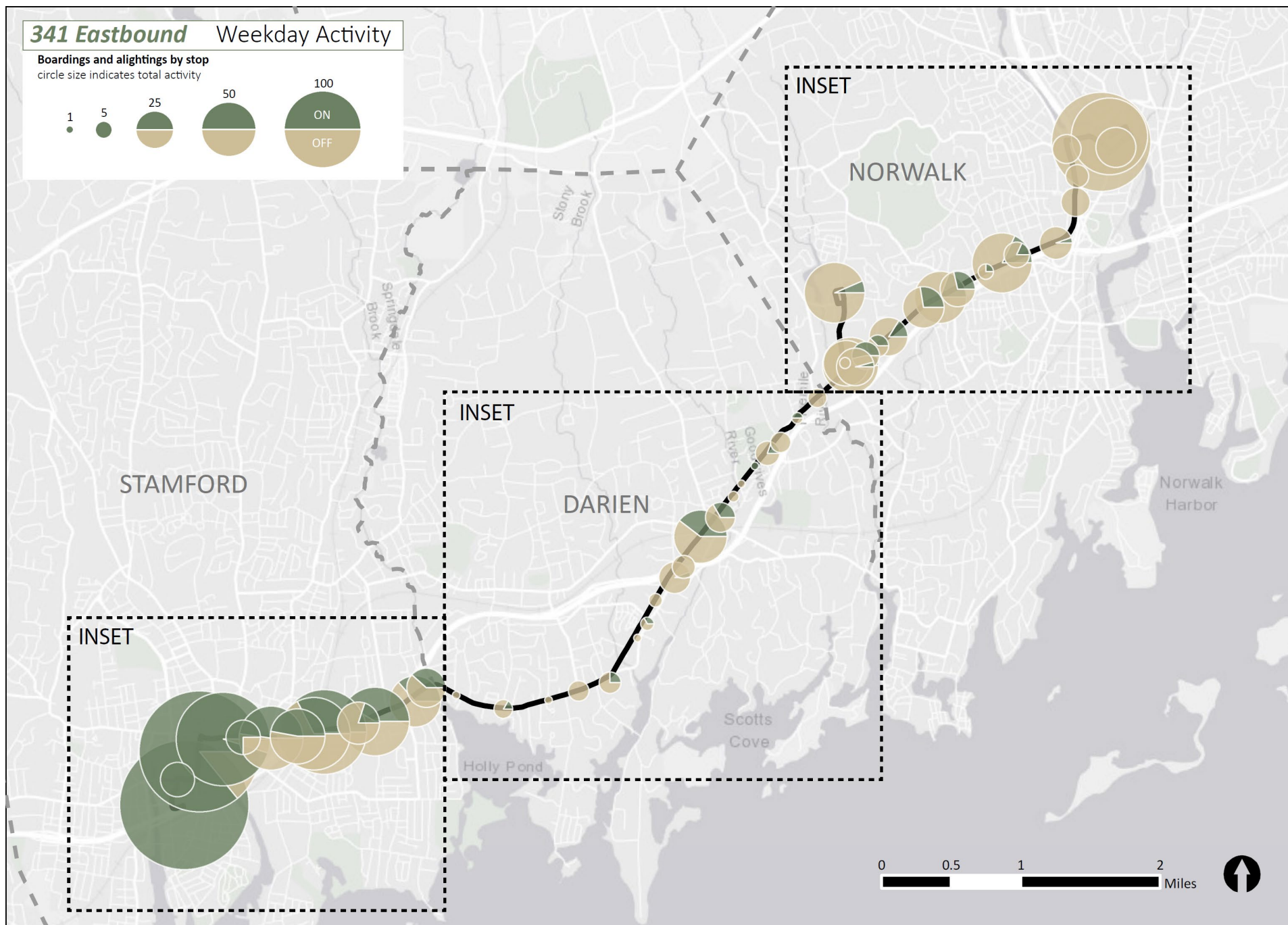
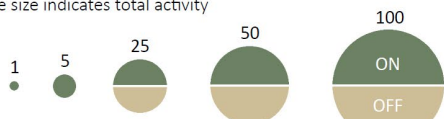


Appendix A: Ridership by Route Maps

341 Eastbound Weekday Activity

Boardings and alightings by stop
circle size indicates total activity

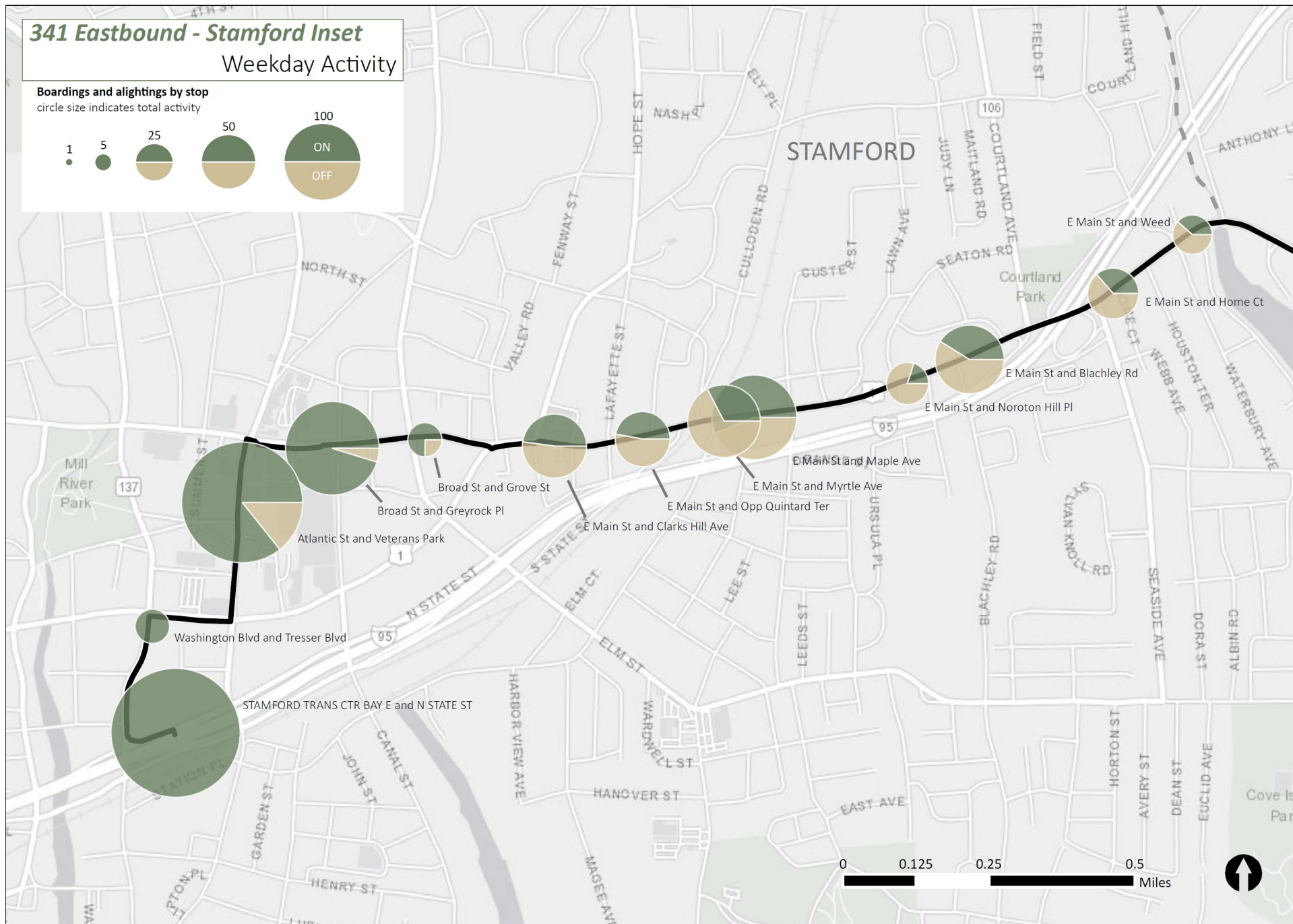
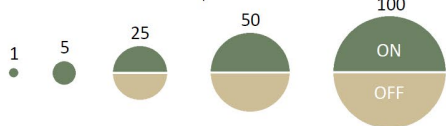


341 Eastbound - Stamford Inset

Weekday Activity

Boardings and alightings by stop

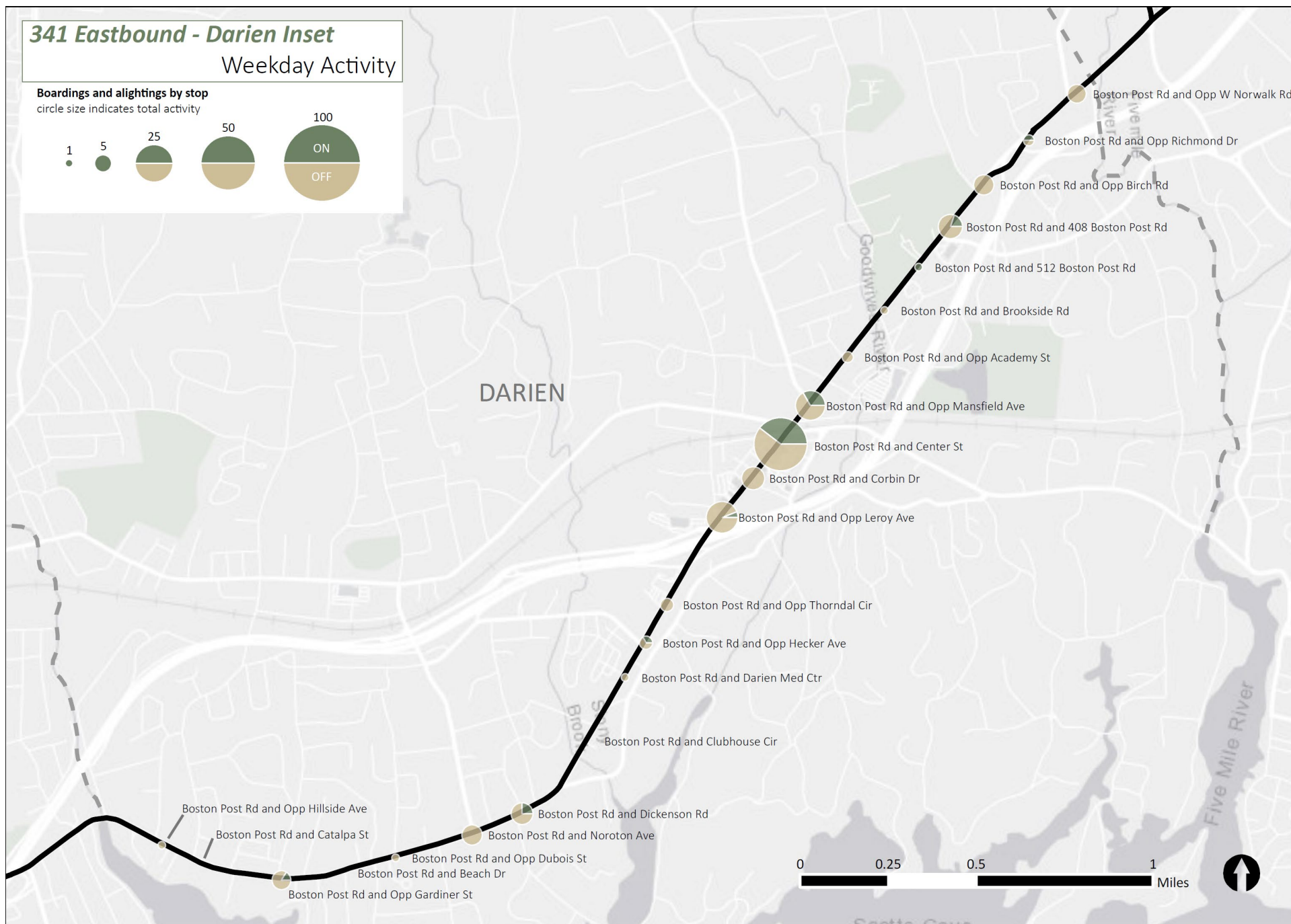
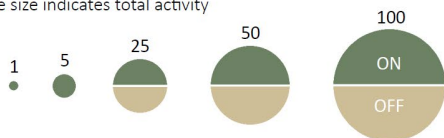
circle size indicates total activity



341 Eastbound - Darien Inset

Weekday Activity

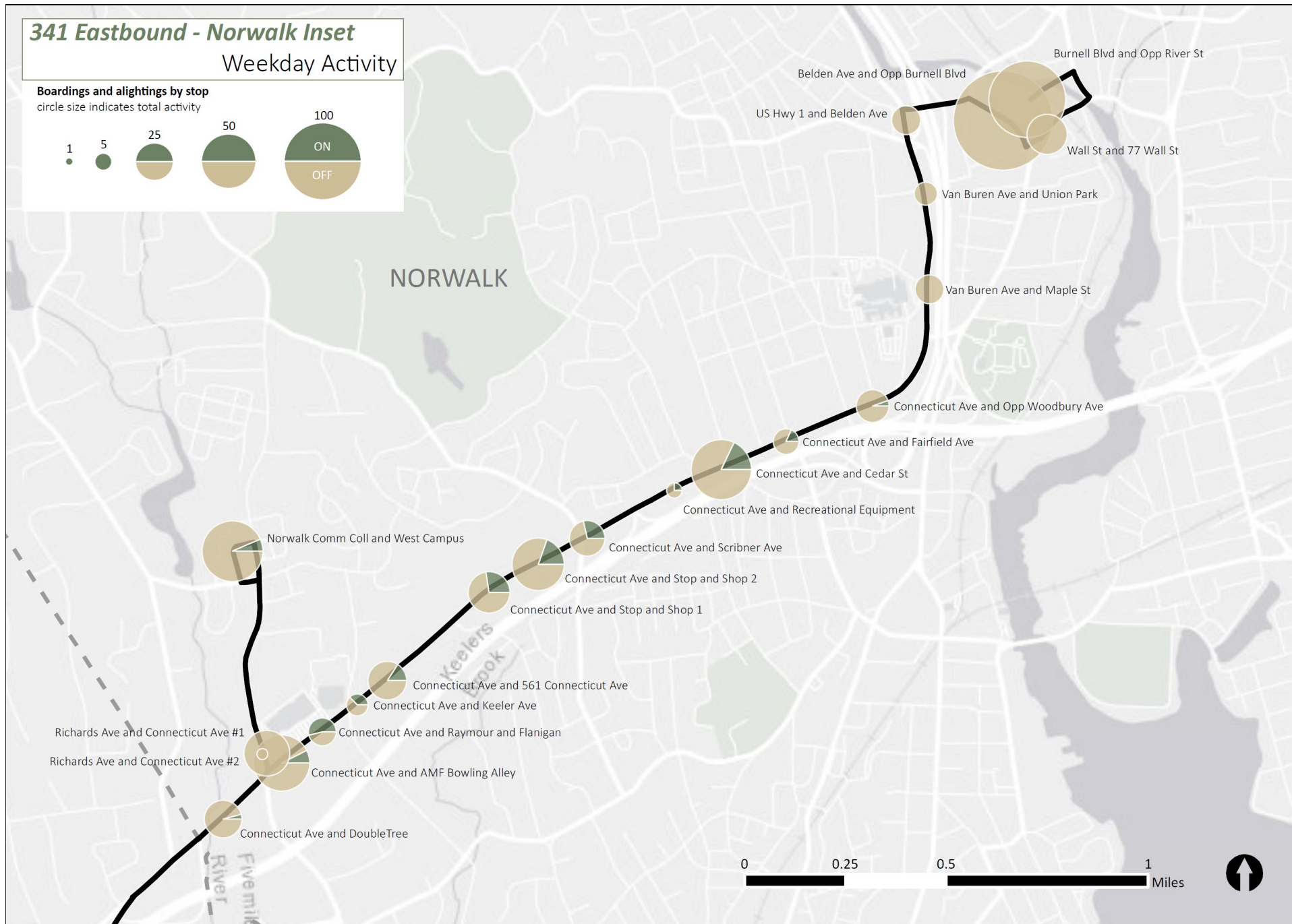
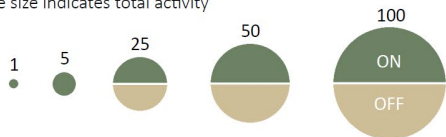
Boardings and alightings by stop
circle size indicates total activity



341 Eastbound - Norwalk Inset

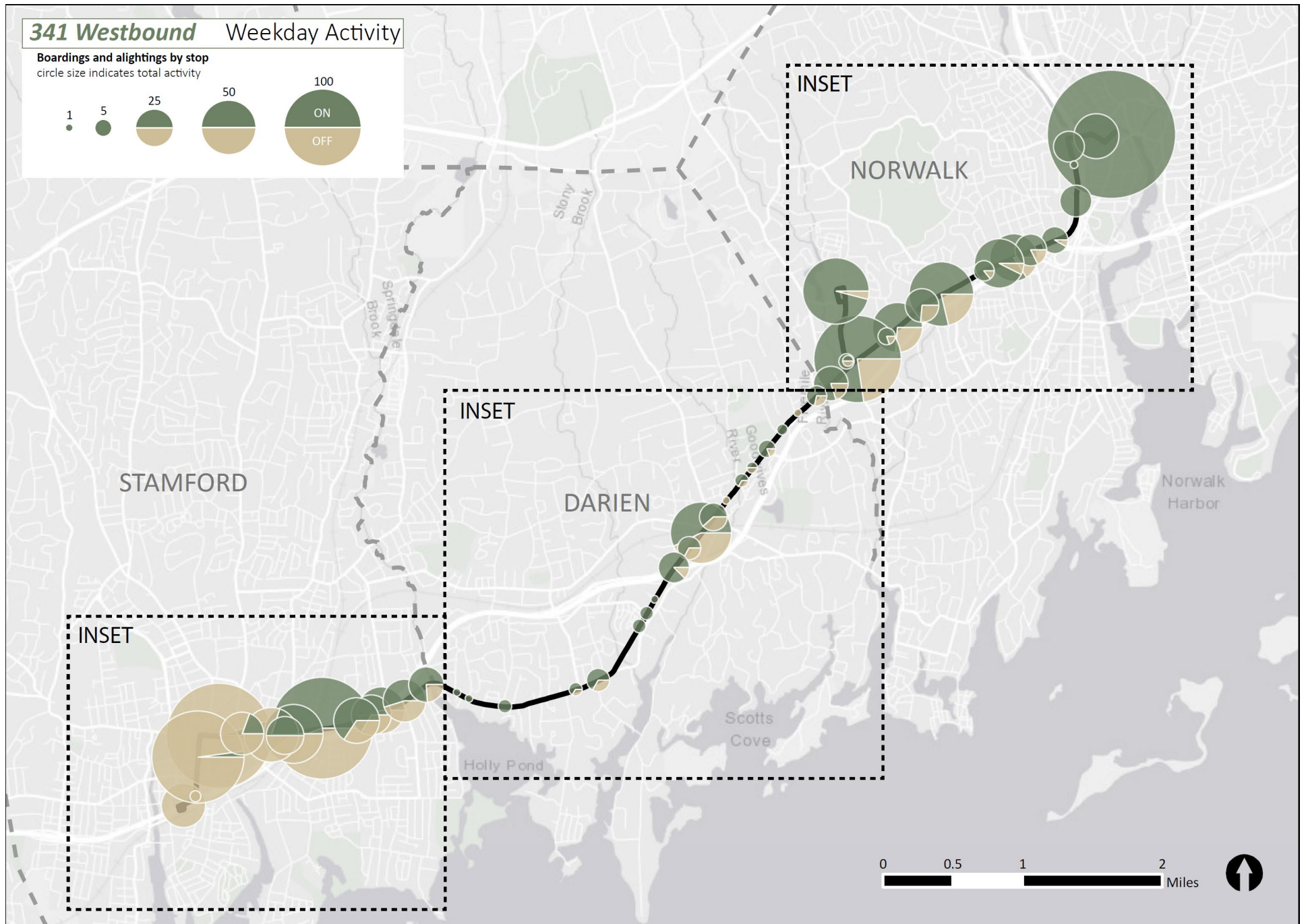
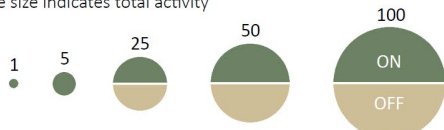
Weekday Activity

