

March 2024

Transit On Demand Service Development

Methodology



Overview & Introduction



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In the Comprehensive Operational Analysis for transit service in New Bedford, Route 221 was identified as a candidate for transit on-demand service.

In this document, we propose three potential TOD zones and explain how these zones were developed.

This document includes an overview of the resources needed to support these zones.

Existing Alignments



Review of the Area

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Existing Service: Route 221

- Route 221 is the North End Shuttle
- Service Characteristics
 - 9:00 a.m. – 5:00 p.m.
 - Daily service
 - 24 one-way daily trips
- Ridership
 - 49 Average Weekday Boardings (Oct 23)
 - 22 Average Saturday Boardings (Oct 23)
- Productivity
 - 2 boardings per one-way weekday trip.
 - Less than 1 boarding per one-way Saturday trip.
- Related Routes
 - 202, 204, 208

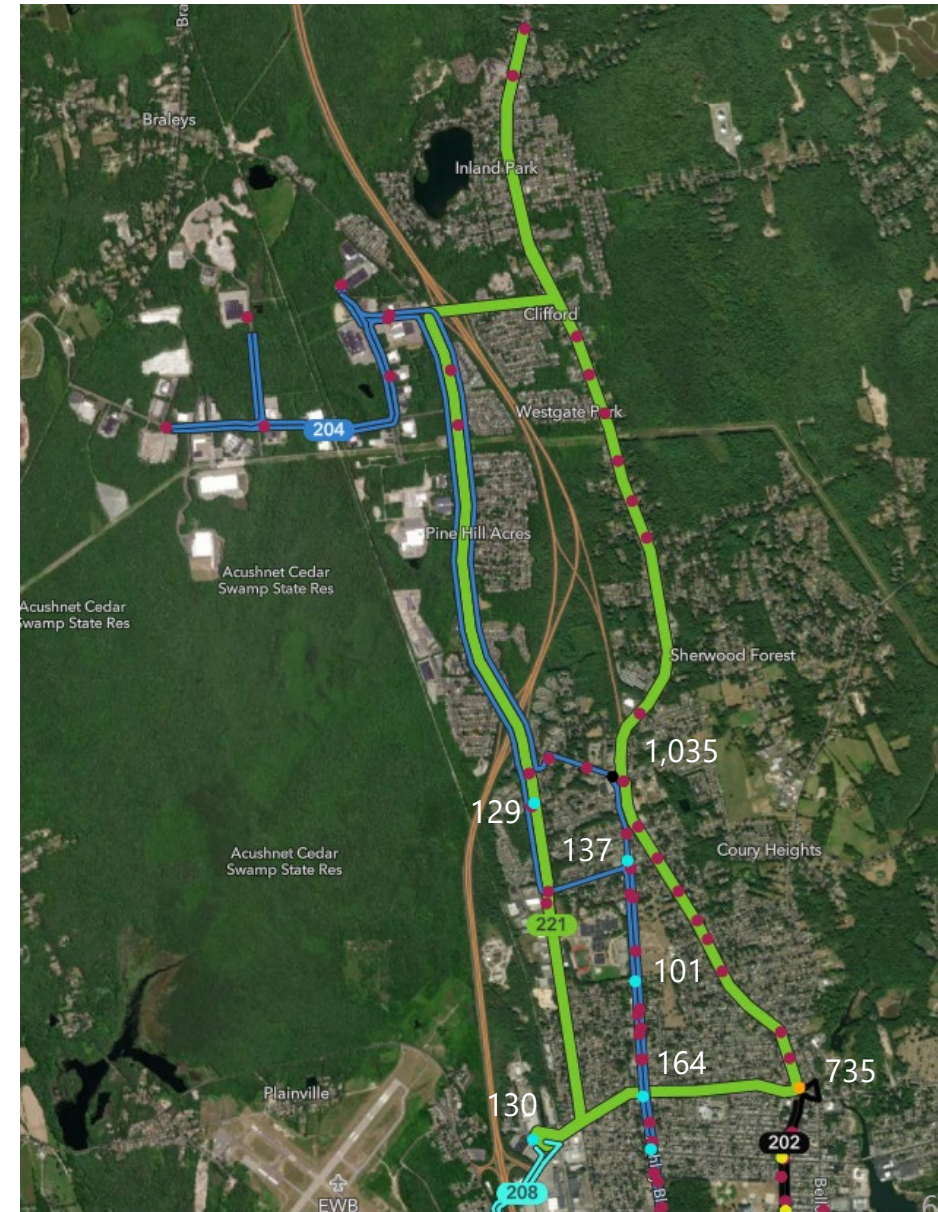
Existing Alignments



North End Ridership

- A significant number of stops have fewer than 100 boardings per month (stops in red)
- Samuel Barnet Blvd (New Bedford Business Park) is served by select Route 204 morning trips
- Phillips Rd near Trucchi's Supermarket has the highest ridership (1,035 monthly boardings)
 - It is served by Route 204
- Several stops are served by more than one Route
 - Eg: Routes 202, 204, 208, and 221.

