
Vehicles that have additional space or incorporate new propulsion technologies.	Standard agency vehicles.	Specially-branded vehicles, potentially larger with additional capacity.	Specially-branded vehicles with faster, all-door boarding capability.	Specially-branded vehicles would differentiate service for broader customer base. Adding level-floor boarding capability would offer operational benefits. Could consider vehicles with alternative propulsion technology, but this would require new fueling and facility resources.
Unique Branding that differentiates the service and is incorporated into the design of vehicles and other investments.	Service is branded as express route within system.	Service contains new naming and branding at stations.	Branded vehicles, stations and other marketing materials.	Rebranding of service consistently across all aspects of experience has been shown to attract a new market of customers based on other projects.

Item highlighted in darker blue represents basic option recommended for Washtenaw. Light-blue items are potential "added-value" features.

Routing and Operations Plan

The recommended limited-stop BRT route would provide service generally consistent with current Route 4, travelling primarily along Washtenaw Avenue and connecting the Blake Transit Center in Downtown Ann Arbor with the Ypsilanti Transit Center is Downtown Ypsilanti. In downtown Ann Arbor, the route would serve a simplified alignment that directly accesses the U-M Medical Campus (a primary destination point along the current route). The service would only stop at a limited set of stations (as shown in the map) spaced approximately ½ mile to 1 mile apart.

The service plan for the corridor would preserve local service operating twice an hour, but for the majority of the day (from approximately 6 am to 8 pm) the BRT service would offer service every 10 minutes on weekdays. A more even mix of local and BRT service could be considered for lower-ridership periods in the late night and on weekends.



Transit Priority Treatments

While many BRT systems operate in a dedicated lane, previous studies of Washtenaw Avenue have concluded that traffic and right-of-way conditions preclude the use of continuous or even significant use of dedicated lanes (at least in the near future). Nevertheless, transit priority treatments at intersections, including transit signal priority (TSP) and queue jumps, when combined, could reduce transit travel times and make service more reliably on time during congested periods.

Transit Signal Priority (TSP): TSP systems are a combination of traffic signal technologies and control strategies that adjust traffic signal

timings in favor of transit vehicles by giving them a higher priority to traverse signalized intersections within a corridor. The primary objective for an agency when deploying TSP systems is to improve operational performance by reducing delay and increasing reliability. Investigation of the current state of technology and coordination with local jurisdictions indicate that many of the technology tools are already in place to achieve TSP, but that additional investment will be needed to better connect the various devices, and work will need to be done to develop an operational protocol or set of rules for how the system should operate. The preliminary recommendation for Washtenaw is a two-stage process to establish the communications backbone and then begin to leverage developing technology around connected vehicle infrastructure.

Queue Jumps: Queue jumps are locations at intersections where buses are provided with an opportunity to avoid traffic backups in order to speed up service and remain on time. The proposed queue jump treatments along Washtenaw have been developed based on locations where traffic congestion is known to be an issue, and also where there are likely opportunities to fit them in given the current roadway configurations. The proposed locations are at Sheridan/Manchester, Huron Parkway, Pittsfield/Arborland (WB), Carpenter/Hogback, and Hewitt. In most cases, at these locations a right-turn lane for vehicles can be converted for use by through-traveling transit vehicles as well. In other cases, minor roadway infrastructure changes may be required to accomplish the desired jump.

Service		Travel Time *(YTC to BTC)*	
		Peak Period	Off-Peak
Existing Route 4		45 minutes	42 minutes
Limited Stop BRT		34 minutes	31 minutes
Difference	**Time**	*-11 minutes*	*-11 minutes*
	%	*24%*	*26%*

The combination of limited stops and priority treatments could make service more reliably on time and save approximately 25% on travel time.

When taking into account these improvements as well as the limited-stop operations of the BRT, the combined effect on travel time could be significant. The table below indicates that end-to-end service could occur approximately 25% faster than current Route 4.

The limited stop BRT service is expected to have an end-to-end travel time of 34 minutes in weekday peak operation and 31 minutes in weekday midday operation, an improvement of 11 minutes over existing in both time periods. The travel time improvement for the BRT service is primarily due to the limited stop pattern and the proposed transit priority treatments.