Boardings and alightings by stop
circle size indicates total activity



341 Westbound Weekday Activity

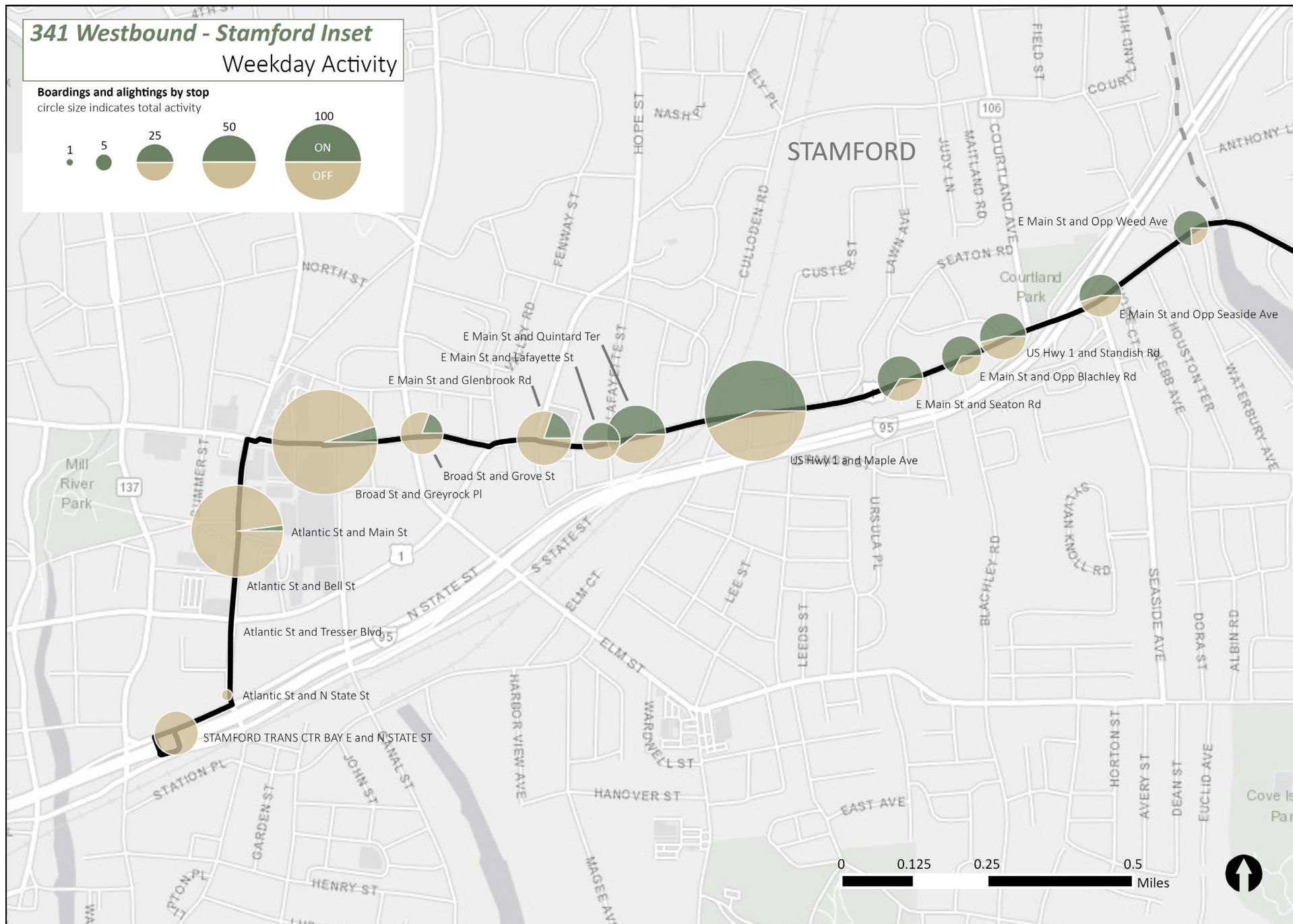
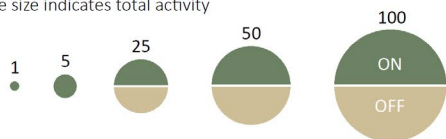
Boardings and alightings by stop
circle size indicates total activity



341 Westbound - Stamford Inset

Weekday Activity

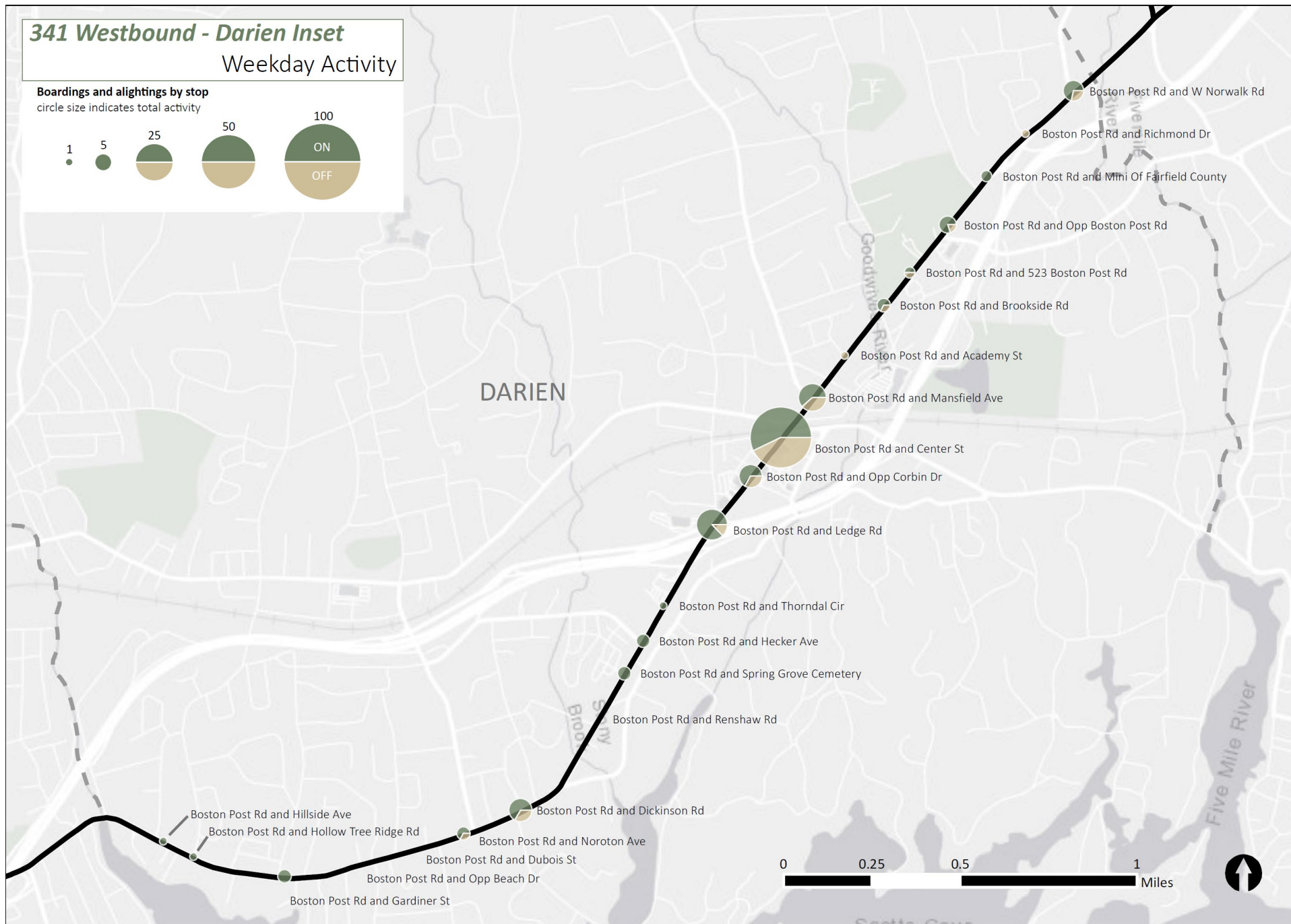
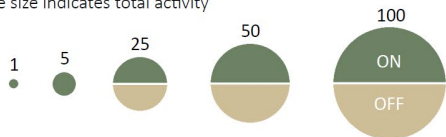
Boardings and alightings by stop
circle size indicates total activity



341 Westbound - Darien Inset

Weekday Activity

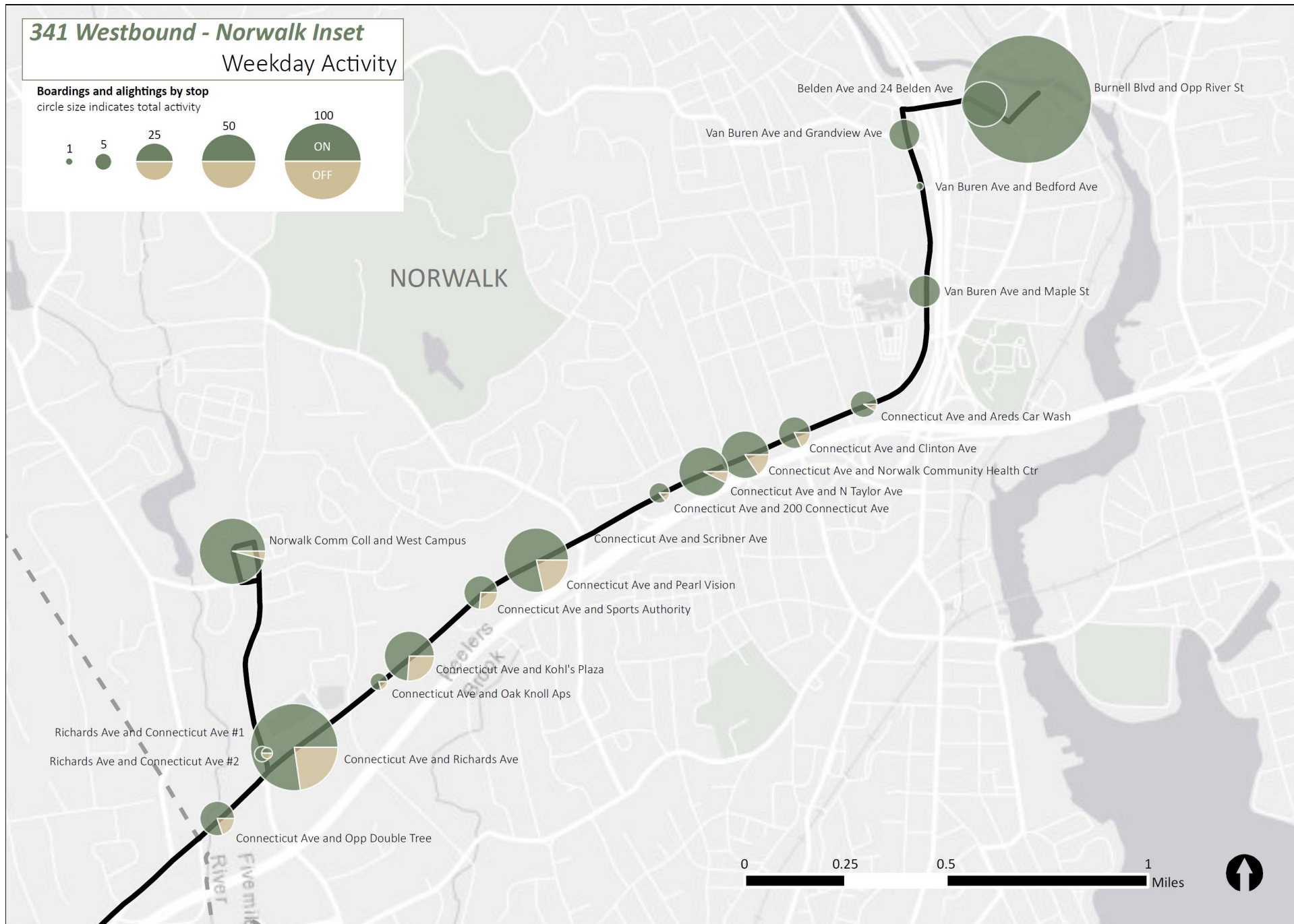
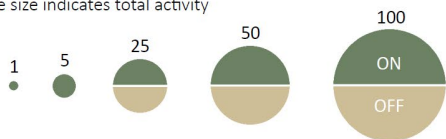
Boardings and alightings by stop
circle size indicates total activity



341 Westbound - Norwalk Inset

Weekday Activity

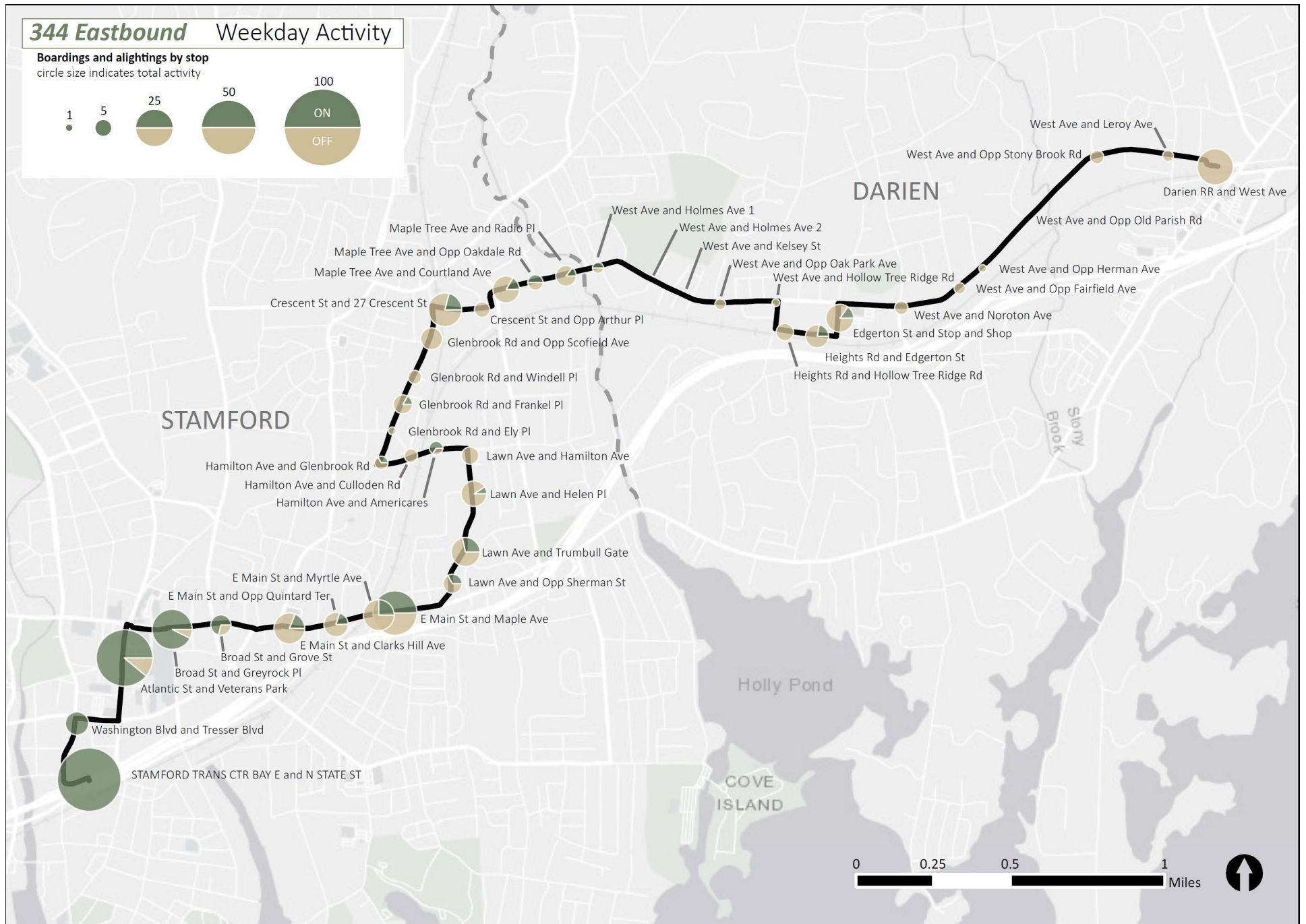
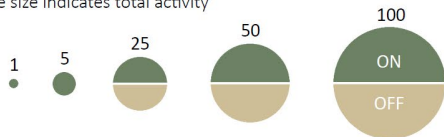
Boardings and alightings by stop
circle size indicates total activity



344 Eastbound Weekday Activity

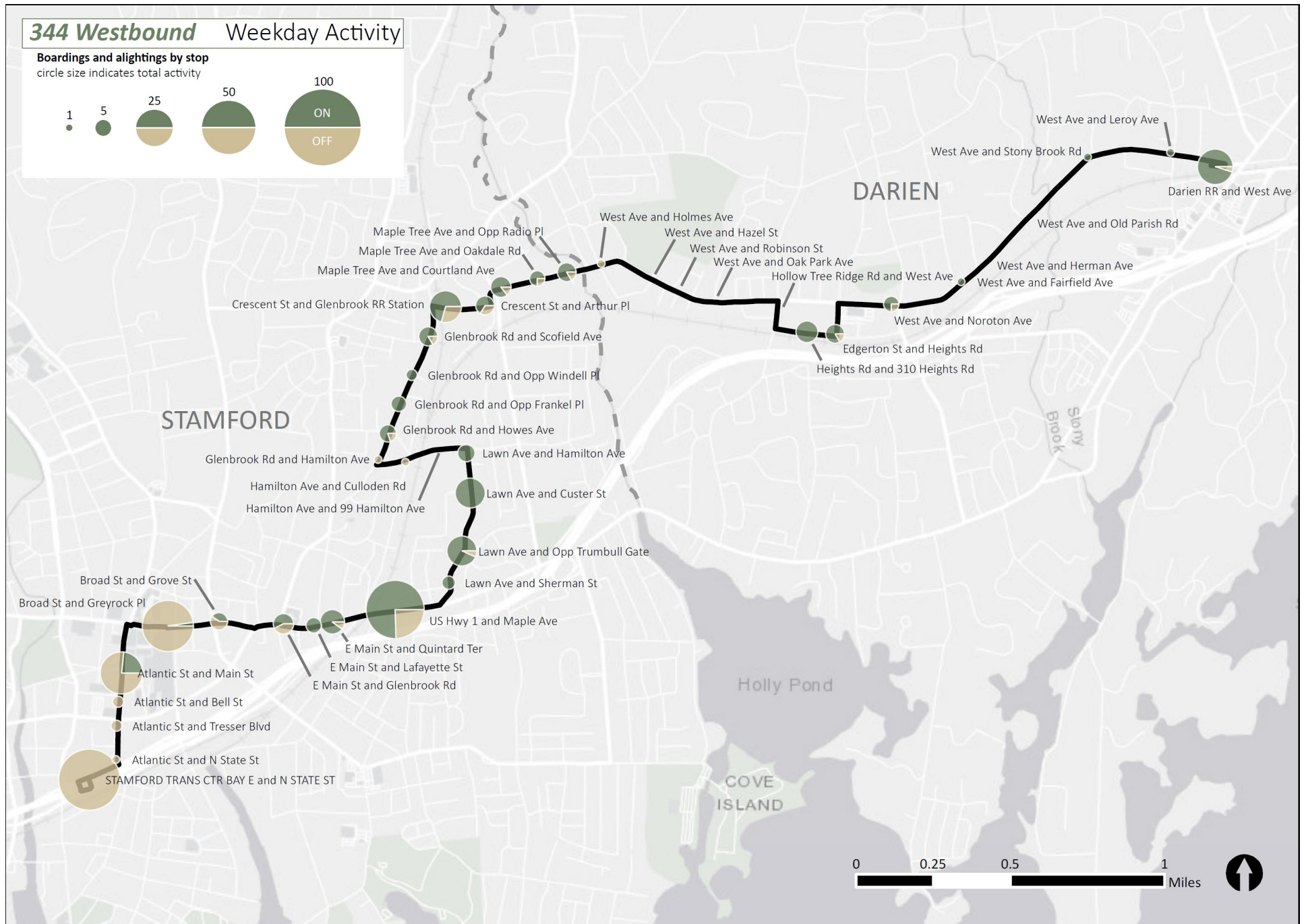
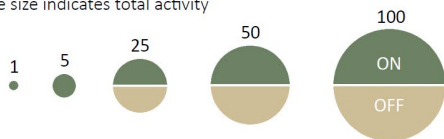
Boardings and alightings by stop