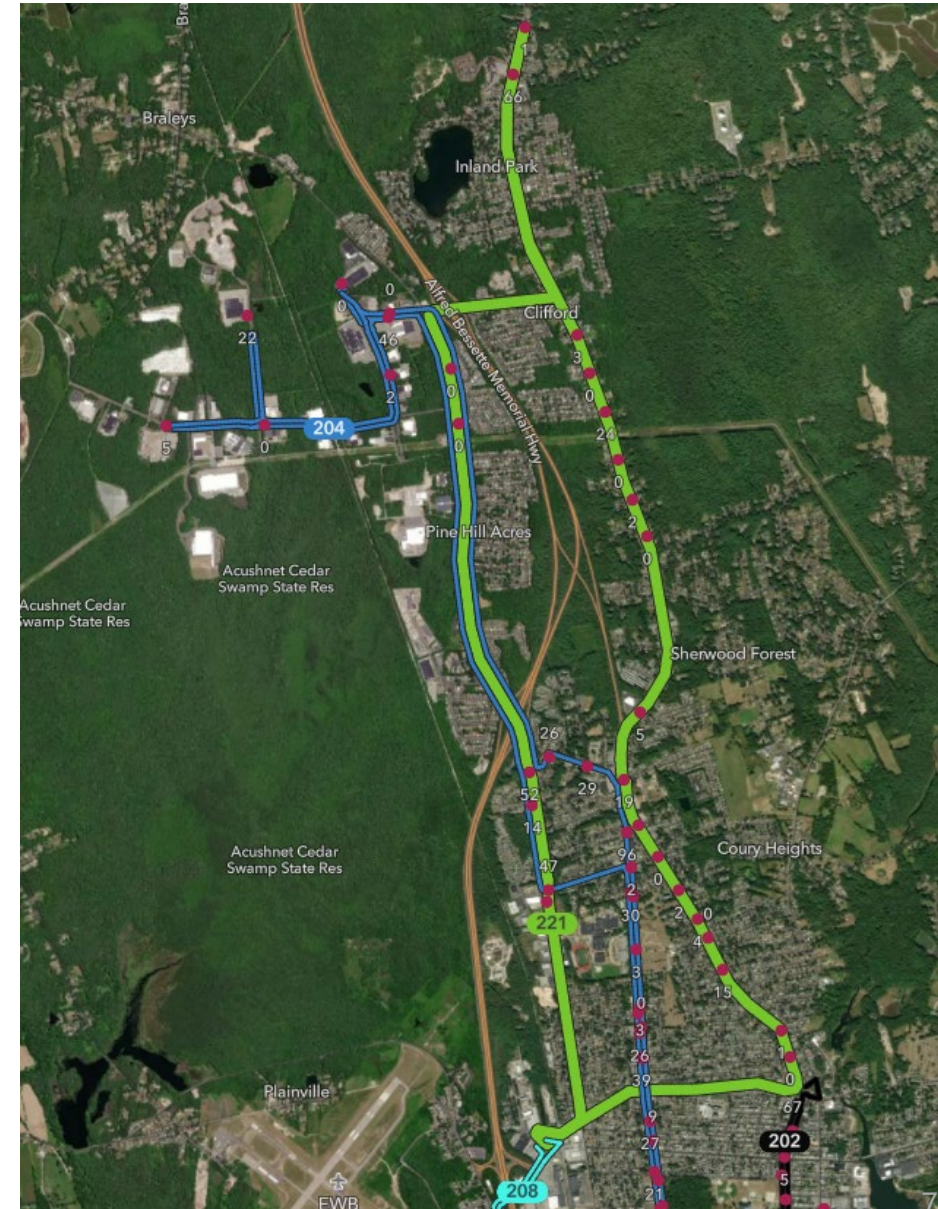
Area Stops & Ridership (monthly)



North End Ridership

- Many stops have fewer than 1 rider per day and some are utilized less than once per week.
- Route 221's highest ridership stop not shared with other routes is by the northern terminus of the Route, at Acushnet Ave and Elaine Ave by Vibra Hospital of Southeastern Massachussets.
 - This stop serves anywhere from 2-3 daily riders or 12 or more irregular riders per month.
- Ridership data appears incomplete for Church St. south of Chaffee St.