Station Locations

To determine the optimal location of BRT stations, each of the 35 existing stop locations across the Washtenaw Corridor were compared and rated using the following evaluation categories:

- Population
- Equity Population
- Employment Density
- Ridership
- Connectivity (to other modes)
- Development Potential

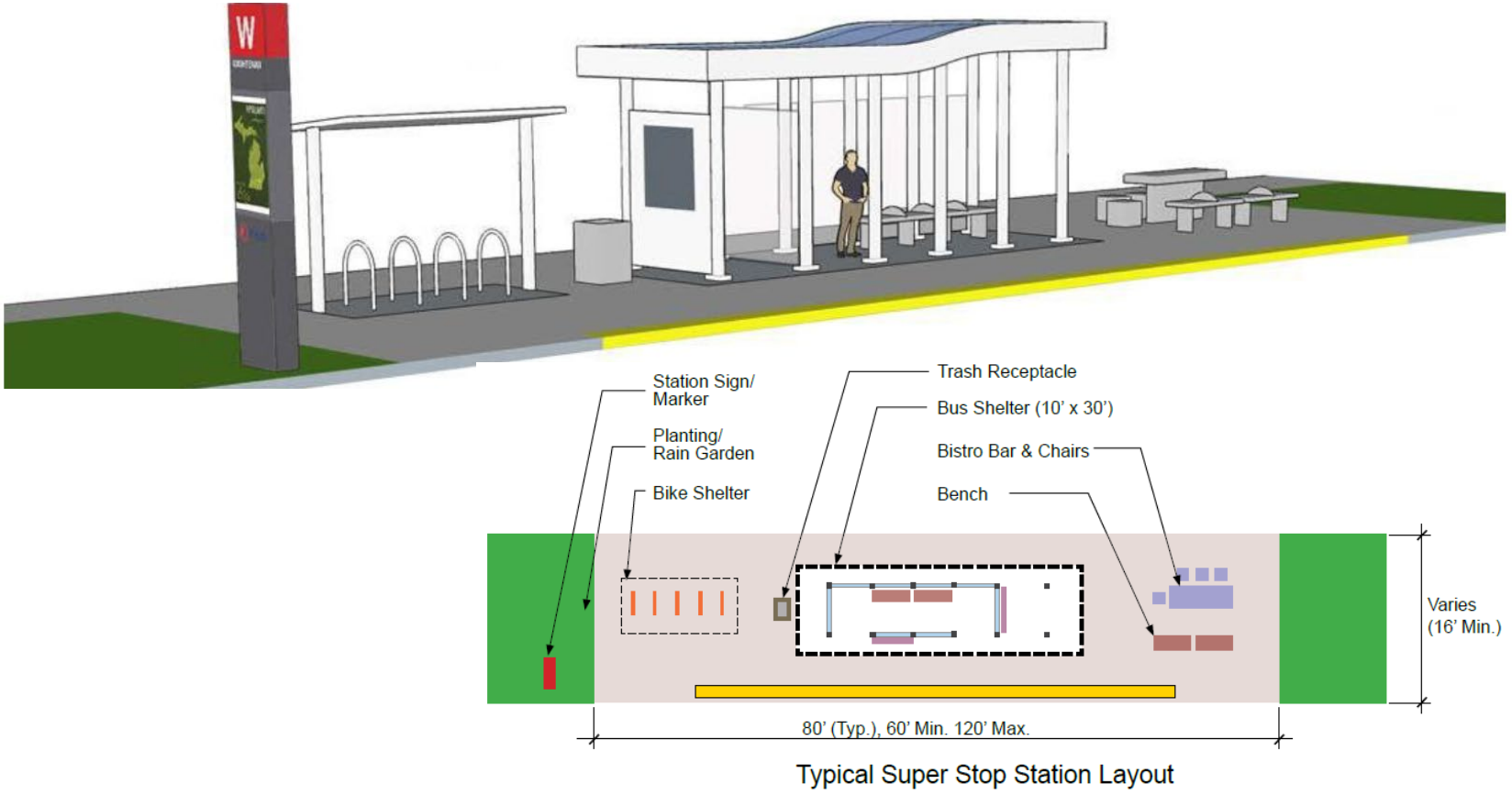
The map on the previous page shows the stops identified as the highest priority locations for BRT stations and amenities along the route.