circle size indicates total activity



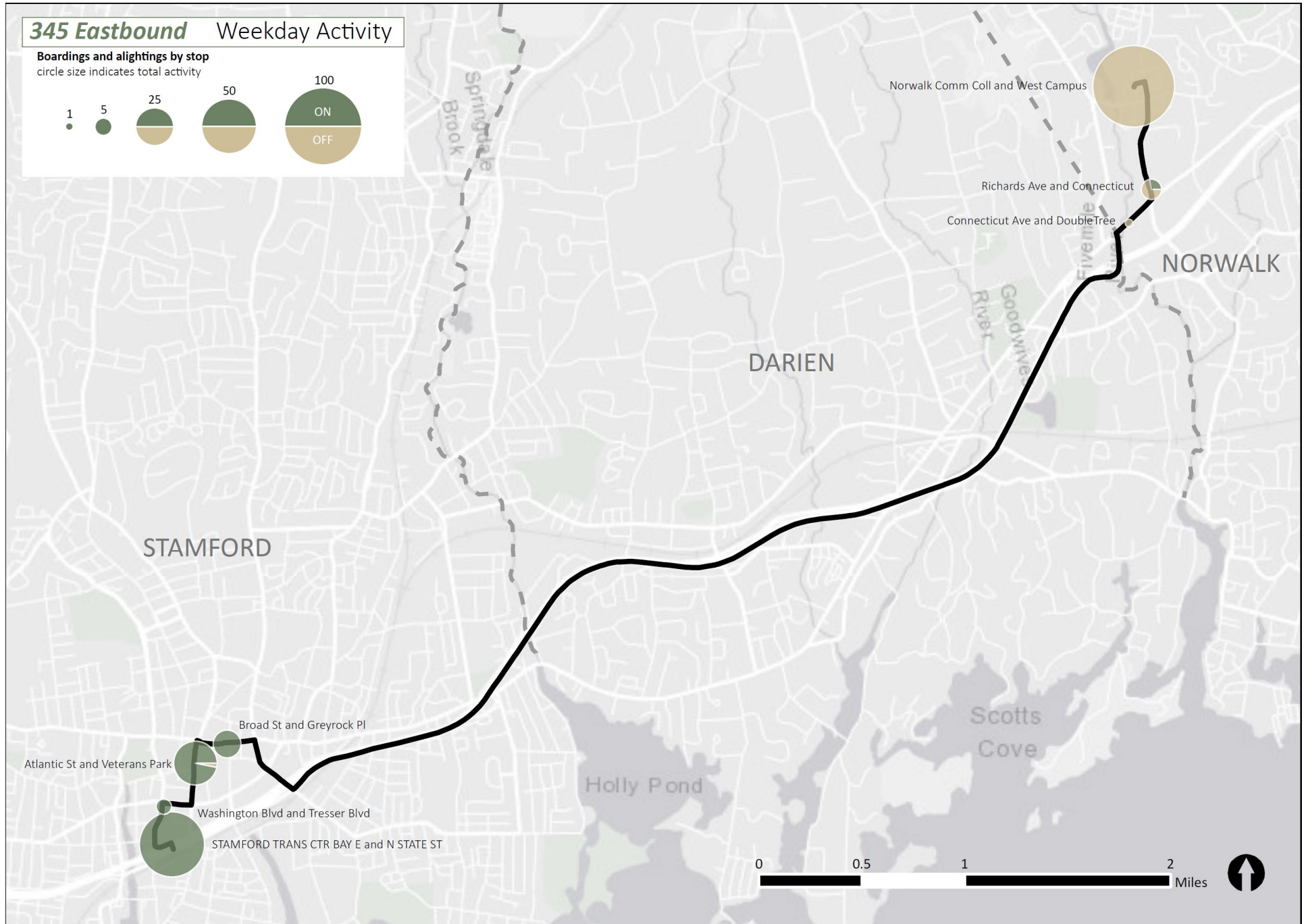
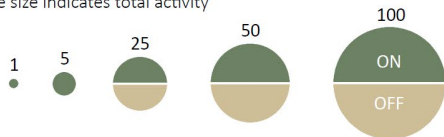
344 Westbound Weekday Activity

Boardings and alightings by stop
circle size indicates total activity



345 Eastbound Weekday Activity

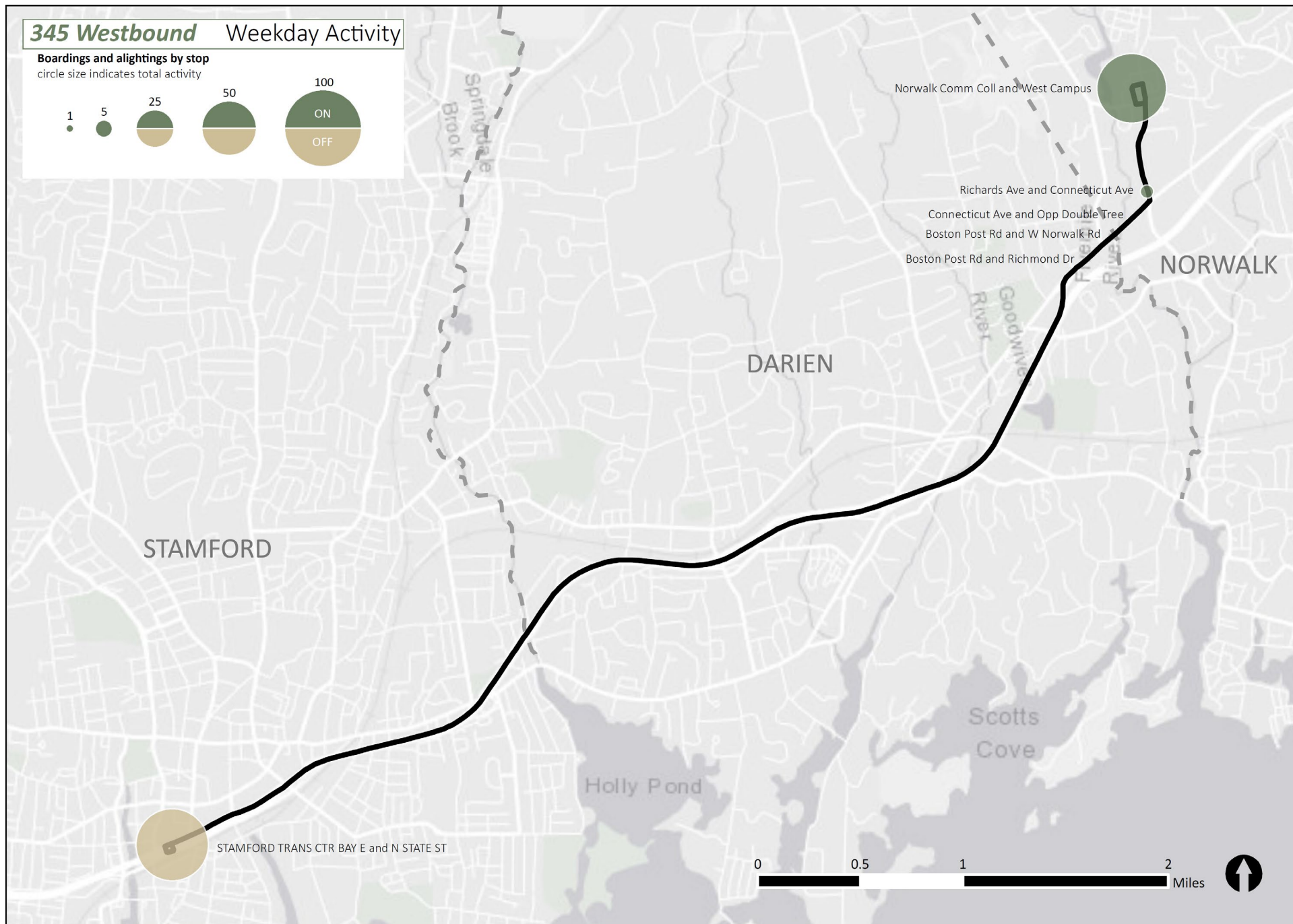
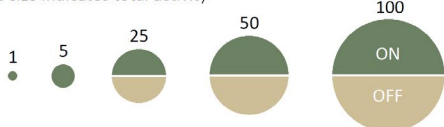
Boardings and alightings by stop
circle size indicates total activity



345 Westbound Weekday Activity

Boardings and alightings by stop

circle size indicates total activity



Appendix B: Bus Stop Elimination and Consolidation Methodology

Purpose and Need

Every time a bus makes a stop, delay is incurred for a variety of different reasons. This delay is incurred due to: 1) deceleration to the stop, 2) dwell time to allow passengers to board and provide payment or disembark at the stop, 3) re-entry delay if a bus pulled out of a travel lane, and 4) acceleration back to speed. Additionally, in corridors with coordinated signal systems, a bus stopping to make a stop can mean that the transit vehicle is removed from a platoon of vehicles that otherwise might have received a “green wave” (5). This means that transit vehicles can hit relatively more red signals than they otherwise might have if the vehicle did not stop.

Figure 1 Impact of a Bus Stop on Delay

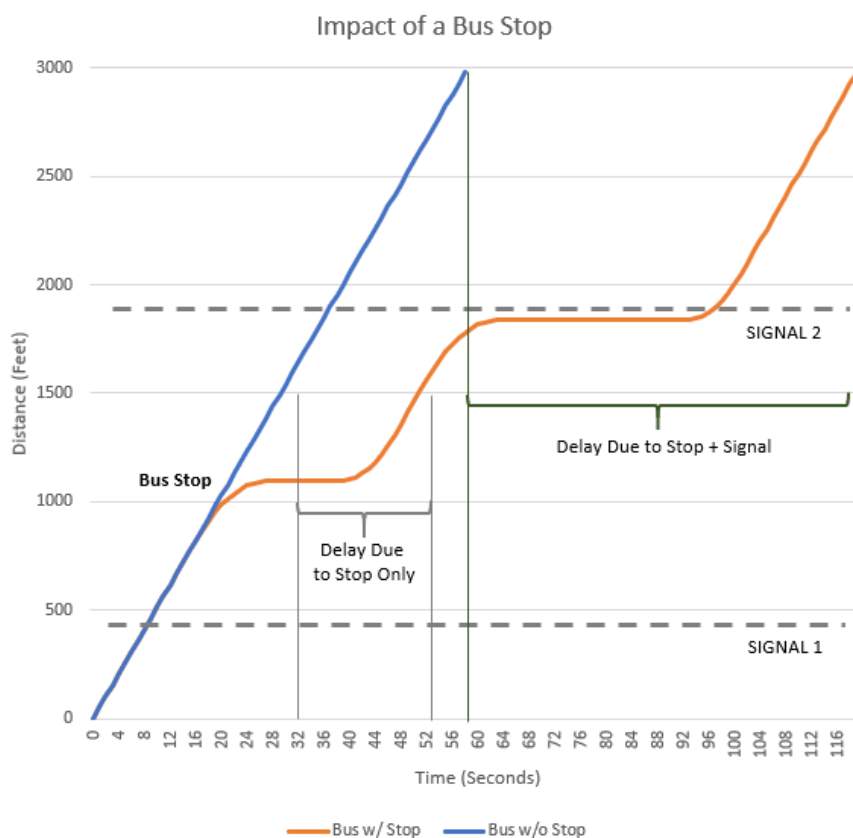


Figure 1 is an example of the delay a single bus-stop can cause and the subsequent impact on bus schedules in a busy corridor with a coordinated signal system.¹

¹ Note 1: The delay here due to stop only is roughly 21-seconds. This accounts for deceleration, 11 seconds of dwell at the stop (CITATION), and acceleration back into traffic at 35 MPH. If a bus pull-off were provided, **additional delay would be incurred** for buses to reenter back into the travel lane. The Transit Quality of Service Manual shows that the re-entry delay can be significant, as high as 40 seconds or more for a near-side bus pull-out in a busy corridor (CITATION).

Note 2: Since coordinated signal systems are frequently timed to minimize delay for through traffic, a single bus-stop can remove that bus from an established platoon of a traffic through the corridor. This means that the delay due to a single bus stop could result in an additional delay at the following signal that would not have been incurred if the bus did not otherwise stop. In this example, the delay shown here is 40 seconds, however, this would vary based on arrival to the signal and the cycle of the signal. This component of delay is difficult to determine in the high-level analysis conducted for this study, but could represent a large portion of delay.

Furthermore, the presence of many inconsistently used transit stops can dramatically impact the reliability of a bus route. For example, consider a 9-stop bus route as illustrated in **Figure 2**. During the first run in the morning peak hour this bus must stop at all 9 stops to serve passengers, with the four lighter used bus stops highlighted in green (even numbered bus stops) only serving 1 or 2 boarding passengers. The next morning peak hour run, however, only stops five times at the heavier used bus stops highlighted in blue (the odd numbered bus stops). This variability can result in reliability concerns as it is difficult for the transit agency to predict the variability in running time for each successive run during the same period. In this example, the reliability of this line could be improved if the lighter used green bus stops were eliminated in favor to keep heavier used bus stops that the agency can expect to make a stop at during every run.

Figure 2 Stops on a Theoretical Bus Route



A theoretical bus line with heavier used bus stops highlighted in blue and lightly used bus stops highlighted in green.

To address these issues of long travel times and low reliability, many transit agencies have successfully embarked on a process of bus stop elimination and consolidation to improve bus services and allow for the improvement of bus stop facilities by focusing investment into higher utilized bus stops. Example agencies which have successfully implemented such consolidation plans include Regional Transportation District (Denver), SFMTA (San Francisco), Maryland MTA, MBTA (Boston), and TriMet (Portland, OR).

Finally, it is important to distinguish between bus stop elimination and bus stop consolidation. Bus stop elimination is the elimination of current bus stops with the reliance of nearby **existing** bus stops to serve the demand of the eliminated stop. Bus stop consolidation, however, frequently relies on the **creation of a new bus stop locations** to more evenly space bus stop locations. Thus, bus stop consolidation can prove to be a more challenging process due to the implementation of bus stops at new locations.

Existing Operating Conditions

Along the three routes evaluated for this study (341, 344, and 345), average spacing varied widely among routes. As a medium-haul route, Route 341 generally had bus stops spaced with longer distances, while Route 344 had bus stops spaced shorter distances apart. Route 345, as an express route to Norwalk Community College, has fewer stops that may be removed or consolidated.

Table 1: Existing Stop Numbers and Average Spacing

Route	Distance	Bus Stops	Average Spacing (Feet)
341 Norwalk - Eastbound	10.85	56	1,040
341 Norwalk - Westbound	10.42	58	965
344 Glenbrook Road - Eastbound	6.10	40	826
344 Glenbrook Road - Westbound	5.95	41	785

* Stop spacing was not considered for 345 NCC Flyer due to its highway/express design

Best Practices

realized from additional bus stops. The total delay in this example is 61 seconds due to additional delay at the signal and associated deceleration and acceleration time.

Research and guidelines recommend that bus stop spacing in suburban areas be located roughly ¼-mile apart (1,320 feet). This recommendation is reinforced in the *Connecticut Statewide Bus Study* (2018), which recommends that bus stops shall not be more frequent than every quarter mile. Previous bus stop elimination and consolidations studies take this recommendation into account, but also takes into frequently served destinations such as grocery stores, community centers, schools and colleges, hospitals, employment centers, and transit centers. Furthermore, locations with current bus shelters were noted and preferred to not be eliminated. Practical considerations such as suitable locations for bus stops also need to be considered- such as sufficient length between curb cuts and presence of a suitable sidewalk to make an ADA compliant bus stop.

Methodology

GIS layers of each stop location along the 341, 344, and 345 routes were obtained by CT Transit, along with route information rolling up average ridership statistics and trip times. To understand which stops may need to be kept, points-of-interests along these three routes were identified in GIS to include the following:

- Civic Centers including:
 - o Churches
 - o Public Government Offices
 - o Libraries
 - o YMCA
- Senior Centers and Housing
- K-12 Schools
- Colleges and Universities
- Medical Centers and Offices
- Grocery Stores
- Transit Centers

Bus stops serving these locations were noted in tabular form.² Additional fields note the weekday average total ridership broken by boardings and alightings, as well as the distance to the prior and next stop. These measures assist in meeting the ¼-mile bus stop spacing guidance previously determined.

In addition to the destinations and distance metrics previously discussed, attention was also given to:

- Pairs of bus stops: Generally, if a bus stop is provided in one direction, it was desired that a matching bus stop in the opposite direction was located in the proximity.
- Far-side bus stops: Generally speaking, far-side bus stops were preferred throughout this analysis
- Improved Bus Stops: Bus stops that already were improved with bus shelters were not generally considered for removal except in one instance – two very closely bus stops in Stamford both containing bus shelters
- Bus stops with moderate daily usage: Bus stop elimination is most beneficial in areas where a bus stop of moderate usage throughout the day is located to a similarly used or higher used bus stop. A bus stop with just a few riders do not make meaningful impacts on scheduling while those with many riders are not good candidates for elimination.

Constraints to relocating and adjusting spacing of bus stops included:

- Block Lengths: Generally speaking, it is best practice to have buses stop at locations of safe pedestrian crossings. For the most part, this means locating bus stops near existing signals. Generally, these signals are in increments

² Tables with these details are provided at the conclusion of Appendix A.

that are not conducive to meeting the spacing guidelines set forth (e.g. if a corridor has a signal every 1000', we should provide a bus stop at this interval even though this is shorter than our guidance).

- Destinations: Destinations served by transit routes are fixed. Thus spacing of many of these high demand bus stops is also fixed. For example, it would be difficult to propose eliminating a bus stop in front of a Walmart.
- Curb Cuts and Sidewalks: Geometrically, a bus stop should include a continuous curb of at least 60' to fit the doors of an articulated bus as well as a sidewalk and an 8' clear landing area to fit any ADA ramp. As US 1 is a congested corridor with many curb cuts, that guideline may impeded relocating some bus stops.

Stops Identified for Relocation/Elimination

Based on a multi-pronged review of existing stop locations, ridership, and physical condition, opportunities were identified to reduce the number of stops and thus widen spacing to more closely match the ¼ mile target. Again, the 345 NCC Flyer express service was not targeted for stop elimination.

Table 2 Route 341/344 Reduction Ramifications

Route	Existing Number of Stops	Potential After Reduction
341 Norwalk - Eastbound	56	48
341 Norwalk - Westbound	58	51
344 Glenbrook Road - Eastbound	40	33
344 Glenbrook Road - Westbound	41	35

Route 341 Norwalk

The following stop changes may be considered, due to low ridership, close stop spacing, or associated safety and operational concerns. Complexities in this corridor include a busy commercial district along Connecticut Avenue with numerous curb cuts and difficult pedestrian crossings (often lacking crosswalks and/or signalization). While opportunities for widening stop spacing exist, relocations or eliminations must be consider logical pairing with ridership generators, accessibility, and available curb space.