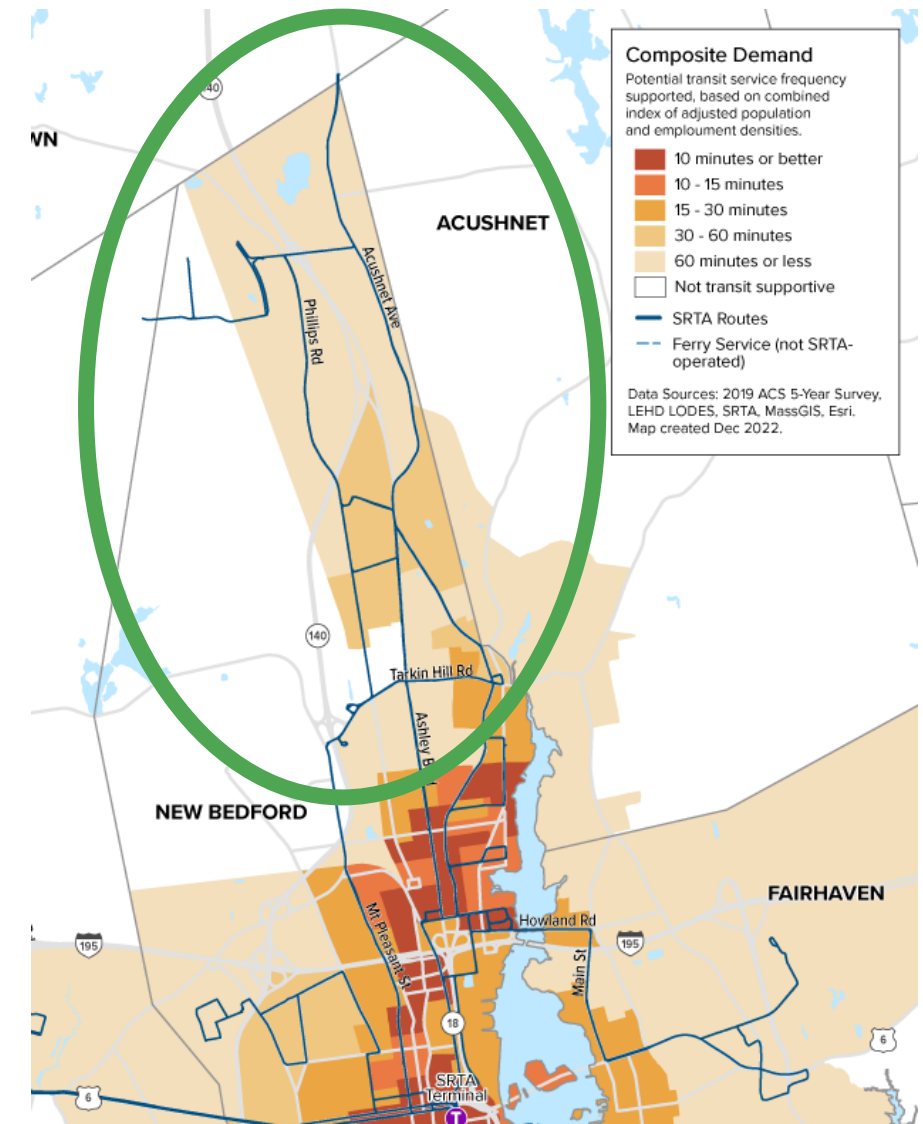
Area Low Ridership Stops (monthly)



Route 221: Underlying Demand for Transit

- The 2023 *New Bedford Bus Service Evaluation* analyzed the underlying demand for transit using demographic and jobs data to estimate the level of service that could be supported across the study area.
- Nearly all block groups in Route 221's service area are classified as "Hourly service or less" with higher service levels found closer to the northern termini of Routes 204 and 202.
 - This makes it a potential candidate for on-demand service.