Station Amenities and Design

Each selected location would provide a set of customer amenities that would include new expanded shelters, enhanced seating, bike parking, lighting and security features. In addition, each station will be an investment in placemaking, providing landscape, streetscape, and accessibility elements that prepare it for redevelopment.

The station prototypes are shown below. These designs incorporate much of the same elements as ReImagine Washtenaw, and were developed through consideration of design consistency and the overall site conditions along the corridor, recognizing that the space and configuration of elements may need to change depending on the surrounding context.

Station Prototype Design



Typical Super Stop Station Layout

Washtenaw BRT Costs

Initial cost estimates for the recommended investment have been developed based on other recently constructed projects.

Operations & Maintenance

An annual operations and maintenance (O&M) cost was developed based on the estimated increase in the number of revenue hours, generally using TheRide's current cost per revenue hour for operating its service. Overall, due to the significant existing service on Route 4, the incremental new operations cost is only about 20% greater than the current corridor service. Currently, TheRide's annual cost of operating Route 4 is approximately $4.5 million (FY18$), and the added service would add $1 million per year, accounting for both BRT and local service operating in the corridor.

Capital Investment

Capital costs for the Washtenaw BRT are presented in the table below. Three options are displayed:

- A basic BRT investment in vehicles, stations and transit-priority elements
- An "added value" BRT that includes elements such as park and ride lots, level-floor boarding, off-board fare collection, and accompanying enhancements to the downtown transit centers
- An investment that accounts for a new transit operations and maintenance facility for the BRT fleet (possibly with CNG or electric vehicles)

Project Element	Included Items (*"added value" items in parentheses*)	Range of Costs (2018$)		
		Basic BRT investment	Including "added value" elements	Including new facility and alt. vehicles
Roadway	Relocated curbs, concrete pads, grading, intersection improvements	$3,700,000	$4,800,000	$4,800,000
Stations	Shelters, seating, station amenities and landscaping (*two park and ride lots, raised station platforms, enhancements to downtown transit centers*)	$4,800,000	$9,200,000	$9,200,000
Maintenance Facility	Per vehicle for allowance for maintenance facility upgrades	$3,900,000	$4,700,000	$25,000,000
Systems	Traffic signals, on-board units, system software (*ticket vending machines at each station*)	$1,300,000	$5,400,000	$5,400,000
Vehicles	New specialized 11-vehicle diesel bus fleet	$7,600,000	$9,400,000	$11,300,000
Professional Services	Environmental, engineering, design, construction	$5,000,000	$8,900,000	$16,000,000
Unallocated Contingency	10% added contingency on all elements	$2,600,000	$4,300,000	$6,200,000
Total Costs		**$28,900,000**	**$46,700,000**	**$78,900,000**

Right-of-way costs are not included in the cost estimate.

Potential Next Steps

The recommended project is currently being reviewed by leadership at TheRide as well as the public and key stakeholders. At the conclusion of that process, and if there is sufficient support for the concept, BRT for the Washtenaw Corridor could advance into project development process. This would involve more detailed design and evaluation as well as securing funding, as described below.

Funding

The primary funding resource for corridor transit projects in the U.S. is through the FTA's New Starts / Small Starts program, which will fund up to 80% of the capital costs (although federal support at 50% is more typical in recent years). Analysis of the project's costs and benefits make it likely that the Washtenaw BRT would be rated competitively by the FTA. Consideration of the project's eligibility would begin with a letter to the FTA formally requesting entry to the program. Discussions with the Regional Transit Authority and the Michigan Department of Transportation could also help identify non-federal funding resources to help with local match and continued project development.

Environmental and Community Impact Analysis

A federally-funded investment in the corridor would need to gain approval through the National Environmental Policy Act (NEPA). The first step in this process is to determine the class of action in consultation with the FTA, during which the scope of the environmental screening needs could be better understood. Based on the Washtenaw project's anticipated impacts, a focus would likely be the impact to traffic operations along the corridor as well as multiple rounds of public engagement to refine the project's footprint and design, including any accompanying facilities (e.g., expanded operations center) needed to operate the service.

Detailed Design

Upon approval through the NEPA process and securing of funding, the project would launch into a detailed design process that would refine and finalize all elements of the project including the design of vehicles, stations, and other amenities. Throughout the final design process there would continue to be opportunities for public review and comment on project elements.