Table 3 Route 341 Norwalk Potential Stop Modifications

Direction	Stop	Action	Notes
Eastbound	East Main St & Myrtle Ave	Eliminate	
	East Main St & Noroton Hill Pl	Eliminate	Remove stop or improve safety of pedestrian crossing of East Main Street
	512 Boston Post Rd	Eliminate	
	Boston Post Rd opposite Richmond Dr	Eliminate	
	Boston Post Rd opposite W Norwalk Rd	Move	Shift stop west to improve spacing
	Connecticut Ave & DoubleTree	Move	Shift stop east to improve spacing
	Richards Ave & Connecticut Ave	Eliminate	
	Connecticut Ave & AMF Bowling Alley	Consolidate	Shift east, opposite Walmart
	Connecticut Ave & Raymour & Flanigan	Consolidate	Shift west, opposite Walmart
	Connecticut Ave & Keller Ave	Eliminate	
	561 Connecticut Ave	Move	Shift east to better serve Kohl's Plaza
	Connecticut Ave & Fairfield Ave	Move	Shift to far side for improved operations
Westbound	Connecticut Ave & Oak Knoll Apts	Eliminate	
	Richards Ave & Connecticut Ave	Eliminate	
	Boston Post Rd & West Norwalk Rd	Move	Shift west to improve spacing

	Boston Post Rd & Richmond Dr	Eliminate	
	523 Boston Post Rd	Eliminate	
	U.S. Route 1 & Standish Rd	Eliminate	
	East Main St & Seaton Rd	Eliminate	Remove stop or improve safety of pedestrian crossing of East Main Street
	East Main St & Lafayette St	Eliminate	
TOTAL STOPS REMOVED		14	

Route 344 Glenbrook Road

The following stop changes may be considered, due to low ridership, close stop spacing, or associated safety and operational concerns. The primarily residential character of Route 344 generally simplifies the improved spacing of stops, without the complication of commercial curb cuts and significant pedestrian safety concerns associated with major arterials.

Table 4 Route 344 Suggested Stops to Remove

Direction	Stop	Action	Notes
Eastbound	East Main St & Myrtle Ave	Eliminate	
	Hamilton Ave & Americares	Eliminate	
	Glenbrook Rd & Frankel Pl	Eliminate	
	Crescent St & Arthur Pl	Eliminate	
	Maple Tree Ave & Oakdale Rd	Eliminate	
	West Ave & Kelsey St	Eliminate	
	Heights Rd & Hollow Tree Ridge Rd	Eliminate	Consolidate stops at Noroton Heights train station
Westbound	West Ave & Robinson St	Eliminate	
	Maple Tree Ave & Oakdale Rd	Eliminate	
	Crescent St & Arthur Pl	Eliminate	
	Glenbrook Rd & Frankel Pl	Eliminate	
	99 Hamilton Ave	Eliminate	
	East Main St & Lafayette St	Eliminate	
TOTAL STOPS REMOVED		13	

Route 345 NCC Flyer

Intermediate stops between Norwalk Community College and Stamford along Connecticut Avenue show low ridership and may be removed from the schedule. From an operational perspective, time savings would be negligible on this express service. Nonetheless, stop locations will ultimately match local bus stops as designated on Route 341.

Coordination and Implementation

The intent of this technical assistance is to inform decision-making and outline a path forward to implementation. Bus stop location and design are a joint effort between host municipalities, CTtransit, and the CTDOT. As such, a coordinated approach to location, facility design, accessibility, and maintenance is important.

Furthermore, conversations with the public (local residents, property owners, bus riders) are integral to the success of any stop spacing initiatives. Formal public meetings must be held prior to any stop elimination and municipalities and transit providers are encouraged to work together to communicate the rationale for proposed changes to the public with sufficient opportunity to provide feedback.

Route 341 Eastbound

Stop Name	Avg. Daily Weekday Ridership (On/Off)	Avg. Daily Weekday Ridership (Total)	Existing Dist to Next Stop	Eliminated or New Stop?	Proposed Dist to Next Stop (if different)	Points of Interests	Existing Amenities	Notes on Proposed Changes
Stamford TRANS CTR	282 / 0	282	1500			Stamford Transportation Center	Transp. Ctr.	
Washington Blvd and Tresser Blvd	20 / 0	20	1800					
Atlantic St and Veterans Park	211 / 35	246	1320				Bus Shelter, Bench	
Broad St and Greyrock Pl	141 / 7	148	840			Stamford Town Center		
Broad St and Grove St	15 / 5	20	1172					
E Main St and Clarks Hill Ave	33 / 36	69	800					
E Main St and Opp Quintard Ter	24 / 27	51	752		1028			
E Main St and Myrtle Ave	29 / 60	89	276	Eliminate				Stop may already be eliminated with new construction at Maple Ave
E Main St and Maple Ave	68 / 53	121	1417		2020		Bus Shelter, Bench	
E Main St and Noroton Hill Pl	6 / 24	30	603	Eliminate				Remove stop or improve safety of pedestrian crossing of East Main Street
E Main St and Blachley Rd	33 / 47	80	1428				Bus Shelter, Bench	
E Main St and Home Ct	16 / 28	44	892					
E Main St and Weed Ave	10 / 16	26	1250					
Boston Post Rd and Opp Hillside Ave	0 / 1	1	527					
Boston Post Rd and Catalpa St	0 / 0	0	1350					
Boston Post Rd and Opp Gardiner St	1 / 5	6	910			YMCA Church		
Boston Post Rd and Beach Dr	0 / 0	0	835					
Boston Post Rd and Opp Dubois St	0 / 1	1	1195					
Boston Post Rd and Noroton Ave	0 / 7	7	810			Churches, Elementary School		
Boston Post Rd and Dickenson Rd	2 / 6	8	1500			Church, Person-to-Person		
Boston Post Rd and Clubhouse Cir	0 / 0	0	1096			Darien Town Hall / Senior Center		
Boston Post Rd and Darien Med Ctr	0 / 1	1	606			Darien Medical Center		
Boston Post Rd and Opp Hecker Ave	1 / 2	3	646			Darien Library		
Boston Post Rd and Opp Thorndal Cir	0 / 3	3	1549					
Boston Post Rd and Opp Leroy Ave	1 / 16	17	747			Whole Foods		
Boston Post Rd and Corbin Dr	0 / 9	9	657			Corbin Downtown		
Boston Post Rd and Center St	19 / 29	48	729			Darien Train Station	Bench	
Boston Post Rd and Opp Mansfield Ave	5 / 10	15	913					
Boston Post Rd and Opp Academy St	0 / 2	2	889			Senior Living		
Boston Post Rd and Brookside Rd	0 / 1	1	826		1596	Church		
Boston Post Rd and 512 Boston Post Rd	1 / 0	1	770	Eliminate				
Boston Post Rd and 408 Boston Post Rd	2 / 8	10	800			Trader Joe's		
Boston Post Rd and Opp Birch Rd	0 / 7	7	946		1598			
Boston Post Rd and Opp Richmond Dr	1 / 1	2	1002	Eliminate				Eliminate stop due to poor spacing and location at highway ramps without safe crossing of US 1.
Boston Post Rd and Opp W Norwalk Rd	0 / 6	6	715	Move	1415			Shift stop west to improve spacing
Connecticut Ave and DoubleTree	1 / 23	24	1100	Move	750			Shift stop east to improve spacing
Richards Ave and Connecticut Ave	0 / 35	35	2685			Walmart		
Norwalk Comm Coll and West Campus	4 / 58	62	2687		3634	Norwalk Community College		
Richards Ave and Connecticut Ave	0 / 2	2	400	Eliminate				Eliminate return stop at Richards Ave and Connecticut Ave for both EB/WB service
Connecticut Ave and AMF Bowling Alley	4 / 49	53	672	Consolidate - Eliminate				Shift east, opposite Walmart
Connecticut Ave and Opp Walmart				Consolidate - New Stop	1659	Walmart		Move stop closer to stoplight to the west will better accommodate riders destined to Walmart.
Connecticut Ave and Raymour and Flanigan	7 / 6	13	578	Consolidate - Eliminate		Walmart		Shift west, opposite Walmart
Connecticut Ave and Keeler Ave	3 / 5	8	506	Eliminate				
Connecticut Ave and 561 Connecticut Ave	4 / 21	25	1800	Move	1350			Shift east to better serve Kohl's Plaza
Connecticut Ave and Stop and Shop 1	8 / 21	29	665			Stop and Shop, ShopRite	Bus Shelter, Bench	
Connecticut Ave and Stop and Shop 2	9 / 37	46	727			Stop and Shop, ShopRite	Bus Shelter, Bench	
Connecticut Ave and Scribner Ave	6 / 15	21	1301			Patel Brothers (Grocery)		
Connecticut Ave and Recreational Equipment	1 / 3	4	673					
Connecticut Ave and Cedar St	11 / 50	61	923		1173	Norwalk Senior Center South		
Connecticut Ave and Fairfield Ave	2 / 9	11	1224	Move	974			Shift to far side for improved operations
Connecticut Ave and Opp Woodbury Ave	1 / 17	18	1850					
Van Buren Ave and Maple St	0 / 14	14	1254			Norwalk Hospital		
Van Buren Ave and Union Park	0 / 9	9	997					
US Hwy 1 and Belden Ave	0 / 14	14	1550					
Belden Ave and Opp Burnell Blvd	0 / 166	166	670					
Wall St and 77 Wall St	0 / 27	27	940			Downtown Norwalk		
Burnell Blvd and Opp River St	0 / 99	99				Norwalk Transit Hub	Transp. Ctr.	

Route 341 Westbound

Stop Name	Avg. Daily Weekday Ridership (On/Off)	Avg. Daily Weekday Ridership (Total)	Existing Dist to Next Stop	Eliminated or New Stop?	Proposed Dist to Next Stop (if different)	Points of Interests	Existing Amenities	Notes on Proposed Changes
Burnell Blvd and Opp River St	277 / 0	277	790			Norwalk Transit Hub	Transp. Ctr.	
Belden Ave and 24 Belden Ave	34 / 0	34	1400					
Van Buren Ave and Grandview Ave	16 / 0	16	706					
Van Buren Ave and Bedford Ave	1 / 0	1	1378					
Van Buren Ave and Maple St	17 / 0	17	1900			Norwalk Hospital	Bus Shelter, Bench	
Connecticut Ave and Areds Car Wash	11 / 1	12	980					
Connecticut Ave and Clinton Ave	14 / 3	17	706					
Connecticut Ave and Norwalk Community Health Ctr	32 / 6	38	586			Norwalk Health Center		
Connecticut Ave and N Taylor Ave	38 / 3	41	642			Norwalk Senior Center South		
Connecticut Ave and 200 Connecticut Ave	6 / 1	7	1215				Bus Shelter, Bench	
Connecticut Ave and Scribner Ave	0 / 0	0	617			Patel Brothers (Grocery)		
Connecticut Ave and Pearl Vision	55 / 15	70	1102			Stop and Shop, ShopRite		
Connecticut Ave and Sports Authority	14 / 5	19	1280			Stop and Shop, ShopRite		
Connecticut Ave and Kohl's Plaza	31 / 11	42	500		1900		Bus Shelter, Bench	
Connecticut Ave and Oak Knoll Aps	4 / 1	5	1400	Eliminate				
Connecticut Ave and Richards Ave	99 / 29	128	365			Walmart	Bus Shelter, Bench	
Richards Ave and Connecticut Ave	1 / 1	2	2684					
Norwalk Comm Coll and West Campus	71 / 3	74	2687		3715	Norwalk Community College		
Richards Ave and Connecticut Ave	4 / 0	4	1028	Eliminate				Eliminate return stop at Richards Ave and Connecticut Ave for both EB/WB service
Connecticut Ave and Opp Double Tree	16 / 4	20	705		875		Bus Pullout	
Boston Post Rd and W Norwalk Rd	5 / 2	7	959	Move	1655			Shift west to improve spacing
Boston Post Rd and Richmond Dr	0 / 1	1	866	Eliminate				Eliminate stop due to poor spacing and location at highway ramps without safe crossing of US 1
Boston Post Rd and Mini Of Fairfield County	2 / 0	2	926				Bench	
Boston Post Rd and Opp Boston Post Rd	4 / 1	5	912		1535	Trader Joe's		
Boston Post Rd and 523 Boston Post Rd	1 / 1	2	623	Eliminate				
Boston Post Rd and Brookside Rd	2 / 1	3	950			Church		
Boston Post Rd and Academy St	0 / 1	1	794			Senior Living		
Boston Post Rd and Mansfield Ave	8 / 5	13	761				Bench	
Boston Post Rd and Center St	36 / 27	63	730			Darien Train Station	Bench	
Boston Post Rd and Opp Corbin Dr	6 / 3	9	929			Corbin Downtown		
Boston Post Rd and Ledge Rd	14 / 2	16	1412			Whole Foods	Bus Shelter, Bench	
Boston Post Rd and Thorndal Cir	1 / 0	1	605					
Boston Post Rd and Hecker Ave	3 / 0	3	560			Darien Library		
Boston Post Rd and Spring Grove Cemetery	3 / 0	3	795			Darien Medical Center		
Boston Post Rd and Renshaw Rd	0 / 0	0	1850			Darien Town Hall / Senior Center		
Boston Post Rd and Dickinson Rd	6 / 3	9	921			Church, Person-to-Person		
Boston Post Rd and Noroton Ave	2 / 1	3	972			Churches, Elementary School		
Boston Post Rd and Dubois St	0 / 0	0	877					
Boston Post Rd and Opp Beach Dr	0 / 0	0	902					
Boston Post Rd and Gardiner St	3 / 0	3	1391			YMCA, Church		
Boston Post Rd and Hollow Tree Ridge Rd	1 / 0	1	507					
Boston Post Rd and Hillside Ave	1 / 0	1	1250					
E Main St and Opp Weed Ave	16 / 5	21	1021					
E Main St and Opp Seaside Ave	17 / 14	31	955		1368			
US Hwy 1 and Standish Rd	20 / 17	37	413	Eliminate				
E Main St and Opp Blachley Rd	18 / 9	27	593		1935			
E Main St and Seaton Rd	23 / 12	35	1342	Eliminate			Bus Shelter, Bench	Remove stop or improve safety of pedestrian crossing of East Main Street
US Hwy 1 and Maple Ave	97 / 77	174	1096				Bus Shelter, Bench	
E Main St and Quintard Ter	35 / 23	58	323		840		Bus Shelter, Bench	
E Main St and Lafayette St	12 / 12	24	517	Eliminate			Bus Shelter, Bench	
E Main St and Glenbrook Rd	10 / 40	50	1105					
Broad St and Grove St	6 / 25	31	880				Bus Shelter, Bench	
Broad St and Greyrock Pl	9 / 178	187	1590			Stamford Town Center	Bus Shelter, Bench	
Atlantic St and Main St	3 / 140	143	495				Bus Shelter, Bench	
Atlantic St and Bell St	0 / 0	0	414					
Atlantic St and Tresser Blvd	0 / 0	0	579					
Atlantic St and N State St	0 / 2	2	572					
Stamford TRANS CTR	0 / 33	33				Stamford Transportation Center		

Route 344 Eastbound

Stop Name	Avg. Daily Weekday Ridership (On/Off)	Avg. Daily Weekday Ridership (Total)	Existing Dist to Next Stop	Eliminated or New Stop?	Proposed Dist to Next Stop (if different)	Points of Interests	Existing Amenities	Notes on Proposed Changes
Stamford TRANS CTR	68 / 0	68	1500			Stamford Transportation Center	Transp. Ctr	
Washington Blvd and Tresser Blvd	9 / 0	9	1800					
Atlantic St and Veterans Park	48 / 6	54	1300				Bus Shelter, Bench	
Broad St and Greyrock Pl	25 / 2	27	840			Stamford Town Center		
Broad St and Grove St	5 / 2	7	1172					
E Main St and Clarks Hill Ave	3 / 13	16	800					
E Main St and Opp Quintard Ter	2 / 8	10	752		1019			
E Main St and Myrtle Ave	4 / 12	16	267	Eliminate				Stop may already be eliminated with new construction at Maple Ave
E Main St and Maple Ave	17 / 16	33	1200				Bus Shelter, Bench	
Lawn Ave and Opp Sherman St	2 / 4	6	587					
Lawn Ave and Trumbull Gate	4 / 10	14	1010					
Lawn Ave and Helen Pl	1 / 10	11	657			Church		
Lawn Ave and Hamilton Ave	0 / 5	5	680		1129			
Hamilton Ave and Americares	2 / 1	3	449	Eliminate				
Hamilton Ave and Culloden Rd	0 / 3	3	524					
Hamilton Ave and Glenbrook Rd	1 / 2	3	581			Apartment Complex		
Glenbrook Rd and Ely Pl	0 / 1	1	486		996			
Glenbrook Rd and Frankel Pl	1 / 5	6	510	Eliminate		Church		Windell Pl stop preferred due to location at signalized crosswalk
Glenbrook Rd and Windell Pl	0 / 3	3	718			Elementary School		
Glenbrook Rd and Opp Scofield Ave	0 / 8	8	670					
Crescent St and 27 Crescent St	4 / 15	19	635		1355	Glenbrook Train Station		
Crescent St and Opp Arthur Pl	0 / 4	4	720	Eliminate				
Maple Tree Ave and Courtland Ave	2 / 10	12	517		1048			
Maple Tree Ave and Opp Oakdale Rd	2 / 2	4	531	Eliminate				
Maple Tree Ave and Radio Pl	1 / 6	7	566					
West Ave and Holmes Ave 1	1 / 1	2	1003					
West Ave and Holmes Ave 2	0 / 0	0	507		1268			
West Ave and Kelsey St	0 / 0	0	761	Eliminate				
West Ave and Opp Oak Park Ave	0 / 2	2	950					
West Ave and Hollow Tree Ridge Rd	0 / 1	1	679		1237			
Heights Rd and Hollow Tree Ridge Rd	0 / 5	5	558	Eliminate				Consolidate stops at Noroton Heights train station
Heights Rd and Edgerton St	2 / 7	9	677			Noroton Heights Train Station		
Edgerton St and Stop and Shop	2 / 11	13	1273			Stop & Shop		
West Ave and Noroton Ave	0 / 3	3	1053					
West Ave and Opp Fairfield Ave	0 / 2	2	520					
West Ave and Opp Herman Ave	0 / 1	1	1216					
West Ave and Opp Old Parish Rd	0 / 0	0	1519					
West Ave and Opp Stony Brook Rd	0 / 3	3	1214					
West Ave and Leroy Ave	0 / 2	2	828					
Darien RR and West Ave	0 / 22	22				Darien Train Station		

Route 344 Westbound

Stop Name	Avg. Daily Weekday Ridership (On/Off)	Avg. Daily Weekday Ridership (Total)	Existing Dist to Next Stop	Eliminated or New Stop?	Proposed Dist to Next Stop (if different)	Points of Interests	Existing Amenities	Notes on Proposed Changes
Darien RR and West Ave	20 / 1	21	802			Darien Train Station		
West Ave and Leroy Ave	1 / 0	1	1425					
West Ave and Stony Brook Rd	1 / 0	1	1602					
West Ave and Old Parish Rd	0 / 0	0	1002					
West Ave and Herman Ave	0 / 0	0	437					
West Ave and Fairfield Ave	1 / 0	1	1310					
West Ave and Noroton Ave	3 / 1	4	1460					
Edgerton St and Heights Rd	5 / 1	6	481			Stop & Shop		
Heights Rd and 310 Heights Rd	8 / 0	8	923			Noroton Heights Train Station		
Hollow Tree Ridge Rd and West Ave	0 / 0	0	1073					
West Ave and Oak Park Ave	0 / 0	0	737		1135			
West Ave and Robinson St	0 / 0	0	398	Eliminate				
West Ave and Hazel St	0 / 0	0	1010					
West Ave and Holmes Ave	0 / 1	1	610					
Maple Tree Ave and Opp Radio Pl	5 / 1	6	515		1157			
Maple Tree Ave and Oakdale Rd	3 / 1	4	642	Eliminate				
Maple Tree Ave and Courtland Ave	6 / 1	7	515		1190			
Crescent St and Arthur Pl	4 / 2	6	675	Eliminate				
Crescent St and Glenbrook RR Station	12 / 5	17	760			Glenbrook Train Station		
Glenbrook Rd and Scofield Ave	5 / 1	6	718					
Glenbrook Rd and Opp Windell Pl	2 / 0	2	544		1082	Elementary School		
Glenbrook Rd and Opp Frankel Pl	4 / 0	4	538	Eliminate		Church		Windell Pl stop preferred due to location at signalized crosswalk
Glenbrook Rd and Howes Ave	4 / 1	5	467				Bench	
Glenbrook Rd and Hamilton Ave	0 / 1	1	580			Apartment Complex		
Hamilton Ave and Culloden Rd	0 / 1	1	678		1142			
Hamilton Ave and 99 Hamilton Ave	0 / 0	0	464	Eliminate				
Lawn Ave and Hamilton Ave	5 / 0	5	686					
Lawn Ave and Custer St	15 / 0	15	1002			Church		
Lawn Ave and Opp Trumbull Gate	14 / 1	15	588					
Lawn Ave and Sherman St	3 / 0	3	1220					
US Hwy 1 and Maple Ave	43 / 14	57	1096				Bus Shelter, Bench	
E Main St and Quintard Ter	9 / 1	10	323		840		Bus Shelter, Bench	
E Main St and Lafayette St	4 / 0	4	517	Eliminate			Bus Shelter, Bench	
E Main St and Glenbrook Rd	4 / 3	7	1105					
Broad St and Grove St	2 / 3	5	880				Bus Shelter, Bench	
Broad St and Greyrock Pl	1 / 43	44	1590			Stamford Town Center	Bus Shelter, Bench	
Atlantic St and Main St	7 / 23	30	495				Bus Shelter, Bench	
Atlantic St and Bell St	0 / 2	2	414					
Atlantic St and Tresser Blvd	0 / 2	2	578					
Atlantic St and N State St	0 / 1	1	572					
Stamford TRANS CTR	0 / 63	63				Stamford Transportation Center		