Composite Demand of Route 221 Service Area



Developing TOD Zones

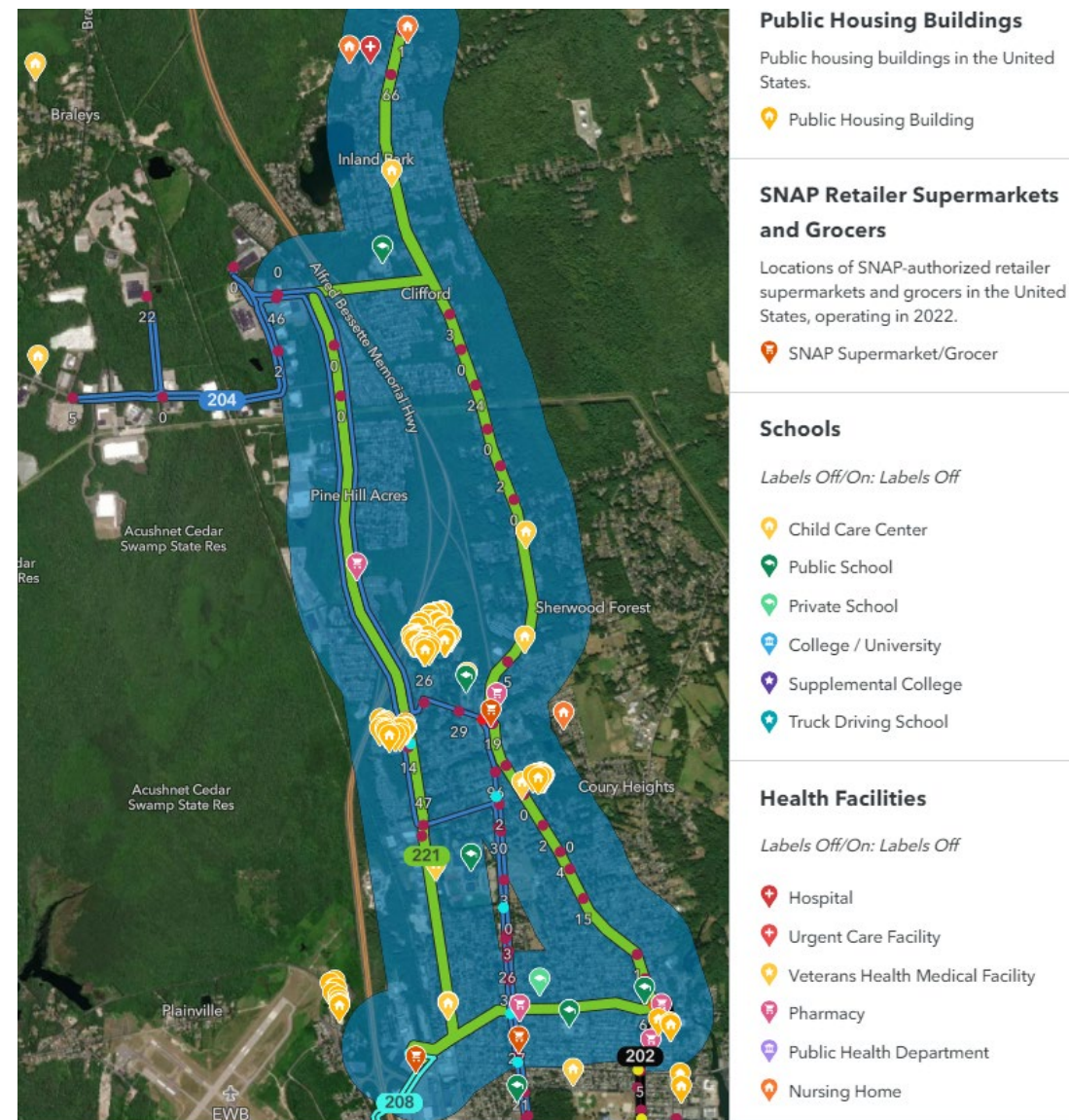


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Zone Considerations

- Underlying Demand for Transit
- Maintain service to:
 - Areas within one-quarter mile of the existing alignment
 - Significant/Important trip generators
 - Public Housing, Schools, Hospitals, Grocers
 - Connections to SRTA fixed-routes
 - 221 & 204 Transfer (Trucchi's Supermarket)
 - 221 & 202 Transfer (Tarkiln Rd/Achusnet Ave)
 - 221 & 208 Transfer (Stop & Shop)
 - These are also high-ridership stops
- Maintain existing vehicle requirement
 - Zone should not exceed 1 bus
- Opportunities for expansion and avoiding duplicative service

