



Bus Stop Optimization Study

Executive Summary

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INTRODUCTION/BACKGROUND

The purpose of this Bus Stop Optimization Study was to evaluate approximately 3,400 bus stops in the RTS Monroe County service area and to provide recommendations to improve the placement of bus stops, resulting in a pattern of stops that is more effective and efficient for bus patrons and bus operations.

Placing of bus stops requires a balance between convenience for the walker and the rider. A little more walking (2 minutes or so more) could reduce the overall travel time by 10 to 20%.¹

Goal is to optimize the stop placement to

- reduce travel times
- lower emission and operating costs and
- improve the overall customer experience
- encourage new customers

Bus stop placements in RTS system grew over time, with no clear guidelines for bus stop spacing, quantity or density. It became clear to RTS officials that a bus stop optimization study was needed. RTS retained the services of Passero Associates, who teamed with Kimley – Horn, to conduct the study.



1. *Eliminating Bus Stops*: Shrestha & Sohik, George Mason University, 2013

STUDY METHODOLOGY

The study consisted of five parts: Data Collection on approximately 3,400 bus stops; Research of Industry Standards; Development of a Bus Stop Analysis Tool, Public Input and Recommendations. The data collection was conducted from January to March of 2014. The first public meeting was held on March 25, 2014. The analysis was performed during April to July with draft recommendations issued in June of 2014. Several meetings were held between RTS staff and the consultants to refine the analysis and the recommendations. The final recommendations were issued in August 2014. A second public workshop meeting was held on September 18, 2014. The five study steps are explained in further detail following.

Data Collection

Bus Stop Inventory

The bus stop inventory of approximately 3,400 stops over 40 bus routes was conducted to ascertain the condition of the bus stop, the bus stop sign, and the access around the bus stop. The information on the bus stop sign was collected because with the opening of the new downtown transit center on 11/28/14 and the rebranding effort, all of the bus stop signs are being replaced. The consultants used several methods to collect the inventory data. The consultants used RTS's Bus Stop Manager database which included information on each bus stop, including type of stop, location of stop by coordinates, any amenities such as shelters or pads and photos. This information was supplemented with the use of Google Street Maps and Pictometry to view the condition and visibility of each stop and, where necessary, site visits were conducted. The consultants entered all of this data into an inventory data spreadsheet which broke down the data into the following categories: Bus stop location; bus stop type; bus stop amenities; bus stop sign mounting details, bus stop deficiencies, nearby generators, and proximity to features (i.e. trees, driveways, overhead wires).



STUDY METHODOLOGY

Industry Standards

RTS does not have a standard for bus stop spacing so they looked to their consultants to seek out what practices other transit agencies used. These standards are intended to ensure there are not more than the specified number of stops per mile because if the stops are too closely spaced, bus operating speeds drop and the overall level of service for riders is reduced. There is an inevitable trade-off of convenience for riders to access the transit system and the level of service possible given the number of times the buses are required to stop. The consultants found that there was no uniform practice in terms of bus stop spacing but found the most common practice used 6 – 8 stops per mile. (Note: Some existing RTS routes have portions of the route with stop spacings of up to 14 stops per mile). The consultants recommended the following spacing standards for two types of service environments. In urban areas the typical stop spacing would be 750' with a goal of 7 stops per mile. In suburban areas the typical stop spacing is 1000' with a goal of 5 stops per mile.

A similar research of industry standards² on the location of shelters suggests that a common practice is to place shelters at bus stops that have the following boarding levels:

Location	Boardings
Rural	10 boardings per day
Suburban	25 boardings per day
Urban	50-100 boardings per day

Other criteria must also be evaluated for the potential inclusion of a shelter:

- Site specific limitations, such as available space, land use compatibility, accessibility, visibility
- Number of transfers at stop
- Proximity to major activity centers

2. TCRP Report 19, *Guidelines for the Location and Design of Bus Stops*: Transportation Research Board, 1996

STUDY METHODOLOGY

Bus Stop Evaluation Tool

With the inventory complete and the bus stop spacing standards set, the consultants proceeded to analyze the bus stop data. To conduct this analysis the consultants prepared an interactive spreadsheet that allowed for the rapid analysis of the vast database using multiple scenarios in order to arrive at the optimum bus stop spacings and locations for each bus route. A number of stops were identified as critical stops (Tier 1) which were protected from elimination due to their status as being a transfer point, having a shelter, being an announced stop or stops associated with private partner support. There were 618 stops identified as critical and coded to remain in the evaluation tool. The analysis then used two factors; the primary factor was the spacing standards and the secondary factor was ridership. Several iterations were run until optimal bus stop spacing was achieved.

The results were then displayed using GIS mapping tools. Maps were prepared for urban and suburban routes and bus stop dispositions were color coded to identify stops being removed, saved or relocated. The GIS mapping allowed for easy visual interpretation of the bus stop placements and identified clusters of stops along a route or long gaps in coverage. These areas were then scrutinized further to see if there were local conditions that caused these anomalies.

RTS staff also assisted in analyzing these anomalies and suggested different search factors to use to better optimize the bus stop placements. The evaluation tool easily allowed for these refinements and updated mapping was prepared.



RECOMMENDATIONS

Bus Stop Placements

- Keep 618 critical stops (Tier 1)
- Eliminate 472 stops along urban routes (27% reduction)
- Eliminate 437 stops along suburban routes (27% reduction)
- Use new recommended bus stop spacing guidelines of 7 stops per mile within City of Rochester and 5 stops per mile in Monroe County suburbs for locating future bus stops

Bus Stop Amenities

The Bus Stop Inventory provides a listing of amenities (e.g., shelters, concrete pads, benches) at each stop. The industry standards for shelters provide RTS with sufficient information to plan future improvements.

RTS does not provide funding for benches at bus stops. RTS will consider assisting neighborhood and private organizations, which will purchase and install the benches, with the planning and logistics involved in the effort.

Bus Stop Signs

RTS is undergoing a rebranding effort in which new signs will be installed at all bus stops. The new signs will clearly display which route numbers are served at each stop. The inventory provides information on sign post condition, height and type, which will facilitate the proper installation.



PUBLIC INPUT

RTS recognized that changes to bus stop locations could negatively impact some of their customers for a variety of reasons (mobility, accessibility, safety, convenience, weather) and approached this study with their needs in mind. **RTS** conducted an extensive public information campaign to be sure that their customers were well informed and had opportunity to provide input. The public participation campaign consisted of the following:

- Initial Public Informational Meeting on 3/25/14 to explain the study's objectives and provide a forum for questions and input.
- Press releases
- Information on **RTS** website
- Public Workshop on 9/18/14
- Public comments were accepted up to October 17, 2014.

RTS received 53 requests for a change to a bus stop recommendation and after further analysis 39 were granted. **RTS** will continue modifications of the recommendation as public input is received.



IMPLEMENTATION

- Bus Stop Sign replacements and Bus Stop removals will begin Spring 2015 and be completed in approximately a year.
- Bus Stops to be removed will be marked at least two weeks prior to removal.
- RTS will work with the City of Rochester and MCDOT to identify and implement any changes to parking restrictions caused by bus stop removals.