Route 345 Eastbound

Stop Name	Avg. Daily Weekday Ridership (On/Off)	Avg. Daily Weekday Ridership (Total)	Existing Dist to Next Stop	Eliminated or New Stop?	Proposed Dist to Next Stop (if different)	Points of Interests	Existing Amenities	Notes on Proposed Changes
Stamford TRANS CTR	71 / 0	71	1460			Stamford Transportation Center	Transp. Ctr	
Washington Blvd and Tresser Blvd	4 / 0	4	1800					
Atlantic St and Veterans Park	31 / 1	32	1250				Bus Shelter, Bench	
Broad St and Greyrock Pl	13 / 0	13				Stamford Town Center		
----- E X P R E S S via I-95 -----								
Connecticut Ave and DoubleTree	0 / 1	1	1037	Move	750			Shift stop based on 341 Recommendations
Richards Ave and Connecticut Ave	2 / 5	7	2684					
Norwalk Comm Coll and West Campus	0 / 112	112				Norwalk Community College		

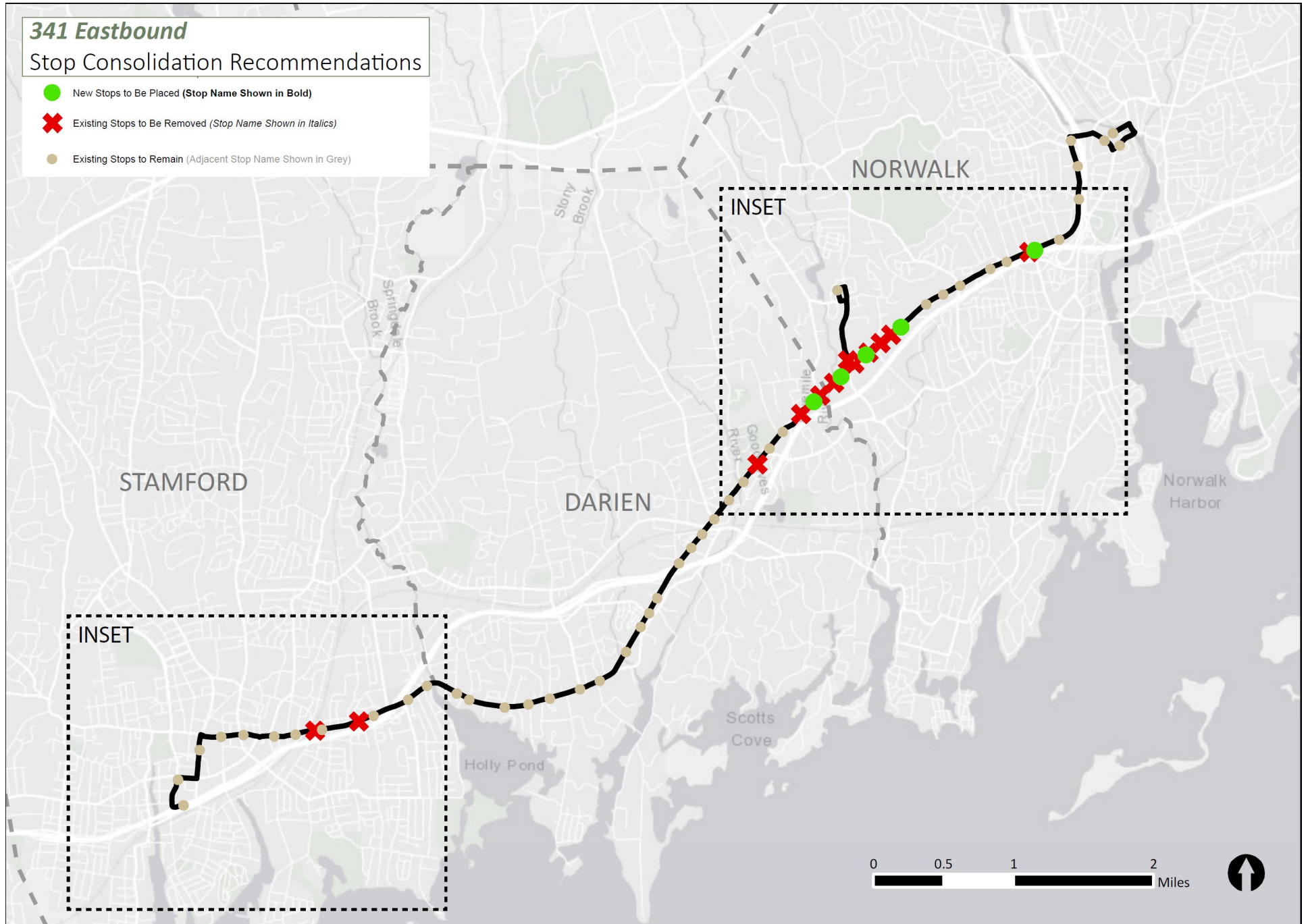
Route 345 Westbound

Stop Name	Avg. Daily Weekday Ridership (On/Off)	Avg. Daily Weekday Ridership (Total)	Existing Dist to Next Stop	Eliminated or New Stop?	Proposed Dist to Next Stop (if different)	Points of Interests	Existing Amenities	Notes on Proposed Changes
Norwalk Comm Coll and West Campus	82 / 0	82	2687		3715	Norwalk Community College		
Richards Ave and Connecticut Ave	3 / 0	3	1028	Eliminate				Eliminate stop based on 341 Recommendations
Connecticut Ave and Opp Double Tree	0 / 0	0	705		875		Bus Pullout	
Boston Post Rd and W Norwalk Rd	0 / 0	0	960	Move				Shift stop based on 341 Recommendations
Boston Post Rd and Richmond Dr	0 / 0	0		Eliminate				Eliminate stop based on 341 Recommendations
----- E X P R E S S via I-95 -----								
STAMFORD TRANS CTR BAY E and N STATE ST	0 / 88	88				Stamford Transportation Center		

341 Eastbound

Stop Consolidation Recommendations

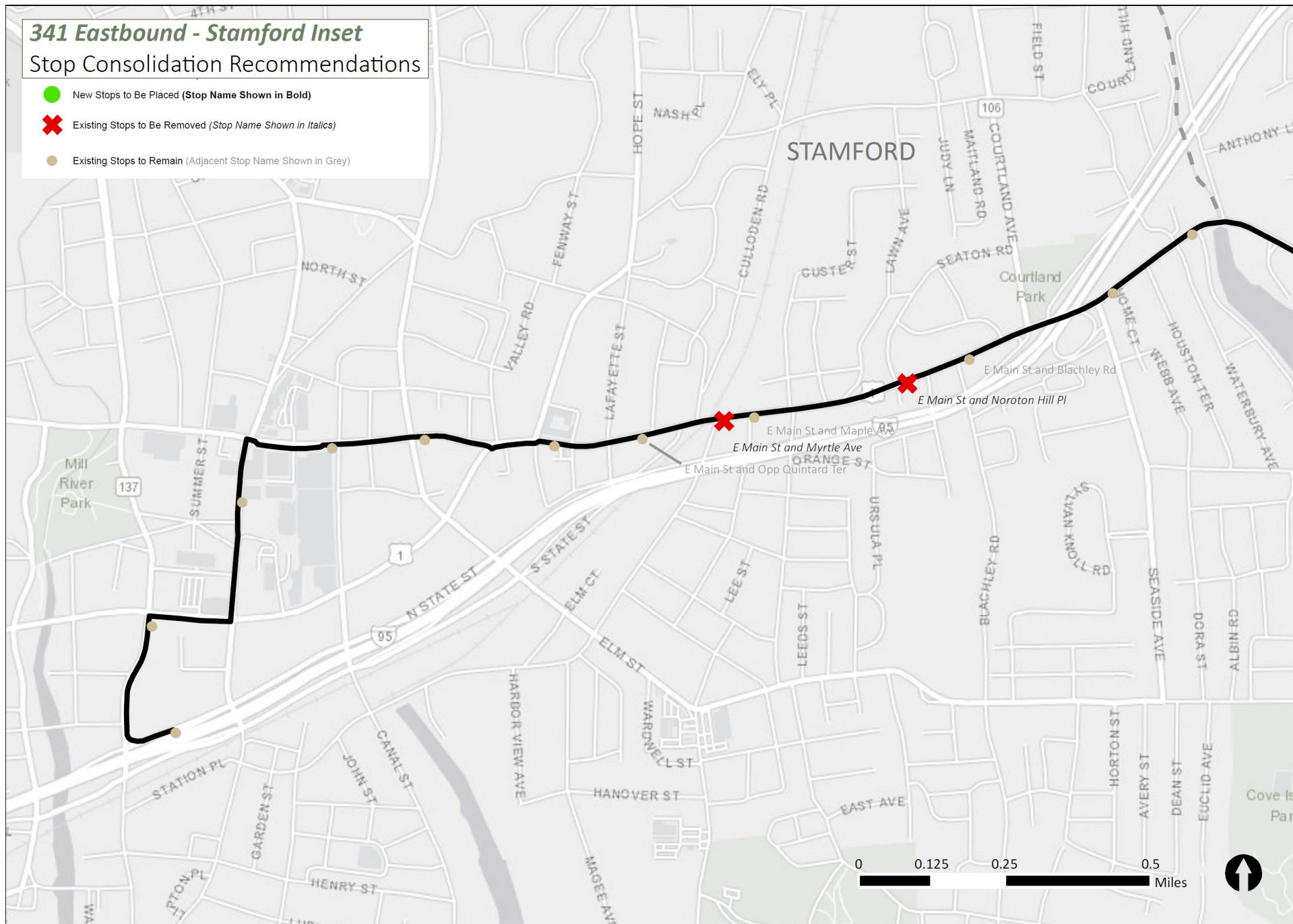
- New Stops to Be Placed (**Stop Name Shown in Bold**)
- ✕ Existing Stops to Be Removed (*Stop Name Shown in Italics*)
- Existing Stops to Remain (Adjacent Stop Name Shown in Grey)



341 Eastbound - Stamford Inset

Stop Consolidation Recommendations

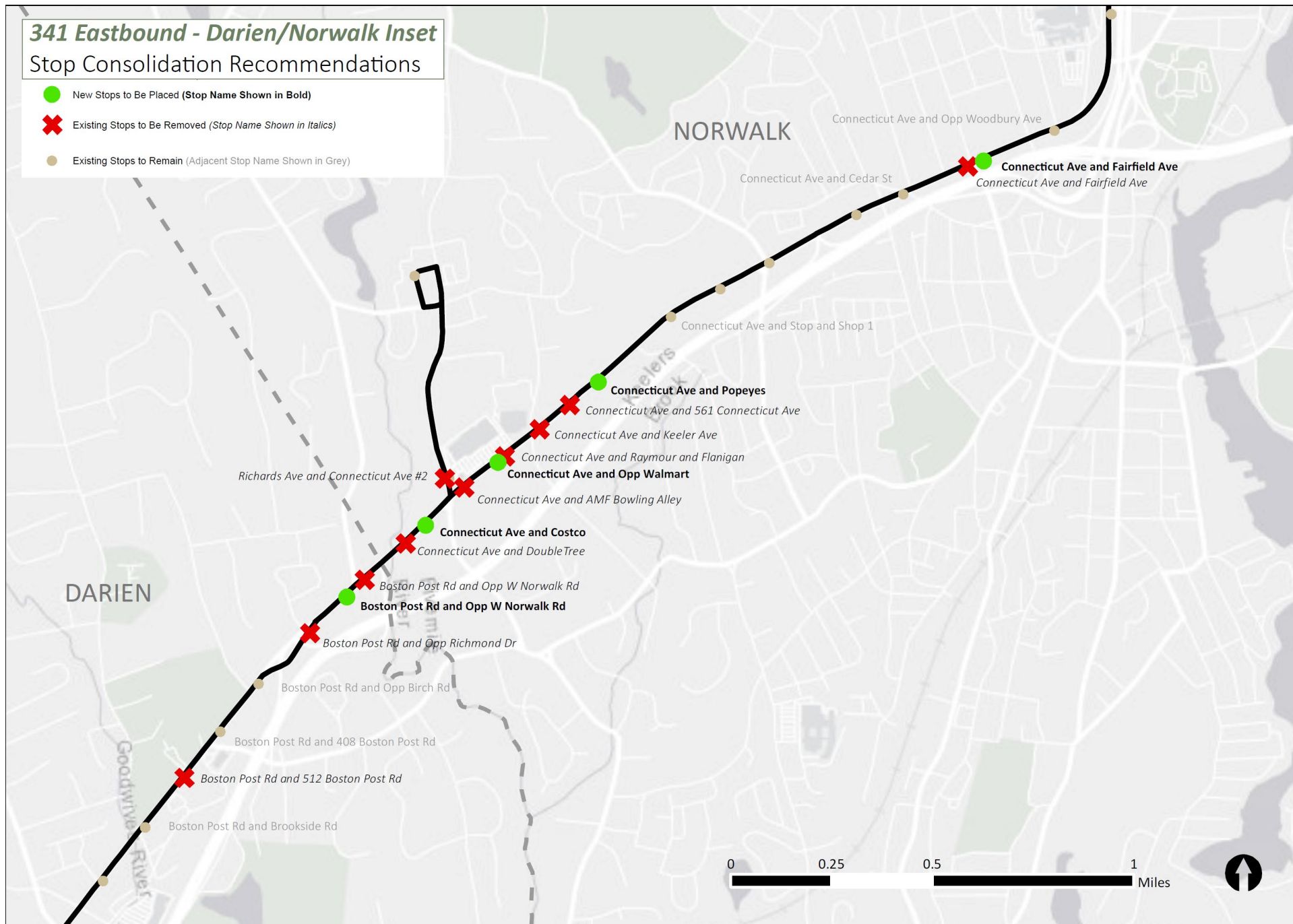
- New Stops to Be Placed (**Stop Name Shown in Bold**)
- ✗ Existing Stops to Be Removed (*Stop Name Shown in Italics*)
- Existing Stops to Remain (Adjacent Stop Name Shown in Grey)



341 Eastbound - Darien/Norwalk Inset

Stop Consolidation Recommendations

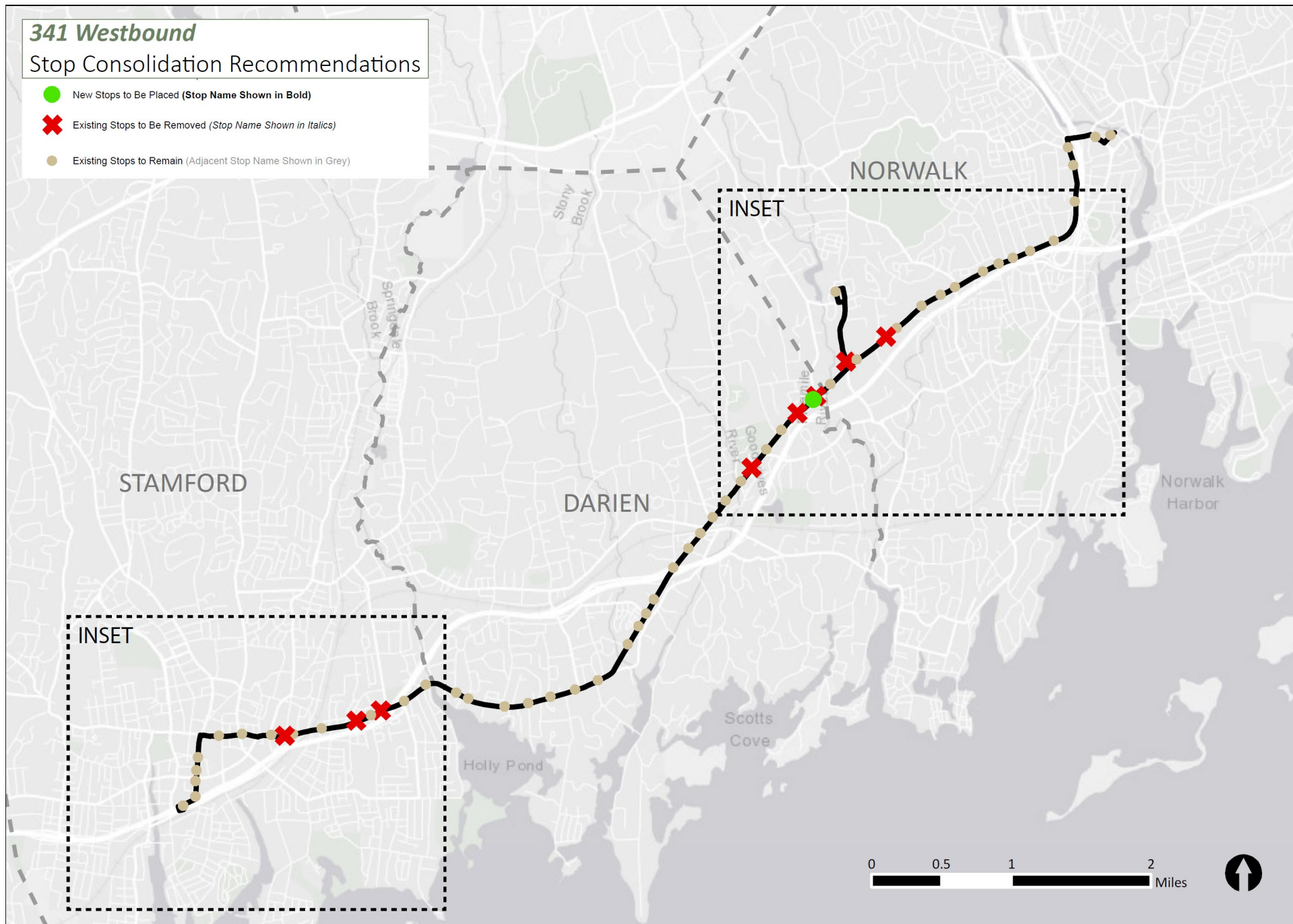
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- ✗ Existing Stops to Be Removed (*Stop Name Shown in Italics*)
- Existing Stops to Remain (Adjacent Stop Name Shown in Grey)