Quarter-Mile Buffer around Route 221 and Destinations



Zone 1

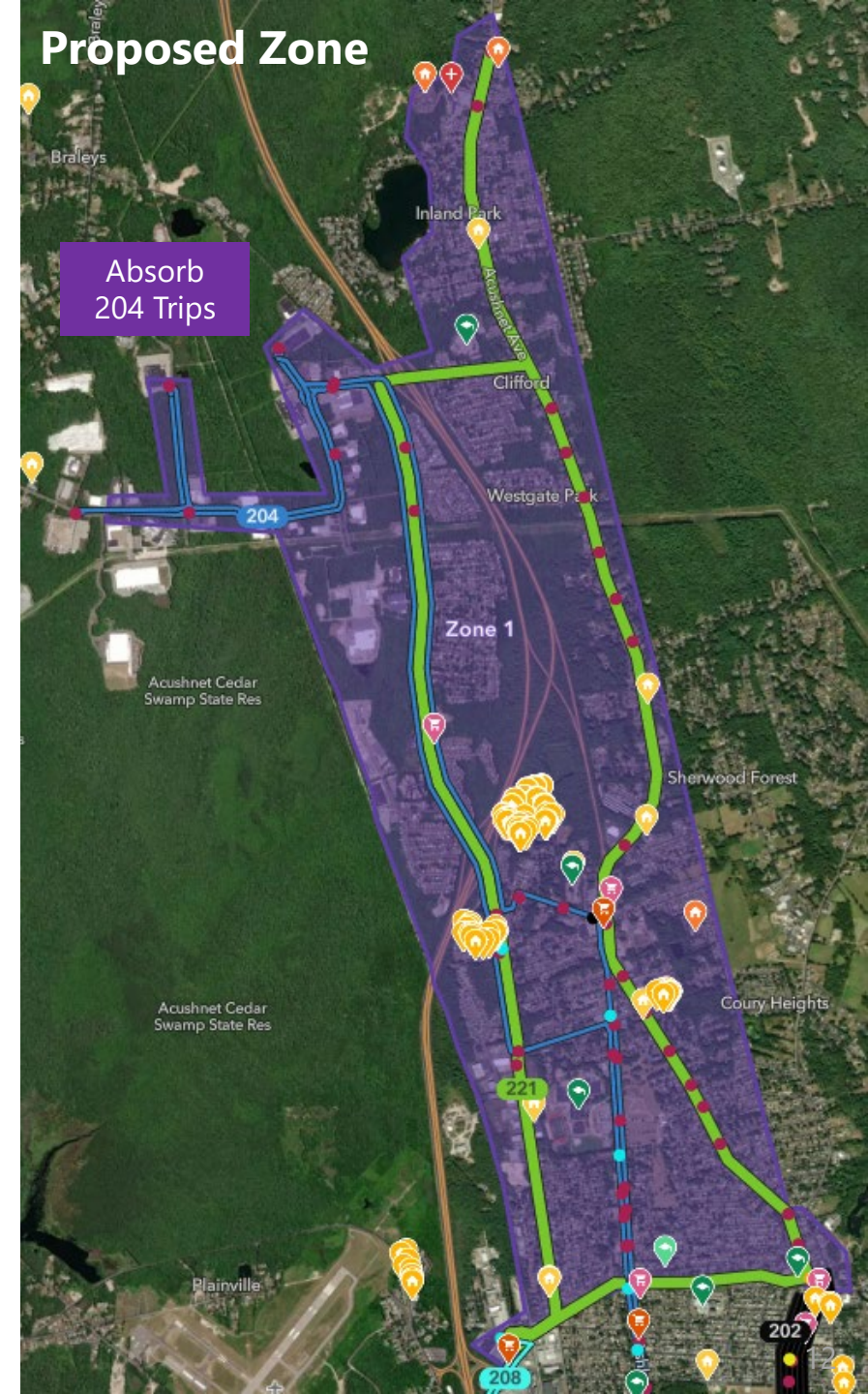
- Service Characteristics: Remix Estimates
 - Area: 3.9 square miles
 - Average Trip Distance: 2.3 miles
 - Assumes “Medium-High” ridership as base ridership
 - Oct 2023 fixed-route ridership in the zone: 2,938
- Other Considerations
 - This zone serves most of the developed area north of Tarkiln Hill Rd.
 - Maintains connections to all three related routes.
 - Service to the industrial park
 - Requires a discussion about the future of Route 204
 - Service retained to New Bedford boundaries

Performance Scenario Tables*

15-Minute Wait	Low	Medium	High	30-Minute Wait	Low	Medium	High
Weekly Rides	89	178	267	Weekly Rides	89	178	267
Trips per Hour	1.6	1.9	2.6	Trips per Hour	1.6	3.2	2.8
Peak Vehicles	1	2	2	Peak Vehicles	1	1	2

*Performance estimates are outputs from Remix, based on the size of the zone, demographics, and major destinations, among other factors, many of which are editable. Travel speeds are based on Monday 5pm traffic conditions. The methodology is detailed at <https://help.remix.com/en/articles/5614531-on-demand-planning>

Proposed Zone



Zone 2

- Service Characteristics: Remix Estimates
 - Area: 2.6 square miles
 - Average Trip Distance: 2.1 miles + Stop & Shop
 - Assumes “Medium-High” ridership as base ridership
 - Oct 2023 fixed-route ridership in the zone: 967
- Other Considerations
 - This zone excludes much of the overlapping service with Route 204’s trunk alignment.
 - Service to the industrial park (Requires a discussion about the future of Route 204).
 - Service retained to New Bedford boundaries