341 Westbound

Stop Consolidation Recommendations

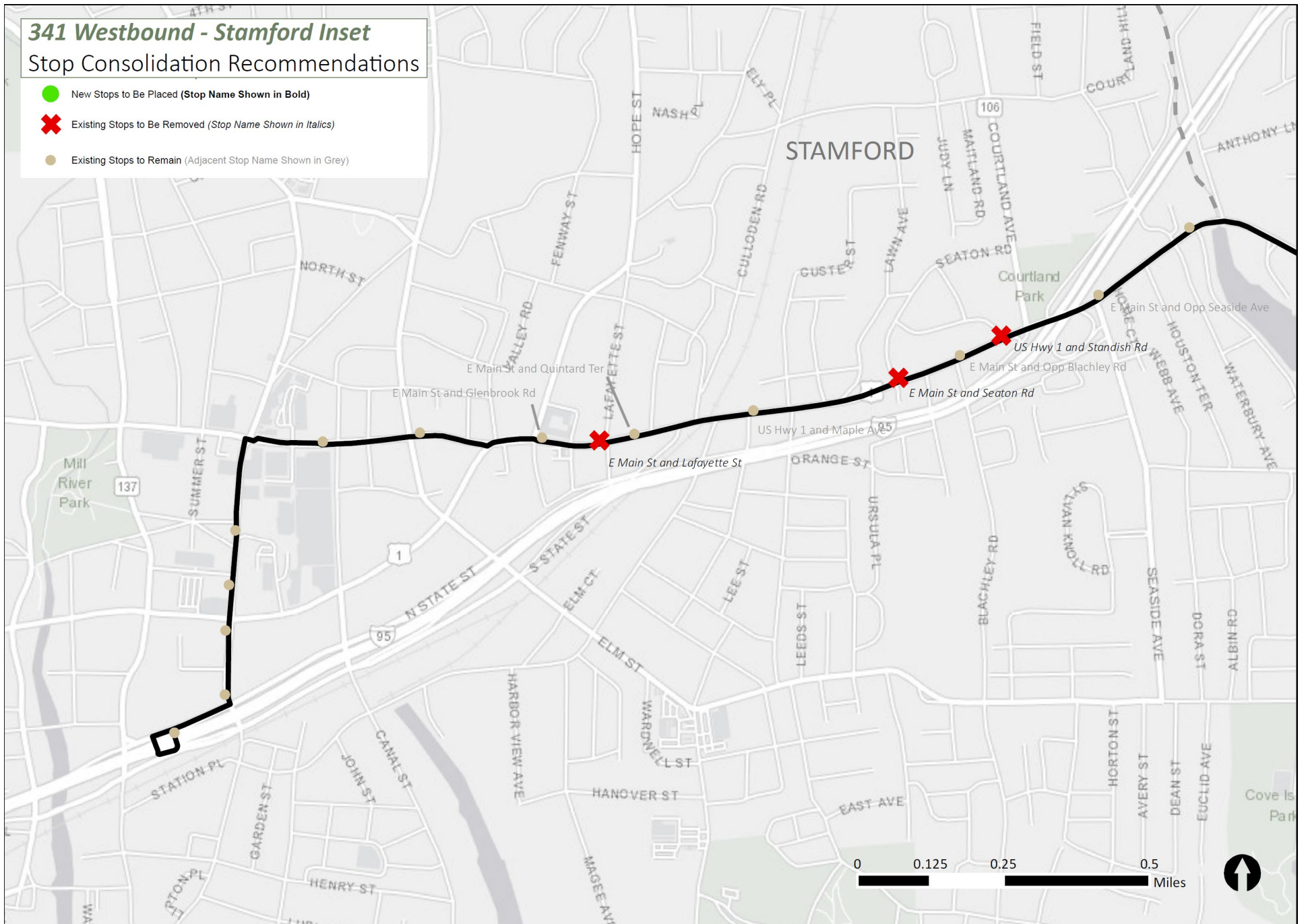
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- ✕ Existing Stops to Be Removed (*Stop Name Shown in Italics*)
- Existing Stops to Remain (Adjacent Stop Name Shown in Grey)



341 Westbound - Stamford Inset

Stop Consolidation Recommendations

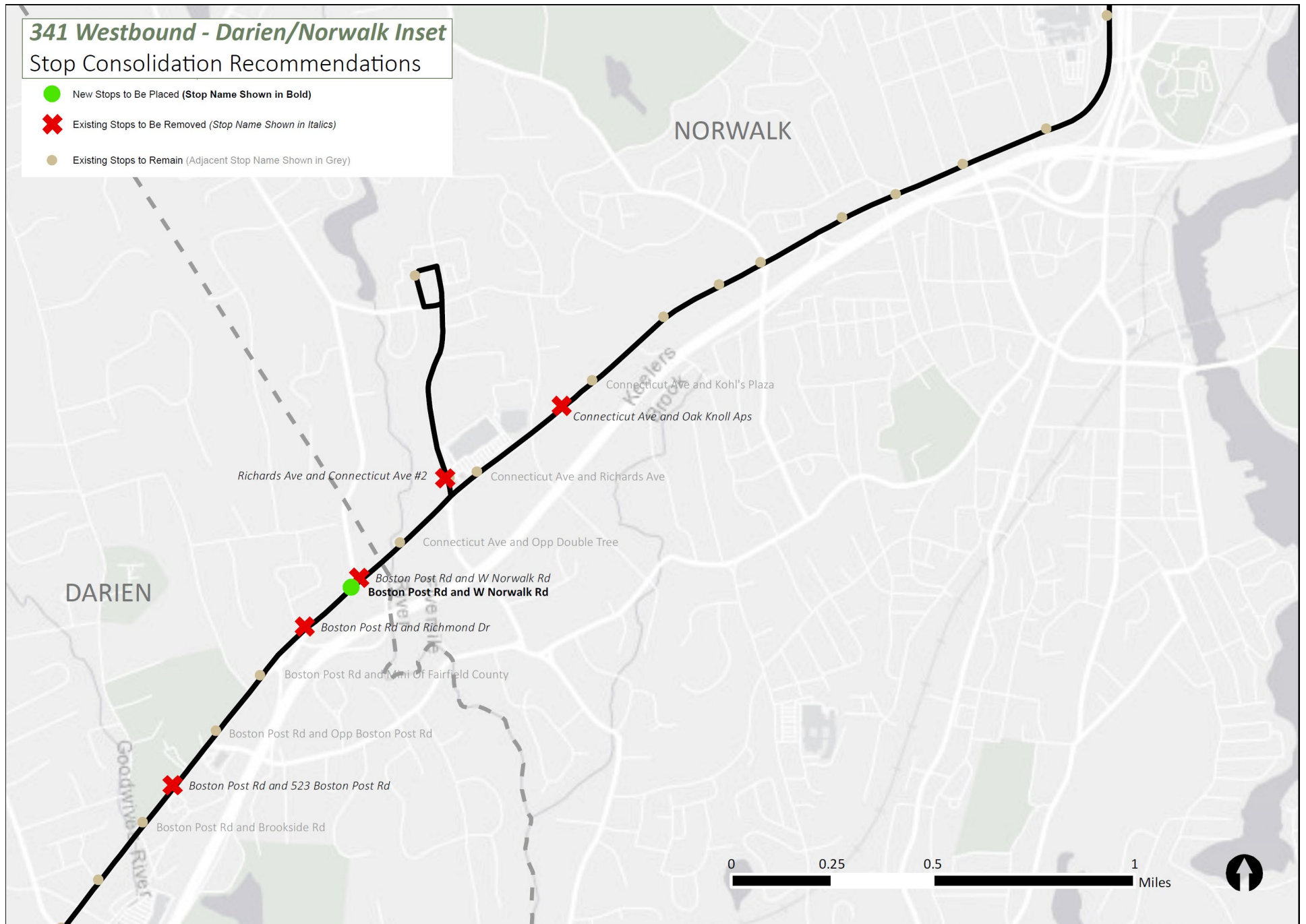
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- ✗ Existing Stops to Be Removed (*Stop Name Shown in Italics*)
- Existing Stops to Remain (Adjacent Stop Name Shown in Grey)



341 Westbound - Darien/Norwalk Inset

Stop Consolidation Recommendations

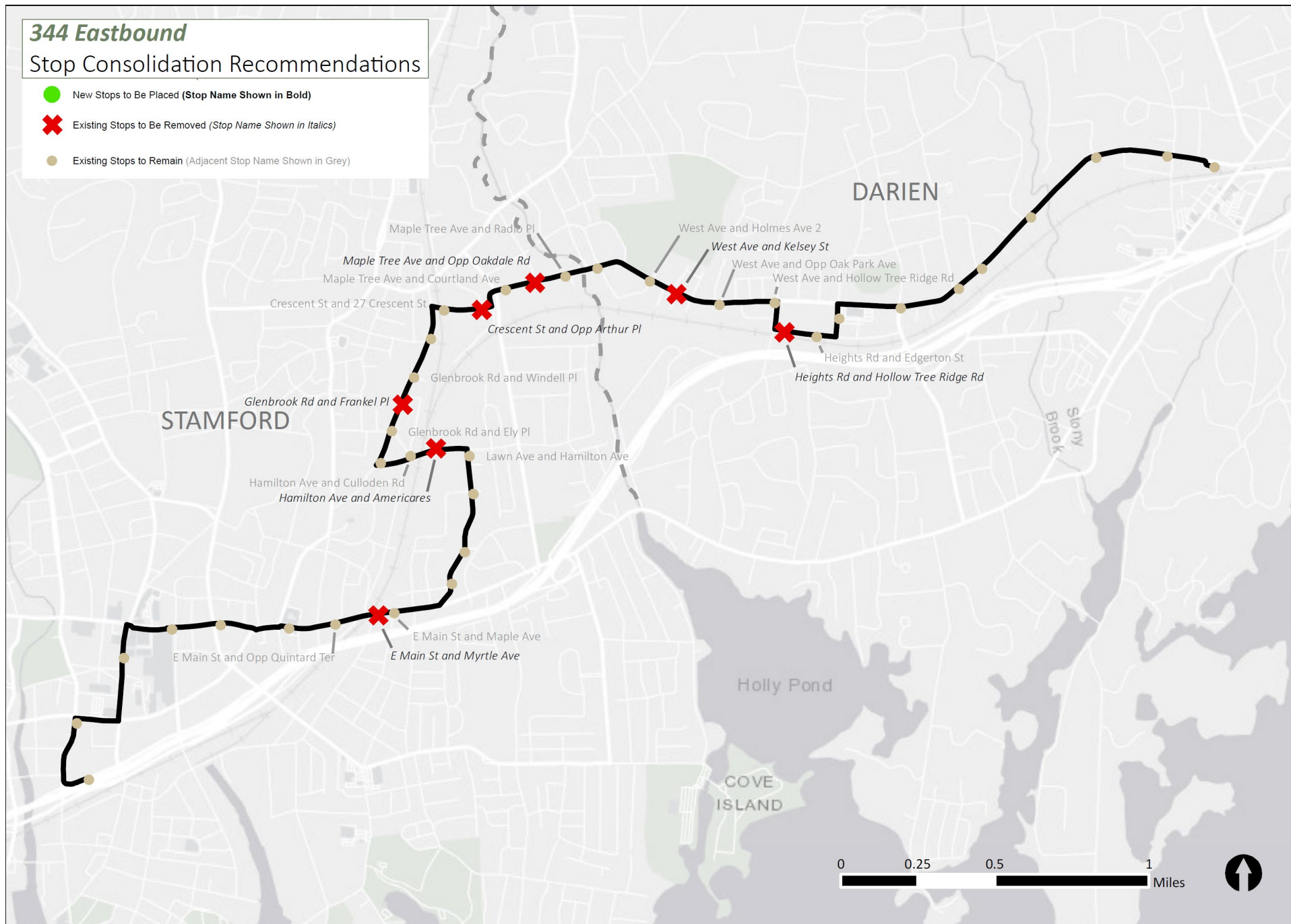
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-  Existing Stops to Be Removed (*Stop Name Shown in Italics*)
-  Existing Stops to Remain (Adjacent Stop Name Shown in Grey)



344 Eastbound

Stop Consolidation Recommendations

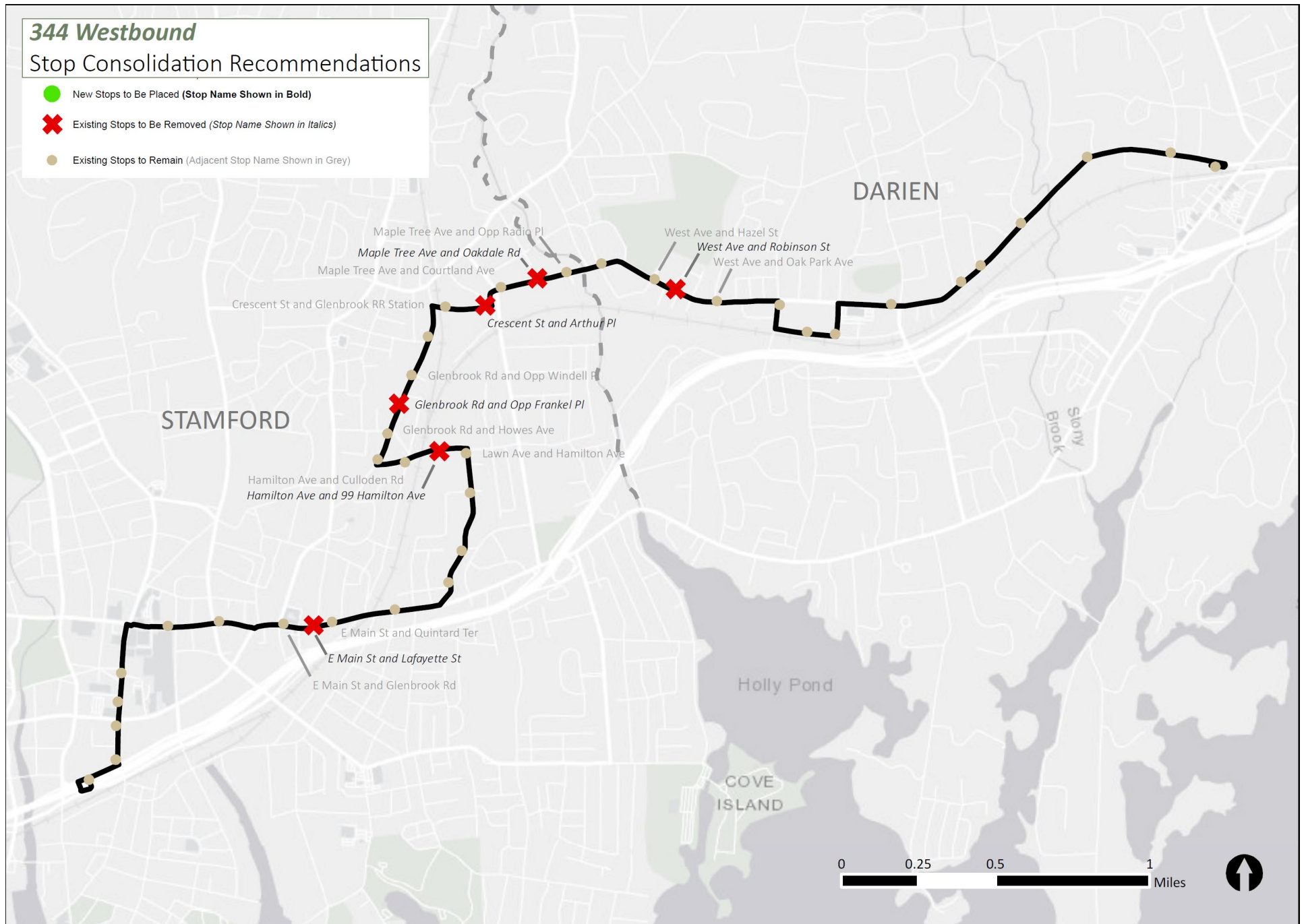
- New Stops to Be Placed (**Stop Name Shown in Bold**)
- ✗ Existing Stops to Be Removed (*Stop Name Shown in Italics*)
- Existing Stops to Remain (Adjacent Stop Name Shown in Grey)



344 Westbound

Stop Consolidation Recommendations

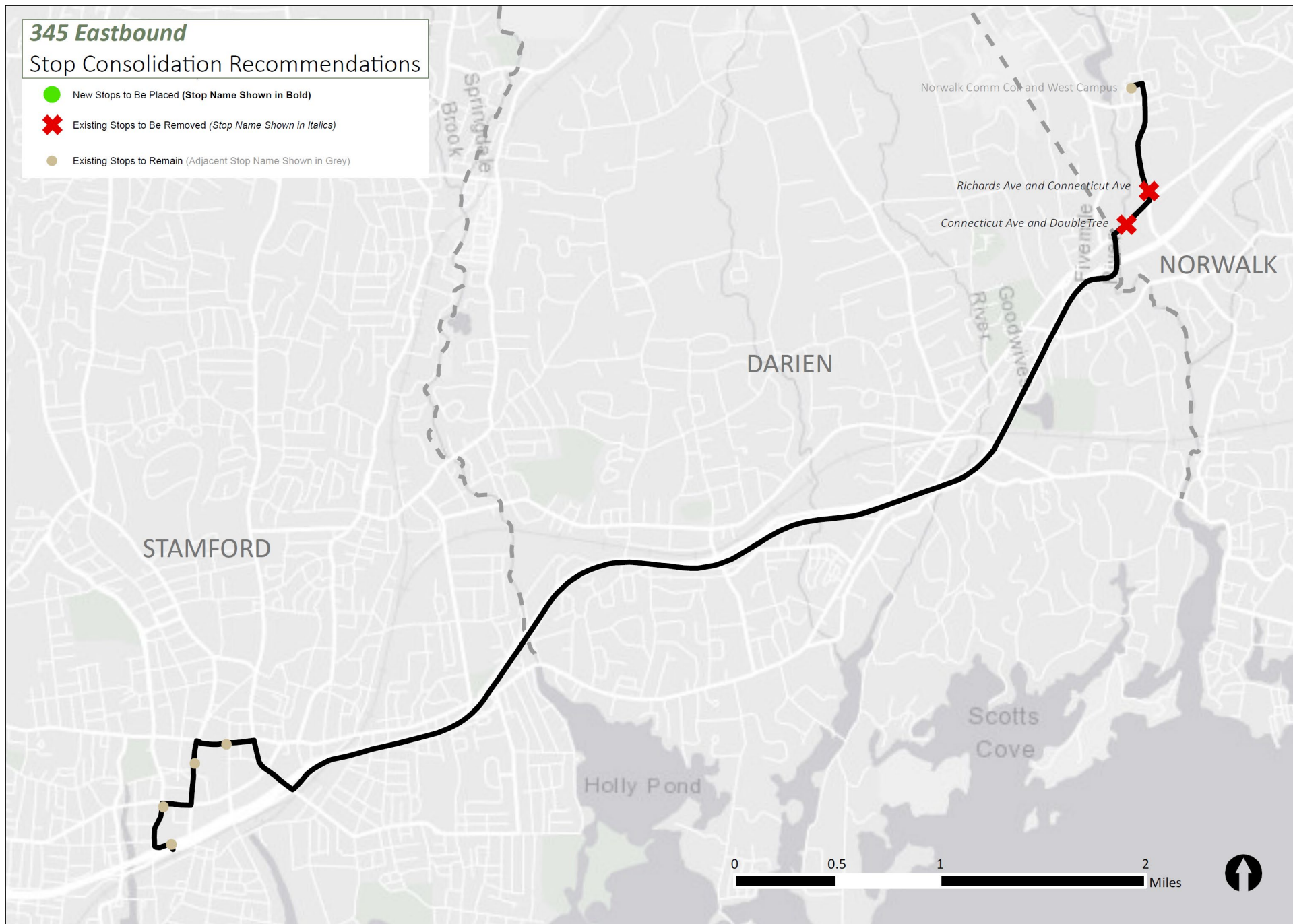
- New Stops to Be Placed (**Stop Name Shown in Bold**)
- ✗ Existing Stops to Be Removed (*Stop Name Shown in Italics*)
- Existing Stops to Remain (Adjacent Stop Name Shown in Grey)