Performance Scenario Tables*

15-Minute Wait	Low	Medium	High	30-Minute Wait	Low	Medium	High
Weekly Rides	47	95	142	Weekly Rides	47	95	142
Trips per Hour	0.8	1.7	2.5	Trips per Hour	0.8	1.7	2.5
Peak Vehicles	1	1	1	Peak Vehicles	1	1	1

*Performance estimates are outputs from Remix, based on the size of the zone, demographics, and major destinations, among other factors, many of which are editable. Travel speeds are based on Monday 5pm traffic conditions. The methodology is detailed at <https://help.remix.com/en/articles/5614531-on-demand-planning>

Proposed Zone - Reduced



Zone 3

- Service Characteristics: Remix Estimates
 - Area: 2.6 square miles
 - Average Trip Distance: 2.1 miles
 - Assumes “Medium-High” ridership as base ridership
 - Oct 2023 fixed-route ridership in the zone: 967
- Other Considerations
 - This zone excludes much of the overlapping service with Route 204’s trunk alignment.
 - Excludes connection to Route 208.
 - Service to the industrial park (Requires a discussion about the future of Route 204).
 - Service retained to New Bedford boundaries

Performance Scenario Tables*

15-Minute Wait	Low	Medium	High	30-Minute Wait	Low	Medium	High
Weekly Rides	52	105	157	Weekly Rides	52	105	157
Trips per Hour	0.9	1.9	2.8	Trips per Hour	0.9	1.9	2.8
Peak Vehicles	1	1	1	Peak Vehicles	1	1	1

*Performance estimates are outputs from Remix, based on the size of the zone, demographics, and major destinations, among other factors, many of which are editable. Travel speeds are based on Monday 5pm traffic conditions. The methodology is detailed at <https://help.remix.com/en/articles/5614531-on-demand-planning>

Proposed Zone - Reduced



Evaluating TOD Zone Options



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Evaluating TOD Zone Options

To help choose which Zone makes sense for potential implementation, each of the zones are evaluated based on Key Performance Indicators (KPIs). This exercise also helps in the development of KPIs and how they can be measured.

Base Assumptions for KPIs Analysis

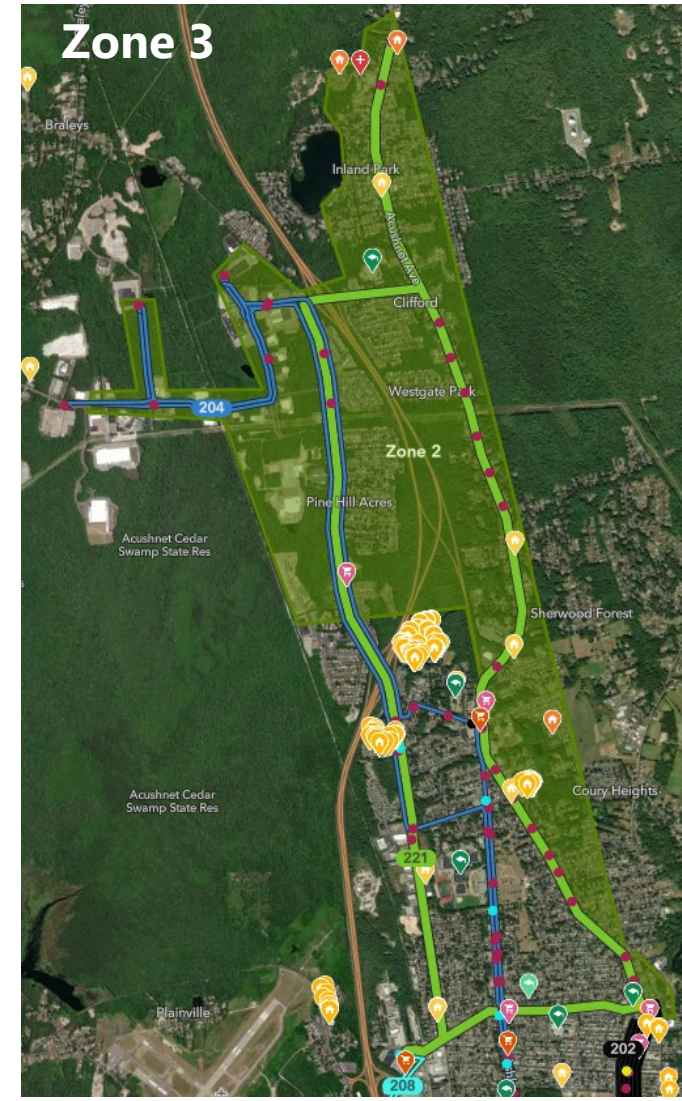
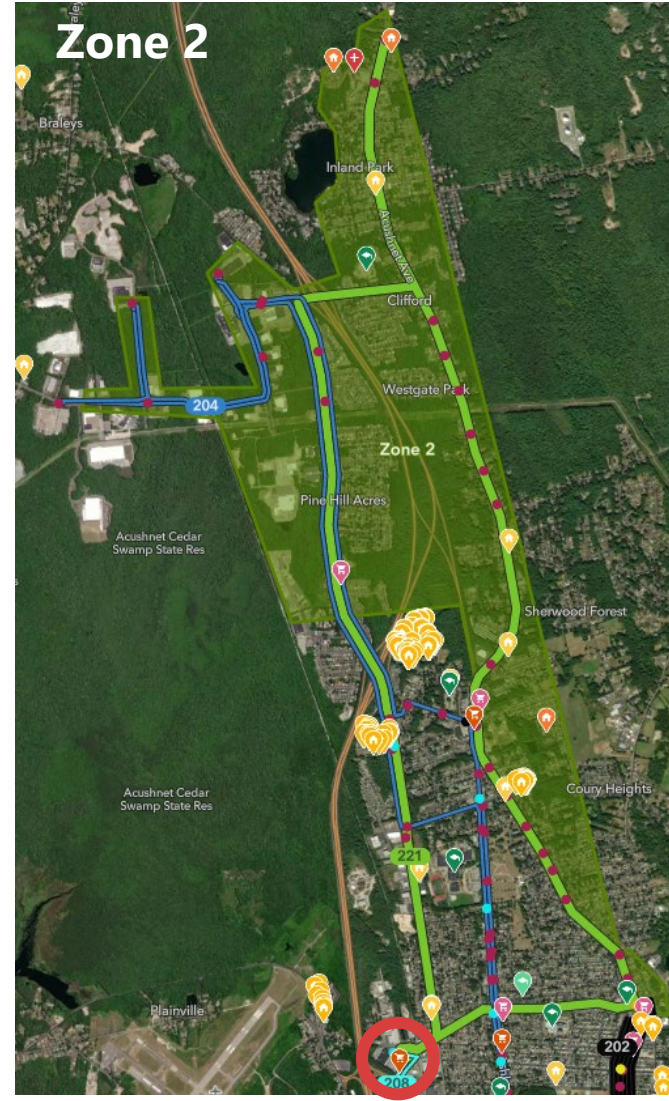
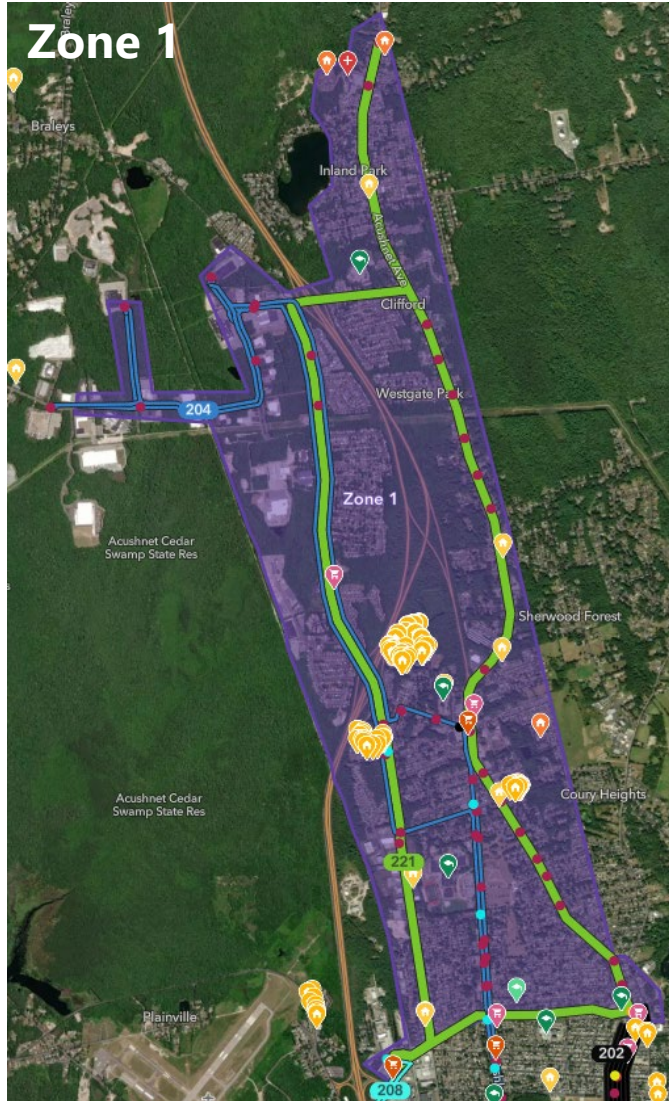
- **Service Type:** Point-to-point service within the zone
 - Zone 2 has one external point, providing a connection with Route 208 at Stop & Shop
- **Service Area:** Staying within New Bedford's boundaries
- **Assumed Hourly Cost:** \$80 – *This is Remix's base estimate*
- **Assumed wait time:** 15-minutes
- **Hours of Service:** 9:00 a.m. to 5:00 p.m., daily
- **New Zone:** A third zone, Zone 2 is being evaluated in addition to Zones 1 and 3. This zone has the same boundaries as Zone 3, however, it allows for connections to Route 208 at Stop and Shop. It was added after a discussion with SRTA.