345 Eastbound

Stop Consolidation Recommendations

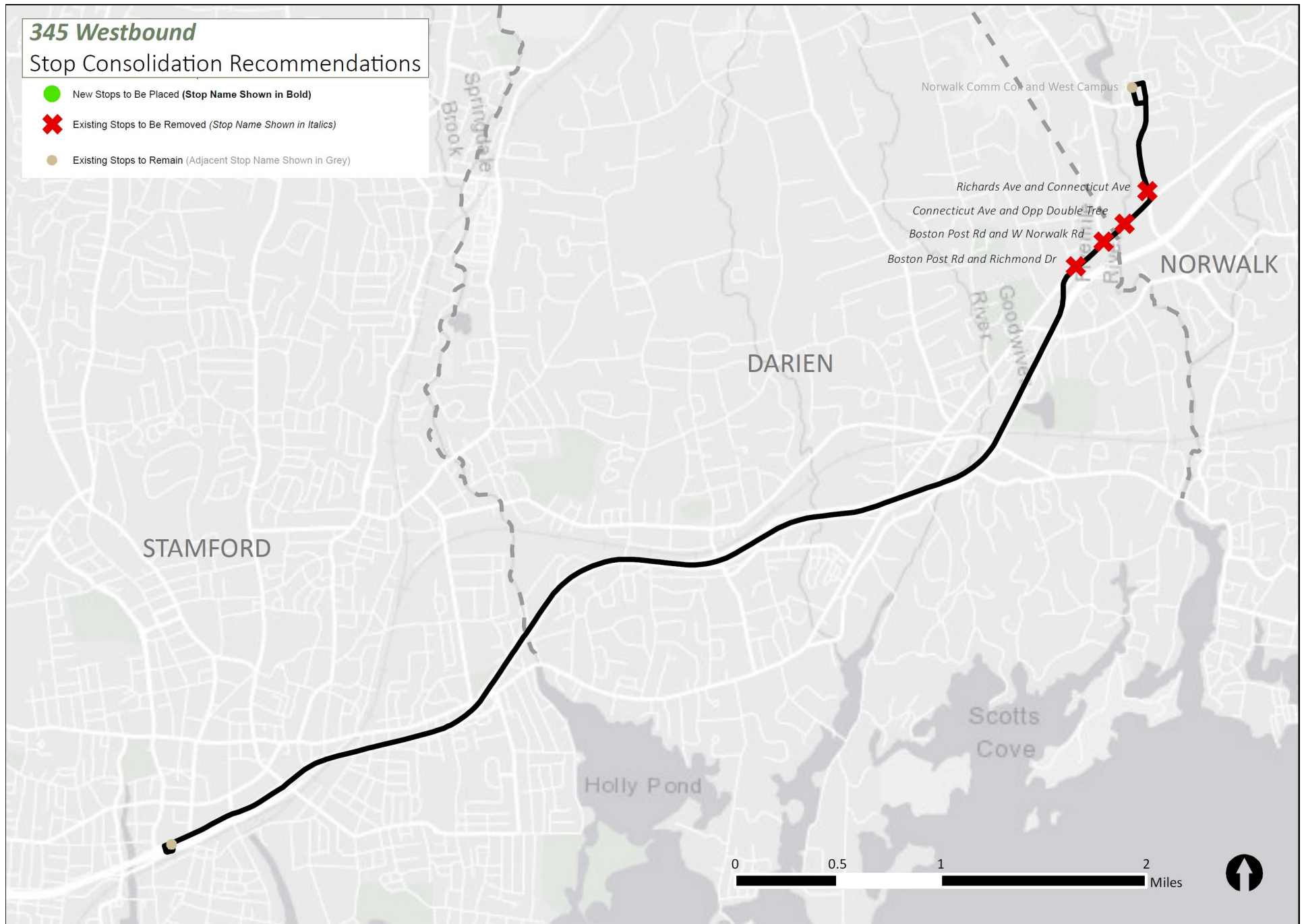
-  New Stops to Be Placed (**Stop Name Shown in Bold**)
-  Existing Stops to Be Removed (*Stop Name Shown in Italics*)
-  Existing Stops to Remain (Adjacent Stop Name Shown in Grey)



345 Westbound

Stop Consolidation Recommendations

-  New Stops to Be Placed (**Stop Name Shown in Bold**)
-  Existing Stops to Be Removed (*Stop Name Shown in Italics*)
-  Existing Stops to Remain (Adjacent Stop Name Shown in Grey)



Appendix C: Best Practices for Bus Stop Design

Attractive and comfortable transit stops serve a variety of functions. These include making transit use more appealing to patrons and potential riders, improving accessibility and overall performance, and branding and marketing of the transit agency. High-quality transit stop design and amenities benefit the riders and promote transit streets as fundamental components of the street network. The following provides a summary of best practices related to transit stop design, as specified in the National Association of City Transportation Officials (NACTO), *Transit Street Design Guide*.³

Shelters

Shelters improve comfort for riders by protecting them from rain, snow, and wind. Shelters are especially vital at stops with moderate to high boardings, at weather-exposed locations, or in areas without nearby shelter locations. Many agencies prioritize shelters in locations with high concentrations of children or seniors, such as outside senior centers or near schools. Basic shelters with seating and network information are appropriate at low volume stops with basic coverage, such as neighborhood transit streets. Providing comfortable shelters and seating can significantly improve the perception of wait times and rider satisfaction.⁴

Small transit shelters should include benches or leaning rails and space for a wheelchair user to wait. They should be located in visible areas to ensure that passengers waiting for buses can be seen from the outside. Glass or transparent materials are recommended, as well as an open back or side. Passengers waiting in shelters should be able to easily see arriving buses and should be visible to bus operators, particularly if buses stop only on demand. Shelters should include interior lighting, or they should be in a well-lit area. An eight to twelve-foot-wide pedestrian through zone should be maintained on the sidewalk, either behind or in front of the shelter in dense, commercial areas. A minimum of five feet must be maintained at any location. The minimum unobstructed boarding area must be five feet long, parallel to the curb, but eight to twelve feet is preferred to accommodate bus door variation or location. Shelters with seating must provide a



Branded rapid service shelter, Seattle (Credit: Oran Viriyincy)

³ National Association of Transportation Officials. *Transit Street Design Guide*. Washington, D.C.: 2016.

⁴ Fan, Yingling, Andrew Guthrie, and David Levinson. *Perception of Waiting Time at Transit Stops and Stations*. Working paper, University of Minnesota, Minneapolis, MN: 2015.

minimum two-and-a-half by four-foot clear space for wheelchair users. This area must be entirely within and protected by the shelter space. Shelters are generally four feet deep but can be as narrow as two feet in tight locations with little room. Narrow shelters typically only have room for covered standing or leaning areas and route information. Wayfinding and route information should be provided, and shelters should include stop names and additional route information. Bus stop signs should display information such as stop name, route number, stop number, direction or destination, and transit system logos.

Large shelters should be used on higher-frequency or higher-capacity routes. They should be used at locations that serve multiple vehicles simultaneously or on transit corridors and destination streets. They can serve both travel directions, depending on placement. Unlike smaller shelters, large transit shelters are typically separated from sidewalks and pedestrian through paths, either on boarding islands or raised platforms. Placement should allow for a minimum of four feet around all sides when at sidewalk level and in front of the shelter if located on an elevated platform. Trash bins and a maintenance plan should be included as part of shelter design and implementation. Highly visible signage identifying the station and travel direction(s) is necessary.

Seating

Seating is a basic feature of a transit stop. Comfortable seating near stops dramatically improves the comfort of the passenger experience. Despite these benefits, financial constraints and limited available land within street rights-of-way often limit the elements that are provided at many transit stops. Seating should be prioritized to improve the comfort of riders. Transit stops with moderate to high boardings, long wait times, or high use by senior or child riders should provide seating for passengers. The United States Access Board recommends four feet of clearance distance on all sides of seating, and seating should not conflict with pathways or sidewalk clearance.⁵ Dark materials that retain heat such as metals should be avoided, particularly in hot, sunny locations. Benches should also be designed to prevent



TriMet bus stop sign pole with single seat attachment, at NW 6th & Glisan (Credit: Steve Morgan)



Leaning rail on 1st Avenue, NYC (Credit: NYC DOT)

⁵ United States Access Board. "Ch. 8 Special Rooms, Spaces, and Elements, Std. 810: Transportation Facilities." ADA Standards. US Department of Justice, Washington, D.C.: 2015.

accrual of rainwater and moisture. Small stops or those with few boardings should provide individual seats or benches with separation between seats. Stops with high boardings should include seating wrapped around and attached to shelters to provide maximum seating. Leaning rails are a minimal accommodation that could also be provided. These should be 30-38 inches tall and offset six inches from the back of a boarding platform or shelter. Seating should be located at least one foot away from any bicycle throughways.

Access

Accessible transit stop design is based on three key elements: barrier-free design, wayfinding to help passengers reach the stop, and safety. These elements account for the needs of all potential transit users, not just people with physical disabilities. ADA (Americans with Disabilities Act) requirements



Rapid ride map and card reader in Seattle, WA (Credit: Flickr user SounderBruce)



86th Street, NYC (credit: NYC DOT)

pertain to surfaces, clearances from curbs and roadways, slopes, and connections to streets, sidewalks, and pedestrian paths. The U.S. Access Board publishes ADA Accessibility Guidelines (ADAAG).⁶ Accessible design means that a transit system has complied with ADA laws, regulations, and state or local building codes.

Wayfinding and Passenger Information

Transit stops should include information about routes serving the stop in a clear, legible manner. Wayfinding should be placed in highly visible, obvious locations such as overhead or at eye-level, in regular intervals. Signage and materials should be consistent with the regional or agency branding. Consistent logos, colors, and fonts reinforces the visibility of route signage. Schedule and real-time arrival information reduces uncertainty and can improve rider satisfaction; therefore, real-time arrival displays should be utilized whenever possible.⁷ Additionally, stops and stations are gateways to neighborhoods and destinations and are an opportunity to highlight key locations in the surrounding area.

Ticket Vending

Off-board ticket vending machines enable riders to purchase tickets prior to boarding, thus promoting a more efficient boarding process and overall rider experience. Riders can use a variety of payment methods such as credit and debit cards, cash, and mobile payment systems. Curbside fare machines are costly to install and maintain

⁶ United States Access Board. "Ch. 8 Special Rooms, Spaces, and Elements, Std. 810: Transportation Facilities." ADA Standards. US Department of Justice, Washington, D.C.: 2015.

⁷ Brakewood, Candace. *Evaluating the Impacts of Real-Time Transit Information in Tampa and Atlanta*. Webcast, Center for Urban Transportation Research, University of South Florida, Tampa FL: 2014.

and should only be use on high-volume corridors. When utilized, vending machines should be placed at a height of 34 to 48 inches to accommodate wheelchair users and they should not block accessible paths, boarding areas, or bus door zones. Fare purchase instructions should be clear and concise and communicated in multiple languages. Machines should also include raised lettering for visually impaired riders.

Landscaping

At bus stops and terminals, landscaping can improve overall aesthetics and rider comfort by proving shade. Landscaping also creates opportunities for safer pedestrian crossings at bus bulb and curb extensions by helping to calm traffic in the surrounding area.⁸ Attractive landscaping including trees and shrubs should be utilized wherever possible to enhance the rider experience and overall perception of transit usage. Trees and shrubs must not hinder the visibility of the riders for transit drivers and likewise, riders should be able to clearly see oncoming buses. Additionally, landscaping such as planter strips should not impede movement in throughway areas or locations where wheelchairs will be traveling. Shrubbery and trees should be trimmed for both horizontal and vertical clearance to maintain access and views.

Bicycle Parking

Bike parking can supplement transit ridership in urban corridors as well as regional stops. Short- and long-term bike parking promotes first and last mile connections and provides access to local destinations. Bike parking should be considered near all bus stations and stops. A clear area around bicycle parking should be provided to avoid impacting pedestrian traffic and transit door operations. If multiple racks are installed, they should be placed at least three feet apart to allow uncluttered access. Bike parking should be located in well-lit areas, in full view of sidewalks and pedestrian areas.



Covered bike racks in Portland, OR (credit: Teresa Boyle)

⁸ Fan, Yingling, Andrew Guthrie, and David Levinson. *Perception of Waiting Time at Transit Stops and Stations*. Working paper, University of Minnesota, Minneapolis, MN: 2015.

Appendix D: Existing Conditions

The study area offers a variety of transit stop types, including sign-and-pole stops, shelter stops, and curbside pull-off stops. To benefit the most number of riders, stops with higher boardings would ideally provide shelters and benches. This is not always the case in the study area; frequently transit stop amenities are ill-matched with ridership levels. Financial constraints often limit the provision of stop elements on existing routes, but investing in high-quality stops can change both the perception and reality of transit service as a comfortable transportation option.⁹ The following provides a summary of the various transit stops located throughout the study area in the City of Stamford, Town of Darien, and the City of Norwalk.

City of Stamford

Sign-and-pole Stops

Stamford has sign-and-pole stops at many of its transit stops. These are typically located along the sidewalk and offer limited information regarding schedules. Bus stop signs are located on telephone poles as well as mounted to freestanding metal poles. As shown in Figure 1, sign-and-pole stops do not provide a designated waiting area; instead they are located within the sidewalk realm. Because of this, sidewalk stops may create conflicts between through-moving pedestrians and alighting passengers when the bus is dwelling.¹⁰ Some sign-and-pole stops are located in areas where on-street parking is allowed, as displayed in Figure 2. This can make it challenging for bus drivers to see riders waiting to be picked up and for riders to board or exit the buses. Such stops are not ADA compliant and may pose safety hazards.



Figure 1: Stamford bus stop, Broad Street, east of Grove Street, view east

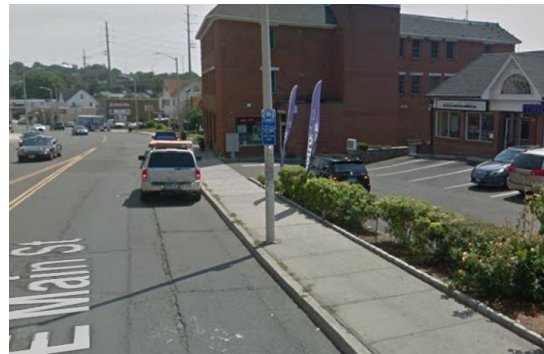


Figure 2: Stamford bus stop, East Main Street, east of Clark Hills Avenue - view east

⁹ National Association of City Transportation Officials. *Transit Street Design Guide*. Washington, D.C.: 2016.

¹⁰ New York City Department of Transportation. *Street Design Manual, 2nd Edition*. New York City Department of Transportation, New York.

Shelter Stops

Stamford has large transit shelter stops at several bus stop locations. These provide schedule information, benches and protection from weather elements. Shelter stops also typically include seating, and an ADA accessible open area, where a wheelchair can safely maneuver. Some shelters, like the one shown in Figure 3, include advertising. This shelter also includes a garbage can for waste. There are striped sharrows in the roadway at this location. People on bicycles must go around stopped buses. The shelter in Figure 4 includes lighting and a bench. There is also a bike rack nearby, but it is unclear if the rack is public or privately owned by the bicycle shop located behind the bus shelter.

There are large scale transit shelters in Stamford as well. The image shown in Figure 5 includes two large shelters, which have bench seating for many riders. Additional amenities include, lighting, schedule information, and garbage cans.



Figure 3: Stamford shelter, Broad Street, west of Greyrock Place, view west



Figure 4: Stamford shelter, East Main Street, west of Quintard Terrace



Figure 5: Stamford shelter, Main Street at Atlantic Street, view south

Town of Darien

Sign-and-pole Stops

Darien has sign-and-pole stops at most of its transit stops. These are typically located along the sidewalk and offer limited bus schedule information. Bus stop signs are located on telephone poles as well as mounted to freestanding metal poles. As shown in Figure 6, sign-and-pole stops do not provide a designated waiting area; instead, they are located within the sidewalk realm. Because of this, sidewalk stops may create conflicts between through-moving pedestrians and alighting passengers when the bus is dwelling.¹¹ Other sign-and-pole stops are simply located in the landscape buffer along the roadside, as visible in Figure 7. Evidence of use is visible at many such stops. Grass is often worn away due to foot traffic, leaving bare dirt patches. Such stops are not ADA accessible.



Figure 6: Darien Sign-and-pole Stop, Post Road north of Leroy Avenue, view east

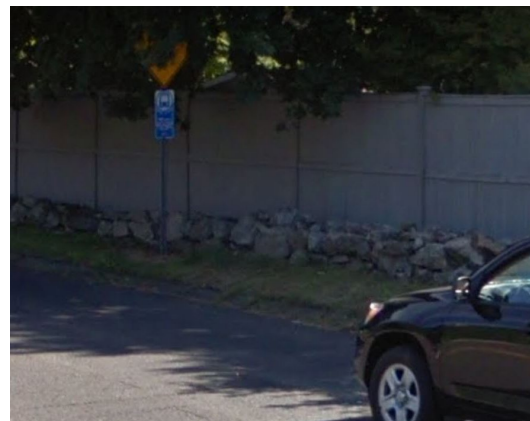


Figure 7: Darien Sign-and-pole Stop, Post Road, north of Clubhouse Circle, view east

Shelter Stops

Shelter stops as shown in Figure 8 provide protection from weather elements. Signage and route information is often included within the shelter. Shelter stops also typically include seating and an ADA accessible open area where a wheelchair can safely maneuver. Prominent shelter stops such as the Darien Whole Foods stop also provide a visual cue for riders as



Figure 8: Darien Shelter Stop at Whole Foods, Post Road, north of Ledge Road, view west

¹¹ New York City Department of Transportation. *Street Design Manual, 2nd Edition*. New York City Department of Transportation, New York.

shelters are highly visible, allowing users to easily identify their locations.

City of Norwalk

Sign-and-pole Stops

Norwalk has sign-and-pole stops at many of its bus stop locations. These often consist of signage mounted to a telephone pole or metal post. Many sign-and-pole stops are located within the sidewalk realm. Some stops, such as the stop displayed in Figure 9 show evidence of heavy ridership including litter, debris, and worn grass. A turned-over shopping cart is visible in Figure 10. Often these are utilized as makeshift seats at stops where seating is not provided. This stop also includes signage for multiple route schedules, which display time points and other information for riders. The sign-and-pole stops shown in Figures 9 and 10 are not ADA accessible.



Figure 9: Norwalk bus stop, Connecticut Avenue, north of Clinton Avenue, view west, with rider waiting



Figure 10: Norwalk bus stop, Connecticut Avenue, south of Best Buy Plaza, south of Scribner Avenue, view west

Curbside Pull-off Stops

Norwalk Community College has a curbside bus pull-off that is located near its entrance, on Richards Avenue. Although this bus pull-off does not have a bench or shelter, it does provide a pull-off area for buses and a waiting pad, adjacent to the sidewalk. Since pull-out stops prioritize through-traffic, including through-moving transit, they are most useful where flow is a priority or where in-lane stops would be problematic.¹²

¹² National Association of City Transportation Officials. *Transit Street Design Guide*. Washington, D.C.: 2016.



Figure 6: Bus pull-off at Norwalk Community College entrance, Richards Avenue, north of West Cedar Street

Shelter Stops

Norwalk has shelter stops as several bus stop locations. These provide schedule information, benches and protection from weather elements. Shelter stops also typically include seating, and an ADA accessible open area, where a wheelchair can safely maneuver.