Evaluating TOD Zone Options

■ KPI Evaluation:

- For several metrics, the evaluation is presented as a range. The Remix model offers a low, medium, and high estimate based on anticipated ridership.
 - The medium range is based on Remix's estimate of ridership based on factors such as demographics, housing, jobs, walkability, and key points of interest. This figure can be further refined by adding several "points of interest" to the zone (which has not been done for this exercise).
 - The low and high range, then take 50% and 150% of the medium estimate, respectively.
- **At least 75% of a zone is not within ¼ mile of an overlapping fixed-route bus service (Assessing Overlap in Coverage):**
 - In designing an on-demand service, one concern is making sure it is not competing with an existing or future fixed-route service. To measure if there is competition, we follow the following steps:
 - Step 1: Identify if there is significant overlap in service (in terms of time & length)
 - *Why: We don't want to include routes that make few trips in the zone or routes that briefly overlap with the zone (eg: 1 stop).*
 - Step 2: If yes, how much of the zone is outside of a ¼-mile buffer of the other service.
- **Zone development will prioritize communities historically neglected by transit service:** This metric compares the poverty rate of the zone to the poverty rate of the entire service area.
- **Percentage of trips where rides are shared:** To estimate what share of trips are shared, we assume shuttles are scheduling one trip per 30 minutes. If more than 2 trips are served per hour, it is assumed those rides are shared. So, if the estimated trips per hour is 2.5, then roughly 25% ($0.5/2$) of riders are assumed to be sharing rides.
- **Passengers served per Day (Typically, we would like per Weekday):** This takes the low and high weekly ridership estimates from Remix and divides by seven.
- **Cost Per Trip:** Divides the weekly cost estimate (*Vehicle Hours per Week * Estimated Hourly Cost*) by the weekly ridership estimate.

Comparing the Zones



Comparing the Zones

Key Performance Indicator	Type	Zone 1	Points Zone 1	Zone 3	Points Zone 3	Zone 2	Points Zone 2
At least 75% of a zone is not within ¼ mile of fixed-route bus service* <i>(This measure is showing how much of each zone is outside a ¼-mile buffer of Route 204 – except for the extension to Samuel Barnet Boulevard.)</i>	Coverage	73%	0	95%	1	95%	1
Zone development will prioritize communities historically neglected by transit service <i>(Remix Output from Census Table C17002, Threshold at 100% of poverty. The system-wide poverty rate is 19%)</i>	Coverage	14%	0	15%	0	15%	0
At least 70% of the zone serves areas with fewer than 11 people per acre and 5 jobs per acre	Coverage	99%	1	100%	1	100%	1
At least X passengers are served per revenue hour <i>(Today, there is an average of 6 riders per rev hour)</i>	Ridership	1.6-2.6		0.9-2.8		0.8-2.5	
Percentage of passenger trips that are shared <i>(For this exercise, this metric is measured as the number of passenger trips that trigger shared trips over the number of trips that would be taken alone & assuming 30-minute wait time)</i>	Ridership	0-60%		0-40%		0-25%	
Passengers served per day with concentrations of ridership within the zone <i>(The analysis does not include an evaluation of where people are requesting service. Also, typically we would prefer per weekday)</i>	Ridership	13-38		7-22		7-20	
Cost per trip has trended downwards (quarterly or annual) <i>(For this evaluation, we are looking at the estimates of cost per trip, not a trend as that data is unavailable)</i>	Efficiency	\$31.16-\$50.34		\$28.54-\$86.15		\$31.55-\$95.32	

*Analysis excludes the Route 204 branch towards Samuel Barnet Blvd as part of fixed-route service, **Assumes the hub at Stop & Shop is ¼ mile square catchment area

Comparing the Zones

Zone 1

15-Minute Wait	Low	Medium	High
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