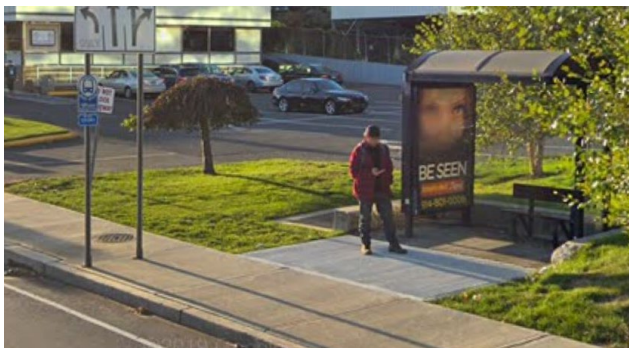


Figure 7: Norwalk bus stop, Connecticut Avenue, south of Taylor Avenue, view west

Appendix E: Notes on Bus Stop Existing Conditions

The City of Stamford completed a field review of study area transit routes within the City of Stamford. The following notes highlight findings and needs from this review:

Route 341 Eastbound

- Intersection of Tresser Boulevard at Washington Boulevard
 - Install a shelter based on passenger counts, and an ADA ped ramp
- Macy's on Broad Street
 - Shelter and/or bench (bench under overhang). Note: would require an easement
- East of Grove Street at Broad Street
 - Shelter on grass (get an easement). Sidewalk is in poor condition
- McDonalds
 - No route signage
- Home Court at East Main Street
 - Install ADA pad

Route 342 Westbound

- 1290 East Main Street
 - Explore possibility of shelter
- 1122 East Main Street
 - ADA pad and shelter (check ridership data)
- Blachley Road at East Main Street
 - ADA pad and shelter
 - Consider consolidating with 1122 stop (they're only 400 ft apart)
- Seaton Road at East Main Street
 - Install an ADA pad connecting road to shelter
- Walgreens
 - Install shelter
- Broad Street across from Macy's
 - Install bus stop sign on its own post
- Atlantic Street at North State Street
 - Install shelter

Route 344 Northbound

- Intersection of Lawn Avenue and Trumbull Gate
 - Place sign on u-channel post
- Helen Place intersection
 - Route sign on u-channel post
 - Install concrete pad
- Hamilton Avenue at Lawn Avenue
 - Move stop back from intersection
 - Install pad and sign on u-channel
 - Crosswalk across Hamilton Avenue
- Americares
 - Sign on u-channel
 - Install ADA pad
- Glenbrook Road at Hamilton Avenue
 - Place sign on u-channel
- Frankel Place at Glenbrook Road
 - Consolidate stop to Windell Place
- 453 Glenbrook Road
 - ADA pad and sign on u-channel
- 9 Maple Avenue
 - ADA pad
- 39 Maple Avenue
 - ADA pad

Route 344 Southbound

- 94 Maple Avenue
 - ADA pad
- Courtland Avenue at Maple Avenue (east of intersection)
 - Blocking lane use sign
 - Needs ADA pad
- Landmark Baptist Church
 - Move to western light pole on other side of Arthur Place
- Stark School
 - ADA pad
- St. Maurice
 - Consolidate with school stop

- Howes Avenue at Glenbrook Road
 - ADA pad
- Hamilton Avenue at Glenbrook Road
 - ADA pad
- Cubesmart
 - Remove sign from fence and place on u-channel
 - ADA pad
- Sherman Street at Lawn Avenue
 - ADA pad at corner
- Crosswalk needed across Lawn Avenue

Appendix F: Comments from Norwalk Transit District



Commissioners [Andrew A. Glickson, Esq.](#), [Alice McQuaid, Esq.](#)
Chief Executive Officer [Kimberlee A. Morton](#)
Chief Operating Officer [Britt T. Liotta](#)
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June 28, 2019

Ariana Vera
WESTCOG
1 Riverside Road
Sandy Hook, CT 06482

Dear Ms. Vera;

Thank you for providing the Norwalk Transit District an opportunity to comment Stamford East Bus Routes Technical Assistance Study.

Goal:

To assess if changes made to Stamford's Route 341 and to determine if CTTransit is complying with its agreement with Norwalk Transit District regarding its closed-door policy through the City of Norwalk.

Findings:

CTTransit's Route 341 already shares stops with NTD currently. It was previously agreed that CTTransit would run closed door through our service area and not compete with the existing Norwalk Transit services in the areas of duplication. If we are interpreting the data correctly it appears that this study supports apparent breaches which we have continuously tried to reach agreement on and have tried to amicably resolve. Please refer to Figure 1 below.

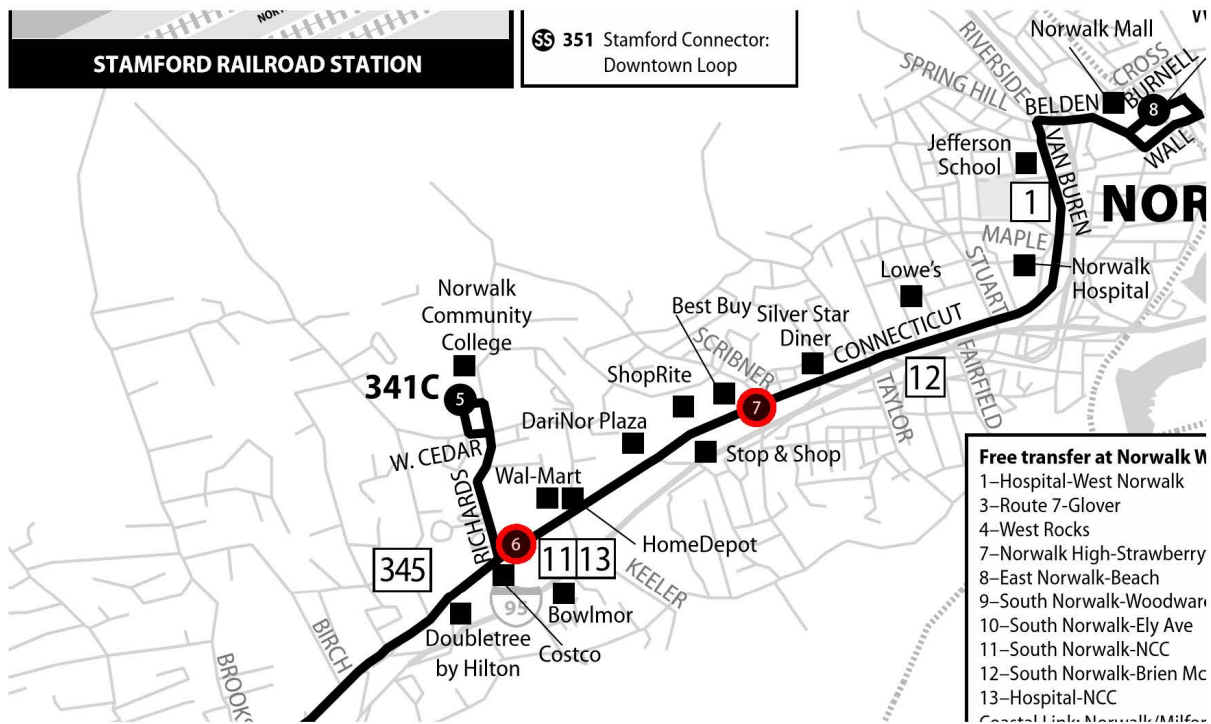


Figure 1: Stamford Route 341 (Effective March 25, 2018)

From the report, several stop modifications are recommended to help capitalize on ridership numbers. These modifications include bus stop elimination, consolidation, and bus stop relocation. These changes are made “due to low ridership, close stop spacing, or associated safety and operational concerns.”¹ When considering new locations, CTTransit found that stops should be placed roughly ¼ mile apart and centered on basic amenities such as groceries, community centers, schools, etc. I very much agree with this. I recommend that we also try to emulate this ideology. We concur with the ¼ mile rule, as it is a common guideline for a walking threshold. Looking at our routes, we have a high saturation in bus stops.

This report recommends the elimination of about 7 stops along Route 341, many of which are on Conn Ave. In Figure 2, all stop modifications are listed.

¹ Western Connecticut Council of Governments. *Stamford East Bus Routes: Technical Assistance*. June 2019.

Direction	Stop	Action	Notes
Eastbound	East Main St & Myrtle Ave	Eliminate	
	East Main St & Noroton Hill Pl	Eliminate	Remove stop or improve safety of pedestrian crossing of East Main Street
	512 Boston Post Rd	Eliminate	
	Boston Post Rd opposite Richmond Dr	Eliminate	
	Boston Post Rd opposite W Norwalk Rd	Move	Shift stop west to improve spacing
	Connecticut Ave & DoubleTree	Move	Shift stop east to improve spacing
	Richards Ave & Connecticut Ave	Eliminate	
	Connecticut Ave & AMF Bowling Alley	Consolidate	Shift east, opposite Walmart
	Connecticut Ave & Raymour & Flanigan	Consolidate	Shift west, opposite Walmart
	Connecticut Ave & Keller Ave	Eliminate	
	561 Connecticut Ave	Move	Shift east to better serve Kohl's Plaza
	Connecticut Ave & Fairfield Ave	Move	Shift to far side for improved operations
Westbound	Connecticut Ave & Oak Knoll Apts	Eliminate	
	Richards Ave & Connecticut Ave	Eliminate	
	Boston Post Rd & West Norwalk Rd	Move	Shift west to improve spacing
	Boston Post Rd & Richmond Dr	Eliminate	
	523 Boston Post Rd	Eliminate	
	U.S. Route 1 & Standish Rd	Eliminate	
	East Main St & Seaton Rd	Eliminate	Remove stop or improve safety of pedestrian crossing of East Main Street
	East Main St & Lafayette St	Eliminate	
TOTAL STOPS REMOVED		14	

Figure 2: Route 341 Norwalk Potential Stop Modifications

Stops highlighted in yellow and green are the stops that can affect transit ridership for the Norwalk Transit District. Bus stops highlighted in green represent eliminated stops, while yellow bus stops represent existing or changed stops. Comments on these bus stop modifications are as follows:

* Many details are too vague regarding new locations for us to provide specific comment and review. When referring to relocation east or west, there is little information to where it would be located. Many of these stops are shared with the Norwalk Transit District. If CTTransit only did eastbound drop-offs and westbound pick-ups there isn't much to be concerned about NTD ridership being affected. However, when referring to figures 3 & 4, it seems that there is a percentage of riders boarding eastbound to Norwalk and departing westbound in our operating zone. This is competitive to our Rt. 11, Rt. 13, and Conn Ave lines.

Yellow= Drop-off / Green= Pick-up

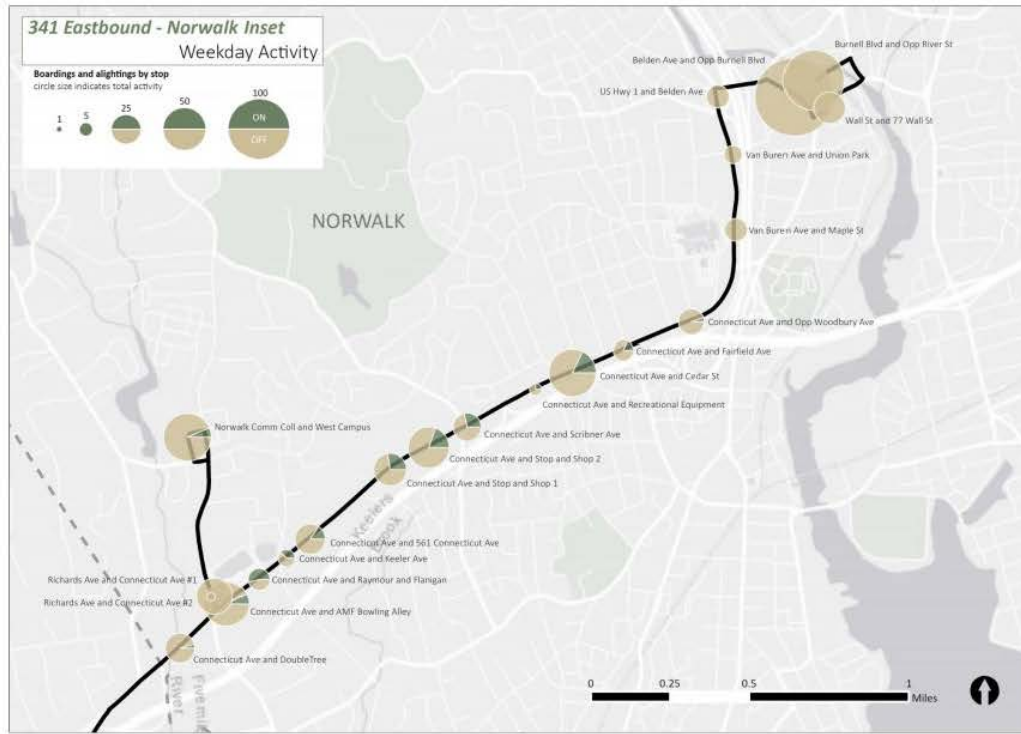


Figure 3: Eastbound Ridership

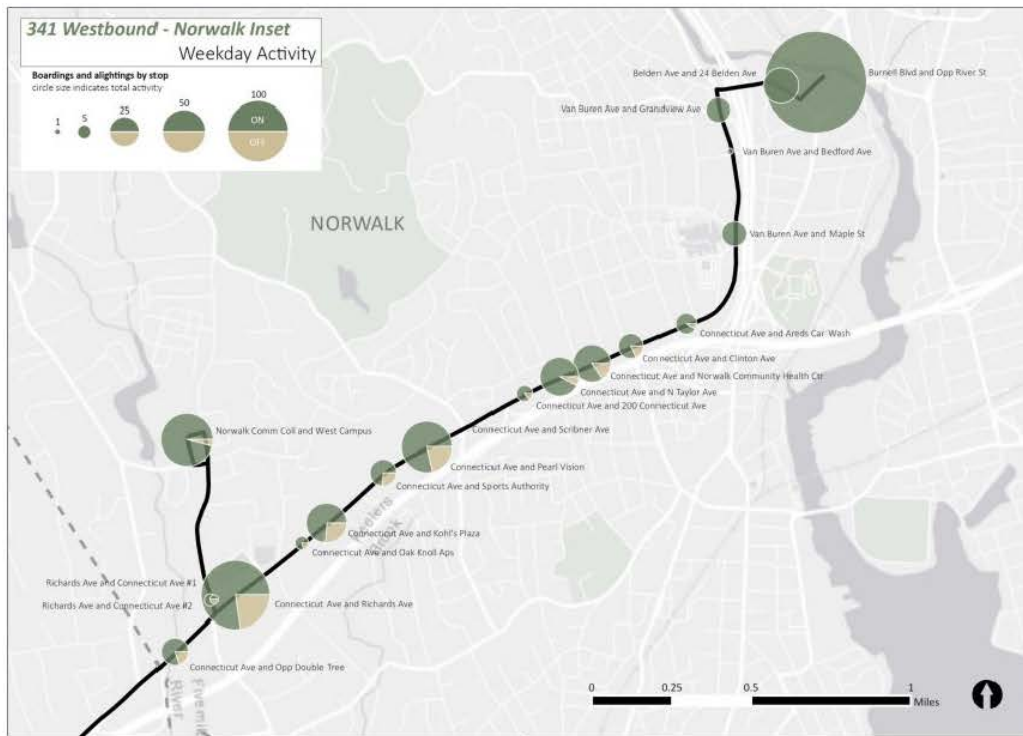


Figure 4: Westbound Ridership

Eastbound

- Connecticut Ave & Double Tree- this stop currently doesn't exist in our operating zone; however, this eastward shift may do so. If this stop is moved past Richards Ave., we find it to be competitive.
- Richards Ave & Connecticut Ave- We currently share this space. From this report, I see that there are other nearby stops. When eliminated the only competing route will be CTTransit's Route 345.
- Connecticut Ave & Raymour & Flanigan- We share this stop with our Rt. 11. It also influences our Conn Ave. If they pick up at this bus stop, we find it competitive as it gives shoppers another means to travel east to Norwalk.
- Connecticut Ave & Keeler Ave- we don't share this stop. We benefit from this elimination. It helps our Rt. 11 Connecticut Ave & Raymour & Flanigan Bus Stop.
- 561 Connecticut Ave- We already share this bus stop. This gives eastbound shoppers another means to travel to Norwalk. If they pick up riders at this stop, we find it to be competitive.
- Connecticut Ave & Fairfield Ave- We share this stop with our Rt. 13. They recommend to "shift to far side for improved operations." This is very vague. Likewise, if they pickup riders at this stop, we find it to be competitive.

Westbound

- Connecticut Ave & Oak Knoll Apts- We don't share this bus stop. It won't affect the NTD.
- Richards Ave & Connecticut Ave- This was taken out with the eastbound bus stop. When the Raymour & Flanigan stop moves to across the Walmart, we believe that they will install an opposite stop, but this is not reported. Otherwise, this is not competitive.

*It is important to note that CTTransit will only have one westbound stop within our zone of operation. It is imperative to understand that drop-offs by CTTransit on any westbound trip with in the City of Norwalk would be considered a violation of our agreement. The extent of this action is difficult to ascertain from the data.

Norwalk Community College

- The location mentioned for improvement in this report was indeed our old bus stop. "N.C.C. had it taken down due to traffic congestion and safety and wanted ALL students to get on and off inside the West Campus... when the buses were stopped there it posed a safety risk for vehicles making a left-hand turn out of the N.C.C. parking lot onto Richards Ave."

In Figure 5, all modifications are concentrated along the eastbound route:

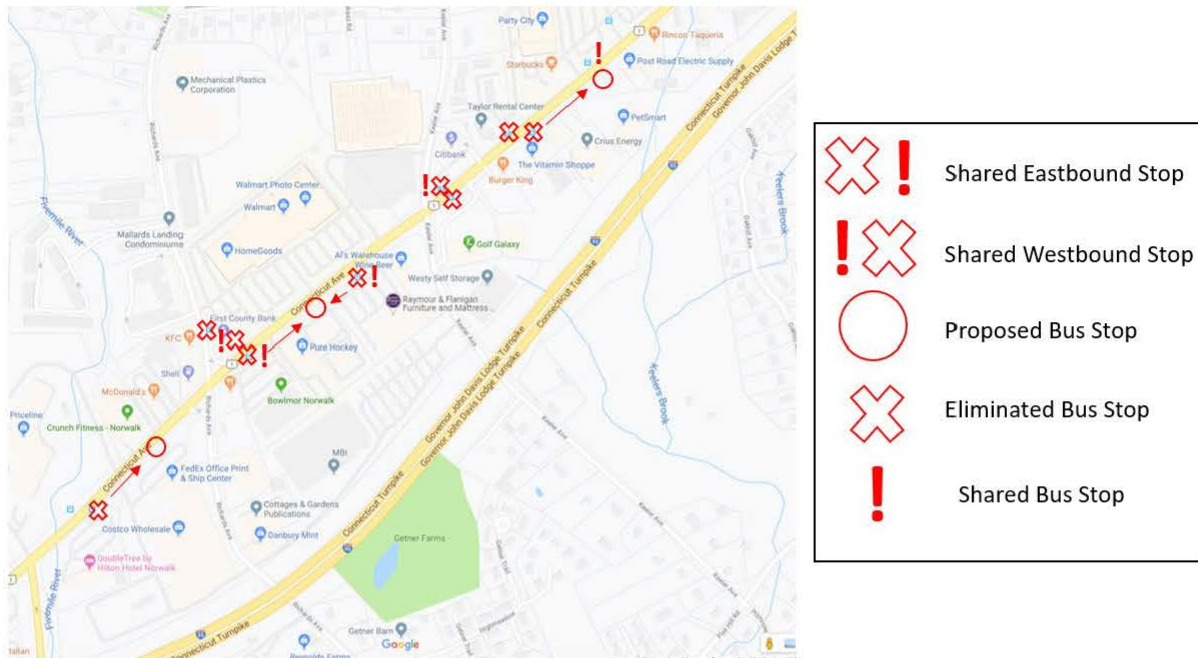


Figure 5: CTTransit Modifications

From this figure, it is evident that CTTransit is consolidating bus stops from 5 eastbound stops to 3 and all 4 westbound stops to 0. CTTransit operates more stops further down Conn Ave. as seen Figures 3 & 4; however, these are where the modifications are concentrated. The only westbound bus stop in this zone is the CTTransit Route 345 Bus Stop at Walmart. There is no westbound stop for the proposed for the Kohl's plaza.

Additionally, there are several bus stops that CTTransit and NTD share. If the additional bus stops are built to serve as only eastbound drop-off areas and westbound pick-up areas, then there is no threat of competition.

Lastly, the report includes bus stop enhancements for locations with high ridership. It should be noted that bus shelters should not be erected in our service area as we have a contract with Signal Outdoor. Norwalk Transit District would be more than happy to work with the parties to ensure that shelters are erected in locations desired that will be mutually beneficial to all parties.

Conclusion

CTTransit reports data pertaining to pickups and drop-offs within our operating zone. If the agreement is for 0 eastbound pick-ups and 0 westbound drop-offs, then there is a breach in the agreement as CTTransit Route 341 directly competes with NTD's Route 13, 11, and Conn Ave. Line. There are many shared stops within our operating zone. The proposed modifications include large consolidation of many bus stops centered on nearby amenities such as Walmart and the Kohl's Plaza. Although not specifically directed at the NTD, the recommendations offered within the report can also benefit NTD. Many NTD routes are highly saturated with bus stops. If CTTransit plans on creating more bus stops with significant improvements near NTD stops, we will require full disclosure and open communication to ensure shelters in our service area are discussed in full compliance with our existing shelter advertising contracts and that they serve equally the mutual needs of the Norwalk Transit District and CTTransit. Improving rider's quality of service with enhanced shelters and benches will increase ridership and assist with ridership retention.

We look forward, as we have in past, to work cooperatively on projects that impact the needs of the riding public across service boundaries.

Respectfully submitted,

Kimberlee A. Morton

Kimberlee A. Morton
Chief Executive Officer

CC: Britt Liotta, Chief Operating Officer
Matt Abbott, Manager of Planning